Graduate Affairs Committee
November 25, 2003
3:30 p.m. - 5:00 p.m.
UL 1126

AGENDA

1. Approval of the minutes for October 28, 2003 ..... Queener
2. Associate Dean's Report ..... Queener
3. IU Dean's Remarks…….. Slattery
4. Purdue Dean's Report ..... Story
5. GSO Report ..... Carroll
6. Graduate Office Report ..... Koerner
7. Committee Business
    a. Fellowship Subcommittee ..... Koerner
    b. Curriculum Subcommittee ..... O'Palka
8. Program Approval ..... Queener
    a. Social Work Minor
    b. LL.M. Track Proposal – Masters of International and Comparative Law
    c. Nursing Informatics Graduate Certificate
    d. Reorganization – Ph.D. in Medical Biophysics
9. Discussion ..... Queener
    a. Performance Indicators ..... Borden
10. New Business……
11. Next Meeting (January 27) and adjournment

Graduate Affairs Committee
November 25,2003
Minutes

Present: Margaret Adamek, William Bosron, Daniel Callison, Jeffrey Grove, Ain Haas, Marvin Kemple, Joyce MacKinnon, Chris Miller, Debra Mesch, Nasser Paydar, Douglas Perry, Sherry Queener (co-chair), Pat Rogan, Sharon Sims, John Story (Purdue), Joanne Warner, Kathryn Wilson, Marianne Wokeck, Frank Emmert, Chip Montrose and Dean John Slattery (IU Bloomington), Gail Vance

Staff: David Koerner

Approval of the minutes - Dr. Queener
The October 28rd, 2003 minutes were approved by the committee.

Associate Dean's Report – Dr. Queener
The Graduate Student Open House has been set for February 4th – 6th, 2004.

GND fees – GND student who are taking undergraduate courses as pre-requisites will be billed as graduate students. A number of departments have concerns about this change. We are continuing to be involved in discussions on this issue.

This is Nassar Paydar's last meeting for the GAC. Nassar has been involved for nineteen semesters and we thank him for his contributions.

IU Dean's Report – Dr. John Slattery

Dr. Slattery met with the Faculty Council. He is interested in facilitating cooperative relationships between IUB and IUPUI. There are a number of issues to pursue:

NCR rankings and how to handle the NCR ranking. We want to develop a plan and present it to NCR and have them accept the plan we develop. Each campus is individually accredited.

Preparing Future Faculty program – working more closely with IUPUI and IUB.

Dr. Slattery will be at IUPUI at least one day per week.

Questions for the Dean from Committee Members:

Teaching Fellowships available at IUB be available at IUPUI. We would like to see this operate as homogenous as possible.

NCR ranking is incredibly important to IUPUI. Anything that can be done to insure an accurate report is critical.

There are a number of Purdue programs at IUPUI. Although students take all of their coursework at IUPUI, Purdue receives credit for the student/graduation. Would like to be looked at in the future. Agree that we have to find a way to get credit for what a school produces.

Purdue Dean's Report - Jon Story

Task Force on examining P&P for PWL should begin before Christmas.

Certification of Faculty is another task force that is being formed at Purdue. Dr. Slattery has experience with certification of faculty from his former institution. He would like to look at how faculty are certified at IUPUI and how we look at new program proposals which could involve an internal review group and two external reviewers. Dr. Slattery is aware of the current process, he would like to create an identity for the Graduate School that is the University rather than IUB. Dr. Slattery has some thoughts on the process and will be bringing ideas forward in the future.

This year is the 75th anniversary of the Purdue Graduate School. Events are being planned for spring semester. Events may include seminars/speakers concerning graduate education.

GSO Report – Michelle Carroll
No report

Graduate Office Report – David Koerner
The Graduate Office will be closed on Thanksgiving and the day after.

The Graduate Office will close at 3:00 PM on Wednesday, Dec. 24th and will reopen at 8:00 AM on Friday, January 2nd, 2004.

Committee Business

Fellowship Subcommittee Report – David Koerner

The 2004 Block Grant applications are due by 5:00 PM on Monday, December 1, 2003.

The applications for the 2004 University Fellowship have been sent out to the departments. Additional copies are available at the meeting if you did not receive one or want a hard copy. The deadline for the 2004 University Fellowship applications is Friday, February 20, 2004 at 5:00 PM.

Tuition Remission needs to be done for Spring Semester.

Curriculum Subcommittee Report

Approved Course Summary approved by the committee.

Program Approval – Dr. Queener

Social Work Minor

The Social Work Minor is based on reorganization of courses for Social Work Masters and additional coursework developed for the PhD. The change involves the list of courses not the Graduate School policy (12 credit hours and completion of S730 and S740). Reviews suggest accepting the minor with revisions. Specifically, which course would be appropriate for the PhD minor; outline basic curricula for minor.

The PhD Curriculum committee in the School of Social Work will consider the comments of the reviewers. The proposed minor incorporates the approved courses already approved by the GAC. The PhD curriculum committee would like to have "maximum flexibility" for the student with the PhD program director and faculty advisor.

One of the concerns is the heavy practice and skill component. One of the reviewers, would like to see the minor be more content oriented rather than skill development.

Graduate School Bulletin allows students to transfer in 30 credit hours. The School of Social Work allows 15 hours in the area of research; 6 hours which must be in statistics (one of which must have been taken in the last three years). The School looks for applicants with research experience. Some students need to take research courses if they are deficient in the area of research.

Approve the minor in principle incorporating the comments from the reviewers.

LLM Track Proposal – Masters of International and Comparative Law

This new track would attract both domestic and international students, both full-time and part-time students. Reviewers had questions about TOEFL scores, transfer of credits, thesis committee structure. The reviewers had some suggestions for the rationale for the program.

TOEFL requirement of 550 is low for graduate level courses. Looking at the current cohort of students, suggest that it might be worthwhile to elevate the TOEFL requirement. At the present time, the Law School has ESL classes/faculty working with students who have a lower TOEFL score. In the future, the Law School may increase their TOEFL score requirement. It was suggest that 600 be a suggested score, allowing applicants with a lower score the opportunity to apply.

Re: Transfer of credits – consider limit of transfer credits. Since this is a new program, the Law School would like to have some flexibility concerning transfer credit. The Law

School would be exempt from the Graduate School policy for transfer credits since it is a degree program in a professional school. The GAC would like to see some language concerning a limit of transfer credit.

The proposal states that part-time students should complete their course of study in 3 years. The Graduate School policy is 5 years. Their was some concern about the rationale for this decision. Members of the committee suggested that the written policy be five years which allows for some flexibility. The track could be completed in three years however.

Motion to approval the Masters in International and Comparative Law Track. Dr. Queener asked the Law School to send the revisions for the official record.

Nursing Informatics Graduate Certificate

Reviewer comments: Accept without revisions and also to accept with revisions. One suggestion was to include definitions such as Nursing Informatics and on-line threaded discussions.

Sharon Farley from Nursing would like to challenge an assumption of the reviewers suggesting that graduate level discussion is not possible on-line. Their current experience is that that is not accurate. Nursing faculty has been pleased with the quality and quantity of discussions that they have had on-line.

School of Nursing recognizes that some students do not have a need for graduate credit but are interested in CEU credit. Need to clarify "contact hours". Question from committee member who is interested in contact hours vs. graduate credit? Perhaps defining target audience would address this concern.

Motion to approve the Nursing Informatics Certificate Program.

Reorganization – PhD in Medical Biophysics to Biomolecular Imaging

After reviewing the comments made by the curriculum committee, the department proposes a change in the curriculum to include an introductory course in biophysics, when appropriate; the department also looked at the Biophysical Society website to assess the correct name for the department/major compared to other degree programs; and propose a review of the program after 3 years to determine if it is meeting their stated goals. The current program director, Dr. Chip Montrose will be leaving the university and Dr. William Bosron will assume the interim leadership of the program.

The GAC committee is concerned about the marketing of this degree program to attract the right type of student to this degree program. There is a more traditional biophysics

program of study at Bloomington compared to this degree program.. The concern is getting the right students into the program. Perhaps something on the website and links to other programs may help attract the right student to the program.

Motion to approve the Biomolecular Imanging degree.

Discussion

Performance Indicators – Vic Borden

Vic Borden distributed documents that show the current type of performance indicator information that is available. He is wanting feedback from the committee on accuracy and the quality of the information. He would like feedback via email.

Members of the committee questioned where this initiative was coming from.
Vic described how this initiative fit into the larger campus initiative supported by the Chancellor.

Vic shared that up to this point the collection of data has been as unobtrusive as possible. In the future, more involvement will be needed to get to the data. Some data may be kept at the department level vs. a central data source. Due to the decentralized process of admission, the information available may not be accurate.

Dean Slattery suggests that someone from Purdue and IU Bloomington be part of the group that is looking at these indicators. GAC will identify a group to work with Vic to come up with indicators.

New Business

No New Business

Next meeting date

Tuesday, January 27, 2004

Meeting adjourned at 5:15 PM

APPROVED
COURSE SUMMARY
November 25, 2003

COURSE CHANGE REQUESTS

School of Continuing Studies

ACE D506 The Adult as a Client of Education 2 3 Credits

Change title to: Adult Education Planning and Development
Change description to: Investigate the theory and research of program planning and development for adults, including processes used to develop educational programs in various settings. Topics include needs assessment, program design and development, implementation, and evaluation.

Justification: New title and description more accurately reflect the nature of the course and the content covered.

ACE D600 Seminar in the Teaching-Learning Transaction in Adult Education 3 Credits

Change title to: The Teaching-Learning Transaction in Adult Education
Change description to: P: D505, D512, or consent of instructor. Critical inquiry into the design of adult learning activities. Includes a review of current theory and research in the teaching-learning transaction and the designing and evaluating of instruction for adults.

Justification: New title and description more accurately reflects material covered and prerequisites needed.

NEW COURSE REQUEST

School of Nursing

NURS I579 Nursing Informatics Practicum 3 Credits

This course provides an opportunity for the learner to synthesize all previous coursework and to demonstrate beginning competency in Nursing Informatics. The course employs an application focus in which the learner demonstrates comprehension, critical thinking, and problem-solving abilities within the context of a real-world environment.

Justification: New Master's Elective

NURS I630 Introduction to Nursing Informatics 3 Credits

Introduction to the field of nursing informatics, current state of the science, major issues for research and development. Includes theoretical models of nursing informatics; nursing roles; information processing and data management; data acquisition and data representation; information system standards system architecture and networking; evaluation; and ethical / social issues in healthcare informatics.

Justification: New Masters / PhD elective

NURS I631 Clinical Information Systems 3 Credits

Clinical Information systems includes; human computer interface and system design; healthcare decision support and clinical guidelines; system selection; organizational issues in system integration; project management for information technology change; system evaluation; regulatory policies; impact of the Internet; economic impacts of e-health; distributed healthcare information technologies and future trends.

Justification: New elective for Masters / PhD

NURS I635 Consumer Health Informatics 3 Credits
Topics include theoretical models for the delivery of consumer health information; Internet-based information delivery access to patient information and privacy issues; quality of consumers health information health literacy; design and development of consumer health information resources; consumer access to clinical information and current research.

Justification: New Master's / PhD elective

School of Social Work

SWK S724 Theory, Practice and Assessment of Social Work Teaching 3 Credits
This course prepares doctoral students to effectively and competently teach social work courses. Content includes teaching philosophies; curriculum and syllabus development; teaching methods; technology related to teaching; assessment, testing, evaluation of students and research related teaching.

Justification: See attached

Memorandum

To: Sherry Queener, Associate Dean, Graduate School

CC: Marion Wagner, Executive Director of MSW Programs

From: Margaret Adamek, PhD Program Director

Date: 6/28/2007

Re: Approval sought for new slate of Social Work minor courses

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The School of Social Work recently revised the entire curriculum for our Masters in Social Work program. The revised course numbers, titles, and objectives have been approved through the University. We are requesting approval through the Graduate School for the attached list of courses to be eligible as external minor courses for doctoral students seeking to complete an external minor in Social Work.

In addition, we have two new doctoral courses that did not appear in the 2002-04 Graduate School bulletin but that are also available as minor courses. Both courses have been approved through the Graduate School. A list of these courses is also attached.

June 28, 2007

Social Work Masters Courses Eligible for an External Minor

IU School of Social Work
2003-04

S501 Professional Social Work at the Masters Level: An Immersion (3 cr.) This foundation course provides an overview of social work, including the definition, scope, history, ethics and values of the profession. This course will provide basic orientation to the available resources and expectations of graduate education in general, and the M.S.W. program, in particular, all within the framework of the adult learner model. Students will develop basic communication, self-assessment, and reflection skills necessary for success in the M.S.W. program. Students will have an opportunity to survey various fields of practice and will begin to identify personal learning goals for their M.S.W. education as well as develop a commitment to lifelong learning as a part of professional practice.

S502 Research I (3 cr.) This foundation research course assists students in developing the knowledge, skills, and values necessary to evaluate the effectiveness of social work practice. Emphasis is placed on knowledge of qualitative and quantitative designs, methodologies, and techniques that inform students of best practices in social work. Students will recognize the impact of ethnicity, gender, age, and sexual orientation on the research process and be able to critically review published studies with attention to researcher bias.

S503 Human Behavior in the Social Environment I (3 cr.) This course provides content on the reciprocal relationships between human behavior and social environments. It includes empirically based theories and knowledge that focus on the interactions between and within diverse populations of individuals, groups, families, organizations, communities, societal institutions, and global systems. Knowledge of biological, psychological, sociological, cultural, and spiritual development across the lifespan is included. Students learn to analyze critically micro and macro theories and explore ways in which theories can be used to structure professional activities. Concepts such as person-in-environment are used to examine the ways in which social systems promote or deter human well-being and social and economic justice.

S504 Professional Practice Skills I (3 cr.) This foundation practice course focuses on basic generalist theory and skills that are necessary when working with a wide variety of client systems: individuals, families, small groups, communities, and organizations. Students are expected to demonstrate competent use of the following skills: attending, establishing rapport, reflecting, summarizing, exploring, questioning, contracting, and establishing clear well-formed goals. In this course students will have opportunities to continue learning about themselves and will examine their personal values and any conflict between personal and professional values so the professional practice standards can be upheld.

S505 Social Policy Analysis and Practice (3 cr.) This foundation policy course will focus on using several policy analysis frameworks to analyze current social policies and programs both at the state and federal levels and to develop policies that increase social and economic justice. Students will be expected to develop a range of policy practice skills to influence policy development within legislative, administrative, community, political, and economic arenas.

S513 Human Behavior and the Social Environment II (3 cr.) (variable title) This course builds upon S503 and focuses on developing further knowledge of human behavior theories and their application to practice. Students will link course content to the concentration that the student has selected.

S514 Practice with Individuals and Families I (3 cr.) This course builds on the practice theories, principles, and skills introduced in S504 to prepare students for competent social work practice with individuals and families. A strengths perspective will be emphasized, and students will be introduced to the fundamental components of the task-centered and solution-focused approaches to practice. The transtheoretical model of change will be presented, and students will develop skills which will empower

individuals and families to engage in the process of change. Students will be prepared to complete assessments and to use intervention skills that will serve diverse populations with specific attention to gender, class, race and ethnicity.

S515 Social Policy and Services II (Variable Title) (3 cr.)
A group of courses covering topics or content including social problems, special populations, particular social service delivery areas, and social indicators that predict areas of future social policy transformations.

S516 Practice with Organizations, Communities and Societies II (cr.)
This course is concerned with helping communities and other social units to empower themselves and eradicate oppressive situations and practices through networking, political participation, leadership development, mobilization, utilization of resources, and other strategies and techniques.

S600 Intermediate Statistics for Social Work (3 cr.) The intent of this course is for students to acquire an understanding of basic and intermediate statistical analyses that are used in the social sciences, the concepts and uses related to those statistics, and to be able to use a decision-making framework for selecting and computing appropriate statistical techniques for data analysis. The course content will assist students in developing knowledge and skill in selecting appropriate statistics to compute from a variety of basic univariate and bivariate statistics. Students will learn selected parametric and non-parametric statistics to examine research problems. Included in the learning process are hand computations of statistics, development of skills in using a comprehensive computer statistics package, and selection of statistical techniques based on levels of measurement and analyses of the assumptions of statistics.

S623 Practice Research Integrative Seminar I (3 cr.) (variable title) This course furthers the knowledge, skills, and values students develop in the foundation-year research course. Students will apply their knowledge and skills in research to evaluate practice or program effectiveness in their concentrations, using research methods that are sensitive to consumers' needs and clients' race, ethnicity, gender, sexual orientation, and additional aspects important to effective and ethnicity research.

S632 Child Welfare Practice I: Working with Children Impacted by Violence in the Family (3 cr.) This course is designed to provide practice skills for students working with children and families impacted by abuse, neglect or family violence. The course is designed to cover the scope, causes, and consequences of child physical, emotional, and sexual abuse and neglect and applications of this knowledge in a wide range of settings that deal with children and families as well as formal child protection services. Students will learn about the dynamics and indicators of maltreatments, etiology of child abuse and neglect, assessing risk, the continuum of intervention from prevention through intervention and future planning, out-of-home placement considerations, and the issues impacting particular oppressed and underserved populations. The focus of this course will be on how to work effectively with clients to achieve the goals of safety, permanency, and well-being.

S633 Child Welfare Practice II: Working with Diverse and Transitioning Families (3 cr.) This course will focus on the experiences of children and families in the child welfare system. Content will include interventions with families through all stages of change including preparation for change, separation and loss, the changed family system, reintegration as children transition into a family, and adolescents transitioning into independent living. Content will include the impact on families when the natural cycle of family development is disrupted. Special consideration will be given to various family types including

adoptive, foster care, kinship, extended, single parent, multigenerational, and homosexual families. Practice content will emphasize strengths based and family-centered approaches and include knowledge and skill development to help children and families work through their family and personal crisis and grief in a timely manner to achieve permanency for children in safe and nurturing environments within 12 months after separation.

S634 Community-Based Practice with Children and Families (3 cr.) This course will examine the development and implementation of a wide range of prevention and intervention strategies provided at the community level. Special attention will be given to the philosophy of empowerment-oriented and client-driven service models. The course will explore the community as a resource and discuss strategies of collaboration and advocacy to enhance the well-being of children and families. Issues explored will include services for families and children to prevent out-of-home placement or involvement in other formal child protection/ juvenile justice services, such as models of community-building, youth development, and family group conferencing/ restorative justice. This course will also provide content on mutual aid and self-help groups to support and educate children and families on issues such as parenting, domestic violence, and abuse.

S661 Executive Leadership Practice (3 cr.) (variable title) This course addresses administrative, management, leadership, and supervisory skills necessary for leadership practice. Included are staff hiring, supervision, evaluation, and termination; working with boards and volunteers, leadership styles, strategic planning, and current best practices in administration.

S662 Fiscal Management, Marketing and Resource Development (3 cr.) This course consists of three modules designed to develop core skills in fiscal management (including issues of budgeting, understanding balance sheets, audits, and theories of accounting); resource development (including fund raising, grant writing, and personnel policies), and marketing for social work leaders.

S663 Leveraging Organizations, Communities, and Political Systems (3 cr.) This course focuses on the knowledge and skills essential for understanding, analyzing, and application in organizations, communities, and political arenas. Such knowledge and skills include, but are not limited to: organizational theories, structures, and processes; examination and application of rural, urban and virtual community models, themes and practices; and understanding and involvement in political, social action, and social change interventions and empowerment practices.

S665 Designing Transformational Programs (3 cr.) This course focuses on alternative, transformational models of strategic, community, and program planning. Featured development models center on collaboration, cultural competence, empowerment, and social justice. The course will address advanced grant writing, identification of funding and other resources, and philanthropic trends within a variety of social service delivery systems. It will move beyond a focus on the technology of program development, to examine planning as a vehicle for designing organizational, community, and social change.

S672 Families, Theories, and Culture (3 cr.) This course is designed to enhance student ability to assess and intervene with families in a culturally sensitive way from a strengths-oriented perspective. It examines the cultural context of families from a multidimensional perspective including race, ethnicity, age, gender, sexual orientation, religion, education, economics, and regional background. This course overviews the major theories of family intervention and discusses how students can apply family theory into practice situations.

S673 Couples and Families Interventions I (3 cr.) This course provides in-depth discussion of ways to intervene with individuals on family-of-origin issues, couples at different stages of family development, parents with children at different ages, and the family as part of a larger social context utilizing a strengths perspective.

S674 Couples and Family Interventions II (3 cr.) This course emphasizes family interventions on a variety of family challenges often seen in family agencies (substance abuse, violence, physical illness, mental illness, family life cycle disruption, etc.). The course reviews assessment and intervention strategies and how to build skills with a variety of family issues.

S682 Assessment in Mental Health and Addictions (3cr.) Recognizing the social, political, legal, and ethical implications of assessment, students enrolled in this course critically examine various conceptual frameworks and apply bio-psychosocial and strengths perspectives to understand its multidimensional aspects. Students learn to conduct sophisticated mental status and lethality risk interviews, engage in strengths and assets discovery, and apply the Diagnostic and Statistical Manual of the American Psychiatric Association and other classification schemes in formulating assessment hypotheses. They gain an understanding of the application of several relevant assessment instruments and learn to evaluate their relevance for service to at-risk populations, including persons affected by mental health and addictions issues. Students learn to collaborate with a diverse range of consumers and other professionals in developing meaningful assessments upon which to plan goals, intervention strategies, and means for evaluation.

S683 Community-Based Practice in Mental Health and Addiction (3 cr.) Students enrolled in this course examine a wide range of community-based services provided for people with severe mental illness and/ or severe addiction problems. Special attention is given to strength-based, client-driven, and evidence-based practice models. Content includes community-based services in areas of case management, employment, housing, illness management, family, dual disorder treatment, and consumer self-help. Students also examine a variety of issues involved in the provision of community-based services such as ethical and legal issues, quality and continuity of care, cultural competency, organizational and financial factors, and other relevant policy and practice issues.

S685 Mental Health and Addictions Practice with Individuals and Families (3 cr.) Students enrolled in this course develop knowledge, values and ethics, skills, and judgment necessary for competent application of selected evidence based, best practice approaches for service for children, youth, adults, and families affected by mental health and addictions issues. Students explore topics such as risk and resilience, recovery, and relapse prevention, and consider implications of current social and policy factors affecting service delivery to persons affected by mental health and addictions issues. Students learn to discover, analyze, synthesize, and evaluate evidence of practice effectiveness and apply that knowledge in communication, strengths discovery and assessment, hypothesis formation, contracting, intervention and prevention planning, service delivery, and evaluation. Students develop professional understanding and expertise in the application of at least one evidence-based approach for service to individuals and families affected by at least one specific mental health or addictions issues.

S686 Social Work Practice: Addictions (3 cr.) The purpose of this course is to provide learners with knowledge and skills relevant to various aspects of social work practice in prevention, intervention, and treatment of selected addictions. Students draw upon previous and concurrent learning experiences and integrate values, knowledge, and skills acquired in other social work courses with the values, knowledge, and skills characteristic of addictions practice. The course assists students to develop a multidimensional

understanding of prevention, intervention, and treatment needs of diverse populations and associated social work practice principles, methods, and skills. Students explore the relationships between and among addiction and socioeconomic status, race, ethnicity, culture, religion, gender, sexual orientation, age, physical and mental ability, and other socio-environmental factors of vulnerability. Consistent with strengths and ecosystems perspectives, students consider the impact of social environments, physical settings, community contexts, and political realities that support or inhibit the emergence of addiction problems.

S687 Mental Health and Addiction Practice with Groups (3 cr.) Students enrolled in this course develop professional knowledge and skills for group work services to persons affected by mental health and addictions issues. The phases of group development and intervention during the various group work stages provide a conceptual framework for the course experience. Students learn to serve children, youth, adults and families in groups that are therapeutic, growth producing and life enhancing. Students examine a number of theoretical perspectives, including cognitive behavioral, communications, behavioral, and interpersonal approaches.

S692 Health Care Practice I (3 cr.) This course will focus on the role of the social worker in a health care setting. Issues such as team building, professional identity, patient advocacy, ethics and managed care will be addressed. Also, the impact of health care payment sources and health care choices for patients will be explored.

S693 Health Care Practice II (3 cr.) This course will examine the psychosocial impact of illnesses. Areas such as coping with chronic illness, caregiver stress, grieving and loss, medical ethics and violence as a health care issue will be examined. The needs of at-risk populations (i.e., children, survivors of sexual assault and domestic violence, frail elderly, individuals living with HIV/ AIDS, etc.) will be addressed.

S690 Independent Study (1-6 cr.) An opportunity to engage in a self-directed study of an area related to the school' s curriculum in which no formal course is available. (In order to enroll in S690, approval from an academic advisor and the director of the M.S.W. program is required.)

S600 Electives Vary in subject matter. Scheduling of these courses will be announced prior to semester registration.

June 28, 2007

New PhD Courses in Social Work

IU School of Social Work
2002-2003

S724 Theory, Practice, and Assessment of Social Work Teaching (3 cr.) This course prepares doctoral students to effectively and competently teach social work courses. Content includes teaching philosophies; curriculum and syllabus development; teaching methods; technology related to teaching; assessment, testing, evaluation of students; and research related to teaching. Students will learn accreditation standards for bachelors and masters social work education. Course goals will be accomplished using readings, written assignments, guest speakers, demonstrations of teaching, and class discussion.

S728 Advanced Statistics for Social Work (3 cr.) Students in this course learn how to evaluate statistical assumptions and select, compute, and substantively interpret a variety of multivariate statistics, using SPSS to analyze actual social work research data. Online resources, WEB-based materials, and model applications of the statistics support students' learning. *Prerequisite: S600-Intermediate Statistics for Social Work.*

Outline for Reviewers Comments

Review of Proposal for PhD Social Work Minor

Documents reviewed:
Social Work Masters Courses Eligible for an External Minor (2003-2004)
New PhD Courses in Social Work (2002-2003)

Summary:
The review consisted of reading each of the course descriptions eligible for a PhD external minor. Not all of the courses required for an MSW are appropriate for an external minor.

Recommendation: **provide reasoned recommendations for particular courses (core and electives) and sequencing in the minor**

Accept without revision
Accept with discussed revisions X
Defer, pending extensive revisions
Not accepted

Discussion:
The MSW places a lot of emphasis on honing basic research skills—understandable in a field in which students have close contact with the practical side of their professional world. For students in fields that have a more traditional emphasis on theory and practice (including the Ph.D. in Philanthropic Studies which builds on the conventions common in research-intensive fields such as history and sociology). For an external minor the content (or social work practice) intensive course are more appropriate than the research skill type of course. The program should have a prescribed, or at least recommended, sequence of courses, divided in core (for the field as a whole MA grads and PhD minors) and electives that can be differentiated by "track" depending on the PhD focus, thereby giving students who need the extra help with research skills a choice but not forcing already sufficiently trained students to repeat unnecessarily. For the latter type of student a greater emphasis on content (including rigorous theory and practice) is more useful in expanding their knowledge and integrating it into the areas of their own interests and specializations.

Indiana University School of Nursing

Proposal for a Certificate Program in Nursing Informatics

Nursing Informatics

Introduction

The emergence of nursing informatics as a discipline is due in large part to advances in computing and communications technology, to an increasing awareness that nursing knowledge and clinical information about patients has become increasingly difficult to manage by traditional paper-based methods, and to a growing conviction that the processes of knowledge retrieval and expert decision making are as important to nursing as the fact base on which clinical decisions or research plans are made.

In addition, the emerging presence of patients as consumers of health information resources presents an important opportunity for nursing to understand how to best utilize these technology-based approaches to support consumers' healthcare decision-making and enhanced healthcare outcomes.

The purpose for development of a certificate program in Nursing Informatics is two fold:

1. To meet the educational needs of nurses who want to expand their current knowledge base or develop new skills in nursing informatics.
2. To meet the growing needs of clinical enterprises that are seeking nurses to fulfill roles in clinical and consumer roles.

Rationale for a certificate program in Nursing Informatics

Healthcare is a trillion dollar industry and with the advancement of Internet technologies and the application of information systems to the delivery of care, more and more focus is being placed on the emerging discipline of nursing and healthcare informatics. There is significant interest in both industry and academia in advancing the field of nursing informatics. Industry is looking for nurses who are information specialists and who can improve the process of care. Academia is looking for advancement in research on the application of information technologies to patient care delivery. This certificate program has been developed to meet the need for nurses with educational preparation in informatics.

The evolution of the program with a certificate focus would take advantage of the unique, expertise, resources and interest present on the IUPUI Campus and at the Indiana University School of Nursing. Online delivery of the required courses would provide an opportunity for sharing of student and faculty expertise in a distance-learning framework of focused study. The proposed certificate program should provide students with the beginning knowledge and skills needed to launch a career in Nursing Informatics and should serve as initial preparation for the ANCC Certification in Nursing Informatics. In addition, the proposed certificate program would also afford IU School of Nursing Master's Degree Students who are interested in informatics, with an opportunity to include the nursing informatics courses in their program of study as a focus area.

Courses in Nursing Informatics could be offered for academic credit as well as contact hours to meet the needs of professional nurses who are seeking nursing informatics content but who are not currently interested in pursuing an academic degree. The opportunity to offer these courses

to both audiences would provide Indiana University with the unique ability to reach a diverse audience and meet a growing need for Nursing Informatics learning opportunities for non-traditional learners. At present, no other Nursing Informatics certificate programs exists that offers the opportunity for learners to choose academic credits or contact hours.

Target audience and expected enrollment:

It is anticipated that 10 – 15 students will take part in this program during the first year. Because this will one of only a few distance-learning program in Nursing Informatics offered in the United States, it is anticipated that enrollment figures will double or triple within two years after initiation of the program. To date, two of the new courses have been offered and both were filled with no marketing outside the IUPUI campus.

Required resources:

All required courses will be taught using distance-learning technologies. Support for, and faculty access to, needed resources will be provided by the School of Nursing. No additional resources are required.

Program Director:

The Associate Dean for Graduate Studies for the School of Nursing will serve as the program director.

Proposal development:

Anna M. McDaniel, DNS RN, Associate Professor of Nursing prepared the proposal.

Proposed date of initiation of the certificate program

Pending approval of the certificate program.

Admissions requirements and procedures:

To be admitted to the certificate program, students must have a Baccalaureate degree from an accredited institution, with a minimum GPA of 3.0. Appropriate work experience also will be taken into account in making decisions about admission. Students will be required to submit a statement of interest and three letters of recommendation. Students already admitted into Indiana University School of Nursing graduate program are automatically eligible to earn a certificate. Such students must declare their participation in the degree program and also submit a statement of interest.

Minimum overall GPA:

Students will be required to receive a final overall grade point average of 3.0 or better to be awarded the certificate. The minimum grade that will be accepted in any single course is B-.

Maximum number of credits that can be transferred from another institution:

A maximum of 3 credit hours of appropriate graduate course work at another institution may be transferred to Indiana University to apply to the certificate. The faculty that

oversees the program will approve all transfers. No undergraduate courses can be applied to this certificate program.

Maximum time for completion:

Maximum time for program completion is ~~four~~ two years as changes in this field and its underlying technology are rapid. Because continuity in the program allows better reinforcement of principles and course concepts, students who have been admitted to the program are expected to remain enrolled in course work with no significant breaks (i.e. more than two semesters) between courses. Most students enrolled in this program will be part-time students, employed full-time. Thus ~~four~~ two years may be needed for the completion of all courses if students take one course per semester.

Number of credit hours taken prior to admission to the certificate program that may be counted to completion of the degree:

There is no limit to the number of graduate courses that can be taken prior to admission to the certificate program, provided that all course work is completed within a ~~four~~two-year period of the first course toward the certificate.

Program evaluation

Evaluation of this program will be conducted through course evaluations and follow-up surveys with course participants.

Program Goals

Nursing informatics is a nursing specialty that draws from computer science, information science, the cognitive and decision sciences, and nursing science. Students in nursing informatics gain knowledge and skills to enhance patient-care delivery, promote consumer health, utilize nursing research, and provide education through information technology. Completion of the certificate program fulfills the educational requirements for eligibility for the AACN certification as Informatics Nurses.

The core areas of study are:

System Design, Development and Evaluation: Understanding the process of system design, selection, implementation, and evaluation. Includes human-computer interface factors and principles of organizational change management.

~~Standardized languages, Coding and classification: Storage and retrieval of healthcare information is an essential function to support clinical and financial operations. Effective access to current literature and retrieval of healthcare information contribute to clinical decisions and support lifelong professional education. Relevant resources include MEDLINE and other relevant bibliographic databases. Coding schemes include: NANDA, NIC, NOC, Omaha Classification, ICD-9, CPT, UMLS, Sno-Med, READ and others.~~

Structured and Unstructured Data collection and management: This deals with the creation and management of the electronic patient record and support of the wide-ranging functions of the patient care enterprise. Systems may include administrative, financial and clinical functionality across distributed healthcare environments. Includes principles of database design and use.

Analysis of c~~Some of the r~~urrent~~elevant~~ standards ~~here~~ such as~~include~~: NMDS NIDSEC, HL7, CORBA med.

Standardized languages, Coding and classification: Storage and retrieval of healthcare information is an essential function to support clinical and financial operations. Effective access to current literature and retrieval of healthcare information contribute to clinical decisions and support lifelong professional education. Relevant resources include MEDLINE and other relevant bibliographic databases. Coding schemes include: NANDA, NIC, NOC, Omaha Classification, ICD 9, CPT, UMLS, Sno-Med, READ and others.

Clinical Decision Support: This deals with providing automated mechanisms for providing support for clinical decision-making. Decision-support may take the form of adverse event monitoring, clinical care reminders, or simple scheduling support.

~~System Design, Development and Evaluation: Understanding the process of system design, selection, implementation, and evaluation. Would also include human-computer interface factors and principles of organizational change management.~~

Ethics, Public Health and Health Policy: Dissemination of health information across distributed systems that support health promotion efforts and consumer health education. Development of policies to safeguard access to health information and to ensure information security, accessibility, and quality. And the social impact of information transfer and the Internet on health care choices and healthcare decision-making.

Development of four new courses in Nursing Informatics

Four new courses are described as part of this proposal. These courses are key to the development of the certificate program and are consistent with the competencies described in the American Nurses Association Scope and Standards for Nursing Informatics Practice. Three new courses form the certificate program core and the fourth is an elective. Because the focus of the three core courses is nursing informatics these courses do not duplicate any existing courses offered at Indiana University. Each of the proposed new courses is described in detail in the next section. Students enrolled in other programs at IU could consider any of these courses. Consumer Health Informatics will be developed with a broad multi-disciplinary perspective.

Core Courses:	Introduction to Nursing Informatics Clinical Information Systems Nursing Informatics Practicum
Elective Course:	Consumer Health Informatics

Sequence of Courses

Spring	Introduction to Nursing Informatics	3 credits
Fall	Clinical Information Systems	3 credits
Spring	Nursing Informatics Elective	3 credits
Summer/Fall	Nursing Informatics Practicum	3 credits

12 credits

Curriculum

Nursing Informatics

The certificate (12 credit hours) would require three core courses and an additional elective selected by the learner from a list of recommended courses. The three required courses are described and suggested electives follow. Proposed course syllabi for new and existing courses follow the brief descriptions.

Core Courses:

Introduction to Nursing Informatics 3 credits
Delivered as an online course and offered during the spring semester.
Prerequisite: None

Introduction to the field of nursing informatics, current state of the science, and major issues for research and development. Includes theoretical models of nursing informatics; nursing roles; information processing and data management; data acquisition and data representation; information system standards system architecture and networking; evaluation; and ethical/social issues in healthcare informatics.

Clinical Information Systems 3 credits
Delivered as an online course and offered during the fall semester.
Prerequisite: Introduction to Nursing Informatics or permission of course faculty.

Clinical Information systems includes; human computer interface and systems design; healthcare decision support and clinical guidelines; system selection; organizational issues in system integration; project management for information technology change; system evaluation; regulatory policies; impact of the Internet; economic impacts of e-health; distributed healthcare information technologies and future trends.

Nursing Informatics Practicum 3 credits
Prerequisites: Introduction to Nursing Informatics and Clinical Information Systems.

This course provides an opportunity for the learner to synthesize all previous coursework and to demonstrate beginning competency in Nursing Informatics. The course employs an application focus in which the learner demonstrates comprehension, critical thinking, and problem-solving abilities within the context of a real-world environment.

Nursing Informatics Electives

Consumer Health Informatics 3 credits
Delivered as an online course and offered during the spring semester.
Prerequisite: None

Topics include theoretical models for the delivery of consumer health information; Internet-based information delivery; access to patient information and privacy issues;

quality of consumer health information; health literacy; design and development of consumer health information resources; consumer access to clinical information and current research.

L650 Data Analysis for Clinical and Administrative Decision Making 3 credits
Focuses on understanding, manipulation, and analyzing quantitative data in nursing and health care. Includes use of computer-based systems for data management and statistical analysis. Application and interpretation multivariate statistical models for decision-making.

T619 Computer Technologies for Nurse Educators 3 credits
Provides nurse educators with an opportunity to acquire knowledge and skills for using computer technologies to support the teaching-learning process. Emphasis is given to theoretical frameworks that guide the selection, use, and integration of computer technologies in nursing education programs.

I5~~3~~03 Social Impact of Information Technologies 3 credits
An overview of important economical, social, legal, and ethical issues raised by information technology.

Other courses as appropriate with consent of faculty advisor

Indiana University School of Nursing

Introduction to Nursing Informatics (3 credits) [Core Course]

Faculty: Josette F. Jones, RN PhD

Texts: Ball, MJ; Hannah, K; Newbold, S & Douglass, J (2000). *Nursing Informatics: Where caring and Technology Meet*. (3rd ed.). Heidelberg: Springer Verlag.

Shortliffe, EH; & Perreault, L.E *Medical Informatics: Computer Aapplications in Health care and Biomedicine* (2nd ed.). Heidelberg: Springer Verlag.

Scope and Practice for Nursing Informatics. ANA 2001 (www.nursingworld.org Pub# NIP21)

Selected readings as assigned

Prerequisites: None

Course Description:

Introduction to the field of nursing informatics, current state of the science, and major issues for research and development. Includes theoretical models of nursing informatics; nursing roles; information processing and data management; data acquisition and data representation; information system standards; system architecture and networking; evaluation; and ethical/social issues in healthcare informatics.

Course Objectives:

1. Analyze theories and models of nursing informatics.
2. Compare and contrast database management tools and information systems in current use for patient care practice.
3. Examine current research issues related to clinical vocabularies; data standards; and informatics applications for delivering and managing patient care.
4. Apply selected criteria in the evaluation of nursing informatics applications.
5. Analyze the social and ethical issues related to computerized healthcare information delivery.

Teaching/Learning Strategies:

The course will be presented in an online format. Case studies, informatics projects, and online discussion groups will support assigned and independent readings.

Course Evaluation:

- Contribution to on-line threaded discussions (35%)

- Information retrieval exercise (10%)
- On-line database exercise (10%)
- Scholarly critique of 3 nursing informatics research projects (30%)
- Staged Nursing Informatics project (individual or collaborative) (15%) individual or collaborative.

Grading Scale:

The IUSON grading scale will be used as a basis for assigning letter grades for this course. Please note that the School of Nursing requires a minimum grade of B- for any graduate course.

A+	4.0	97-100
A	4.0	93-96
A-	3.7	90-92
B+	3.3	87-89
B	3.0	83-86
B-	2.7	80-82
C+	2.3	77-79
C	2.0	73-76
C-	l.7	70-72
D+	l.3	67-69
D	l.0	63-66
D-	0.7	60-62
F	0.0	< 60

Required Texts:

Ball, MJ; Hannah, K; Newbold, S & Douglass, J (2000). *Nursing Informatics: Where caring and Technology Meet.* (3rd ed.). Heidelberg: Springer Verlag.

Shortliffe, EH; & Perreault, L.E *Medical Informatics: Computer Aapplications in Health care and Biomedicine* (2nd ed.). Heidelberg: Springer Verlag.

Scope and Practice for Nursing Informatics. ANA 2001 (www.nursingworld.org Pub# NIP21)

Selected readings as assigned

Topical~~Content~~ Outline:

Module I: Concepts and Operational Definitions (week 1-5)

1. Nursing and Information Management
2. Information Management and Information Technology
   a. Life Cycle of an Information System
   b. Understanding Databases
   c. Information System Applications
3. Nursing Informatics

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a. Definition
b. Evolution
c. Standard and scope of Nursing Informatics practice
d. Implication for education, research, and practice

~~e.~~

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Module II: Nursing Informatics (week 6- 8)

4. Theories supporting Nursing and Health Care Informatics
    a. System Theory
    b. Information Theories
    c. Innovation/Change Theories
    d. Learning Theories
5. The importance of Nursing Theories and Conceptual Models for Nursing Informatics

Module III: Nursing Informatics Applications (week 9 -13)

6. Supporting Administrative Management of Nursing and Health Care
7. Supporting the Delivery of Nursing Care
    a. Telehealth
    b. PDA applications
    c. Consumer Health
    d. Clinical Databases
    e. Decision Support Systems
    f. Bio-informatics
8. Nursing Informatics Research
    a. Evidence Based Practice
    b. Standardized Languages

Module IV: Nursing Informatics and Knowledge Building (weeks 14-15)

9. Knowledge Building in Nursing/ for Nursing
10. Nursing Informatics: Science, Engineering, and Technology

If you need any special accommodations due to a disability, please contact Adaptive Educational Services at 274-3241. The office is located in CA 001E.

~~Presentation of Projects (week 16)~~

~~Presentation and evaluation of projects~~
~~Course Evaluation~~

~~Learning Strategies:~~

~~The course will be presented in an online format. Case studies, informatics projects, and online discussion groups will support readings.~~

Indiana University School of Nursing

Clinical Information Systems 3 credits [Core Course]

Faculty: Josette F. Jones, RN PhD

~~Texts: Ball, MJ; Hannah, K; Newbold, S & Douglass, J (2000). *Nursing Informatics: Where caring and Technology Meet.* (3rd ed.). Heidelberg: Springer Verlag.~~

~~Shortliffe, EH; & Perreault, L.E *Medical Informatics: Computer Aapplications in Health care and Biomedicine* (2nd ed.). Heidelberg: Springer Verlag.~~

~~Van de Velde, R. & Degoulet, P. (2003). *Clinical Information Systems.* Heidelberg: Springer Verlag.~~

~~Selected readings as assigned~~

Prerequisites: Introduction to Nursing Informatics or permission of course instructor

Course Description:

Clinical i ~~I~~nformation systems include~~s~~; human computer interface and systems design; healthcare decision support and clinical guidelines; system selection; organizational issues in system integration; project management for information technology change; system evaluation; regulatory policies; impact of the Internet; economic impacts of e-health; distributed healthcare information technologies and future trends.

Course Objectives:

1. Analyze the state of the science and current research issues related to (1) informatics applications for delivering and managing healthcare information in distributed environments and (2) clinical decision support/clinical guidelines.
2. Characterize nursing knowledge representation in system design, and human computer interface issues (hardware, software, end user).
3. Assess organizational challenges in the selection, integration and implementation of clinical information systems and develop strategies to meet these challenges.
4. Apply evaluation methodologies to support design, development and implementation of clinical information systems.
5. Analyze the issues related to security of information in clinical information systems in light of current standards, Federal regulatory requirements, and related organizational policies.
6. Analyze the impact of information technology on delivery of c~~C~~linical ~~i~~information and work redesign in the clinical enterprise. ~~Consider future trends, social and ethical issues in clinical information systems.~~

Teaching/Learning Strategies:

Assigned and independent reading, informed class participation (online format), case studies, clinical information system analysis.

Course Evaluation:

- Contribution to on-line threaded discussions (35%)
- Clinical Information System Evaluation paper (20%)
- Course Project (45%)

Examples of Course Project:

Propose a computer interface solution to meet the needs of a diverse population.
Design a project management plan to address the key issues in one aspect of an information system deployment.
Provide a hypothetical solution for an enterprise required to meet a new federal mandate for information security.

Grading Scale:

The IUSON grading scale will be used as a basis for assigning letter grades for this course. Please note that the School of Nursing requires a minimum grade of B- for any graduate course.

A+	4.0	97-100
A	4.0	93-96
A-	3.7	90-92
B+	3.3	87-89
B	3.0	83-86
B-	2.7	80-82
C+	2.3	77-79
C	2.0	73-76
C-	l.7	70-72
D+	l.3	67-69
D	l.0	63-66
D-	0.7	60-62
F	0.0	< 60

Required Texts:

Ball, MJ; Hannah, K; Newbold, S & Douglass, J (2000). *Nursing Informatics: Where caring and Technology Meet.* (3rd ed.). Heidelberg: Springer Verlag.

Shortliffe, EH; & Perreault, L.E *Medical Informatics: Computer Aapplications in Health care and Biomedicine* (2nd ed.). Heidelberg: Springer Verlag.

Van de Velde, R. & Degoulet, P. (2003). *Clinical Information Systems.* Heidelberg: Springer Verlag.

Selected readings as assigned

Topical Outline

History and Trends in Clinical Information Systems

Patient-Care Systems and Patient Monitoring

Clinical Decision Support Systems
Integrating Clinical Guidelines

Integrated Nursing Terminologies, Care Maps and Critical Pathways

System Design and Human and Computer Interaction

Organizational Change and Project management

Clinical Information System Selection Process
Selection of Vendors and Consultants

Clinical Information System Integration

Clinical Information System Evaluation

Standards for Nursing Information Systems

Security in Clinical Information Systems

Health policies related to Clinical Information Systems

Economic Impacts of Healthcare Information Technologies and E-Health

Social and Ethical Issues

If you need any special accommodations due to a disability, please contact Adaptive Educational Services at 274-3241. The office is located in CA 001E.

Indiana University School of Nursing

Nursing Informatics Practicum (3 credits) [Core Course]

Faculty: Anna M. McDaniel, DNS RN

Texts: Ball, MJ; Hannah, K; Newbold, S & Douglass, J (2000). *Nursing Informatics: Where caring and Technology Meet.* (3rd ed.). Heidelberg: Springer Verlag.

Shortliffe, EH; & Perreault, L.E *Medical Informatics: Computer Aapplications in Health care and Biomedicine* (2nd ed.). Heidelberg: Springer Verlag.

Additional readings as assigned

Prerequisites: Introduction to Nursing Informatics and Clinical Information Systems

Course Description:

This course provides an opportunity for the learner to synthesize all previous coursework and to demonstrate beginning competency in Nursing Informatics. The course employs an application focus in which the learner demonstrates comprehension, critical thinking, and problem-solving abilities within the context of a real-world environment.

Course Objectives:

1. Function as an active participant in a professional nursing informatics role.
2. Identify strategies that can be used to manage information technology change.
3. Perform the leadership roles of communicator, systems thinker, and decision maker within a healthcare organization.
4. Identify nursing and information science theory used in the practice settings.
5. Analyze the nursing informatics leadership role in the delivery of clinical services across the healthcare enterprise.
6. Evaluate the organization's use of nursing information systems to support data driven decision making.
7. Examine the extent that research guides nursing informatics practice.

Teaching/Learning Strategies:

Assigned and independent reading, informed class participation (online format), organizational assessment, guided clinical experience.

Course Evaluation:

- Participate in online practicum seminar (20%)
- Written Organizational Assessment (30%)
- Clinical project with written summary and analysis (50%)

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Grading Scale:

The IUSON grading scale will be used as a basis for assigning letter grades for this course. Please note that the School of Nursing requires a minimum grade of B- for any graduate course.

A+	4.0	97-100
A	4.0	93-96
A-	3.7	90-92
B+	3.3	87-89
B	3.0	83-86
B-	2.7	80-82
C+	2.3	77-79
C	2.0	73-76
C-	l.7	70-72
D+	l.3	67-69
D	l.0	63-66
D-	0.7	60-62
F	0.0	< 60

Required Texts:

Ball, MJ; Hannah, K; Newbold, S & Douglass, J (2000). *Nursing Informatics: Where caring and Technology Meet*. (3rd ed.). Heidelberg: Springer Verlag.

Shortliffe, EH; & Perreault, L.E *Medical Informatics: Computer Aapplications in Health care and Biomedicine* (2nd ed.). Heidelberg: Springer Verlag.

Additional readings as necessary to meet learning objectives

Practicum Guidelines

Student's Role:

- Develop nursing informatics practicum goals and objectives that articulate personal learning needs. Schedule faculty contact for discussion by the end of the first week of the semester.
- Identify potential site and select a potential preceptor in consultation with course faculty based on informatics practicum goals and objectives.
- Schedule and complete an interview with potential preceptor agreed upon by the course faculty.
- Negotiate the following for a final learning contract with your preceptor:
- Prioritize objectives;
- Approximate the number of hours needed to complete each objective;
- Make changes in objectives based on the organizations and the preceptor's specific needs, resources and constraints;
- Identify the types of resources the student will need from the preceptor or agency for each objective, such as: regular meeting time for discussion; assistance in locating or gaining access to organizational resources; introduction to key members of the organization; others as needed.
- Determine the method of evaluation for each objective, such as: student discussion with preceptor; student diaries or written reports to preceptor; student presentations to nursing staff and/or preceptor.

- Participate weekly in online informatics practicum seminar discussions;
- Complete a project in collaboration with preceptor, including a formal presentation as part of the online practicum seminar and written analysis of the project;
- Implement and complete student learning contract that includes passing evaluation by preceptor and faculty;
- Notify course faculty of any problems developed during practicum, related to completion of learning goals with possible solutions or alternatives.

Faculty's role:

- Review the student's initial goals and objectives.
- Discuss potential practicum placement sites with students.
- Provide syllabus and role expectation information to students and preceptors throughout practicum.
- Assist in informatics practicum placements in conjunction with students as necessary.
- Verify the site contracts if appropriate.
- Review learning contracts and objectives during the first week of the informatics practicum semester.
- Facilitate seminars with students during semester.
- Maintain contact with preceptor during practicum concerning student's progress and visit sites as possible.
- Problem-solve student/preceptor issues as appropriate.
- Identify formal online presentation dates and formats.
- Collect and review final student projects.
- Collect evaluation forms from preceptors.

Preceptor's Role:

- Interview the potential student preceptor
- Review the student's goals and objectives and revise as necessary to fit the needs, capabilities and constraints of the organization.
- Negotiate the type of activity you will provide for the student concerning each objective (example: discussion of project or role for teaching or analysis; coordination to direct them to proper resources, supervision in terms of approving or guiding student's work).
- Negotiate the evaluation method, i.e., how the student will demonstrate competency (through regular discussion with preceptor, formal presentation to group, written report, etc.).
- Complete written learning contract with student
- Serve as role model, resource, and guide learning experiences for the student;
- Negotiate student's schedule for completion of practicum.
- Evaluate student.
- Communicate with course faculty regarding student's performance during the practicum;
- Provide ongoing feedback to student during practicum on progress toward completion of learning objectives;
- Notify course faculty of any problems or concerns during the practicum;

- Provide a written grade of Satisfactory/Unsatisfactory for each student objective. Note: If organizational barriers have prevented the student from completing one or more objectives, comments to that effect will be helpful.
- Complete preceptor's evaluation forms and return to course faculty.

If you need any special accommodations due to a disability, please contact Adaptive Educational Services at 274-3241. The office is located in CA 001E.

Indiana University School of Nursing

Consumer Health Informatics (3 Credits) [Elective Course]

Faculty: Anna M. McDaniel, DNS RN

Texts: ~~Kreuter, M., Farrell, D., Olevich, L. & Brennan, L. (2000). *Tailoring Health Messages: Customizing Communication with Computer Technology.* Mahwah, NJ: Lawrence Erlbaum.~~

~~Maheu, M.M., Whitten, P., & Allen, A. (2001). *E-Health, Telehealth, and Telemedicine: A Guide to Start-up and Success.* San Francisco: Jossey-Bass.~~

~~Rice, R.E., & Katz, J.E. (2001). *The Internet and Health Communication: Expereinces and Expectations.* Thousand Oaks, CA: Sage Publications.~~

~~Street, Jr., R.L., & Gold, W.R., & Manning, T. (1997) *Health Promotion and Interactive Technology: Theoretical Applications and Future Directions*. Mahwah, NJ: Lawrence Erlbaum.~~

Prerequisites: None

Course Description:

Topics include theoretical models for the delivery of consumer health information; Internet-based information delivery; access to patient information and privacy issues; quality of consumer health information; health literacy; design and development of consumer health information resources; consumer access to clinical information and current research.

Course Objectives:

1. Compare and evaluate the available consumer information technologies, including listserves, news groups, chat rooms, e-mail and other virtual spaces and critique one web-based consumer informatics application (e-health portals, list-serves, chat rooms) and formulate several hypotheses regarding the impact on consumer participants.
2. Evaluate the quality of the information delivered on the Internet and recommend strategies for ensuring information quality.
3. Examine the impact of technology-based information on consumer healthcare decision-making.
4. Analyze the change in the relationship between healthcare consumers and providers as a result of available consumer information technologies.
5. Examine current and future trends in the development of standardized consumer language
6. Propose research to evaluate the effects of this technology on the future of healthcare delivery to consumers.
7. Describe the issues and challenges of healthcare delivery using telehealth approaches.
8. Analyze the social and ethical issues related to computerized healthcare information delivery.

Teaching/Learning Strategies:

Assigned and independent reading, informed class participation (online format), case studies, evaluation of consumer health application.

Course Evaluation:

- Contribution to on-line threaded discussions (35%)
- Critical Analysis of 3 Interactive Consumer Health applications (25%)
- Course Project (40%)

Examples of course projects:

Design and develop a web-based consumer informatics application
Systematic review of methods to assure quality of online consumer health information

Grading Scale:

The IUSON grading scale will be used as a basis for assigning letter grades for this course. Please note that the School of Nursing requires a minimum grade of B- for any graduate course.

A+	4.0	97-100
A	4.0	93-96
A-	3.7	90-92
B+	3.3	87-89
B	3.0	83-86
B-	2.7	80-82
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C-	l.7	70-72
D+	l.3	67-69
D	l.0	63-66
D-	0.7	60-62
F	0.0	< 60

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Required Texts:

Kreuter, M., Farrell, D., Olevich, L. & Brennan, L. (2000). *Tailoring Health Messages: Customizing Communication with Computer Technology.* Mahwah, NJ: Lawrence Erlbaum.

Maheu, M.M., Whitten, P., & Allen, A. (2001). *E-Health, Telehealth, and Telemedicine: A Guide to Start-up and Success.* San Francisco: Jossey-Bass.

Rice, R.E., & Katz, J.E. (2001). *The Internet and Health Communication: Expereinces and Expectations.* Thousand Oaks, CA: Sage Publications.

Street, Jr., R.L., & Gold, W.R., & Manning, T. (1997) *Health Promotion and Interactive Technology: Theoretical Applications and Future Directions*. Mahwah, NJ: Lawrence Erlbaum.

Selected readings as assigned

Topical Outline:

Consumer Health Informatics, Overview and Nursing's Role

Consumer Healthcare and Information Technology

Ethics and Consumer Healthcare Informatics

Digital Divide and Access to Consumer Health Information

Public Health and Consumer Uses of Health Information

Design and Development of Consumer Health Applications

Evaluation of Consumer Health Informatics Applications

Knowledge Representation and Consumer Vocabularies

New Media Communications and Changing Healthcare Relationships

Health Policy and the Web-Enabled Health Consumer

Telehealth and the World Wide Web

Security of Online Health Information

Measures to Ensure Online Information Quality

Computers in Nursing and Healthcare Education

The Future of Computer Applications in Consumer Health Care

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Syllabi for Current ~~Nursing~~ Courses that will serve as Electives

Indiana University School of Nursing

T619 Computer Technologies for Nurse Educators (3 credits) [Elective]

~~Course Number & Credit Hours~~
~~T619 / 3 credit hours~~

~~Placement of course within the curriculum~~
~~This course meets requirements for MSN, PhD, & Post-Master's Certificate Option~~

~~Pre Requisite: None~~

Faculty: ~~Information:~~
Diane M. Billings, EdD, RN, FAAN

~~Professor, Teaching/Education and Associate Dean~~
~~E-Mail:~~
~~dbillin@iupui.edu~~
~~Room Number~~
~~NU 350~~
~~Office Phone:~~
~~(317) 274-4489~~
~~-~~Prerequisite: None

Field Code Changed

Course Description:

This course provides nurse educators an opportunity to acquire knowledge and skills for using computer technologies to support the teaching/learning process. Emphasis is given to theoretical frameworks that guide the selection, use and integration of computer technologies in nursing education programs.

Course Objectives:

~~At the completion of this course you will be able to:~~

1. Synthesize knowledge from education, nursing, social sciences and the humanities into frameworks for using computer technologies in nursing education.
2. Use computer technologies to assess, plan, implement, and evaluate instruction.
3. Analyze social, ethical, legal, and organizational issues influencing the use of computer technologies in nursing education.
4. Apply frameworks for evaluating instructional software.
5. Utilize empirical data from computer literature to integrate computer technologies in a nursing education program.

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Teaching/Learning Strategies:

Independent reading, informed class participation, case study, and case studies, software critique, critical reflection.

Textbooks:
Use any or all of these to meet your own needs.

Alspach, J. (1995). *The Educational Process in Nursing Staff Development*. St. Louis: W. Mosby Co.

Billings, D. and Halsted, J. (Eds.) (1999). *Teaching in Nursing*. Philadelphia, WB Saunders.

Brookfield, S. (1995). *Becoming a Critically Reflective Teacher*. San Francisco, Jossey-Bass.

Gaberson, K. B. and Oermann, M. (1999). *Clinical Teaching Strategies in Nursing*. New York. Springer Publishing Co.

Kelly-Thomas, K. (Ed) (1998). *Clinical and Nursing Staff Development*. Philadelphia: Lippincott, Williams and Wilkins.

Linn, P.L. and Gronlund, N.E. (2000). *Measurement and Assessment in Teaching*. Upper Saddle River, NY: Prentice-Hall, Inc.

Schookcraft, V. (1994). *A Down-to-Earth Approach to Being a Nurse Educator*. New YorK: Springer Publishing Co.

Seldin, P. (1993). *Successful Use of Teaching Portfolios.* Bolton, MA: Anker Press.

Steven, K. and Cassidy, V. (Eds.) (1999). *Evidence-based Teaching: Current Research in Nursing Education*. New York: James & Bartlett Publishers.

Ulrich, D. & Glendon, K. (1999). *Interactive Group Learning: Strategies for Nurse Educators.* New York: Springer Publishing.

Valiga, T. & Bruderle, E. (1996). *Using the Art and Humanities to Teach Nursing*. New York: Springer Publishing Co.

Valiga, T. & Streubert, H. (1991). *The Nurse Educator in Academia: Strategies for Success*. New York: Springer Publishing Co.

Course Evaluation:

- ~~1.~~ Software Critique 20%
- ~~2.~~ Course/Curriculum Integration Plan 30%
- ~~3.~~ Completion of online learning activities/discussion 30%
- ~~4.~~ Issue Analysis 20%

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INDIANA UNIVERSITY SCHOOL OF NURSING

L650 Data Analysis for Clinical and Administrative Decision-Making
(3 credits) [Elective]

~~Credit Hours: Three credit hours~~

~~Pre-requisite: R500~~

Faculty: Anna M. McDaniel, DNS RN

Prerequisite: R500 ~~Associate Professor~~

Course Description:

Focuses on understanding, manipulating, and analyzing quantitative data in nursing and health care. Includes use of computer-based systems for data management and statistical analysis. Application and interpretation multivariate statistical models for decision-making.

Course Objectives:

~~At the completion of this course you will be able to:~~

1. ~~1.~~ Manage a set of data using a computerized database.
2. ~~2.~~ Utilize a computer-based statistical application to analyze data.
3. ~~3.~~ Interpret results of statistical analyses for decision making.
4. ~~4.~~ Use a decision model to answer clinical and administrative questions in nursing.

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Teaching/Learning Strategies:

Participation in class discussion (on-line and face-to-face), lecture, required readings, oral and written presentations, computer exercises.

Course Evaluation:

Class participation.....15%
Research critique.....15%
Homework (Guided statistical analyses).....20%
Project (See guidelines).....50%

Required Texts:

Grimm, L.G., & Yarnold, P.R. (Eds). (1995). Reading and understandingmultivariate statistics. Washington, DC: American Psychological Association.

Norusis, M.J. (1998). SPSS 8.0 Guide to data analysis. Englewood Cliffs, NJ: Prentice Hall.

Selected readings as assigned

~~Content~~Topical Outline~~: and Learning Experiences:~~

~~Overview of course:~~ Using data for decision making and quality improvement
~~[4]~~
Introduction to Decision Theory and Decision Analysis

Principles of data management: Data entry, verification, and manipulation
~~[1]~~
Ethical uses of data for research and decision making

Principles of g~~G~~raphical data display
~~[1,2]~~
Statistical techniques and application to decision making:
Exploratory Data Analysis techniques ~~[1,2,3]~~
Factorial ANOVA and Multivariate ANOVA ~~[3]~~

Multiple Regressions Analysis
Logistic Regression ~~[3]~~

Critiquing research for decision making~~Released time to work on projects~~

~~Required Texts:~~

~~Grimm, L.G., & Yarnold, P.R. (Eds). (1995). Reading and understandingmultivariate statistics. Washington, DC: American Psychological Association.~~

~~Norusis, M.J. (1998). SPSS 8.0 Guide to data analysis. Englewood Cliffs, NJ: Prentice Hall.~~

~~Guidelines for Course Requirements:~~

~~1. Class Participation (15%)~~

~~The purpose of this requirement is to promote the development of skills in expressing an informed opinion to a group of peers. Active participation (both in class and on-line) requires prior reading and critique of assigned readings.~~

~~2. Research Critique (15%)~~

~~The purpose of this assignment is for students to refine skills in critique of scientific literature. Each student is to select a research study that has used exploratory or~~

multivariate analysis techniques. An oral and written critique using the format provided is required (see guidelines). Due as assigned.

3. Homework (20%)

These assignments will provide "hands on" experience in computer applications. Students will practice data entry, verification, and manipulation. Actual nursing data sets will be available for performance of common statistical analysis procedures. Students are expected to work independently in consultation with instructor to complete assignments. Due as assigned.

4. Project (50%)

The purpose of the project is to provide an opportunity for students to apply techniques for data analysis to "real life" situations. Each student is expected to collaborate with a "decision maker" (e.g., manager, advanced practice nurse, clinical specialist, educator, researcher) in nursing or health care. The student will identify a problem or question that is pertinent to the decision maker's scope of practice. Using data provided by the decision maker, the student will create and manage a data set, perform analyses, and present the results in a report. Students will give an oral presentation and submit a paper (see guidelines) describing the decision process and results of data analysis. Due as assigned.

Guidelines for Course Project

Each student will collaborate with a decision maker in nursing or health care to identify a problem or question that is pertinent to the decision maker's scope of practice. Using data provided by the decision maker, the student will create and manage a data set, perform analyses, and present the results. The purpose of the paper is to analyze the decision making process and describe how data influenced the outcome.

Writing should conform to School of Nursing standards. The paper is limited to ten pages (excluding references and appendices). The format for the paper is presented below. Comments in italics are intended to guide students in content to include in each section.

I.Problem Specification

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- What was the problem to be resolved/question to be answered?
- Describe the context and situation surrounding the problem/question
- Who was/were the decision maker(s)?
- What was the purpose or goal of the decision process?

II.Data and Statistical Analysis

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- What data were needed to make an informed decision?
- What data were available? How were data obtained?
- Describe the structure of the data set.
- How were data analyzed? What were the results?

III.Decision Model

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- What decision(s) was/were made?
- How was the decision reached?
- Describe the model used by the decision maker.
- How did the data analysis inform the decision making?

IV.Conclusion

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- Was the goal for the decision met?
- What is the likely outcome of the decision?
- What are the implications of the decision for clinical practice?

Guidelines for Research Critique

1. Was the problem studied significant to generate or refine knowledge for nursing practice?

2. What are the major strengths of the study? Provide specific examples to support your evaluation.

3. What are the major weaknesses of the study? Provide specific examples to support your evaluation.

4. Was the methodology used in the study sound? Give rationale for your opinion.

5. Are the findings from the study credible/valid? Are they practical in "real life" situations?

6. What is the significance of the findings for nursing practice?

7. Can you use the findings of this study in your practice? How can these findings inform decision that you make on a day-to-day basis?

8. Are the findings consistent with those from previous studies?

9. Can the study be replicated in other settings? Should it be replicated in other settings?

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Wainer, H. (1984). How to display data badly. The American Statistician, 38, 137-147.

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If you need any special accommodations due to a disability, please contact Adaptive Educational Services at 274-3241. The office is located in CA 001E.

INDIANA UNIVERSITY SCHOOL OF INFORMATICS

Social Impact of Information Technologies (3 credits) [Elective]

Faculty: Josette F. Jones, RN, PhD, BC

Prerequisite: None

Course Description:

This seminar is designed to stimulate and direct thoughts around selected topics related to socio-economic, legal and ethical impacts of information technology and technological advances. The class will do some selected readings on those topics as well as independent readings.

Students will participate in group research projects: assess societal issues related to information technology and technology advances in their work field, formulate a research project, review research literature, write a report, and present the project in class.

Course Objectives:

1. Synthesize, discuss the socio-economical impact of information technology and technological advances
2. Critically appraise research literature related to societal impact of information technology and technology advances
3. Formulate sound research projects related to current societal issues in the use of information technology and technology advances

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Teaching/learning Strategies:

Seminar preparation including review and synthesis of relevant literature, completion of all course activities, independent and assigned reading

Course Evaluation:

- Participation in all seminars 30%
- Contribute to regular scholarly exchange 20%
- Evidence of scholarly critique of relevant literature 20%
- Initiate, participate, report and present the group's research project 30%

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Required Texts:

Teich, A. H. (2003). *Technology and the Future* (9th Edition): Thomson Wadsworth.

Selected readings available at the electronic course reserve or at the library

Topical Outline:

__ Economic Development and Information Technology
__ Emerging Industries
__ Industrial Integration
__ ECommerce

__ Workforce Development
- __ Skill development
- __ Training
- __ Educational Systems
- __ Regional differences

__ Workforce Displacement
- __ Downsizing
- __ Lay-offs
- __ Obsolescence
- __ Under-representation of women and minorities

__ Work Design Implications
- __ Organizational changes
- __ Job redesign
- __ Ergonomic implications
- __ Work related stressors

__ Implication in Social Interactions
- __ Role of technology in the society
- __ Communication pattern
- __ Virtual communities
- __ Diffusion of responsibilities
- __ Performance monitoring

__ Socio-Ethical Impact of Technology Advances
- __ Biogenetics
- __ Internet and personality development

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DRAFT: Sequence of Courses

The proposed program consists of three core courses and an elective. The core courses deal with the design, technical, organizational and societal issues related to health information systems; the elective elaborates on the consumer use and impact on clinical information systems.

Core Courses:

Introduction to Nursing Informatics Spring offering
Designed for students in nursing and health informatics with no or little background in nursing/health informatics and the state of the science.

- Clinical Information Systems Fall offering
  Required for students in Nursing and Health Informatics. The purpose of this course is to provide a basic understanding of clinical information systems and the impact on providers.
- Nursing Informatics Practicum prerequisite or concurrent with Clinical Information Systems
  This course provides an opportunity for the learner to synthesize all previous coursework and to demonstrate beginning competency in Nursing/Health Informatics

Elective Course:

- Consumer Health Informatics
  Focuses on the delivery of consumer health information; its successes and challenges.

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To: Dr. Jackie O'Palka, Chair, Curriculum Sub-Committee, GAC

From: Dr. Joanne Warner, Associate Dean for Graduate Programs, IUSON

Re: Support for Proposal for Informatics Certificate

Date: October 22, 2003

The School of Nursing and the School of Informatics are in full support of the proposal for Informatics Certificate. Dr. Anna McDaniel, associate professor in the School of Nursing and director of graduate programs in Health Informatics, provides an excellent link between both schools. She and Dr. Douglas Perry have worked to avoid redundancy or conflict in courses, to enhance communication so that students are best served and to nurture the interdisciplinary linkages that characterize contemporary learning.

While students from nursing, informatics and other fields will elect to take these courses, the School of Nursing is the most appropriate home for this certificate. Healthcare delivery requires competencies in informatics, and therefore deserves a important part in our curricula (whether for a degree or certificate). Second, Dr. McDaniel is a founding leader in a CIC Clinical Nursing and Health Informatics Consortium (including Iowa, Wisconsin, Indiana and Michigan); this dynamic partnership of leading nurse scholars in informatics is leveraging resources across campuses to build knowledge and facilitate learning. This Consortium is also collaborating on a training grant to continue enhancing resources. Third, the PhD in Nursing Science at IUPUI is increasingly attracting students interested in informatics and health systems, particularly as the program became distance-accessible. These courses will not only be useful as students pursue a certificate, but for PhD students in the Health Systems focus area or those seeking a minor concentration in informatics.

This set of courses represents the best thinking of nursing informatics leaders across the nation and provide a great opportunity to give visibility nationally to IUPUI in this increasingly important area. Thank you for your consideration.

Memo

To: Dr. Jackie O'Palka, Chair, Curriculum Subcommittee, GAC

From: Dr. Douglas Perry, Associate Dean, School of Informatics

CC: Dr. Gwendolyn Johnson, Assistant Dean, IUPUI Graduate Office

Date: 6/28/2007~~11/19/2003~~

Re: Support for Nursing Informatics Courses

The School of Informatics endorses the creation of four new courses in the School of Nursing:

- NURS I579 Nursing Informatics Practicum
- NURS I630 Introduction to Nursing Informatics
- NURS I631 Clinical Information Systems
- NURS I635 Consumer Health Informatics

Two of these courses, I579 and I630, are courses which will focus on issues specific to the nursing profession, and will not duplicate courses in the curriculum of the Health Informatics Graduate Program in the School of Informatics.

NURS I631 is currently offered as INFO I590 (a "topics" course) in the School of Informatics for the Health Informatics Graduate Program. The School of Informatics seeks to create a new course, INFO I534, from the existing topics course. If approved, NURS I631 will be cross-listed as INFO I534, with nursing majors enrolling in the former and health informatics majors enrolling in the latter.

NURS 635 is a new course that will be available to health informatics graduate students as an elective.

The two developers of these courses, Drs. Anna McDaniel and Josette Jones, have joint appointments and split salary lines in both the School of Nursing and the School of Informatics. Dr. McDaniel is the Director of the Health Informatics Graduate Program (in the School of Informatics). These new courses reflect their professional efforts in both schools.

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Reviewer Comment for Nursing Informatics Graduate Certificate Proposal

Documents Reviewed:
Memorandum of Support for proposal from Dr. Doug Perry, Associate Dean, School of Informatics
Memorandum of Support from Dr. Joannne Warner, Associate Dean for Graduate Programs, School of Nursing
Proposal for a Certificate Program in Nursing Informatics to include proposed course syllabi

Summary:
The IU School of Nursing is proposing to offer a certificate in Nursing Informatics. Four new courses would be developed, with three of the courses required and one course that could be used as an elective. These courses would not appear to duplicate other informatics courses on campus, per the memorandum from Dr. Doug Perry. The course could be used to complete a certificate program or could be used by students in the nursing doctoral program. All courses would be offered in a distance format. The faculty who would deliver the content appears to be well prepared to do so. All elements of the proposal appear to be complete.

Recommendation:
Accept without revision

Reviewers Comments

Review of Proposal for:
Certificate Program in Nursing Informatics

Documents reviewed: Proposal for a Certificate Program in Nursing Informatics
Memo from Douglas Perry, Associate Dean-School of Informatics
Memo from Joanne Walker, Associate Dean-IUSON
Course Syllabi

Summary: The development of a certificate program in Nursing Informatics program is novel and shows that the IUSON will continue to be at the cutting edge of graduate education. The overall rationale is fine, as is the development of the new courses. This reviewer, however, has a few concerns. Please see the questions below.

Recommendation: **Four possible recommendations**

Accept without revision
***Accept with discussed revisions**
Defer, pending extensive revisions
Not accepted

Discussion:

Overall, I am concerned that "All courses will be taught using distance-learning technologies." Normally, graduate education requires a level of discussion of a topic between the instructors and the students, which will be lost if everything is online. In contrast, many undergraduate textbook taught classes do not require this and are more easily made into an on-line format. While I note that a percentage of grades for the courses will be based on "online threaded discussion", this concept is not discussed in the rationale of the program. A more thorough explanation, or additional documentation, of how this will provide the students with a graduate level of education would be helpful.

The maximum time of completion is stated as two years, because of the rapidly changing field and its technology. This might suggest to the students that the rate of change would make this certificate out of date before they receive it? Are there ways to show in the structure of the certificate program that the courses will establish the life-long learning skills needed for this field?

Based on my reading of the proposal, I am unclear what is meant by the sentence in the rationale section "Courses in Nursing Informatics could be offered for academic credit as well as contact hours..." This is followed by the sentence "… for learners to choose academic credits or credit hours." Can this be explained to me, as one needs to be admitted to the graduate school to take 12 academic hours to get the certificate?

It is unclear if students in a masters or doctoral program would also get a certificate if they took these courses, or are there clear distinctions between courses that count for the degree programs versus the certificate program?

To: **The Graduate Affairs Committee**
Indiana University, Indianapolis
Professor Sherry Queener, Chair

From: **Indiana University School of Law - Indianapolis**
Professors Jeffrey Grove and Frank Emmert

Re: **Proposal for a New LL.M. Track: Master of International and Comparative Law**

Date: **5 November 2003**

The following proposal for a new LL.M. degree track in international and comparative law is the first major programmatic initiative developed by the Center for International and Comparative Law. It ties together our existing course offerings in these areas and suggests the gradual development of some additional courses. Without requiring significant new human and financial resources, the proposal would allow the law school to attract three important new groups of students, namely foreign and American students looking for a broad international and comparative program, as well as legal professionals in the Indianapolis area interested in post-graduate international legal studies alongside employment.

At its meeting on Thursday, October 30, 2003, the Curriculum Committee unanimously approved the proposal. It was submitted to the Faculty on Tuesday, 4 November and again approved unanimously.

The proposal is now submitted to the Graduate Affairs Committee. Since the law school would like to enroll the first group of students in the academic year 2004/05, it would be greatly appreciated if the GAC could consider this proposal at its meeting in November.

I. Campus: IUPUI

II. Proposed Degree: "LL.M. in International and Comparative Law." This is a new track, to be added to the existing "LL.M. in American Law for Foreign Lawyers" at Indiana University School of Law - Indianapolis.

III. Projected Date of Implementation: Admission of the first class into this new track is anticipated for the fall of 2004. Appropriate faculty are in place for teaching the courses in the program.

IV. Major Objectives of the Proposed Degree Track and its Chief Features:

Major Objectives: Education of American and foreign legal professionals in the area of international and comparative law; additional electives for J.D. students.

Indiana University School of Law - Indianapolis already offers a Master's Program in American Law for Foreign Lawyers. The proposed new degree track would diversify the study opportunities for foreign lawyers, giving us a larger pool of qualified foreign applicants from which to choose. Even more importantly, the new degree track would open post-graduate study opportunities for American legal professionals from Indiana-

polis, as well as other parts of Indiana and the United States. In addition to a full-time one year Master's Program, the law school would also offer a number of courses in the format of evening courses, making it possible for legal professionals from the Indianapolis area to pursue the degree part-time while retaining their present employment. This should promote the integration of the law school with the State Bar Association, larger corporations with legal departments in Indianapolis, and other legal professionals in private practice and public service.

In a globalizing world, legal professionals serving corporations, NGOs, or government agencies are increasingly confronted with work that reaches beyond the national frontiers. Hence, there is a dire need for more legal professionals with at least some understanding of the basic notions of European, Asian, Arab, and Latin American legal systems, as well as the ground rules of international law for transnational commercial and other activities. This need exists both in the U.S. and abroad, opening opportunities of bringing together American and foreign lawyers in a small and intensive program where the horizontal exchange between the students complements the work in and for the courses.

Professors are in place to teach the courses and the administrative staff is ready and equipped to support larger numbers of post-graduate students coming to the law school. Thus, additional cost for this degree track is limited and tuition could be set at a level sufficient to generate net revenues for the law school.

Admission Requirements: The criteria for eligibility follow the same basic rules as the existing degree track "LL.M. in American Law for Foreign Lawyers." Foreign applicants must hold an academic degree in law from a nationally recognized educational institution in their home country that would be considered equivalent to a Juris Doctor (J.D.) or a Bachelor of Law (LL.B.) or must otherwise be admitted to the practice of law. American applicants must hold a J.D. from an ABA-accredited law school. In exceptional cases, applicants may be considered with an academic degree other than in law. In all cases, documentation of academic degrees and, where applicable, a law license, is required.

To be eligible for admission, a non-native English speaker also must have a score of at least 550 on the paper-based TOEFL, a score of at least 213 on the computer-based TOEFL, or a score of at least 6.0 on the IETLS.

Curriculum Requirements: The proposed degree track follows the same basic rules as the existing degree track "LL.M. in American Law for Foreign Lawyers." In particular, it also requires completion of 24 credit hours with grades of Pass, Honors, or High Honors. The 24 credit hours include the possibility to write a Master thesis for 2 to 4 credits hours (with the rule of thumb that 25 pages have to be submitted per credit hour). The credits for the Master thesis, as well as a minimum of 12 course credits, have to be taken in areas related to international and/or comparative law (see course list in the annex). The remaining 8 to 12 credit hours can be completed with any elective courses from the curriculum (including further courses in international and comparative

law). The requirements are the same for local students pursuing the degree part-time over a framework of more than one academic year.

The existing courses *Introduction to the American Legal System* and *Legal Analysis, Research and Communication for LL.M. Students I and II* will not be required for all students in this degree track; foreign students will be advised on an individual basis whether or not to take these courses. *LARC I and II* will be required of foreign lawyers with a demonstrated need for instruction in legal writing/methodology. A course *Advanced Legal Research*, currently being developed by Judith Anspach, will be required for those students writing a Master thesis.

Transfer Credits: Once the new degree track is set up and running, it may be decided that students from universities having signed cooperation agreements with Indiana University School of Law - Indianapolis can transfer a certain number of credits into this program, as long as the abovementioned curriculum requirements and equivalent standards for admission and quality control are met.

Financial Support: Students are eligible to apply for financial support through the IUPUI Financial Aid Office. Limited financial support - in the form of partial tuition waivers - may be made available by the law school for deserving students. It is anticipated that some law firms, corporations, or government agencies might sponsor scholarship assistance, especially for lawyers working for them.

Program Evaluation: After the new degree track has been implemented and conducted for a couple of years, there will be a thorough evaluation by the law school's Curriculum Committee and Faculty. In the meantime, courses and instructors will be evaluated, faculty who receive or express concerns will be heard, and students will be able to discuss any problems with their academic advisors, according to the established procedures at the law school and in the existing Master program. Last but not least, the program is also subject to ABA acquiescence and will be reviewed by the ABA in the context of the regular reviews of the law school as a whole.

V. Justification for the New Degree Track: The new degree track meets growing demand in the U.S. and abroad for graduate level education in international and comparative law. Since the law school already offers a significant number of the courses required for a serious and diverse program in international and comparative law, it is a logical step to offer a degree that ties these courses together and attracts new and additional students to the law school.

The new degree track will enable the law school to accelerate the growth of its international student body, which will in turn enrich the classroom discussions and general campus life for everyone.

Furthermore, any courses added for the new degree track will also be open to J.D. students, giving them an ever more attractive choice of electives.

VI. Student Population to Be Served: By contrast to the degree track "LL.M. in American Law for Foreign Lawyers," the proposed new track is designed both for foreign lawyers and for U.S. lawyers seeking additional education in international and comparative law. It is expected that foreign lawyers and U.S. lawyers from other parts of the U.S. will enroll in the one-year full-time program. In addition, the program will offer certain courses as evening courses, allowing lawyers from the Indianapolis area to pursue the degree as a part-time program over a period of more than one year, while retaining their employment. We anticipate to enroll approximately equal numbers of foreign and U.S. students in the program.

VII. Relationship to Campus and Departmental Missions: The "LL.M. in International and Comparative Law" would fulfill the missions and goals of the law school and the university by attracting international students to study in Indianapolis, by incorporating international scope and new approaches into legal scholarship, by facilitating relationships with foreign institutions of higher learning, and by increasing educational opportunities for members of the local legal community. In the Mission Statement of the law school, composed as part of the last self-evaluation, the faculty and administration acknowledge the importance of preparing students for an increasingly globalized world. The internationally-focused LL.M. program will address these needs; students will be better prepared to serve their local and global communities. Moreover, the program will fulfill the university's goals, as described in IUPUI's "Vision, Mission, and Values," statement, of facilitating "the development of new graduate degree and post-baccalaureate certificate programs to meet local, national, and global needs," of increasing the numbers of Master students, and of attracting and supporting a more diverse student body, particularly one that includes more international students. As students from other universities, namely foreign universities, enroll in the program, opportunities may arise for further collaboration between IUPUI and these foreign institutions. These relationships can only enhance the international research interests and activities of the faculty and students at IUPUI. Moreover, because the LL.M. program will be available for local students and attorneys, the increased provision of educational services will fulfill the law school's and university's goals of outreach to the local community and should result in stronger ties between IUPUI and the city and state.

VIII. Relationship to Existing Degree Programs Within the IU System: Indiana University School of Law - Bloomington has a long-standing and highly reputed graduate program with possibilities of earning an LL.M. or an M.C.L. (Master of Comparative Law) degree. The program in Bloomington and the proposed new program for Indianapolis are complementary in many respects. Therefore, once our program is firmly established, there may well be opportunities for collaboration, such as joint courses or faculty and student exchange. Similar opportunities might be developed with the Department of Political Science in Bloomington, which is offering graduate studies *inter alia* in comparative politics and in international relations, with options of a minor in law.

The Department of Political Science of IUPUI in Indianapolis does not offer graduate studies at the present time. However, opportunities for collaboration may well evolve if

and when the existing program in international studies is expanded for graduate students.
Similarly, the Indiana University Kelley School of Business - Indianapolis, has a number of international study options and even international degree requirements at the undergraduate level. Course offerings related to the proposed degree track are currently more limited for its graduate students but do include courses such as *Competitive Strategies in Global Industries, International Management,* and *Essentials of International Business*. Consequently, there are certain opportunities for collaboration. For example, the law school could accept MBA students into courses such as *European Union Law or WTO Law*, or it could develop a specific course *International Business Law* for MBA students.

The same is true for possible contacts with the MBA program at Purdue University's Calumet School of Management, where certain courses already cover areas closely related to some of the courses to be offered in the proposed degree track, such as *International Trade* as a graduate level course in economics.

As far as business programs are concerned, the most interesting match is probably with the Center for International Business Education and Research (CIBER) at Purdue University in West Lafayette. This school offers a Master Program in International Management, which already includes a course in *International Business Law*. Thus, it is very well possible that joint courses in areas such as *International Intellectual Property Protection* or *International Tax Law* could be developed for the benefit of students in both institutions and programs. CIBER might also be interested in our future courses in *European Union* and *WTO Law*.

IX. Resources Required for the Implementation of the Proposed Degree Track:
Since the proposed degree track is largely based on courses that are already offered at the law school for students in the J.D. program, no additional resources are required in the short term. With the anticipated growth of the program over the years, the following resources should gradually be added:

Faculty: At present, the following members of the law school's faculty are already teaching courses in international and comparative law:

William Bradford: Public International Law, Foreign Relations and National Security Law
Daniel Cole: International Environmental Law
Robin Craig: International Environmental Law, Moot Court in International Environmental Law
Kenneth Crews: International Intellectual Property Protection
George Edwards: International Human Rights Law, International Human Rights Law Overseas Internships, Public International Law, International Legal Transactions, International Criminal Law
Frank Emmert: WTO Law, International Commercial Transactions, Vis Moot Court in International Commercial Law, European Union Law, Trading In

and With the EU Internal Market, Moot Court in EU Law, Seminar Advanced Issues of EU Law
Nicholas L. Georgakopoulos: Comparative Law
Helen Grant: International Refugee Law (fall 2003 only)
Jeffrey Grove: Introduction to the American Legal System
Swadesh Kalsi: International Trade Law (of the U.S.)
Linda Kelly: Immigration Law and Procedure, Conflict of Laws
Maria Lopez: Immigration Law and Procedure
James Nehf: European Union Law
Antony Page: Public International Law, International Securities Regulations
Anthony Tarr: Comparative Law
Julie-Anne Tarr: Comparative Law, International Commercial Transactions
James Torke: Comparative Constitutional Law

In the academic year 2003/04, the following courses in the area of international and comparative law are actually being offered at the law school (in random order):

Fall Legal Analysis, Research and Communication for LL.M. Students I (2 cr.)
Introduction to the American Legal System for LL.M. Students (2)
International Human Rights (3)
Immigration Law (2)
Public International Law (3)
Refugee and Asylum Law (2)
Seminar in Comparative Constitutional Law (2)
Conflict of Laws (2)
International Criminal Law (3)
International Trade Law [of the U.S.] (2)
Total fall credits: 23

Spring Legal Analysis, Research and Communication for LL.M. Students II (2)
Comparative Law (3)
International Intellectual Property Law (3)
WTO Law (3)
Seminar in International Legal Transactions (2)
Immigration Law (2)
Public International Law (3)
Total spring credits: 18

Total fall and spring credits offered in international and comparative law: 41

In addition, students in the new degree track may participate in one of the law school's ABA approved summer programs (China, France, Argentina) and obtain six semester credit hours there.

Under the assumption that 2003/04 is a typical year and that a similar range of courses will be offered during the academic year 2004/05, the proposed degree track can be launched without additional faculty resources.

With the anticipated growth of the program over the years, the following faculty resources should be added in the mid-term:

1 full-time faculty member to teach - inter alia - International Commercial Transactions, International Commercial Arbitration, International Tax Law, Vis Moot Court in International Commercial Law

Administration: At present, the administrative structure supporting the Master Programs at the law school consists of the following persons:

Jeffrey W. Grove, Associate Dean for Graduate Studies and Professor of Law
Tyler Henderson, Assistant Director of the Foreign Lawyers LL.M. Program
Marianne Scott, Graduate Assistant, Foreign Lawyers LL.M. Program

With the establishment of the Center for International and Comparative Law, the general administrative structure of the law school has been reinforced as of the fall of 2003 by the following persons:

Frank Emmert, Director of the Center for International and Comparative Law and Professor of Law
Marna Walthall, Coordinator of the Center for International and Comparative Law

Prof. Emmert and Ms. Walthall will have principal operational responsibility for marketing, applications, course planning, etc. Prof. Grove will be overall responsible for all graduate programs, and Mr. Henderson and Ms. Scott will give advice and assistance in particular in the early stages of the program. It is expected that the present administrative structure can handle the additional applicants/students for the new degree track in the first and possibly second year of the program. Once the number of students admitted to the new degree track exceeds 15, respectively the number of Master students overall exceeds 50, either Mr. Henderson's office will need reinforcement by another part-time person or by upgrading Ms. Scott's position to full-time or the Center for International and Comparative Law will need additional part-time staff.

Library: In order to support a Master Program in International and Comparative Law, in particular one that includes a thesis requirement, the current library holdings with regard to these subject areas will have to be expanded gradually. As this must be done without detriment to the collection for the J.D. program, additional library funds have to be allocated. However, this expansion is already on the way as part and parcel of the establishment of the Center for International and Comparative Law and a general emphasis on more international courses and studies (see also the remarks in the report of the ABA site visit team and the response by Dean Tarr, pp. 3 and 53 respectively). Therefore, it is not expected that additional funds will have to be spent specifically for this new degree track.

Facilities: As mentioned earlier, the participants in this new degree track are taking courses that are also offered to the J.D. students and are already featured on our annual curriculum. Therefore, the new degree track will not directly require additional classrooms. However, it is also clear that the development of a Master Program that will eventually accommodate about 100 students in its different degree tracks, and the addition of at least one full-time faculty in the mid-term, will increase the need for additional classrooms and offices at the law school. Again, this is a development that will happen anyway, and the needs of this new degree track will only be incremental.

Similarly, the additional students will not immediately create a need for more work spaces in the library and computer labs but will also not go unnoticed with the level of use made of the existing facilities.

An entirely different question may arise with respect to student housing. For the time being, the new international house seems to offer very good opportunities. As demand increases, the law school will have to find additional options, such as shared accommodation at Canal Square. In the long term, a combination of housing, office space and lecture rooms may need to be acquired to satisfy the different needs of a growing law school community.

X. Innovative Features of the Proposed Degree Track: There are a number of important innovative features in the proposed degree track. First of all, it is currently not possible to get a Master degree in international and comparative law in Indiana and there are generally not very many law schools in the United States offering this specialization, in spite of its increasing importance. To an extent, therefore, the proposed program will be breaking new ground. Secondly, the existing courses in international and comparative law at the law school will not only be presented under a new umbrella; we will also add a range of new courses in the coming years that have never been offered in Indianapolis and are not offered - at least not regularly - elsewhere in Indiana, such as *European Union Law, WTO Law*, and *International Tax Law*. Thirdly, the fact that the program will also be offered in the format of evening courses will allow professionals from the Indianapolis area to pursue a Master Degree alongside their current employment.

Overall, the proposed degree track will attract new students to the law school, both from Indiana and from out-of-state and abroad; furthermore, it will enrich the experience of our existing students by offering them more elective courses to chose from, as well as more opportunities for contacts and collaboration with foreign students.

Appendix: List of existing courses and proposed new courses in international and comparative law (italics signal new or modified courses):

General Courses
International Law (3 cr.)
Comparative Law (3 cr.)
Conflict of Laws (2 cr.)
International Civil Litigation (3 cr.)
Seminar in Conflict of Laws (2 cr.)
Jessup Moot Court in International Law (2 cr.)

International Trade and Commercial Law
International Trade Law *[of the United States of America]* (2 cr.)
WTO Law (3 cr.)
International Commercial Transactions (3 cr.)
International Commercial Arbitration (2 cr.)

International Securities Regulations (2 or 3 cr.)
International Tax Law (3 cr.)
International Intellectual Property Protection (3 cr.)
Seminar in International Legal Transactions (2 cr.)
Vis Moot Court in International Commercial Law (2 cr.)

Human Rights and Civil Liberties

Immigration Law and Procedure (2 or 3 cr.)
International Human Rights Law (3 cr.)
International Criminal Law (3 cr.)
International Refugee Law (2 cr.)
International Environmental Law (2 cr.)
Moot Court in International Environmental Law (2 cr.)
International Human Rights Law Internship (4 cr.)

European Union Law

European Union Law (3 cr.)
Trading in and With the EU Internal Market (3 cr.)
Moot Court in EU Law (2 cr.)
Seminar: Advanced Issues of EU Law (2 cr.)

Advanced Comparative Law

Foreign Relations and National Security Law (3 cr.)
Law and Politics of Latin American Integration (Argentina summer program)
European Union Legal System (France summer program)
Legal System of the United Kingdom (France summer program)
Legal Systems of Continental Europe (France summer program)
Legal System of China (China summer program)
Legal Aspects of the Transformation in Central and Eastern Europe (Croatia or Moscow summer program)
Enlargement of the European Union (Croatia or Moscow summer program)

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Review of the New LL.M. Track: Master of International and Comparative Law

November 6, 2003

The proposal seems to be complete and has taken into account the necessary steps to establish the degree. We should "applaud" the Law School at Indianapolis for taking such steps to both provide this additional track and to increase their efforts to attract international students to our campus.

The degree seems to be one that offers a promising relationship with the Kelly School of Business and the Center for International Business Education. The faculty is in place to provide this track and they represent a wide diversity of backgrounds and expertise to support it.

Only a couple of minor things to suggest for consideration:

1. Increase the minimum TOEFL scores for admission to at least 560 on paper-based; many graduate schools expect 600. Increase the computer-based score to at least 223; many honors programs expect 250.
2. Transfer credits – establish a general acceptance of six credits from other accredited programs upon approval of the Dean or the Curriculum Committee Chair.
3. I assume there is a thesis committee structure in place. If not, probably a better approach is for the student to satisfy a group (three) of faculty reviewers than simply one faculty advisor for the final paper.

Daniel Callison, Professor
School of Library and Information Science

The proposal looks generally OK to me and makes a good case for the new track in International and Comparative Law, but I do have some questions and suggestions for improvement.

The number of credit hours required for the degree (24) seems low to me, but I don't have a copy of the Bulletin at home with me to check whether this falls in the range of what is acceptable for master's degree programs.

On page 2, 2nd paragraph, I wonder why African legal systems have been excluded. Is it assumed that they are not distinctive because they reflect the systems of the former colonial powers? I'm not sure that colonial influence left a more enduring legal legacy than in Africa than in other parts of the world.

Under "Curriculum Requirements" (p. 2), with regard to writing a master's thesis, I recommend replacing the word "possibility" with "option". "Possibility" is ambiguous, for it could be interpreted as indicating that the faculty are still considering whether to require a thesis. I assume that they have already considered the matter and decided to let the student choose.

The section on existing degree programs (pp. 4-5) makes clear how the proposed track could help other programs, but there should also be some attention to the possibility that it might hurt them. The proposal would be strengthened by a more explicit statement that the students are expected to be drawn from groups that are not likely to enroll in other existing programs in Indiana because they live abroad or already have full-time jobs in the Indianapolis area.

On page 6, the third faculty member is shown as teaching an international course in Fall 2003 only. I don't understand why this is relevant to a program that is planned to start a year later, unless students who are taking the course now might want to use the course for the proposed LLM track after it gets approved. Will there be a replacement who will teach this course in the future?

Under "Administration" (p. 7) and/or "Facilities" (p. 8), there should be a clear statement about how many students are expected in the proposed track. The proposal lumps together this track with others, so we have some idea of the total number of master's students expected in various tracks (50-100, apparently), but if we're voting on this track we need to know its anticipated scope.

The "Facilities" section (p. 8) recognizes "the need for additional classrooms and offices at the law school", but doesn't say whether this need can be accommodated in the existing building space. There is acknowledgement that "office space and lecture rooms may need to be acquired", but no discussion of the prospects for such expansion.

The second paragraph seems confusing. It's not clear whether the proposed track will create a significant strain on existing library and computer lab facilities.

Under "Innovative Features" (p. 8), many new courses are expected to be added, apparently without significant expansion of the faculty ranks (see 2nd par. on p. 7). That implies an adverse impact on the

existing curriculum. If more international courses are added, what other types of courses will be offered less often? I assume there won't be an increase in the teaching load. Will there be a gradual shift to replacing current faculty with newcomers who have more expertise relevant to the proposed track?

The list of courses (pp. 8-9) does not make clear whether these will be offered often enough or scheduled conveniently enough to make attainment of the degree possible as planned. There should be sample curricula for both full- and part-time students, so we can see what they can expect to find in the course schedule from one semester to the next.

PROPOSAL

GOAL: BIOMOLECULAR IMAGING PROGRAM
LEADING TO A PH.D. IN MEDICAL BIOPHYSICS

CONTENT:

1. REVISION OF THE MEDICAL BIOPHYSICS CURRICULUM
2. INTRODUCTION OF A BIOMOLECULAR IMAGING MINOR
3. COURSE CHANGE REQUESTS FOR G613, G614 AND F592 TO PROVIDE APPROPRIATE CORE COURSES FOR THE NEW PROGRAM.

CALL HIEDI LINDER (8-3839) WITH ANY QUESTIONS

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COVER PAGE

INSTITUTION:	Indiana University
COLLEGE:	School of Medicine
DEPARTMENT:	Inter-departmental Administered by the Dept. of Cellular and Integrative Physiology
DEGREE PROGRAM, TITLE:	Degree in Medical Biophysics Program focus in *Biomolecular Imaging*
FORM OF RECOGNITION TO BE AWARDED/DEGREE CODE:	Ph.D. or Minor
LOCATION OF PROGRAM/CAMPUS CODE:	Indiana University-Purdue University Indianapolis
PROJECTED DATE OF IMPLEMENTATION:	??
DATE:	_____

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Summary of Proposal

I **Campus** IUPUI

II **Proposed Degree** Ph.D., Medical Biophysics

III **Projected date of implementation** ??

IV **List the major objectives of the proposed program, and describe its chief features.**

The conceptual objective of the proposed program is to recognize that imaging plays a central role in modern biomedical and biophysical research. It is the discipline providing three-dimensional structures of individual proteins; as well as probing the heterogeneity of tissue, cellular and molecular function in living organs or whole organisms. The overall academic objective of the program is to generate scientists trained in the theory and application of imaging to the biomedical sciences. Our goal is to produce graduates that are capable of leading their research areas through the design and implementation of new approaches to probe biological functions, and solve biomedical questions.

The immediate objective of this application is to update the inter-departmental Medical Biophysics program to focus on Imaging, one of the most active areas of biophysical research. In overview, the revised curriculum includes a set of pre-existing courses at the Medical Center that teach the fundamentals of cell and molecular biology, and a group of three newly revised courses that build on the fundamentals of imaging science (Introduction to Introduction to Biomolecular Imaging: F592) to develop more specialized knowledge in Advanced Cellular Imaging (G613) and Advanced Molecular Imaging (G614). Please note that this application is bundled with the proposed syllabi for both G613 and G614 and seeks approval for these course changes as part of the curricular changes. Approval for F592 was requested earlier in anticipation of offering this course in Fall 2004.

V **Why is this revision of the degree program needed? (Rationale)**

This program updates the existing Medical Biophysics Ph.D. program. The existing Ph.D. program in Medical Biophysics has attracted a unique pool of students from physical science backgrounds (e.g. physics and chemistry), but has suffered from lack of focus, few students applications, and thin faculty support. Several recent attempts to modestly revamp the program have failed to yield significant improvement. The program has needed a deep realignment to match emerging areas of biophysical research that closely reflect faculty research areas, and to broaden appeal of the program to undergraduates. This revision also serves to provide an academic focus for the cadre of faculty on the IUPUI campus who use advanced imaging methodologies as a central pillar of their research focus. We believe the new Biomolecular Imaging program meets these goals.

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Summary of Proposal

VI Describe the student population to be served.

A limitation of the existing Medical Biophysics program is that it has strong appeal only to the relatively few students in the physical sciences that are also attracted to biological sciences. One of the goals in our revised program is to have a curriculum that is attractive not only to these students, but also to the abundant undergraduates majoring in Cell Biology. These students are universally exposed to the power of imaging approaches (it is central to the field of Cell Biology). We will target the spark of interest and excitement related to that familiarity in our advertisements and recruitment.

VII How does this program complement the campus or departmental mission?

The IUPUI campus has developed a unique constellation of resources in the imaging sciences under the auspices of INGEN, and this new program is integrated with the faculty who are part of the INGEN imaging initiatives. At the level of faculty, a goal of this interdepartmental program is to bring together a diverse group of scientists in both the Basic and Engineering Sciences. Despite a broad interest in Imaging at IU and Purdue, there has been no structure to allowing or encouraging interested faculty to unite and pursue a common cause. We hope this program will serve this purpose in faculty development. The program has no significant overlap with existing programs on campus. The new program is perceived as complementing and enhancing Biomedical Engineering strengths on campus. Both Ed Berbari and George Wodoka (IUPUI and Purdue leaders of Biomedical Engineering) have expressed interest in participating in the program. In this first iteration of the revised program, we have developed the faculty resources only on the IUPUI campus. We plan to expand at a later point to include participation from the West Lafayette campus, but the logistics of needing frequent meetings to develop the program have encouraged a more local effort at first.

VIII Describe any relationship to existing degree programs within the IU system.

As listed above, the new program provides a change in program emphasis for the pre-existing Medical Biophysics degree program. Student entering the new Biomolecular Imaging program will continue to receive the Ph.D. in Medical Biophysics. This program neither duplicates nor conflicts with any other degree program within the IU system.

IX List and indicate the sources (including reallocation) of any new resources (personnel, financial, learning, etc.) required to implement the proposed program.

The existing budget from the Graduate Office for the Medical Biophysics program will be used to support students and administer the program over the long-term.

Several new resources will be available to implement the program. As the

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Summary of Proposal

department administering the program, the Department of Cellular and Integrative Physiology has agreed to provide 30% secretarial time to support the realignment and implementation of the program. To initiate the program, the Dean of Research (Dr. Pescovitz) has supported the use of INGEN funds to advertise the program. The Dean of Graduate Studies (Dr. Bosron) has submitted a block grant that has been funded and will provide stipends to support up to 3 first year students starting in 2003 in the new program.

X **Describe any innovative features of the program (e.g., involvement with local or regional agencies, offices, etc.; cooperative efforts with other institutions; opportunities for students, etc.)**

Biomedical imaging sciences have recently been recognized as part of the national research mission. The crucial role of this scientific domain has now been formally recognized by the creation of a new NIH institute, the National Institute of Biomedical Imaging and Biomedical Engineering (NIBIB). The mandate of this new institute is to provide state of the art training and research opportunities for biomedical research in the imaging and Biomedical Engineering sciences.

There are very few degree programs (less than a dozen) in the country directly related to biomedical imaging sciences. The IUPUI campus and the proposed program have a marked advantage because of the availability of an unusually broad array of imaging expertise. This will translate to expansive and unusual opportunities for students that should ultimately provide great job and research opportunities as the NIBIB continues to support the field.

Major Program

Doctor of Science in Medical Biophysics
Indiana University School of Medicine
Indiana University-Purdue University Indianapolis

A. Abstract

Objectives:
The academic objective of the program is to generate scientists trained in the theory and application of imaging to biomedical research, with an emphasis on cellular and molecular imaging sciences.

Clientele to be served:
The program is designed for undergraduate students desiring to pursue professional research that develops and applies imaging to answer questions of biomedical importance. Curriculum is readily accessible for students with undergraduate training in physical sciences (e.g. chemistry, physics) or biological sciences (e.g. cell biology, molecular biology).

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Curriculum Overview:
A total of 90 semester hours is required to complete the Ph.D. in Medical Biophysics. The curriculum includes 23 credits of required core courses (listed below). Electives may then be chosen based on student interest and the need to complete a minor. Total semester hours of coursework must amount to at least 35 credit hours, with remaining credit hours coming from 2-3 years of independent research.

Required Courses	Course Number	Credits
Eukaryotic Cell Biology	G817	3
Molecular and Cellular Physiology	F705	4
Fundamentals of Molecular Biology	G865	3
Introduction to Responsible Conduct of Research	G505	1
Introduction to Research	F701	2
Introduction to Biomolecular Imaging	F592*	3
Advanced Molecular Imaging	G614	3
Advanced Cellular Imaging	G613	3

*F592 Course change request previously submitted.

Employment possibilities:

Graduates will be qualified to perform research in academic, biotechnology, pharmaceutical, and industrial settings.

B. Program Description

1. Proposed Program and Stated Objectives

Background:

Imaging plays a central role in modern biomedical and biophysical research. It is the technology that permits us to visualize the three-dimensional structures of individual proteins; as well as probing the heterogeneity of tissue, cellular and molecular function in living organs or whole organisms. The crucial role of this scientific domain has now been formally recognized by the creation of a new NIH institute, the National Institute of Biomedical Imaging and Bioengineering (NIBIB). The mandate of this new institute is to provide new training and research opportunities for biomedical research in the imaging and Biomedical Engineering sciences. The IUPUI campus has developed a unique constellation of resources in the imaging sciences under the auspices of INGEN. These include academic strengths in the distinct, but overlapping, areas of cellular imaging and molecular imaging. The breadth of the topic areas will be used to simultaneously provide students a broad interdisciplinary background, while offering a diverse choice of

training opportunities.

This program updates the existing Medical Biophysics Ph.D. program. The existing Ph.D. program in Medical Biophysics has attracted a unique pool of students from physical science backgrounds (e.g. physics and chemistry), but has suffered from lack of focus, few students application, and thin faculty support. Several recent attempts to modestly revamp the program have failed to yield significant improvement. The program has needed a deep realignment to match emerging areas of biophysical research that closely reflect faculty research areas, and to broaden appeal of the program to undergraduates. We believe the new Biomolecular Imaging program meets these goals.

Activities in the Medical Biophysics program over past 5 years:

Students in the program:

Year	Matriculated Students	Total Enrollment
2002-03	0	3 Ph.D.
2001-02	1 Ph.D.	5 Ph.D., 1M.S.
2000-01	0	5 Ph.D., 1 M.S.
1999-00	0	6 PH.D., 1 M.S.
1998-99	2 Ph.D., 1 M.S.	8 Ph.D., 1 M.S.

Current position of Graduates:

Zhenhui Chen (Ph.D. 1997). First postdoc at Johns Hopkins University (Moorman), Second postdoc at IU-Clarian

Joseph M. Autry (Ph.D. 1998). Postdoc at University of Minnesota (Thomas)

Michael Brzustowicz (Ph.D. 2001). Postdoc at Stanford (Brurger)

Lawrence Mark (MD, Ph.D. 2001). Residency at IU, Dermatology, Performing research.

Alfred C. Dumanal (Ph.D. 2000). First postdoc at Univ. of Virginia (Biltonen). Second postdoc at Purdue/IUMC.

Proposed Program and Objectives:

This proposal seeks to change the emphasis of the Medical Biophysics Ph.D. to a program focused on Biomolecular Imaging. The revised program objective is to generate scientists trained in the theory and application of imaging to biomedical research, with an emphasis on cellular and molecular imaging sciences.

This proposed program builds on campus strengths in diverse imaging sciences and includes faculty from the IU departments of Physiology, Biochemistry, Molecular Biology, Cell Biology and Anatomy, Nephrology, Medicine, as well as the Purdue departments of Engineering, Computer & Information Science, Biomedical Engineering, Chemistry, Physics, and Biology. The revised program strengthens the interdepartmental nature of the original Medical Biophysics program, and shifts focus to one of the most active areas of current biophysical research on this campus

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and elsewhere.

It is anticipated that students will obtain the Ph.D. in Medical Biophysics following approximately 1½ years of coursework (described in section 3 below) and 2-3 years of independent research, culminating in a thesis. In the first year in the program, students will participate in laboratory rotations and define the laboratory they will join for independent research. Once a laboratory is picked, the student and mentor will recruit faculty for a research committee that will have initial oversight of the student's progress. By the end of the second year, students will be required to successfully defend a thesis proposal, written in the format of a National grant (e.g. NIH, AHA, etc), in order to advance to Ph.D. candidacy. The thesis proposal defense will include an oral presentation to the faculty in the program. This format of proposal defense assures training at grant writing, and students will be encouraged to submit their proposals to obtain fellowship funding for their thesis work. While advantageous, obtaining funding is not required since it is assumed that the thesis mentor or the program will pay the student stipend and all customary and usual fees through the duration of the training. Following the advance to Ph.D. candidacy, students will be required to make yearly presentation of work-in-progress to the program faculty in a formal seminar in the late Spring. Upon advance to Ph.D. candidacy, the research committee (or potentially other faculty) will be formed into the thesis committee to monitor progress of the student until degree completion. The thesis committee will hold a Fall meeting with the student to assess progress and hear research updates from the student. Thus each student will make oral research presentations twice yearly to help monitor and facilitate progress for timely completion of the degree.

The academic environment will be enriched by a research seminar series in which speakers from within and outside the University will be invited to present their findings. It will be required that program faculty present their own work at least every second year, as a way to acquaint students and colleagues in the program with current research interests. It is hoped this will provide some cohesiveness to a program that is spread throughout the campus. As much as possible, the seminars of outside speakers will be co-sponsored by INGEN groups and/or Departments interested in imaging, to leverage both funds and interest for the invited speakers.

The steering committee is the group of faculty that provides direct oversight and direction to the Introduction to Biomolecular Imaging program. It is currently composed of Drs. Dunn, Hurley, Montrose and Naumann. Membership on the committee will be rotated among participating faculty in the program, with 2 year terms. Some of the current members may be asked to stay on for longer than this term upon initiation of the revised program, so that terms can be staggered. The only proposed restriction on membership is that both the School of Science and School of Medicine must be represented on the committee. This helps sustain the interdepartmental nature of the program. The director of the program (chair of the Department of Cellular and Integrative Physiology which oversees the program), selects new committee members with advisory input from the steering committee.

One long term objective of the revised program is to apply for a training grant from the NIH. The new NIBIB (National institute of Biomedical Imaging and

Bioengineering) at the NIH has already issued requests for applications for training grants in the imaging sciences. We hope to be competitive for such funds within 3 years after initiating the program.

2. Admission Requirements, Anticipated Applicants, and Student Financial Support

Admission requirements:

Students accepted into the program must fulfill the standard admission requirements of the Indiana University Graduate School. Under exceptional circumstances, the School of Medicine Graduate Studies Committee may ask the Indiana University Graduate School to conditionally admit individuals as special students.

Prerequisite coursework and/or degrees:

Applicants must possess at least a bachelor's degree. Undergraduate level calculus, physics, organic and inorganic chemistry will routinely be required. Exceptions may be made if other strengths are identified in the application.

Anticipated clientele:

Undergraduates majoring in Biomedical Engineering, Cell Biology, Physics, Molecular Biology, Chemistry, or Zoology.

Selection criteria:

The minimum admission requirements are:

1.) Undergraduate baccalaureate degree
2.) Passing grades in coursework covering calculus, physics and chemistry
3.) Adequate scores on standardized tests (GRE/MCAT)
4.) Strong letters of support from faculty at applicant's undergraduate institution, and research mentors (if applicable).

Student financial support available:

Qualified students will be proposed for University Fellowships to support their first year of study. Alternatively, a block grant to the School of Medicine Graduate school is providing support for the first year of study in the new program for up to 3 students. Students will also be supported by the existing funds allocated to the Medical Biophysics program. It is anticipated that all students will receive full stipend and tuition remission support. Past the first year, research mentors must provide support for students who have joined their laboratory.

3. Proposed Curriculum

The curriculum listed by content area is listed below. All courses except electives are required.

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Required Courses		**22 cr.**
Eukaryotic Cell Biology	G817	3
Molecular and Cellular Physiology	F705	4
Fundamentals of Molecular Biology	G865	3
Introduction to Responsible Conduct of Research	G505	1
Introduction to Research	F701	2
Introduction to Introduction to Biomolecular Imaging	F592	3
Advanced Cellular Imaging	G613	3
Advanced Molecular Imaging	G614	3

** New course, number not yet determined.

Elective courses [in consultation with program faculty] ……≥12 cr.
No listing is provided here, please see section….

Independent research……≤55 cr.

Total Minimum Credits……..……...90 cr.

Sample curriculum sequence (2 years):

Fall – Year One		**11-12 credits**
Eukaryotic Cell Biology	G817	3
Fundamentals of Molecular Biology	G865	3
Introduction to Biomolecular Imaging	F592	3
Introduction to Responsible Conduct of Research (or Elective)	G505 (or Elective)	1

Spring – Year One		**11-12 credits**
Molecular & Cellular Physiology	F705	4
Advanced Cellular Imaging	G613	3
Introduction to Research	F701	2
Elective	Elective	2-3

Summer – Year One		**6 credits**
Research in Physiology	F701	6

Fall – Year Two		**10-14 credits**
Advanced Molecular Imaging	G614	3
Elective (or Introduction to Responsible Conduct of Research)	Elective (or G505)	2(1)
Elective	Elective	6-8

Spring year 2
Remaining electives needed to complete 35 minimum credit hours and a minor.

Beyond the Spring semester of year 2, credit hours will be awarded for research in Fall, Spring and summer sessions; consistent with the need to sustain full-time academic status and complete 90 credit hours by the completion of the 4th year of

study in the program.

Existing required courses:

Eukaryotic Cell Biology (3cr)
G817
Organization and function of sub-cellular structures. Intracellular coordination of cell activity: protein and RNA trafficking, chromatin dynamics and intracellular processing of receptor mediated signals.

Molecular and Cellular Physiology (4cr)
F705
The course emphasizes intracellular mechanisms which underlie the physiological functions of many organ systems. Three general topic areas will be discussed: membrane transport, physiology of excitable membranes and contraction, and endocrine regulation. Current research techniques and research findings in these areas will be discussed through an interactive discussion of original research publications.

Fundamentals of Molecular Biology (3 cr.)
G865
Principles of molecular structure function and biosynthesis; core information regarding prokaryotic and eukaryotic gene continuity and metabolic coordination; introduction to multicellular systems and problems.

Introduction to Responsible Conduct of Research (1 cr.)
G505
This course provides an introduction to both the theory and practice of research ethics and covers the key ethical principles and concepts. Topics covered include the history of science and misconduct, mentoring and laboratory supervision, data management and ownership, human subjects research (including safety compliance), animal rights and welfare, research writing, authorship and mentorship, conflict of interest and industry relationships, intellectual property and copyright and genetic technology.

Introduction to Research (variable cr.)
F701
This course provides credit hours for laboratory rotations and independent research effort. For rotations, students consult with program faculty and select up to 3 laboratories in which students rotate for a minimum of 5 weeks each to perform laboratory research. Credit for this course also requires weekly attendance at the research seminar series run by the program.

New required courses:

Introduction to Biomolecular Imaging (3 cr.)
F592
Introduce key concepts that carry through all imaging modalities, and provide

examples of how these concepts of modern imaging apply in the real world at the level of cellular and molecular imaging. Includes a survey of the principles and application of modern imaging methods.

Advanced Cellular Imaging (3 cr.)
G613
Goal is to introduce the imaging methods and concepts that are used to extract information about cellular structure and function. The course emphasizes general principles of optical microscopy and digital imaging. Visible light microscopy and electron microscopy are emphasized as modalities of cellular imaging. Applications and examples relate to analysis of cellular properties. The course includes 7 laboratory sessions. The course will be team taught by a group of faculty from diverse departments within the IUPUI campus. Ken Dunn is the Course Director.

Advanced Molecular Imaging (3 cr.)
G614
Goal is to introduce the imaging methods and concepts that are used to extract information about structure and function of individual molecules. The course emphasizes general principles of macromolecular structure and dynamics, and discusses both ensemble and single molecule analyses. Methodologies using visible light, electrons, x-ray diffraction and atomic force mapping are among the topics covered as modes of molecular imaging. The molecular course includes 6 laboratory sessions. The course will be team taught by a group of faculty from diverse departments within the IUPUI campus. Tom Hurley is the Course Director.

Recommended electives:

Electives are selected in consultation with the program director, the research mentor, and the research committee for the student. Some electives may require other courses as pre-requisites, depending on student background. The goal is to accommodate the widely varying backgrounds of students, and allow students to develop diverse areas of emphasis within the program. Partial lists of relevant electives are given below, but provide examples of the diversity of emphasis that is possible.

CELLULAR related Electives	**Course Number**	**Credits**
Epithelial Cell Biology	G760	3
Physiology of Membranes	F710	2
Integrative Cell Biology	G818	3
Membrane Biophysics	F650	3
Cell-Cell communication	G706	3
Cellular Biochemistry and Regulation	B810	2
Curr. Topics in Cell Structure and Function	G595	3
Experimental approaches to Cell Struc/Func	G801	3
Cellular Pharmacodynamics	F806	3
Medical Physiology	F613	5

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MOLECULAR related Electives	Course Number	Credits
Protein Structure and Function	B807	3
Methods in Molecular Biology and Pathology	G890	3
Advanced Molecular Biology Methods	G910	3
Molecular and Biochemical Genetics	Q612	3
Basic Human Genetics	Q580	3
Membrane Biophysics	F650	3
Molecular Immunology	J805	3
Drug-protein interactions	F832	3
Molecular mechanisms of drug action	F835	3
Medical Biochemistry	B800	3
X-Ray Crystallography	A620	3

IMAGING related Electives	Course Number	Credits
Electron microscopy	D866	2
Electron microscopy laboratory	D867	1-3
Computer graphics	CSCI 550	3
Advanced Graphics and Visualization	CSCI 552	3
Numerical Methods for Engineers &Scientists	CSCI 512	3
Physical Optics	Physics 400	3
Physical Optics laboratory	Physics 401	2
Coherent Optics and Quantum Electronics	Physics 522	3
Medical Imaging	BME 595E	3
Biosignal Analysis	BME 595G	3
Intro to Digital Signal Processing	EE 410	3

GENERAL ELECTIVES

G651 - Introduction to Biostatistics 1 (3 cr)
G652 - Introduction to Biostatistics II (3 cr)
N802- Techniques of Effective Grant writing (3 cr)
F780- Scientific Oral communication (1 cr)
G655- Research Communication (2 cr)

MINORS

All minors offered in the School of Medicine will be available to students, including those offered by each basic science department (12 credit hours in one department) and the specialty minors (e.g. Life Sciences, Aging, Diabetes, Cancer). In addition, some of the minors from the School of Science will be relevant. It is anticipated that students may opt for minors already existing or being developed in Biomedical engineering, Bioinformatics, Computer Science, or Chemistry.

Courses at another institution:

Students are not required to take courses at other institutions, although electives

may be accepted, pending approval by the Indiana University Graduate School.

4. Form of Recognition

Type of degree to be awarded:

Students who complete the graduate requirements will receive a Ph.D. in Medical Biophysics from Indiana University.

Program, organizational and site information on diploma:

All students completing the degree requirements will receive the Ph.D. in Medical Biophysics. The Ph.D. is appropriate given the research thrust of the degree. The Ph.D. in Medical Biophysics is housed in the Indiana University Graduate School. There will be ongoing review of curricular and admissions criteria by the Indiana University Graduate School. The Indiana University Graduate School will award the degree.

5. Program Faculty and Administrators

Below is a list of each faculty, indicating where their area of imaging expertise fits within the main areas of emphasis in the program (designated as Cellular, Molecular or Image Analysis). If individuals are full members of the graduate faculty, they will be included in the program as potential thesis research mentors. Faculty who are not yet full members of the graduate faculty will not qualify as thesis mentors, but can contribute to teaching and membership on research committees. Details about faculty professional and scholarly achievements are contained in the CVs for these individuals that are attached in Appendix C.

Simon Atkinson, Ph.D.
Department: Medicine (Nephrology), Biochemistry & Molecular Biology
Rank: Associate Professor
Specialization: Cellular
Graduate Faculty: Full member, Indiana University

Robert Bacallao, M.D.
Department: Medicine (Nephrology)
Rank: Associate Professor
Specialization: Cellular
Graduate Faculty: None

Robert Berbari, Ph.D.
Department: Engineering
Rank: Professor
Specialization: Cellular
Graduate Faculty: Full member, Purdue University

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Glenn Bohlen, Ph.D.
Department: Physiology
Rank: Professor
Specialization: Cellular
Graduate Faculty: Full member, Indiana University

Ricardo Decca, Ph.D.
Department: Physics
Rank: Assistant Professor
Specialization: Cellular
Graduate Faculty:

Kenneth W. Dunn, Ph.D.
Department: Medicine (Nephrology)
Rank: Associate Professor
Specialization: Cellular
Graduate Faculty: Associate member, Indiana University

Jeffrey Elmendorf, Ph.D.
Department: Physiology
Rank: Assistant Professor
Specialization: Cellular
Graduate Faculty: Associate member, Indiana University

Shiaofen Fang, Ph.D.
Department: Computer and Information Science
Rank: Associate Professor
Specialization: Image Analysis
Graduate Faculty: "P" rating, Purdue University

Vincent Gattone, Ph.D.
Department: Anatomy and Cell Biology
Rank: Professor
Specialization: Cellular
Graduate Faculty: Full member, Indiana University

Thomas Hurley, Ph.D.
Department: Biochemistry and Molecular Biology
Rank: Professor
Specialization: Molecular
Graduate Faculty: Full member, Indiana University

Marshall Montrose, Ph.D.
Department: Physiology
Rank: Professor
Specialization: Cellular
Graduate Faculty: Full member, Indiana University

Alonso Moreno, Doctor in Science

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Department: Medicine (Cardiology), Physiology
Rank: Associate Professor
Specialization: Cellular
Graduate Faculty:

Christoph Naumann, Ph.D.
Department: Chemistry
Rank: Assistant Professor
Specialization: Molecular
Graduate Faculty: Associate member, Indiana University

Frederick Pavalko, Ph.D.
Department: Physiology
Rank: Associate Professor
Specialization: Cellular
Graduate Faculty: Full member, Indiana University

William Stillwell, Ph.D.
Department: Biology
Rank: Professor
Specialization: Cellular and Molecular
Graduate Faculty: Full member, Indiana University

Mihran Tuceryan, Ph.D.
Department: Computer and Information Science
Rank: Professor
Specialization: Image Analysis
Graduate Faculty: Full member, Indiana University & Purdue University

Wiltz Wagner, Ph.D.
Department: Anesthesia
Rank: Professor
Specialization: Cellular
Graduate Faculty: Full member, Indiana University

Hiroki Yokota, Ph.D.
Department: Biomedical Engineering, Anatomy & Cell Biology
Rank: Assistant Professor
Specialization: Molecular
Graduate Faculty: Full member, Indiana University

Weiming Yu, Ph.D.
Department: Medicine (Nephrology)
Rank: Assistant Professor
Specialization: Cellular
Graduate Faculty: Currently pursuing Indiana University membership

Program Administrators

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Program Director
Marshall Montrose, Ph.D. (Physiology, Acting Chair)

Steering Committee
Kenneth Dunn, Ph.D. (Medicine)
Thomas Hurley, Ph.D. (Biochemistry)
Marshall Montrose, Ph.D. (Physiology)
Christoph Naumann, Ph.D. (Chemistry)

Administrator
Hiedi Linder, Physiology

New faculty positions required

No new faculty positions are required.

6. Needed Learning Resources

Library holdings, equipment and research facilities available:

In support of its educational and research mission, Indiana University has an extensive array of learning resources and facilities that will be available to the student. State-of-the-art data, video and voice technologies are present to create a sophisticated learning environment.

Library holdings:

The libraries will be important resources for students in the graduate program. The collections in Bloomington number 5.6 million volumes and over 40,000 journals. The IUPUI campus, meanwhile, has a new, state-of-the-art library completed in 1993. There are more than 300,000 volumes, including subscriptions to over 3,000 journals. The library has two networked classrooms as well as both faculty and student networked study rooms and over 600 individual study carrels. Students have access to several databases for bibliographic searches. The Ruth Lilly Medical Library, located in the Medical Research Building, serves the schools of Medicine, Nursing, and Allied Health Sciences. This library houses over 194,000 volumes. Students have electronic access to over 400 databases such as Medline, CINAHL, HEALTH, CANCERLIT, and the Cochrane Library.

Shared computer laboratories on the campus give students access to databases for bibliographic searches and to statistical packages for research. There are eighteen such learning centers on the IUPUI campus, including centers in the Ruth Lilly Medical Library, and the University Library. Within the School of Medicine, Medical Educational Resources Program (MERP) and Medical Illustration are additional resources of visual and electronic equipment and resources.

Available Teaching Facilities in the Biotechnology Training Program: Imaging Centers on Campus

In addition to the equipment available in the laboratories of individual research

mentors, IUPUI has a remarkable array of modern, state-of-the-art imaging equipment available to students and researchers.

Indiana Center for Biological Microscopy

The recent confluence of technical developments in optical microscopy, and the digital technologies of image deconvolution and three-dimensional image representation have made high resolution three-dimensional imaging possible. Funding from Indiana University, Indiana University Medical School, the Division of Nephrology, the NIH and the Lilly Endowment has given Indiana University a world-class center for biological microscopy, equipped with a comprehensive set of the best examples of these technologies. The Indiana Center for Biological Microscopy is equipped with approximately $2 million dollars in optical equipment:

- two combined confocal and 2-photon microscopes (Zeiss 510-NLO META, Bio-Rad MRC-1024MP),
- ultraviolet-visible confocal microscope (Zeiss LSM-510)
- high-speed confocal microscope (Perkin-Elmer Ultraview)
- high resolution cooled CCD imaging and image deconvolution microscope (Applied Precision Deltavision System)
- dedicated microinjection and micromanipulation system equipped for high resolution DIC and video microscopy.
- numerous Pentium and Silicon Graphics workstations running advanced image processing software for analysis of both 2-dimensional and 3-dimensional images.

The Center seeks to apply, develop and combine these imaging technologies to provide researchers and students with a rational, integrated approach to microscopic imaging. The unique strength of the imaging facility is that it not only provides investigators with hands-on access to state-of-the-art imaging equipment, but also with the benefit of close interaction with the facility staff. Providing consultation, training and experimental assistance, the facility staff provides researchers with the opportunity to optimally apply the imaging technology most appropriate to each particular research question. The Center is also actively involved in research into biological imaging, resulting in the development and dissemination of new methods of microscopy and digital image analysis software. The products of these activities are disseminated through a program of education, including seminars, courses and individual training. Further details of the Center may be found at: http://www.nephrology.iupui.edu/Imaging/

Medical Sciences Imaging Facility

The facility offers a combination two-photon/confocal microscope for subcellular resolution of events in living cells and tissues (Zeiss LSM510 NLO). The two-photon component is equipped with a 10W pumped Titanium Sapphire laser for maximal focusing depth into living tissues, and the facility specializes in living tissue and in vivo imaging in anesthetized animal models. The facility also houses an Olympus U-10 acoustic microscope for imaging based on ultrasound echos (spatial resolution almost cellular level), a conventional upright fluorescence

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microscope, a low light digital imaging fluorescence microscope (with Roper CoolSnap HQ camera for 20 Hz image collection), 3 PC-based image analysis workstations with Metamorph (Universal Imaging) software, and a networked, Fuji Pictrography 3000 printer for photo-quality digital prints. More information is available at http://www.iupui.edu/~medphys/msif/

Indiana Center of Excellence in Biomedical Imaging

The Center is housed within the research laboratories of the Department of Radiology, and specializes in whole animal imaging using chemical reporters that report on cell and molecular events. The goals of the Center are (1) identification and development of tracers and/or contrast agents to monitor gene expression, cellular physiology and molecular interactions, (2) development of novel in vitro and in vivo imaging methodologies for the study of cellular and molecular processes, and (3) application of developments to study animal and human subjects.

The equipment includes: High Resolution Small FOV Positron Emission Tomography, 1.5T GE Signa LX Magnetic Resonance, Siemens HR+ PET Scanner, FUJI FLA-2000 for Autoradiographic Analysis, EVS MicroCT. The facility will soon be getting a Siemens PET/CT and Siemens 3T MRI. More information is available at http://www.indyrad.iupui.edu/in-cebi/.

Interventional Radiology Research Laboratory

The laboratory specializes in whole organism imaging using general isotopic chemical reporters. The facility includes two imaging suites designed for imaging animals via fluoroscopy and radiographic imaging. The laboratory suite also includes nuclear medicine imaging and a chemical laboratory. Radiographic imaging equipment available within the Radiology Research Laboratory includes the following: Toshiba Angiorex Digital Fluoroscopy, Picker Cine Angiographic C-arm, and a GE DXD 350II Radiography Unit. Other radiographic equipment includes a portable fluoroscopy unit and a mobile radiographic unit.

Supporting equipment includes inhalation anesthesia machines and physiologic monitors for surgical/imaging procedures. A preparation room provides an area for preparation of animals to be imaged. The prep room also is equipped for minor surgical procedures, autopsies, necropsies and other none imaging procedures. The laboratory also includes biochemical, radiopharmaceutical, darkroom, office and conference areas. More information is available at http://www.indyrad.iupui.edu/public/researchlab/researchlab.html.

IUPUI Nanoscale Imaging Center (NIC)

Currently, one of the most active areas of biomedical imaging is focused on the study of biological systems at a truly molecular level. Funded by IUPUI through a Research Investment Fund Award and by the Schools of Science and Engineering, the IUPUI-Nanoscale Imaging Center (NIC) represents a concentrated campus effort to investigate the behavior of single molecules and nanostructures, with an emphasis on Medical, Biological, and Materials Science applications. NIC provides

IUPUI researchers with state-of-the-art single molecule imaging and nanoscale characterization and manipulation tools, including wide-field single molecule fluorescence microscopy (custom-built), single molecule near-field optical microscopy (custom-built), fluorescence correlation spectroscopy (Zeiss-Confocor 2), and combined atomic force and optical microscopies (Digital Instruments-Bioscope AFM & Zeiss-Axiovert 100). The center has been built on the existing expertise within the School of Science concerning sophisticated optical setups for single molecule imaging, nanoscale manipulation and characterization, and subcellular imaging. Part of NIC's objective is not only to provide cutting-edge technology and expertise concerning nanoscale-level imaging for researchers at the IUPUI campus, but also to develop next generation imaging techniques and imaging probes in this highly perspective discipline.

Available Imaging Teaching Facilities

A classroom in the new BRTC facility is designed for teaching microscopy and image analysis. The classroom (1200 sq ft) contains, 14 computer workstations, an instructor station, polycom setup for video conferencing, internet access, two high resolution video projectors, electronic data projection system, and touch screen for interactive work with the data projector system. All computers will have Metamorph image analysis software (Universal Imaging Co) that is among the most popular and versatile programs for use in biological imaging. The room will have an inverted scope with fluorescence and a dissecting scope, both interfaced with a video rate CCD camera whose output will be visible to trainees on both their workstations, and a data projection screen at the front of the class. Using the Waycom Touchscreen, instructors can be at the screen and touch it to activate links to go to web sites, pull down menus when instructing on software, etc. The system can also be used to "write" on the screen (circle projected microscope structures, draw arrows to items, write text by hand, etc).

The teaching facility also includes a 2500 sq ft teaching laboratory with instrument room, cell culture facility, darkroom, cold room and access to proteomics core, protein expression core, and center for medical genomics and animal facilities in the building.

C. Program Rationale

1. Institutional Factors

Compatibility with the institution's mission:

The Ph.D. in Medical Biophysics has already been approved by the State as a granted degree. The proposed revamping of the program is consistent with the Indiana University's Strategic Directions Charter developed in 1996 in several areas. We feel that this deep revision of a long-standing program is consistent with several recommendations in the strategic plan including the (1) call for continual self-assessment of University activities, and (2) promoting strategic educational units that reflect the excellence of Indiana University in distinctive ways. These were points raised in the Accountability and Best Practices recommendations of the Plan. We also

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believe that the plan supports the Community of Learning objective to improve teaching, research and creative work, and the Responsibilities of Excellence goals to direct resources to programs that have special importance for the future. This is clearly an unusual program that rides a rising wave of interest in the imaging sciences.

Planning process resulting in this proposal

This proposal is the result of 8 months work from the steering committee, who met at least once per month for a couple of hours to develop the concept, design the coursework, and build the information in this proposal.

Impact of the proposed program on other programs

The Department of Biomedical Engineering at IUPUI is just initiating a Master's degree program. We hope that the Introduction to Biomolecular Imaging program would be an appealing alternative for further training of these students at the Ph.D. level, and provide for on-campus continuity of their education.

2. Student Demand

In addition to the physical sciences student classically interested in the program, we seek to provide a new research focus that will provide Cell Biology undergraduates with a new avenue for advancing their research interests. We hope the program will also appeal to the students graduating from the newly developed MS program in Biomedical Engineering being initiated on campus.

3. Transferability

Transfer of graduate credits from other institutions will be in accordance with the regulations established by the Indiana University Graduate School.

4. Access to graduate and professional programs

This degree is not preparing students for entry into other graduate or professional schools.

5. Demand and employment factors

Given the mandate of the new NIH NIBIB institute to support biomedical research using imaging, there will be a growing market for researchers trained in this field. Given the lack of Ph.D. training programs in this research area, graduates should encounter favorable job markets for their skills in both academia and commercial settings.

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6. Regional, state and national factors

Comparable programs in region or state

The proposed Ph.D. program emphasizing Introduction to Biomolecular Imaging, or any form of imaging sciences, is unique to Indiana. The closest graduate teaching domain is Biomedical Engineering, which is strongly represented at West Lafayette as well as developing at IUPUI. As a field and course of study, biomedical engineering is most interested in the use of engineering principles to build new devices of benefit to human health, and this can include imaging devices. However, the Introduction to Biomolecular Imaging program is equally, or more, interested in the development and use of advanced imaging methodologies to address important biological questions with existing devices. Thus the new program is complementary to existing programs. Several other schools in states surrounding Indiana have programs in optics, optical engineering, or computer graphics. However none of these provides an emphasis on biological principles.

External agencies

There are no regional, accrediting, professional associations, or licensing requirements that have shaped the program's curriculum or other aspects of the program.

D. Program Implementation and Evaluation

1. Program Implementation

2. Program Evaluation

General Principles:

The evaluation process will be a continuous one, as we note the progress of students and consider their reactions to the program. The School of Medicine and the Indiana University Graduate School will monitor course enrollments, students' grades and progress, timely completion of the students' thesis, quality of the research, and the students' successful transition to careers in Medical Biophysics. In the fourth year after implementation, an evaluation team from the core faculty will study the program in depth and submit a report to the Deans of the schools of Medicine and the Indiana University Graduate School. Overall responsibility for evaluation of the degree resides in the Indiana University Graduate School and in the School of Medicine. The school dean, program director, and Graduate Studies Committee will evaluate the curriculum based on an assessment of learning outcomes. The Graduate Studies Committee will periodically review course materials to determine whether the content is focused on the goals of the program. Student course evaluations will also be closely monitored. In addition, students will complete surveys at the beginning and end of their enrollment in the program to measure students' expectations, knowledge, and satisfaction. Student learning outcomes will be assessed by oral and written examinations. The program administrator will keep a computerized database of all graduates with respect to

employment, research, publications, and other professional activities.

3. Trainee Evaluation

1. Once a research laboratory is selected by the end of the first year, the *primary mentor* will meet at least every other week with a trainee to review research progress, address goals and concerns, and provide feedback.
2. Trainees will give a formal "work in progress" seminar yearly in the Spring to all faculty in the program. This will provide an opportunity for feedback from all faculty and students, as well as training in presentation skills.
3. To advance to Ph.D. candidacy, trainees must submit and defend a thesis proposal by the end of their second year, using the grant format of a major federal or national granting agency (NIH NRSA, AHA fellowship, etc). Students will be encouraged to submit the completed grant to the agency in an attempt to secure funding for their thesis research. After successful defense of the thesis proposal, the student advances to Ph.D. candidacy, and the research committee becomes a thesis committee.
4. Trainees will meet with their research or thesis committee (consisting of 3-5 faculty members) yearly in the Fall. The trainee will present latest research advances, and the committee will review progress, provide advice and guidance, and identify "next steps" in the trainee's research and other goals for the next quarter. The committee may also assist the student in selecting helpful elective coursework to supplement their training.
5. Following each Committee meeting, the primary mentor will prepare a summary report that will be forwarded to the Program Director. The Program Director will review the report initially to identify any issues that need immediate attention, and also keep a copy on file for review at the trainee's annual meeting with the Program Director.
6. The Program Director will meet separately with each trainee for a one hour annual Progress Report Meeting in the winter months after the student has completed the yearly Thesis committee meeting. At this meeting, he will review the trainees' files, which will include their thesis Committee reports, coursework performance, and other items. He/she will provide feedback and address particular trainee concerns.

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Appendices: Ph.D. in Medical Biophysics

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Appendix A – Curriculum Vitae

Faculty are listed in alphabetical order.

Atkinson, Simon

NAME	POSITION TITLE		
Simon John Atkinson, Ph.D.	Associate Professor		
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
King's College, London, England	B.Sc.	1986	Biophysics
University of Cambridge, England	Ph.D.	1990	Molecular Biology
Johns Hopkins Univ. School of Medicine, Baltimore MD	Post-Doc	1990-94	Cell Biology

POSITIONS AND EMPLOYMENT

1986-1990 GRADUATE RESEARCH:
MRC Laboratory of Molecular Biology, Cambridge. Advisor: Dr. Murray Stewart. *Molecular Biology and Electron Microscopy of Myosin Filament Assembly.*

1990-1994 POSTDOCTORAL RESEARCH:
The Johns Hopkins University School of Medicine. Preceptor: Dr. Thomas D. Pollard. *Biochemistry and Molecular Genetics of the Actin Cytoskeleton in Acanthamoeba and Dictyostelium.*

1994-2000 ASSISTANT PROFESSOR, Department of Medicine and Department of Biochemistry and Molecular Biology, Indiana Univ. School of Medicine

2000-present ASSOCIATE PROFESSOR, Department of Medicine and Department of Biochemistry and Molecular Biology, Indiana Univ. School of Medicine.

AWARDS AND HONORS

1986-1990, MRC Research Studentship. 1991-1992, Postdoctoral Fellowship, Institute for Biophysical Research on Macromolecular Assemblies, The Johns Hopkins University. Membership in professional societies: British Society for Cell Biology, American Society for Cell Biology, American Society for Nephrology.

SELECTED PUBLICATIONS

1. Dunn, K.W., R.M. Sandoval, K.J. Kelly, P. Dagher, G. Tanner, **S.J. Atkinson**, R.L. Bacallao and B.A. Molitoris. (2002) "Functional studies of the kidney of living animals using multicolor 2-photon microscopy." Am. J. Physiol. (Cell Physiol.) In press.
2. Tao, W., Bailey, J.R., **Atkinson, S.J.**, Connors, B., Evan, A., Yoder, M. & Williams, D.A. (2002) "The TRQQKRP motif located near the C-terminus of Rac2 is essential for its biological functions and intracellular localization". Blood, in press.
3. Price, M.O., **Atkinson, S.J**. Knaus, U.G. & M.C. Dinauer (2002) "Rac Activation Induces Phagocyte NADPH Oxidase Activity in Cells and Level of Superoxide Production is Exchange Factor-Dependent" J. Biol. Chem. 277: 19220-19228

4. Sutton, T.A., Mang H.E. and **S.J.Atkinson** (2001). “Rho-Kinase Regulates Myosin II Activation during Recovery Following ATP depletion”. Am. J. Physiol. (Renal Physiol.) 281: F810-818
5. Insall, R.H, Mueller-Taubenberger, A., Machesky, L.M., Koehler, J., Simmeth, E., **Atkinson, S.J.**, Weber, I. and G. Gerisch (2001). “Dynamics of the Dictyostelium Arp2/3 Complex in Endocytosis, Cytokinesis, and Chemotaxis” Cell Motil. Cytoskel. 50: 115-128
6. Herget-Rosenthal, S., Hosford, M., Kribben, A., **Atkinson, S.J.**, Sandoval, R.M. & B.A.Molitoris (2001). “Characteristics of EYFP-actin and visualization of actin dynamics during ATP depletion and repletion”. Am. J. Physiol. (Cell Physiol.) .281: C1858-1870
7. Jin, Y, **Atkinson, S.J.**, Marrs, J.A. and Gallagher, P.J. (2001). “Myosin II light chain phosphorylation regulates membrane localization and apoptotic signaling of tumor necrosis factor receptor-1”. J. Biol. Chem. 276: 30342-30349
8. †Yang, F.-C., †**Atkinson, S.J.**, Gu, Y., Borneo, J.B., Roberts, A.W., Pennington, J. & Williams, D.A. (2001) “Rac and Cdc42 GTPases control hematopoietic stem cell shape, adhesion, migration, and mobilization.” Proc. Natl. Acad. Sci. USA, 98: 5614-5618 († denotes joint first author).
9. David A. Williams, Wen Tao, Fengchun Yang, Chaekyun Kim, Yi Gu, Pamela Mansfield, John E. Levine, Bronia Petryniak, Caroline W. Derrow, Chad Harris, Baoqing Jia, Yi Zheng, Daniel R. Ambruso, John B. Lowe, **Simon J. Atkinson**, Mary C. Dinauer, and Laurence Boxer (2000). “Dominant negative mutation of the hematopoietic-specific Rho GTPase, Rac2, is associated with a human phagocyte Immunodeficiency”. Blood. 96:1646-1654
10. Mehta, D., Tang, D.C., **Atkinson, S.J.**, and S.J. Gunst. (2000) “Role of Rho in calcium-insensitive contraction and paxillin tyrosine phosphorylation in smooth muscle”. *Am. J. Physiol.*: (*Cell Physiol*.). 279: C308-C318
11. Zong, H., Raman, N., Mickelson-Young, L.A., **Atkinson, S.J.** and Quilliam, L.A. (1999) “Loop 6 of RhoA Confers Specificity for Effector Binding, Stress Fiber Formation and Cellular Transformation”. *J. Biol. Chem.* 274: 4551-4560.
12. Raman, N. and **Atkinson, S.J.** (1999). “Rho Controls Actin Cytoskeletal Assembly in Renal Epithelial Cells During ATP Depletion and Recovery”. *Am J. Physiol (Cell Physiol.)*. 276: C1312-1324.
13. Roberts, A.W., Kim, C., Zhen, L., Kapur, R., Petryniak, B., Pollock, J., Lowe, J.B., **Atkinson, S.J**., Dinauer, M.C. and Williams, D.A.(1999), “Deficiency of the Hematopoietic Cell-Specific Rho Family GTPase Rac2 is Characterized by Abnormalities in Neutrophil Function and Host Defense”. *Immunity*. 10: 183-196.
14. Schwartz, N., Hosford, M., Sandoval, R., Wagner, M.C., **Atkinson, S.J**., Bamburg, J. and Molitoris, B.A. (1999) “Ischemia Activates Actin Depolymerizing Factor: Role in Proximal Tubule Microvillar Actin Alterations”. *Am. J. Physiol. 276* (*Renal Physiol. 45*) F544-F551.
15. Pavalko, F.M., Chen, N.X., Turner, C.H., Burr, D.B., **Atkinson, S.J**., Hsieh, Y-F, Qiu, J. and Duncan, R.L. (1998). “Cytoskeletal-integrin interactions are required for fluid shear-induced mechanical signaling in MC3T3-E1 Osteoblasts”. *Am. J. Physiol.* (*Cell Physiol.*). 275: C1591-C1601
16. Gopalakrishnan, S., Raman, N., **Atkinson, S.J**. and Marrs, J.A. (1998). “Rho GTPase Signaling Regulates Tight Junction Assembly and Protects Tight Junctions During ATP Depletion”. *Am. J. Physiol.*275 (*Cell Physiol.*). C798-809

17. Kelleher, J.F., **Atkinson, S.J.** and Pollard, T.D. (1995). "Sequences, Structural Models and Cellular Localization of the Actin-Related Proteins Arp2 and Arp3 from *Acanthamoeba." J. Cell Biol.* 131: 385-397.
18. Machesky, L.M., **Atkinson, S.J.,** Ampe, C., Vandekerckhove, J. and Pollard, T.D. (1994) "A Cortical Complex of Seven *Acanthamœba* Polypeptides Including Two Unconventional Actins Binds to Profilin." *J.Cell Biol.* 127: 107-115.
19. **Atkinson, S.J.,** Doberstein, S.K. and Pollard, T.D. (1992) "Moving off the Beaten Track". *Current Biology* 2: 326-328

RESEARCH SUPPORT

	Dates of Project	% Effort
ACTIVE:		
1 R01 DK53194 (PI: Atkinson)	07/01/99-06/30/04	35%
NIH/NIDDK	$137,147	

Rho GTPases and actin function in renal ischemia.
The major goals of this proposal are to analyze the contribution of Rho GTPase function to actin cytoskeletal disruption in proximal tubule epithelial cells in renal ischemia.

1 P01 DK DK53465 (PI: Molitoris, B.A.)	01/01/00-12/31/04	25%
NIH/NIDDK	$626,896	

Actin Dysregulation in Ischemia: Mechanisms and Effects
The major goals of this proposal are to characterize the molecular basis for ischemic injury to the actin cytoskeleton. ROLE: Co-PI for projects 1 and 2.

1 P50 DK 61594-01 (PI: Molitoris, B.A.)	04/01/02-03/31/07	10%
NIH/NIDDK	$1,042,006	

Center for Advanced Renal Microscopic Analysis
The major goal of this proposal (response to RFA # DK-01-015) are to develop a center for investigation of renal physiology and pathophysiology utilizing cutting edge approaches in cell biology and light microscopy. ROLE: P.I Project 2. ("Phagocyte mediators of ischemia-reperfusion injury")

1 P01 HL69974 (PI: Skalnik, D.G.)	04/01/02-03/31/07	10%
NIH/NHLBI	$1,411,862	

Role of Rac2 in development and function of blood cells.
The major goals of this proposal are to characterize the role of the Rho family GTPase Rac2 in hematopoietic cell function. ROLE: Director, Core B (Imaging)

2 R01 CA74177 (PI: Clapp D.W.)	07/01/02-06/30/07	5%
NIH-NCI	$250,000	

Neurofibromatosis type I regulates myelopoiesis.
The major goal of this project is to define the role of the NF-1 gene product in myeloid cell proliferation and function. ROLE: Consultant.

1 R01 DK60495 (Dagher, P.C.)	07/01/02-06/30/07	5%
NIH-NIDDK	$175,000	

Role of guanine nucleotides in ischemic renal injury.
The major goal of this project is to investigate the role of GTP depletion in ischemic

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injury and its effect on apoptotic cell death. ROLE: Consultant.

2 R01 DK51098 (PI:Dunn, K.W.) 07/01/02-06/30/07 5%
NIH-NIDDK $200,000
Regulation of endocytosis in cultured renal epithelia.
The major goal of this proposal is to investigate the role of Rab GTPases in regulating trafficking in polarized epithelia. ROLE: Consultant.

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Bacallao, Robert

NAME	POSITION TITLE
Bacallao, Robert	Associate Professor

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education such as nursing and include postdoctoral training.*

INSTITUTION AND LOCATION	DEGREE (*if applicable*)	YEAR(s)	FIELD OF STUDY
Northwestern University, Evanston, IL.	BS	1976	Engineering Science
University of Illinois, Chicago, IL.	MD	1980	Medicine

PROFESSIONAL EXPERIENCE:

1980-81 Internship, University of Illinois
1981-83 Residency, University of Illinois
1983-85 Nephrology Fellowship, UCLA School of Medicine
1985 Instructor in Medicine, UCLA School of Medicine
1986-92 Assistant Professor of Medicine, UCLA School of Medicine
1992-1996 Assistant Professor of Medicine & Cellular, Molecular & Structural Biology, Northwestern University
1996-present Associate Professor of Medicine, Indiana University School of Medicine

HONORS AND AWARDS:

1975 Tau Beta Pi
1985-87 Burrough Wellcome National Kidney Foundation Fellowship
1987-92 NIH Physician Scientist Award
1990 Woods Hole Cell Physiology Course
1992-95 American Heart Association National Grant-in-Aid
1995-1998 American Society of Nephrology Clinician Scientist Award
1995-1999 NIH First Award.
1999-2003 NIH RO1 DK 46883-06A1

BIBLIOGRAPHY:

1. Mandel LJ, Bacallao R, Zampighi G. Uncoupling of the molecular fence and paracellular gate functions in epithelial tight junctions. *Nature*, 361, 552-555, 1993.
2. Carone, F.A., Nakamura, S., Caputo, M.,Bacallao, R., Nelson, W.J., Kanwar, Y.S. Cell Polarity in Human Renal Cystic Disease, *Lab. Invest*., 69: 648-655, 1994.
3. Doctor, R.B., Bacallao, R., Mandel, L.J. Method for recovering ATP content and mitochondrial function following chemical anoxia in renal cell cultures. *Am. J. Physiol*.266, C1803-C1811, 1994.
4. Turk E, Klisdak I, Bacallao R, Sparkes RS, Wright EM. Assignment of the Human Na^+/Glucose Cotransporter Gene SGLT1 to Chromosome 22q13.1. *Genomics* 17: 752-4, 1994.
5. Bacallao, R., Garfinkel, A., Monke, S., Zampighi, G., and Mandel, L. J. ATP depletion: method to study junctional properties in epithelial tissues. I. Rearrangement of the actin cytoskeleton., *J. Cell Sci*., 107: 3001-13, 1994.
6. Mandel, L.J. and R. Bacallao ATP depletion: A novel method to study junctional properties in epithelial tissues. II. Internalization of E-cadherin and NaK-ATPase. *J. Cell Sci*., 107, 3015-24, 1994.

.

7. Carone, F.A., Nakamura, S., Bacallao, R., Nelson, W.J., Khokha, M., Kanwar, Y.S. Impaired Tubulogenesis of Human Renal Cyst-Derived Cells in Collagen Gel, *Kidney International*, 47: 861-868, 1995.
8. Goenhofen, N., Doctor, R. B., Bacallao, R., Mandel, L.J. Actin and Villin Compartmentation During ATP depletion and Recovery in Renal Cultured Cells. *Kidney International*, 48: 1837-1845, 1995.
9. LaPointe, M.S., Ye, M., Bacallao, R., Batlle, D. NHE-1 protein in vascular smooth muscle and lymphocytes from the spontaneously hypertensive rat. *Hypertension* 4:880-5, 1997.
10. Grindstaff, K.K., Bacallao, R.L., Nelson, W.J. Apiconuclear organization of microtubules does not specify protein delivery from the trans-Golgi network to different membrane domains in polarized epithelial cells*. Molecular Biology of the Cell* 9:685-99, 1998.
11. Charron, A.J., Xu, Weimin, Bacallao*, R.L., Wandinger-Ness*, A. Cablin: a novel protein of the capillary basal lamina, *Amer. J. Physiol*. 277. H1985-1996, 1999.
12. Charron, A.J., Nakamura, S., Bacallao*, R.L., Wandinger-Ness*, A. Compromised Cystoarchitecture and Polarized Trafficking in Autosomal Dominant Polycystic Kidney Disease Cells, J. Cell Biol. 149. 111-124, 2000.
13. Charron, A.J., Bacallao*, R.L., Wandinger-Ness*, A. ADPKD: A Human Disease Altering Golgi Function and Basolateral Exocytosis in Renal Epithelia, Traffic 1, 675-686, 2000.
14. Kher, R. and Bacallao, R. Direct *In Situ* Reverse Transcriptase Polymerase Chain Reaction, Am.J. Physiol. Cell, 281: C726-732, 2001.
15. Sandoval, R.M., Dunn, K.W., Kelly, K.J., Dagher, P.C., Bacallao, R.L., Molitoris, B.A. Intra-vital Four Dimensional Imaging of the Intact Kidney Using Two-Photon Microscopy, Am. J. Physiol. Cell, 283: C905-916, 2002.
16. Phillips, C.L., Miller, K.J., Filson, A.J., Nürnberger, J., Clendenon, J.L., Dunn, K.W., Overbeek, P., Gattone, V.H., Bacallao, R.L. Inversion of Embryonic Turning is a Model of Autosomal Recessive Polycystic Kidney Disease, J.A.S.N., manuscript accepted.

* Both authors are co-senior investigators on these papers and contributed equally to the scientific effort.

REVIEWS AND CHAPTERS: (Since 1995)

1. Carone, F.A., Bacallao, R., and Y. S. Kanwar The pathogenesis of polycystic kidney disease. *Histol. Histopathol*. 10: 213-221, 1995.
2. Bacallao, R. Filling in the Matrix of Kidney Disease. *Nature-Medicine*, 1: 305-6, 1995.
3. Bacallao, R. The Role of the Cytoskeleton in Renal Development, *Seminars in Nephrology*. 15: 285-290, 1995.
4. Bacallao, R., Kianush, K. and Jesaitis, L. Guiding principles of specimen preservation for confocal fluorescence microscopy. *The Handbook of Biological Confocal Microscopy* 2nd edition, Ed. J. Pawley, Plenum Press, N.Y. 311-325, 1995.
5. Doctor, R., Bacallao, R. and L.J. Mandel. Role of the Cytoskeleton in Membrane Alterations in Ischemic or Anoxic Renal Epithelia. In: *Current Topics in Membranes*, Ed. W. J. Nelson, Academic Press, San Diego, 398-416, 1996.

.

Berbari, Edward

NAME	POSITION TITLE
Edward J. Berbari	Professor of Electrical and Biomedical Engineering

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education such as nursing and include postdoctoral training.*

INSTITUTION AND LOCATION	DEGREE (*if applicable*)	YEAR(s)	FIELD OF STUDY
Carnegie Mellon University, Pittsburgh, PA	B.S.E.E.	1971	Electrical Engineering
University of Miami, Coral Gables, FL	M.S.	1973	Biomedical Engineering
University of Iowa, Iowa City, IA	Ph.D.	1980	Electrical Engineering

Research and Professional Experience

Professor of Electrical and Biomedical Engineering, Purdue School of Engineering and Technology, Indiana University Purdue University Indianapolis (IUPUI), August, 1994 - present

Professor of Medicine, Indiana University School of Medicine, IUPUI, August, 1994 – present

Director of Biomedical Engineering, Purdue School of Engineering and Technology, IUPUI, January, 1996 – present

Chairman, Department of Electrical and Computer Engineering, Purdue School of Engineering and Technology, IUPUI, August, 1994 – July, 2000.

Director, Biomedical Engineering Program, University of Oklahoma, 1992 - 1994

Assistant/Associate/Full Professor of Medicine, Dept. of Med., Univ. of Oklahoma Health Sci. Ctr., 1980 -1994

Associate/Full Professor, Department of Electrical Engineering, University of Oklahoma, 1991 – 1994

Adjunct Asst./Assoc. Professor, Dept. of Electrical Engineering, University of Oklahoma, 1980 – 1991

Biomedical Engineer and Research Assoc., Dept. of Medicine, Univ. of Miami, Miami, FL, 1975 – 1977

Awards and Honors

Young Investigators Award (Second Place), Deborah Heart and Lung Foundation, Brown Mills, N J, 1976
Alumni Research Scholar, University of Oklahoma Health Sciences Center, 1986
Research Award, Nihon University School of Medicine, Tokyo, Japan, 1991
Elected Fellow of Institute of Electrical and Electronic Engineers (IEEE), 1992
Elected Fellow of American Institute for Medical and Biological Engineering (AIMBE), 1995
Abraham Max Distinguished Professor Award, Purdue School of Engineering and Technology, IUPUI, 1997

.

Selected Publications

1. Berbari EJ, Collins S, Salu Y, Arzbaecher R. Orthogonal surface lead recordings of His-Purkinje activity: Comparison of actual and simulated waveforms. IEEE Trans. Biomed. Engr. BME 30:160-167, 1983.
2. Berbari EJ, Collins S, Arzbaecher R. Evaluation of esophageal electrodes for recording His-Purkinje activity based upon signal variance. IEEE Trans. Biomed. Engr. BME 33:922-929, 1986.
3. Berbari EJ, Lazzara R. An introduction to high resolution ECG recordings of cardiac late potentials. Arch. Int. Med. 148:1859-1863, 1988.
4. Berbari EJ. High Resolution Electrocardiography, CRC Crit. Rev. in Biomed. Engr. 16:67-103, 1988.
5. Lander P, Deal RB, Berbari EJ. The analysis of ventricular late potentials using orthogonal recordings. IEEE Trans. Biomed. Engr. 35:629-639, 1988.
6. Berbari EJ, Albert DE, Lander P. Spectro-temporal estimation of the electrocardiogram. Annals of New York Academy of Science 601:197-208, 1990.
7. Geselowitz DB, Smith S, Mowrey K, Berbari EJ. Model studies of extracellular electrograms arising from an excitation wave propagating in a thin layer. IEEE Trans. Biomed. Engr. 38:526-531, 1991.
8. Berbari EJ, Rajagopalan CV, Lander P, and Lazzara R. Changes in late potential measurements as a function of decreasing bandwidth. J. Cardiovasc. Electro. 2:503-508, 1991.
9. Berbari EJ, Lander P, Scherlag BJ, Lazzara R, and Geselowitz DB. Ambiguities of epicardial mapping. J. Electrocardiol., 24(Suppl):16-20, 1992.
10. Berbari EJ and Lazzara R. The significance of electrocardiographic late potentials: Predictors of ventricular tachycardia. In: Annual Review of Medicine: Selected Topics in the Clinical Sciences, Creger WP, Coggins CH and Hancock EW, Editors, Annual Reviews, Inc., Palo Alto, CA, 43:157-169, 1992.
11. Lander P and Berbari EJ. Principles and signal processing techniques of the high-resolution electrocardiogram. Prog. Cardiovasc. Dis., 35(3):169-188, 1992.
12. Berbari EJ, Ramachandran D, Lander P, Geselowitz D. Identifying uncertainty in epicardial activation maps. In: Computers in Cardiology. IEEE Computer Society Press, Los Angeles, CA, 1992, pp 423-426
13. Lander P, Berbari EJ, Rajagopalan CV, Vatterott P, and Lazzara R: Critical Analysis of the signal averaged electrocardiogram: Improved identification of late potentials. Circulation, 87(1):105-117, 1993.
14. Berbari EJ, Lander P, Geselowitz DB, Scherlag BJ, Lazzara R. The methodology of cardiac mapping. In: Cardiac Mapping, Breithardt G, Borgreffe M, Shenasa M, eds., Futura Publishing, Armonk, New York, 1993, pp. 63-79.
15. Romberg D, Geselowitz DB, Berbari EJ, Spatial filtering of epicardial electrograms from infarct regions: An *in vitro* study. In Computers in Cardiology, IEEE Computer Society Press, Los Alamitos, CA, 1994, pp 153-156.
16. Berbari EJ, Lander P, Geselowitz DB, Scherlag BJ, and Lazzara R: Identifying the end of ventricular activation: Body surface late potentials versus electrogram measurements in a canine infarction model. J. Cardiovasc. Electrophysiol., 5(1):28-40, 1994.
17. Berbari EJ, Dyer J, Lander P, Geselowitz DB: Simulation of intracardiac electrograms with a moving dipole source. J. Electrocardiol. 27(Suppl):146-150, 1994.

.

18. Dyer JW, Lander P, Ballouz G, Berbari EJ, Distribution of noise on the body surface using a 128 channel signal averaged ECG. Computers in Cardiology, 22: 83-86, 1995.
19. Lander P, Berbari EJ, Lazzara R. Optimal filtering and quality control of the signal-averaged electrocardiogram: Hi-fidelity 1-minute recordings. Circulation, 91:1495-1505, 1995.
20. Steinberg JS and Berbari EJ. The signal-averaged electrocardiogram: Update on clinical applications. J Cardiovascular Electrophysiology, 7:972-988, 1996.
21. Reiger M, Dyer JW, Geselowitz DB, Berbari EJ. Interpolation of local activation times versus potentials to derive an activation map in infarcted myocardium. Computers in Cardiology, 23:137-140, 1996.
22. Sih HJ, Zipes DP, Berbari EJ. Linear lesions alter organization of atrial fibrillation. Computers in Cardiology, 23:141-144, 1996.
23. Lander P, Gomis P, Goyal R, Berbari EJ, Caminal P, Lazzara R, Steinberg JS, Analysis of Intra-QRS late potentials: Improved predictive value for arrhythmic events using the signal-averaged electrocardiogram. Circulation., 95:1386-1393, 1997.
24. Lander P and Berbari EJ, Time-frequency plane Weiner filtering of the high resolution ECG: Background and time-frequency representations. IEEE Trans. Biomed. Engr., 44:247-255, 1997.
25. Lander P and Berbari EJ, Time-frequency plane Weiner filtering of the high resolution ECG: Development and application. IEEE Trans. Biomed. Engr., 44:256-265, 1997.
26. Gomis P, Jones DL, Caminal P, Berbari EJ, Lander P. Analysis of abnormal signals within the QRS complex of the high resolution ECG. IEEE Trans. Biomed. Engr.,44:681-695, 1997.
27. Sih HJ, Berbari EJ, Zipes DP, Epicardial maps of atrial fibrillation after linear ablation lesions. J Cardiovascular Electrophysiology, 8:1046-1054, 1997.
28. O'Leary EA, Maass-Moreno R, Sih HJ, Moreno AP, Soonpaa MH, Berbari EJ. Cardiac activation mapping in a transgenic mouse model of cardiac hypertrophy. Computers in Cardiology, 25:509-512, 1998.
29. Romberg D, Maass R, Biermann M, Zipes DP, Berbari EJ. Mapping of local conduction anistropy in the ischemic myocardium. Computers in Cardiology, 26:281-285, 1999.
30. Sih HJ, Zipes DP, Berbari EJ, Olgin JE. A high resolution algorithm for quantifying organization during atrial fibrillation, 46:440-450, 1999.
31. Sih HJ. Zipes DP. Berbari EJ. Adams DE. Olgin JE. Differences in organization between acute and chronic atrial fibrillation in dogs. J.Amer. College of Cardiology. 36(3):924-31, 2000.
32. Cházaro A, Sörnmo L, Sih HJ, Maass-Moreno R, Berbari EJ. Analysis of Ventricular Repolarization in Context of Premature Ventricular Beats. Computers in Cardiology, 27:339-342, 2000.
33. O'Leary EA, Sörnmo L, Sih HJ, Berbari EJ. Detection of Low Level ST Segment Changes From the Ambulatory ECG And Their Correlation With Ventricular Premature Beats. Computers in Cardiology, 27:829-832, 2000.
34. Sun X and Berbari EJ. The Link Between Abnormal Intra QRS Potentials and Premature Ventricular Beats. Computers in Cardiology, 28:61-64, 2001.

.

Funding since 1995

Epicardial and body surface analysis of late potentials	NIH HL-36625	1/93-12/96	Completed ($417,075)	Principal Investigator
High Resolution ECGs and Arrhythmia Risk Evaluation	NIH HL-44695	4/90-3/95	Completed ($489,742)	Principal Investigator
Center for Biomedical Engineering in Cardiac Electrophysiology	Whitaker Foundation	6/96 - 5/99	Completed ($486,164)	Principal Investigator
ECG Measurements of Ventricular Arrhythmia Mechanisms	NIH HL-56362	12/96-11/99	Completed ($429,170)	Principal Investigator
A Collaborative Program in Biomedical Engineering Between Purdue University and Indiana University	Whitaker Foundation	12/1/97-11/30/01	Completed ($820,000)	Co-Director
Analysis of His Purkinje Signals from Patients with Muscular Dystrophy	Medtronic, Inc	12/99 – 11/01	Completed ($45,000)	Principal Investigator
Analysis of Intracardiac Recordings	Medtronic, Inc	8/02 – 7/02	Ongoing ($30,000)	Principal Investigator

.

Bohlen, Harold Glenn

NAME	POSITION TITLE
Herald Glenn Bohlen	Professor

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.*)

INSTITUTION AND LOCATION	DEGREE (*if applicable*)	YEAR(s)	FIELD OF STUDY
Arizona Medical Center, University of Arizona	Post-doc.	1973-1976	Physiology
Bowman Gray School of Medicine, Wake Forest University, Winston-Salem, N.C	Ph.D.	1968-1973	Physiology
Appalachian State University, Boone, N.C	B.S.	1964-1968	Biology

ACADEMIC APPOINTMENTS

1986-Present Professor of Physiology, Indiana University School of Medicine, Indianapolis, Indiana

1981-1986 Associate Professor of Physiology, Indiana University School of Medicine, Indianapolis, Indiana

1976-1981 Assistant Professor of Physiology, Indiana University School of Medicine, Indianapolis, Indiana

1973-1976 Research Associate, Department of Physiology, Arizona Medical Center, University of Arizona, Tucson, Arizona

PROFESSIONAL SOCIETIES

Splanchnic Circulation Group (1982), President 1988-1989

Circulation Group of the American Physiological Society (1981)
Chairman of Awards Committee, 1996-1998
Member of Program Committee, 1997-1998
Chair of the Program Committee, 1999-2000

American Physiological Society (1977)

Microcirculation Society (1977)
a. Member of Nomination Committee (1982-84)
b. Chairman of Nomination Committee (1984-85)
c. Council Member (1987-1989)

Society for Experimental Medicine and Biology (1979)

American Association for the Advancement of Science (1978)

HONORS

National Defense Fellowship, Title IV (1968-71).

Cardiovascular Predoctoral Traineeship (NIH), Bowman Gray School of Medicine, Winston-Salem, N.C.

Special Fellow supported jointly by the Arizona and American Heart Associations (July 1, 1973 - June 30, 1974).

American Physiological Society, 1977.

Microcirculatory Society of North America, 1977.

Fellow of the Circulation Group of the American Physiological Society, 1978.

Lamport Award for Outstanding Young Cardiovascular Scientist from the Circulation Group of the American Physiological Society, 1979.

NIH Research Career Development Award, Research Program entitled "Microvascular Characteristics of Diabetes Mellitus." 1982-1987.

Research in Diabetes Award, Indiana Affliate of the American Diabetes Association, 1991.

1997 recipient of the Eugene Landis Award for Microvascular Research from the Microcirulatory Society.

GRANT SUPPORT, FELLOWSHIPS AND AWARDS

"Microvascular responses during intestinal absorption," National Institutes of Health. Principal Investigator
2001-2006

"Microvascular behavior during diabetes mellitus," National Institutes of Health, Diabetes Research and Training Center Grant to Indiana University, 1977-80: Direct costs $47,180. Specifically funded investigator in the Center Grant

"Microvascular characteristics of diabetes mellitus," National Institutes of Health. Principal Investigator
1998-2003

PUBLICATIONS

Book Chapters and Invited Reviews (Reviews refeered by journal, book chapters reviewed by editors)

Bohlen, H.G. Studies of Chronic Microvascular Diseases. In: Microcirculatory Technology, ed. C.H. Baker and W.F.Nostuk. Raven Press, New York. 1986.

.

Harper, Scot L., Bohlen, H.G., and Granger, D.L. Vasoactive Agents and the Mesenteric Microcirculation. Presented at the Fall 1984 Meeting of the American Physiological Society. Am. J. Physiol. 249:G309-G315, 1985.

Bohlen, H.G. Cerebral microvascular control in normal, hypertensive and diabetic conditions. In Microvascular Perfusion and Transport in Health and Disease, edited by Paul F. McDonagh, Karger Publishing, New York, pp. 80-112, 1987.

Bohlen, H.G. The microcirculation in hypertension. Journal of Hypertension. 7(Suppl. 4):S117-S124, 1989.

Bohlen, H.G. and Lash, J.M. The microvascular consequences of diabetes mellitus and hypertension. The Resistance Vasculature, edited by John Bevan, William Halpern and Michael Mulvany. Humana Press, Newark, New Jersey, 1991.

H.G. Bohlen. The microcirculation and the lymphatic system. In Medical Physiology, edited by R.A. Rhoades and G.A. Tanner. Little, Brown and Company, Boston, MA, pp. 289-304, 1995.

Bohlen, H.G. Special Circulations. In Medical Physiology, edited by R.A. Rhoades and G.A. Tanner. Little, Brown and Company, Boston, MA, pp.305- 320, 1995.

Bohlen, H.G Intestine Microcirculation. In Clinically Applied Microcirculation Research, edited by J.H. Baker, G.L. Anderson, and M.D. Menger. CRC Press, Boca Raton, FL, pp. 227-237, 1995.

Journal Articles

Bohlen, H.G. and J.M. Lash. Endothelial-dependent vasodilation is preserved in non-insulin-dependent Zucker fatty diabetic rats. American Journal of Physiology 268:H2366-H2374, 1995.

Bohlen, H. G. and J.M. Lash. Intestinal Absorption of sodium and nitric oxide dependent vasodilation interact to dominate resting vascular regulation. Circulation Research, 78:231-237, 1996.

Connors, B., W.H. Lee, G. Wang, A.P. Evan, and H.G. Bohlen. Aldose reductase and IGF-I gene expression in aortic and arteriolar smooth muscle during hypo- and hyperinsulinemic diabetes. Microvascular Research: 53:53-62, 1997.

Jin, J.S. and H.G. Bohlen. Non-insulin dependent diabetes and hyperglycemia impair rat intestinal flow mediated regulation. American Journal of Physiology, 272:H728-H734, 1997.

Lash, J.M. and H.G. Bohlen. Time and order -dependent changes in functional and nitric oxide-mediated dilation during exercise training. Journal of Applied Physiology, 82:460-468, 1997.

Bohlen, H.G. Mechanism of increased vessel wall nitric oxide concentrations during intestinal absorption. American Journal of Physiology 275:H542-H550, 1998.

.

Bohlen, H.G. Integration of intestinal structure, function, and microvascular regulation. (1997 Eugene Landis Award) Microcirculation 5:27-37, 1998.

Bohlen, H.G. Invited Editorial on "Vasomotor responses of soleus feed arteries from sedentary and exercise-trained rats. American Journal of Physiology 276:439-440, 1999.

Lash, J.M., G.P. Nase and H.G. Bohlen. Acute hyperglycemia depresses NO formation in skeletal muscle. American Journal of Physiology H1513-H1520, 1999.

Bohlen, H.G. and G.P. Nase. Dependence of Intestinal Arteriolar Regulation on Flow Mediated Nitric Oxide Formation. American Journal of Physiology 279:H2249-H2258, 2000.

Bohlen, H.G. and G.P. Nase. Intestinal Arteriolar Nitric Oxide Concentration Is Decreased During Hyperglycemia-Induced PKC Activation. American Journal of Physiology, 280:H621-627, 2001.

H Glenn Bohlen, Geoffrey P Nase and Jong Shiaw Jin, Multiple mechanisms of early hyperglycaemic injury of the rat intestinal microcirculation. Journal of Experimental Physiology and Pharmacology 29:138-42, 2002.

H. Glenn Bohlen and Geoffrey P. Nase. Obesity lowers hyperglycaemic threshold for impaired endothelial nitric oxide function. American Journal of Physiology 283:H391-H397, 2002

.

Decca, Ricardo

NAME	POSITION TITLE
Ricardo S. Decca	Assistant Professor

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.*)

INSTITUTION AND LOCATION	DEGREE (*if applicable*)	YEAR(s)	FIELD OF STUDY
Instituto Balseiro, S. C. de Bariloche, Argentina Instituto Balseiro, S. C. de Bariloche, Argentina	B.S. Ph.D.	1988 1994	Physics Physics

Department of Physics
Indiana University Purdue University Indianapolis

PROFESIONAL EXPERIENCE:

2000-present	Assistant Professor, Indiana University Purdue University Indianapolis
Summer 1999	Instructor, Introductory Physics (Calculus based), University of Maryland
Summer 1998	Instructor, Introductory Physics (Calculus based), University of Maryland
1997-2000	Assistant Research Scientist, University of Maryland
1994-1997	Research Associate, University of Maryland
Jan.-Oct. 1993	Research Visitor, AT&T Bell Labs
1990-1993	Teaching Assistant, Experimental Physics, Instituto Balseiro
1984-1985	Teaching Assistant, Algebra, Universidad Nacional de Córdoba

AWARDS AND DISTINCTIONS:

1989-1994	Fellowship holder Consejo Nacional de Investigaciones Científicas y Tecnológicas, Argentina.
1985-1989	Fellowship holder Comisión Nacional de Energía Atómica, Argentina.

REPRESENTATIVE PUBLICATIONS:

1.- *Mechanical Oscillator tip-to-sample separation control for near-field optical microscopy,* R. S. Decca, H. D. Drew, and K. L. Empson, Rev. Sci. Instrum. **68**, 1291 (1997).

2.- *Investigation of the electric-field distribution at the subwavelength aperture of a near-field scanning optical microscope,* R. S. Decca, H. D. Drew, and K. L. Empson, Appl. Phys. Lett. **70**, 1932 (1997).
3.- *Photoinduced superconducting nanowires in $GdBa_2Cu_3O_{6.5}$ films,* R. S. Decca, H. D. Drew, B. Maiorov, J. Guimpel, and E. Osquiguil, Appl. Phys. Lett. **73**, 120 (1998).
4.- *Anomalous proximity effect in underdopped $GdBa_2Cu_3O_{6+x}$ Josephson junctions,* R. S. Decca, H. D. Drew, E. Osquiguil , B. Maiorov, and J. Guimpel, Phys. Rev. Lett. **85**, 3708 (2000).
5.- *Single molecule tracking scheme using a near-field scanning optical microscope*, R. S. Decca, C.-W. Lee, S. Lall, and S. R. Wassall, Rev. Sci. Instrum. **73**, 2675 (2002).
6.- *Experimental investigation of the isotopic Casimir effect,* E. Fischbach, D. E. Krause, R. S. Decca, and D. López, Physics Letters A (in press).
7.- *Direct imaging of domains in the L□' state of 1,2-dipalmitoylphosphatidylcholine bilayers*, C.-W. Lee, R.S. Decca, S.R. Wassall, J.J. Breen, Phys. Rev. E, in press.

OTHER PUBLICATIONS:

1.- *$La_{1.8}Sr_{0.2}CuO_4$: A clean limit superconductor,* E. Osquiguil, R. S. Decca, G. Nieva, L. Civale, and F. de la Cruz, Solid State Commun. **65**, 491 (1988).
2.- *Metallic to variable range hopping transition controlled by oxygen content in La-Sr-Cu-O,* E. Osquiguil, L. Civale, R. S. Decca, and F. de la Cruz, Phys. Rev. B **38**, 2840 (1988).
3.- *Oxygen distribution in $La_{1.8}Sr_{0.2}CuO_4$: Effect on transport properties,* R. S. Decca, D. Serafini, F. de la Cruz, and J. P. Abriata, Phys. Rev. B **48**, 4306 (1993).
4.- *Collapse of vertex corrections in high density two dimensional systems,* R. S. Decca, A. Pinczuk, S. Das Sarma, B. S. Dennis, L. N. Pfeiffer, and K. W. West, Phys. Rev. Lett. **72**, 1506 (1994).
5.- *Inducing superconductivity at a nanoscale: Photodoping with a near-field scanning optical microscope,* R. S. Decca, H. D. Drew, B. Maiorov, J. Guimpel, and E. Osquiguil, Journal of Microscopy **194**, 407 (1999).

SYNERGISTIC ACTIVITIES:

Undergraduate research supervision (past two and a half years): N. Lipkowitz, D. Armstrong, R. Cantrell, S. Lall, S. Bomkamp, M. Hanni, A. Mafolasire, M. Elliot, N. Gustaffson, J. Durham*, J. Landy*, J. Ryan*.
*Indicates a high school student.

.

Dunn, Kenneth

NAME	POSITION TITLE
Kenneth William Dunn	Associate Professor

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.*)

INSTITUTION AND LOCATION	DEGREE (*if applicable*)	YEAR(s)	FIELD OF STUDY
Univ. of California, Santa Cruz	A.B.	1971-1976	Biology
State Univ. of New York, Stony Brook	Ph.D.	1980-1986	Biology
Columbia Univ., Coll. Phys. Surgeons (laboratory of Fred Maxfield)	NIH Post doc fellow	1987-1991	Endocytosis

A. Positions and Honors. List in chronological order previous positions, concluding with your present position. List any honors. Include present membership on any Federal Government public advisory committee.

Professional positions

1991-1995 - Asst. Professor of Clinical Pathology, Department of Pathology, Columbia University College of Physicians and Surgeons, New York, NY

1995 to 2001 - Asst. Professor of Medicine, Indiana University Medical Center, Indianapolis, IN

2001 – Assoc. Professor of Medicine, Indiana University Medical Center, Indianapolis, IN

Awards and other professional activities

1976 Honors in biology, U.C. Santa Cruz, 1976.
1987 NIH Postdoctoral Research Award
1992-1993 Cystic Fibrosis Found. Pilot Grant, K. Dunn and T.McGraw, co-P.I.s
1993-1995 National Kidney Found. Young Investigator Grant
1994-1997 American Heart Association, NYC Affiliate, Investigatorship Award

Invited major presentations: Invited Minisymposium presentation - - Annual meeting of the American Society for Cell Biology, December 1998, Gastrointestinal cell biology summer research conference - Federation of American Societies for Experimental Biology, July, 2001, Symposium presentation, American Society of Nephrology, November, 2002

Editorial board: American Journal of Physiology (Cell)

Ad hoc reviewer: Science, J. of Cell Biology, Traffic, J. Biol. Chem., J. of Cell Science, J. of Clinical Investigation, J. of Cell Physiology, J. of Clinical Investigation, Pharm. Science and Tech. Today, J.of Leukocyte Biology, American J. of Physiology, Biotechniques,

Ad hoc reviewer: Human Frontiers Science Program, NSF, NIH (General Medicine B), NCI

Faculty, Woods Hole Optical Microscopy Course, 1998 to 2000

B. Selected peer-reviewed publications (in chronological order).

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Dunn, K., Mayor, S., Meyer, J. and F. Maxfield. 1994. Applications of ratio fluorescence microscopy in the study of cell physiology. *FASEB J.,* 8:573-582.

Li, W.-C., Kuszak, J., Dunn, K., Wang, R.-R. *et al.* 1995. Lens epithelial cell apoptosis appears to be a common cellular basis for non-congenital cataract development in humans and animals. *J. Cell Biol.* 130:169-182.

van Weert, A., Dunn, K., Geuze, H., Maxfield, F. and Stoorvogel, W. 1995. Transport from late endosomes to lysosomes, but not sorting of integral membrane proteins in endosomes, depends upon the vacuolar proton pump. *J. Cell Biol.* 130:821-834.

Johnson, A., Ghosh, R., Dunn, K., Garippa, R., Park, J., Mayor, S. and F. Maxfield. 1996. Transferrin receptor containing the SDYQRL motif of TGN38 causes a reorganization of the recycling compartment but is not targetted to the TGN. *J. Cell Biol.* 135:1749-1762.

Presley, J., Mayor, S., McGraw, T., Dunn, K. and F. Maxfield. 1997. Bafilomycin A1 treatment retards transferrin receptor recycling more than bulk membrane recycling. *J. Biol. Chem*. 272:13929-13936.

Wiater, L., Dunn, K., Maxfield, F. and H. Shuman. 1998. Early events in phagosome establishment dictate the intracellular fate of L. pneumophila in macrophage-like U-937 cells. *Infection and Immunity.* 66:4450-4460.

Brown, P.S., E. Wang, B. Aroeti, S. J. Chapin, R. Sandoval, K. E. Mostov and K. W. Dunn. 2000. Definition of distinct compartments in polarized MDCK cells for membrane-volume sorting, polarized sorting and apical recycling. *Traffic.* 1:124-140

Dunn, K.W. and E. Wang. 2000. Optical aberrations and objective choice in multi-color confocal microscopy. *Biotechniques.* 28: 542-550.

Wang, E., P. Brown, B. Aroeti, S. J. Chapin, K. E. Mostov and K. W. Dunn. 2000. Apical and basolateral endocytic pathways of MDCK cells converge in an acidic common endosomes distinct from a nearly-neutral apical recycling endosome. *Traffic.* 1:480-493.

Wang, E., M. Lee and K. W. Dunn. 2000. pH-dependent Accumulation of Drugs in Lysosomes of Drug-Sensitive MES-SA but not Multidrug-resistant MES-SA/Dx5 Uterine Sarcoma Cells *J. Cell Phys.* 184: 263-274.

Fang, S., Y. Dai, F. Myers, M. Tuceryan and K. Dunn. 2000. Three-dimensional data exploration by interactive volume visualization. *Scanning.* 22:218-226.

Sandoval, R., K. Dunn and B. Molitoris. 2000. Aminoglycosides traffic rapidly and directly to the Golgi complex in LLC-PK1 cells. *Am. J. Physiology*. 279:F884-890.

Phillips, C., Arend, L., Filson, A., Kojetin, D., Filson, A., Clendenon, J., Fang, S. and K. Dunn. 2001. 3-D imaging of embryonic mouse kidney by 2-photon microscopy. *Am. J. Pathology.* 158:49-55.

Wang, E., Pennington, J., Goldenring, J., Hunziker, W. and K. Dunn. 2001. Brefeldin A rapidly disrupts plasma membrane polarity by blocking polar sorting in common endosomes of MDCK cells. *J. Cell Sci*. 114: 3309-3321

Clendenon, J., C. Phillips, R. Sandoval, S. Fang and K. Dunn. 2002. Voxx, A PC-based near real-time volume rendering system for biological microscopy. *Amer. J. Phys. Cell.* 282:C213-C218

Gopalakrishnan, S., K. Dunn and J. Marrs. 2002. Rac1, but not RhoA, signaling protects epithelial adherens junction assembly during ATP depletion. Am. J. Phys. Cell. 282:C261-C272.

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Dunn, K., R. Sandoval, K. Kelly, P. Dagher, G. Tanner, S. Atkinson, R. Bacallao and B. Molitoris. 2002. Functional studies of the kidney of living animals using multicolor 2-photon microscopy. Am. J. Physiol. (Cell). 282:C905-C916.

C. Research Support.

Research projects ongoing or completed during the last three years

NIH/NIDDK R29 DK51098. (Dunn, P.I.). "*Endocytosis in cultured renal epithelia*" 4/1/96 – 3/31/02, renewed for 07-02 to 06-06**.** The long term goal was to identify the specific pathways of endocytosis in epithelial cells and to investigate how protein sorting is accomplished, both via endosome acidification and via specific protein interactions. 50% effort Renewal (R01 DK51098) is directed at isolating and characterizing proteins regulating polarized sorting in endosomes in epithelia and in determining the roles of various Rab and EHD proteins in regulating intracellular membrane transport. 40% effort

NIH/NIDDK P50 DK 61594-01 (Molitoris, P.I.). "*O'Brien Center, Center for Advanced Renal Microscopic analysis".* Project Principal Investigator, Core director. 07-02 to 06-07. The major goal of this project (response to RFA # DK-01-015) is to develop a center for investigation of renal physiology and pathophysiology utilizing cutting edge approaches in cell biology and light microscopy. I am Co-PI on subproject 1, which is directed at developing methods for intravital and 3-dimensional microscopic analyses studies of the kidney and director of the optical microscopy core. 30% effort

NIH/NIDDK P01 DK53465 (B. Molitoris, P.I.). "*Actin dysregulation in ischemia: mechanism and effects*". Director of imaging core facility. 12/1/99-11/30/04. Goal of this project is to understand how the actin cytoskeleton mediates the effects of ischemia during renal failure. The long term goal is to better understand the cell biology of ischemia, to facilitate developing therapeutics. 15% effort

NIH/NCI P30 CA82709 (S. Williams, P.I.). "*Indiana University Cancer Center*". Director of imaging core facility. 7/1/99-6/30/03. Long term goal is to reduce the incidence, morbidity and mortality of cancer. 4% effort

American Heart Association, Indiana Aff. "*Endocytosis of LDL in a cultured epithelial cell line*". Principal investigator (post-doctoral award to Exing Wang). 1998 – 2000. The goals of this project were to investigate endocytosis of LDL by epithelial cells, particularly with respect to apical endocytosis and transcytosis. The long-term goals of this project are to identify cellular mechanisms underlying processing of LDL and heart disease. 0% effort

Indiana Univ. Strategic Directions Initiative. "*Advanced 3-dimensional imaging and visualization for the biomedical sciences*", Principal investigator. 1998 - 2000. The goals of this project were to develop methods for collection and analysis of 3-dimensional microscopy images. 15% effort.

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Elmendorf, Jeffrey

NAME	POSITION TITLE
Jeffrey S. Elmendorf	Assistant Professor of Cellular and Integrative Physiology

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
State University of New York at Oneonta, Oneonta, NY	BSc	1991	Chemistry
Albany Medical College, Albany, NY	MS	1995	Physiology & Cell Biology
Albany Medical College, Albany, NY	Ph.D.	1996	Physiology & Cell Biology
University of Iowa, Iowa City, IA	Post-Doc	1996-99	Signal Transduction

A. Positions and Honors

Positions and Employment

06/90-09/90 Juvenile Diabetes Foundation Summer Research Internship: Department of Pediatric Endocrinology, SUNY Health Science Center at Syracuse, "The Effects of Age and Diabetes on the Growth-Promoting Activity Present in Various Components of the Blood,"

01/91-06/91 Independent Study: Department of Biology, SUNY College at Oneonta, "The Kinetic Actions of Insulin and Vanadate on the Blood Glucose of Diabetic Rats."

01/92-08/96 Predoctoral Research Fellow: Department of Physiology and Cell Biology, Albany Medical College, Albany, NY.

09/96-12/99 Postdoctoral Research Fellow: Department of Physiology and Biophysics, University of Iowa College of Medicine

01/00-present Assistant Professor, Indiana University School of Medicine, Center for Diabetes Research, Departments of Cellular and Integrative Physiology, and Biochemistry and Molecular Biology

Other Experience and Professional Memberships

American Association for the Advancement of Science
American Diabetes Association
Juvenile Diabetes Foundation

Honors

1990 Juvenile Diabetes Foundation Summer Research Internship Award
1991 Faculty-Student Independent Research Study Grant Award
1993 National Institute of Health Predoctoral Trustee Scholarship (NIH-T32-07194)
1995 Graduate Studies Program Award in Recognition of Excellence in Research
1996 National Research Service Award (NIDDK T32-DK07018)
1996 The Alumni Association Graduate Student Award for Outstanding Academic and Professional Qualities
1998 Juvenile Diabetes Foundation Postdoctoral Fellowship Award (JDFI File Number 398234)

1998 National Institute of Health Postdoctoral Fellowship Award (1 F32 DK09852-01) *(Funding from this source declined due to funding from Juvenile Diabetes Foundation Postdoctoral Fellowship already accepted for same time period)*
1999 Juvenile Diabetes Foundation Walk To Cure Diabetes Invited Speaker, Cedar Rapids, Iowa
2000 President's Poster Session Presentation, Annual Meeting of American Diabetes Association
2001 Diabetes Research and Training Center Pilot Project Award *(Funding from this source declined due to funding from American Diabetes Association Career Development Award already accepted for same time period)*
2002 Indiana Central Association of Diabetes Educators (ICADE) Meeting Invited Speaker, Indianapolis, Indiana

B. Publications 5

1. **Elmendorf JS**, Damrau-Abney A, Smith TR, David TS, Turinsky J: Insulin-stimulated phosphatidylinositol 3-kinase activity and 2-deoxy-D-glucose uptake in rat skeletal muscles. Biochem Biophys Res Comm 208(3):1147-1153, 1995.
2. Turinsky J, Nagel WG, **Elmendorf JS**, Damrau-Abney A, Smith TR: Sphingomyelinase stimulates 2-deoxyglucose uptake by skeletal muscle. Biochem J 313:215-222, 1996.
3. **Elmendorf JS**, Damrau-Abney A, Smith TR, David TS, Turinsky J: Phosphatidylinositol 3-kinase and dynamics of insulin resistance in denervated slow and fast muscles *in vivo*. Am J Physiol 272 (Endocriol. Metab. 35):E661-E670, 1997.
4. Turinsky J, Damrau-Abney A, **Elmendorf JS**, Smith TR: Effect of monensin on 2-deoxyglucose uptake, on insulin receptor, and phosphatidylinositol 3-kinase activity in rat muscle. Journal of Endocrinology 154:85-93, 1997.
5. Smith TR, **Elmendorf JS**, David TS, Turinsky J: Growth hormone-induced insulin resistance: role of the insulin receptor, IRS-1, GLUT-1, and GLUT-4. Am J Physiol 272 (Endocriol. Metab. 35):E1071-E1079, 1997.
6. Chen D., **Elmendorf JS**, Olson AL, Li X, Earp HS, Pessin JE: Osmotic shock stimulates GLUT4 translocation in 3T3L1 adipocytes by a novel tyrosine kinase pathway. J Biol Chem 272: 27401-27410, 1997.
7. **Elmendorf JS**, Chen D, Pessin JE: Guanosine 5'-O(3-Thiotriphosphate) (GTP S) stimulation of GLUT4 translocation is tyrosine kinase-dependent. J Biol Chem 273:13289-13296, 1998.
8. Thurmond DC, Ceresa BP, Okada S, **Elmendorf JS**, Coker K, Pessin JE: Regulation of insulin-stimulated GLUT4 translocation by Munc18c in 3T3L1 adipocytes. J Biol Chem 273:33876-33883, 1998
9. Pessin JE, Chen D, Olson AL, **Elmendorf JS**: Role of regulated GLUT4 glucose transporter vesicular trafficking in insulin action. Signaling in the Liver. Haussinger and Heinrich (Dordrecht, Kluwer Academic Publishers) 115-124. 1998
10. Pessin JE, Thurmond DC, **Elmendorf JS**, Coker KJ, Okada S: Molecular basis of insulin-stimulated GLUT4 vesicle trafficking. J Biol Chem 274:2593-2596, 1999.
11. **Elmendorf JS,** Pessin JE: Insulin signaling regulating the trafficking and plasma membrane fusion of GLUT4-containing intracellular vesicles. Exp Cell Res 253:55-62, 1999.
12. Min J, Okada S, Kanzaki M, **Elmendorf JS,** Coker K, Ceresa BP, Syu L, Noda Y, Saltiel AR, Pessin JE: Synip: A novel insulin-regulated syntaxin 4 binding protein mediating GLUT4 translocation in adipocytes. Mol Cell (3) 751-760 1999.

13. **Elmendorf JS**, Boeglin D, Pessin JE: Temporal separation of insulin-stimulated GLUT4/IRAP vesicle plasma membrane docking and fusion in 3T3L1 adipocytes. J Biol Chem 274:37357-37361, 1999.
14. Yang C, Watson RT, **Elmendorf JS**, Sacks DB, Pessin JE: Calmodulin antagonists inhibit insulin-stimulated GLUT4 (Glucose Transporter 4) translocation by preventing the formation of phosphatidylinositol 3, 4, 5-trisphosphate in 3T3L1 adipocytes. Mol Endocrinol 14:317-326, 2000.

C. Research Support

Ongoing Research Support

American Diabetes Association Career Development Award
Elmendorf (PI)
01/01/01-12/31/04
"Regulation of GLUT4 Trafficking by a Novel Phosphatidylinositol 3-kinase-independent/Tyrosine Kinase-dependent Signal"
The major goal of this career development award is to establish that additional agonists such as sphingomyelinase can activate glucose transport by a mechanism independent of several well-characterized proteins involved in insulin signaling. Furthermore, this proposal includes studies specifically aimed at determining: 1) whether antagonists of insulin action altered GLUT4 translocation induced by any of insulinomimetic agents and 2) whether the membrane
compartments for signal propagation, as well as membrane compartments containing GLUT4, used by insulin and the insulinomimetic agents were shared.

Biomedical Research Grant
Elmendorf, (PI)
3/01/02-02/28/03
"Proteomic Analysis of Novel Signals Regulating GLUT4 Translocation"
The major goal of this pilot grant is to use predominantly advanced protein analysis techniques to identify shared target proteins of insulin, osmotic shock, $G_{q/11}$ agonists, sphingomyelinase and □-cyclodextrin.

Completed Research Support

Showalter Research Trust Fund
Elmendorf (PI)
07/01/00-06/31/01
"Characterization of a Novel Tyrosine Kinase Signaling Pathway Regulating GLUT4 Translocation"
This pilot grant focused on understanding what vesicular pool of GLUT4 is utilized by GTP□S stimulation.

Juvenile Diabetes Foundation Postdoctoral Fellowship Award
Elmendorf (PI)
07/01/98-06/31/00
"*Characterization of the Molecular Mechanism of Insulin and Guanosine 5'-[□-thio]triphosphate (GTP□S) Stimulation of GLUT4 Translocation*"
The major goal of this postdoctoral fellowship award was to understand GTP□S-stimulated GLUT4 translocation. Funding from this source was concluded early due to acceptance of Assistant Professorship faculty position at Indiana University School of Medicine within the Department of Physiology and Biophysics

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Fang, Shiaofen

NAME	POSITION TITLE
Shiaofen Fang	Associate Professor of Computer Science

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Zhejiang University, China	B.S.	1983	Mathematics
Zhejiang University, China	M.S.	1986	Applied Mathematics
University of Utah	Ph.D	1992	Computer Science

A. Positions and Honors.

Positions and Employment

1986-1988, Research Staff, CAD/CG Center, Zhejiang University, China.
1992-1993, Assistant Professor, CAD Program, School of Architecture, Ohio State University.
1993-1996, Research Scientist, Center for Information Enhanced Medicine, Institute of Systems Science, National University of Singapore.
1996-2002, Assistant Professor, Department of Computer and Information Science, Indiana University Purdue University Indianapolis.
2002-present, Associate Professor, Department of Computer and Information Science, Indiana University Purdue University Indianapolis.

Other Experience and Honors

1998-present, Faculty member, Purdue Biomedical Engineering Graduate Program.
1996-present, Member, ACM and ACM SIGGRAPH.
1999, Teaching Excellence Recognition Award (TERA), School of Science, Indiana University Purdue University Indianaplis.
1988, Pao Yu-Kong Schoolarship, Pao Yu-Kong Foundation.

Selected peer-reviewed publications (in chronological order).

1. Shiaofen Fang, Beat Bruderlin and Xiaohong Zhu, Robustness In Solid Modeling -- A Tolerance Based Intuitionistic Approach, Computer-Aided Design, 25(9), 567-576, 1993.

2. Shiaofen Fang and Beat Bruderlin, Robustness in Geometric Modeling - Tolerance Based Methods, Lecture Notes in Computer Science 553, Springer-Verlag, March, 1991, pp. 85-101.

3. Shiaofen Fang, R. Srinivasan, S. Huang and Raghu Raghavan, Deformable Volume Rendering by 3D Texture Mapping and Octree Encoding, Proc. of IEEE Visualization'96, pp. 73-80, Oct. San Francisco.

.

4. Rajeev Raje, Michael Boyles, Shiaofen Fang, CEV: Collaborative Environment for Visualization Using Java-RMI, Concurrency: Practice and Experience Journal, 10(11-13),1079-1085, 1998.

5. Shiaofen Fang and R. Srinivasan, Volumetric CSG -- A Model-Based Volume Visualization Approach, Proc. Sixth International Conference in Central Europe on Computer Graphics and Visualization, 88-95, 1998.

6. Hongsheng Chen and Shiaofen Fang, Fast Voxelization of 3D Synthetic Objects, ACM Journal of Graphics Tools, 3(4), 33-45, 1999.

7. Shiaofen Fang, Tom Biddlecome and Mihran Tuceryan, Image-Based Transfer Function Design for Data Exploration in Volume Visualization, Proc. IEEE Visualization'98, pp. 319-326, 1998.

8. Shiaofen Fang, R. Srinivasan, Raghu Raghavan and Joan Richtsmeier, Volume Morphing and Rendering -- An Integrated Approach, Journal of Computer Aided Geometric Design, 17(1), 59-81, 2000.

9. Mike Boyles and Shiaofen Fang, Slicing-Based Volumetric Collision Detection, ACM Journal of Graphics Tools, 4(4), 23-32, 2000.

10. Rajagopalan Srinivasan and Shiaofen Fang, Integrating Volume Morphing and Visualization, Journal of Computational Geometry, Special Issue on Computational Geometry in Virtual Reality, 15(1-3), 149-159, 2000.

11. Shiaofen Fang and Hongsheng Chen, Hardware Accelerated Voxelization, Computers and Graphics, 24(3), 433-442, 2000.

12. Shiaofen Fang, Yi Dai, Fred Myers, Mihran Tuceryan and Ken Dunn, Three-Dimensional Microscopy Data Exploration by Interactive Volume Visualization, Journal of Scanning Microscopies, 22(218-226), 2000.

13. Shiaofen Fang and Duoduo Liao, Fast CSG Voxelization by Frame Buffer Pixel Mapping, ACM/IEEE Volume Visualization and Graphics Symposium 2000 (Volviz'00), pp 43-48, Salt Lake City, UT, 2000.

14. Shiaofen Fang and Hongsheng Chen, Hardware Accelerated Voxelization, in: Volume Graphics (chapter 20), pp. 301-315, A. Kaufman, R. Yagel and M. Chen editors, Springer-Verlag, March, 2000.

15. Haiying Wang, Snehasis Mukhopadhyay and Shiaofen Fang, Feature Decomposition Architectures for Neural Networks: Algorithms, Error Bounds, and Application, International Journal of Neural Systems.12(1), 69-81, 2002.

16. Carrie L. Phillips, Lois J. Arend, Adele J. Filson, Doug J. Kojetin, Jeffrey L. Clendenon, Shiaofen Fang, and Kenneth W. Dunn, Three-Dimensional Imaging of Embryonic Mouse Kidney by Two-Photon Microscopy, American Journal of Pathology, 158, 49-55, 2001.

.

17. Mike Boyles and Shiaofen Fang, 3DIVE: An Immersive Environment for Biomedical Visualization, Journal of Computer Science and Technology, 2002.

18. Jeffrey L. Clendenon, Carrie L. Phillips, Ruben M. Sandoval, Shiaofen Fang, Kenneth W. Dunn, Voxx - An Inexpensive, Near Real-Time Visualization System for Biological Microscopy, American Journal of Physiology - Cell Physiology, 282: C213-C218, 2002.

19. Duoduo Liao and Shiaofen Fang, Fast Volumetric CSG Modeling Using Standard Graphics System, Proc. 7th ACM Symposium on Solid Modeling and Applications, Saarbrucken, Germany, 204-211, 2002.

C. Research Support.

Ongoing Research Support

Institute of Museum and Library Services, Palakal (PI) 11/01/01 -- 10/31/03
CLIOH: A digital cultural library indexing our heritage,
The goal of this project is to establish a new medium digital library of the world's cultural treasures in collaboration with various museum and library services.
Role: Co-PI

Completed Research Support

CCR9732297 Fang (PI) 7/15/98 – 12/31/01
NSF
Deformable Volume Modeling
The goal of this project is to study the fundamental methodology for the visualization and modeling of deformable objects, such as muscle and tissues, facial expressions, and growth patterns. A landmark-based learning model and a scattered data interpolation technique are employed, and applied to various application such as craniofacial growth and facial expression analysis.
Role: PI

NSF 2001 MRI grant McRobbie (PI) 8/1/01 – 7/31/02
The AVIDD: a distributed facility for managing, analyzing and visualizing instrument-driven data flows. Major Research Instrumentation Grant.
Role: Co-PI

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Gattone, Vincent

NAME	POSITION TITLE
Vincent H. Gattone II	Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Ursinus College, Collegeville ,PA	BS	1973	Chemistry
George Washington University, Washington, DC	MS	1975	Pathology
Medical College of Ohio, Toledo, OH	Ph.D.	1980	Medical Sciences

A. Professional Experience:

1983 - 1986 Assistant Professor, Anatomy, Penn. State Univ., Hershey Medical Center
1986 - 1989 Assistant Professor, Anatomy, Univ. of Kansas Medical Center
1989 - 1995 Associate Professor, Anatomy & Cell Biology, Univ. of Kansas Medical Center
1995 - 2000 Professor, Anatomy & Cell Biology, Univ. of Kansas Medical Center
1994 - 1995 Visiting Scholar (Sabbatical) Univ. of Michigan, Dept. of Pathology
2000- pres. Professor, Anatomy & Cell Biology, Indiana University School of Medicine

B. Honors and Awards

Bohan Teaching Professorship Award, 1997
Chancellor Teaching Award, and Kemper Teaching Award, 1999
Bioscience Invention of the Year for 1999 from the Silicon Prairie Technology Association

C. Selected Research Publication (from a total of 80)

Gattone VH, JP Calvet, BD Cowley, AP Evan, TS Shaver, K Helmstadter and JJ Grantham. (1988) Autosomal recessive polycystic kidney disease in a murine model; a gross and microscopic description. Lab Invest 59:231-238.

Welling LW, AP Evan, **VH Gattone**, S Rollings, R Saunders, K Koskel and A Spitzer. (1989) Correlation of structure and function in developing proximal tubules of guinea pig. Am J Physiol 256:F13-F17.

Gattone VH, GK Andrews, F Niu, LJ Chadwick, RM Klein and JP Calvet. (1990) Defective epidermal growth factor gene expression in mice with polycystic kidney disease. Dev Biol 138:225-230.

Takahashi H, JP Calvet, D Hoover, K Yoshida, JJ Grantham and **VH Gattone**. (1991) A hereditary model of slowly progressive polycystic kidney disease in the mouse.J Am Soc Nephrol 1:980-989.

Evan AP, LM Satlin, **VH Gattone**, B Connors and GJ Schwartz. (1991) Postnatal maturation of the rabbit renal collecting duct II. morphologic observations. Am J Physiol 261:F91-107.

Gattone VH, DA Sherman, DA Hinton, Niu Fu-wen, RT Topham and RM Klein. (1992) Epidermal growth factor in the neonatal mouse salivary gland and kidney. Biol Neonate 61:54-67.

.

Harding MA, **VH Gattone**, JJ Grantham and JP Calvet. (1992) Localization of overexpressed c-myc mRNA in polycystic kidneys of the cpk mouse. Kid Int 41:317-325.

Cowley BD, S Gudapaty, AL Kraybill, BD Barash, MA Harding, JP Calvet and **VH Gattone**. (1993) Autosomal dominant polycystic kidney disease in the rat. Kidney Int 43:522-534.

Lowden DA, GW Lindemann, GS Merlino, BD Barash, JP Calvet and **VH Gattone**. (1994) Renal cysts in transgenic mice expressing transforming growth factor alpha. J Lab Clin Med 124:386-394.

Kalluri R, **VH Gattone**, ME Noelken and BG Hudson. (1994) Unmasking of alpha 3 (IV) collagen induces autoimmune Goodpasture syndrome. Proc Natl Acad Sci USA 91:6201-6205.

Deshmukh GD, Radin NS, **VH Gattone** and Shayman JA. (1994) Glycosphingolipid Abnormalities in the Polycystic (cpk/cpk) Mouse. J Lipid Res 35:1611-1618.

Gattone VH, BD Cowley, BD Barash, S Nagao, H Takahashi, T Yamaguchi, J Rupp and JJ Grantham. (1995) Methylprednisolone retards the progression of inherited polycystic kidney disease in rodents. Am J Kidney Dis 25:302-313.

Gattone VH, DA Lowden and BD Cowley. (1995) Epidermal growth factor ameliorates autosomal recessive polycystic kidney disease. Dev Biol 169: 504-510.

Gattone VH, KA Kuenstler, GW Lindemann, X Lu, BD Cowley, CA Rankin and JP Calvet. (1996) Renal expression of a transforming growth factor alpha transgene accelerates the progression of inherited, slowly progressive polycystic kidney disease in the mouse. J Lab Clin Med 127: 214-222.

Gattone VH, KA MacNaughton, and AL Kraybill. (1996) Murine autosomal recessive polycystic kidney disease with multiorgan involvement induced by the cpk gene. Anat Rec 245: 488-499.

Cowley, BD, JJ Grantham, MJ Muessel, AL Kraybill, and **VH Gattone**. (1996) Modification of disease progression in rats with inherited polycystic kidney disease. Am J Kid Disease 27: 865-879.

Cowley, BD, JC Rupp, MJ Muessel, and **VH Gattone**. (1997) Gender and the effect of gonadal hormones on the progression of inherited polycystic kidney disease in rats. Am J Kid Disease 29: 265-272.

Kalluri, R, **VH Gattone**, and BG Hudson. (1998) Identification and localization of type IV collagen chains in the inner ear cochlea. Connective Tissue Res 37(1-2): 143-150.

Gattone VH, C Tian, W Zhuge, M Sahni, O Narayan, and EB Stephens (1998) SIV-associated nephropathy in rhesus macaques infected with lymphocyte-tropic SIV $_{mac}$239. AIDS Research and Human Retroviruses 14: 1163-1180.

Stephens, EB, C Tian, Z Li, O Narayan, and **VH Gattone** (1998) Rhesus macaques infected with macrophage-tropic simian immunodeficiency virus (SIV$_{mac}$R71/17E) exhibit extensive focal segmental and global glomerulosclerosis. J. Virol. 72:8820-8832.

Rankin, CA, Y Itoh, C Tian, DM Ziemer, JP Calvet, and **VH Gattone** (1999) Matrix metalloproteinase 2 in a murine model of infantile polycystic kidney disease. J Am Soc Nephrol 10: 210-217.

Gattone VH, R Maser, C Tian, JM Rosenberg, and MG Branden. (1999) Developmental expression of urine concentration associated genes and their altered expression in murine infantile-type polycystic kidney disease. Devel Genetics 24:309-318.

Liu, ZQ, S Muhkerjee, M Sahni, C McCormick-Davis, K Leung, Z Li, **VH Gattone**, C Tian, RW Doms, TL Hoffman, R Raghavan, O Narayan, and EB Stephens (1999) Derivation and biological characterization of a molecular clone of SHIV$_{KU-2}$ that causes AIDS, neurological and renal disease in Rhesus macaques. Virol 260: 295-307.

Ricker JL, **VH Gattone**, JP Calvet and CA Rankin. (2000) The development of autosomal recessive polycystic kidney disease in BALB/c-cpk/cpk Mice. J Am Soc Nephrol 11:1837-1847.

Stephens EB, C Tian, B Dalton and **VH Gattone**. (2000) Simian-human immunodeficiency virus associated nephropathy (SHIVAN) in macaques. AIDS Research and Human Retroviruses 16:1295-1306.

Nakanishi K, **VH Gattone**, WE Sweeney and ED Avner. (2001) Renal dysfunction but not polycystic change ameliorated by neonatal EGF in bpk mice. Pediatric Nephrol 16:45-50.

Torres VE, BD Cowley, MG Branden, I Yoshida and **VH Gattone**. (2001) Long-term ammonium chloride or sodium bicarbonate treatment in two models of polycystic kidney disease. Exp Nephrol. 9:171-180.

Ricker JL, JE Mata, PL Iverson and **VH Gattone**. (2002) c-myc antisense oligonucleotide treatment ameliorates murine ARPKD. Kid Internat 61(Sym 1): S125-131.

Gattone VH and D Goldowitz. (2002) The renal glomerulus and vasculature in "aggregation" chimeric mice. Nephron 90:267-272.

Gattone VH , JL Ricker, CM Trambaugh and RM Klein. (2002) Multiorgan mRNA misexpression in murine autosomal recessive polycystic kidney disease. Kid Internat 62:1560-1569.

Li J, RL Duncan, DB Burr, **VH Gattone**, CH Turner. (2003) Parathyroid hormone enhances mechanically induced bone formation possibly involving L-type voltage sensitive calcium channels. Endocrinology 144:1226-1233.

D. RESEARCH PROJECTS ONGOING OR COMPLETED DURING THE LAST 3 YEARS

Funded

1. Title: "The basis for multiorgan cystogenesis in murine ARPKD"
Principal InvestigatorVincent Gattone
Agency: Polycystic Kidney Research Foundation
Type: Grant-in-Aid Period: 01-01-01 - 12-31-03
To determine common pathways involved in inherited forms of cyst disease by identifying similarly misexpressed mRNAs in kidney, liver and pancreatic cysts in a mouse model of ARPKD.

2. Title: " Actin Dysregulation in Ischemia: Mechanisms and Effects"
Principal Investigator: Bruce Molitoris (V. Gattone Co-Investigator)
Agency: NIH/NIDDK
Type: P01 (DK53465); Period: 03-01-00 - 01-31-05
To determine the role of actin tin the development of ischemic renal dysfunction.

3. Title: " Transmission Electron Microscope"
Principal Investigator: Andrew Evan (V. Gattone Co-Investigator)
Agency: NIH/ NCRR
Type: S10 (RR17754); Period: 04-01-03 - 03-31-04
To purchase a state-of-the-art TEM for the EM Center.

Pending

4. Title: "wpk-induced polycystic kidney disease"
Principal Investigator: Vincent Gattone
Agency: NIH/NIDDK DK
Type: R01 (DK63999-01A1); Period: 12-01-03 - 11-30-08

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To characterize the PKD induced in rats by the wpk gene and to localize and clone the wpk gene.

5. Title: Transgene induced HIV-associated nephropathy
Principal Investigator: Vincent Gattone
Agency: NIH-NIDDK
Type: R21 (DK65504) Period: 7-01-03- 6-30-05
To evaluate a transgenic rat that expresses HIV genes and develops a nephropathy sinumar to HIVAN.

6. Title: " Renal Innervation of the Polycystic Kidney"
Principal Investigator: Vincent Gattone
Agency: AHA Midwest Affiliate Grant in Aid
Type: Grant in Aid Period: 7-01-03- 6-30-05
To determine the contribution of renal innervation to the hypertension and progression of PKD in the Han SPRD-Cy/+ rat model of PKD.

<u>Ended</u>

1. Title: " Growth Factors in Infantile Renal Cystic Disease"
Principal Investigator: Vincent H. Gattone
Agency: NIH/NIDDK
Type: R01 (DK40695); Period: 05-01-94 - 04-30-00
The goal was to determine if epidermal growth factor contributes to postnatal collecting duct maturation and its absence in inherited murine polycystic kidney disease contributes to the pathogenesis of the disease.

2. Title: "Simian Immunodeficiency Viral Nephropathy"
Principal Investigator: Edward B. Stephens, Co-Investigator, Vincent Gattone
Agency: NIH/NIDDK

Type: R01 (DK49516) Period: 09-30-94 - 09-29-00
Investigate the role of macrophage- and lymphocyte-tropic viruses in SIV induced renal disease.

3. Title: "Inhibition of c-myc to Treat Polycystic Kidney Disease"
Principal Investigator: Patrick Iversen (AVI BioPharma), Vincent Gattone Subcontractor
Agency: NIH/NIDDK
Type: R43 SBIR (DK/CA56592) Period: 07-01-00 - 6-30-01 (Phase I)
To determine if antisense DNA oligonucleotides to c-myc are efficacious in treating C57BL/6J-cpk mice and cy rats with PKD. There is no overlap with the present proposal.

Hurley, Thomas

NAME	POSITION TITLE
Thomas D. Hurley	Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Pennsylvania State Univ., Univ. Pk, PA.	B.S.	1983	Biochemistry
Creighton Univ., Omaha, NE	M.S.	1985	Biochemistry
Indiana Univ. Sch. Of Medicine, Indianapolis, IN	Ph.D.	1990	Biochemistry
IUSM & The Johns Hopkins Univ. Sch. Of Medicine; Baltimore, MD	Post-Doc	1990-1992	Biophysics

A. Positions and Honors

9/83-5/85 Graduate Student Teaching Assistant, Dept. of Biochemistry, Creighton University, Omaha, NE
6/85-8/85 Research Technician, J.T. Baker Chemical Company, Phillipsburg, NJ
9/85-2/90 Graduate Student Research Assistant, Dept. of Biochemistry, Indiana University School of Medicine, Indianapolis, IN
4/86-2/90 NIAAA Pre-doctoral Fellowship T32-AA07642
11/88 Instructor, NIAAA Molecular Biology Course for Alcohol Researchers, Dept. of Medicine, Indiana University School of Medicine, Indianapolis, IN
3/90-7/92 Post-doctoral Fellow, Indiana University School of Medicine, Indianapolis, IN, and Johns Hopkins University School of Medicine, Baltimore, MD
3/90-7/92 NIAAA Post-doctoral Fellowship, T32-AA07642
7/92-6/96 Assistant Professor, Dept. of Biochemistry & Molecular Biology, Indiana University School of Medicine, Indianapolis, IN
7/96-6/01 Associate Professor, Dept. of Biochemistry & Molecular Biology, Indiana University School of Medicine, Indianapolis, IN
7/01-Present Professor, Dept. of Biochemistry & Molecular Biology, Indiana University School of Medicine, Indianapolis, IN
1999- Present Director, Center for Structural Biology, Indiana University School of Medicine
3/90 First Prize, Sigma Xi Graduate Student Competition, Indiana University School of Medicine
4/91 Kinsley Award, Best Ph.D. Dissertation of 1990, Indiana University Graduate School
4/92 Bowman Award, Best Post-Doctoral Publication, Indiana University Medical School
04/00 1999 Teaching Excellence Recognition Award, Indiana University
2000-present Shared Instrumentation Study Section, NIH
02/03 Ad hoc Member; NIH Study Section ALTX-1

Professional Societies - American Crystallographic Association, Research Society on Alcoholism, American Society for Biochemistry and Molecular Biology

B. Publications (Selected from 44 total)

.

1. Longenecker, K.L., Roach, P.J**., Hurley, T.D**. (1996) Three-dimensional Structure of Mammalian Casein Kinase I: Molecular Basis of Phosphate Recognition. *J. Mol. Biol*. 257: 618-631.
2. Davis, G.J., Bosron, W.F., Stone, C.L., Owusu-Dekyi, K., and **Hurley, T.D**. (1996) X-ray Structure of Human □$_3$□$_3$ Alcohol Dehydrogenase. The contributions of Ionic Interactions to Coenzyme Binding. *J. Biol. Chem*. 271: 17057-17061.
3. **Hurley, T.D.**, Steinmetz, C.G., Xie, P., Yang, Z.-N. (1997) Three-dimensional Structures of Human Alcohol Dehydrogenase Isoenzymes Reveal the Molecular Basis for Their Functional Diversity. In: *Enzymolgy and Molecular Biology of Carbonyl Metabolism 6*, (Weiner, H., Wermuth, B., and Crabb, D., eds.) Plenum Press, New York, pp. 291-302.
4. Yang, Z.-N., Bosron, W.F., and **Hurley, T.D**. (1997) Structure of human □ □ alcohol dehydrogenase: A glutathione-dependent formaldehyde dehydrogenase. *J. Mol. Biol*. 26: 330-343.
5. Kedishvili, N.Y., Gough, W.H., Chernoff, E.A.G., **Hurley, T.D**., Stone, C.L., Bowman, K.D., Popov, K.D., Bosron, W.F., and Li, T.-K. (1997) cDNA sequence and catalytic properties of a chick embryo alcohol dehydrogenase (ADH-F) and oxidizes retinol and 3β,5α-Hydroxysteroids. *J. Biol. Chem*. 272: 7494-7500.
6. Steinmetz, C.G., Xie, P., Weiner, H. and **Hurley, T.D**., (1997) Structure of Mitochondrial Aldehyde Dehydrogenase: The genetic component of alcohol aversion. *Structure* 5: 701-711.
7. Xie, P., Bosron, W.F., and **Hurley, T.D**. (1997) X-ray Structure of Human Class IV $\sigma\sigma$ Alcohol Dehydrogenase: Structural Basis for Substrate Specificity. *J. Biol. Chem*. 272: 18558-18563.
8. Sheikh, S., Ni, L., **Hurley, T.D**., and Weiner, H. (1997) The potential roles of the conserved amino acids in human liver aldehyde dehydrogenase. *J. Biol. Chem*. 272: 18817-18822.
9. Harris, R.A., Hawes, J.W., Popov, K.M., Zhao, Y., Shimomura, Y., Sato, J., Jaskiewicz, J., **Hurley, T.D.** (1997) Studies on the regulation of the mitochondrial alpha-ketoacid dehydrogenase complexes and their kinases. *Advances in Enzyme Regulation*, 37: 271-293.
10. Longenecker, K.L., Roach, P.J., and **Hurley, T.D**. (1998) Crystallographic studies of casein kinase Iδ: Toward a structural understanding of autoinhibiton. *Acta Crystallogr*, 54:473-475.
11. Hodes, M.E., Zimmerman, A.W., Aydanian, A., Naidu, S., Miller, N.R., Garcia Oller, J.L., Barker, B., Aleck, K.A., **Hurley, T.D**., Dlouhy, S.R. (1998) Different mutations in the same codon of the proteolipid protein gene, PLP, may help in correlating genotype with phenotype in Pelizaeus-Merzbacher disease/X-linked spastic paraplegia (PMD/SPG2). *Am. J. Med. Genetic*. 82:132-139.
12. **Hurley, T.D**., Steinmetz, C.G., and Weiner, H. (1999) Three-dimensional structure of mitochondrial aldehyde dehydrogenase: mechanistic implications. In: Enzymology and Molecular biology of Carbonyl Metabolism *7*, (Weiner, H., Crabb, D. eds.) Plenum Press, NY, pp 21-32.
13. **Hurley T.D.** and Weiner H. (1999) Evaluation of the roles of the conserved residues of aldehyde dehydrogenase. In: Enzymology and Molecular biology of Carbonyl Metabolism *7*, (Weiner, H., Crabb, D. eds.) Plenum Press, NY, pp 45-52.

14. Stone, C.L., Jipping, M.B., Owusu-Dekyi, **Hurley, T.D.**, Li, T.K., and Bosron, W.F. (1999) The pH-dependent binding of NADH and subsequent enzyme isomerization of human liver □$_3$□$_3$ alcohol dehydrogenase. *Biochemistry* 38:5829-5835.
15. Xie, P., and **Hurley, T.D**. (1999) Methionine-141 directly influences the binding of 4-methylpyrazole in human σσ alcohol dehydrogenase. *Protein Science* 8:2639-2644.
16. Ni, L., Zhou, J., **Hurley, T.D.**, and Weiner, H. (1999) Human Liver Mitochondrial Aldehyde dehydrogenase: Three-dimensional Structure and Restoration of Solubility and Activity of Chimeric Forms. *Protein Science* 8:2784-2790.
17. Wei, B., Ni, L., **Hurley,T.D.**, and Weiner, H. (2000) Cooperativity in NAD^+ binding induced by mutations of
Arginine 475 located at the subunit interface in human liver mitochondrial Class 2 aldehyde dehydrogenase. *Biochemistry 39:*5295-5302.
18. Yang, J., **Hurley, T.D.**, and DePaoli-Roach, A. (2000) Interaction of inhibitor-2 with the catalytic subunit of type 1 protein phosphatase. *J. Biol. Chem. 275*:22635-22644.
19. Sanghani, P., Stone, C.L., Ray, B.D., Pindel, E.V., **Hurley, T.D.**, and Bosron, W.F. (2000) Kinetic mechanism of human glutathione-dependent formaldehyde dehydrogenase. *Biochemistry* 39:10720-10729.
20. Niederhut, M.S., Gibbons, B.J., Perez-Miller, S. and **Hurley, T.D** . (2001) Three-dimensional structures of the three human class I alcohol dehydrogenases. *Protein Science* 10:697-706.
21. **Hurley, T.D.**, Perez-Miller, S., and Breen, H. (2001) Order and disorder in mitochondrial aldehyde dehydrogenase. *Chem. Biol. Inter*. 130:3-14.
22. Bosron, W.F. and **Hurley, T.D.** (2002) Lessons from a bacterial cocaine esterase. *Nature Struct. Biol*. 9:4-5.
23. Gibbons, B.J., Roach, P.J., and **Hurley, T.D.** (2002) Crystal structure of the autocatalytic initiator of glycogen biosynthesis, glycogenin. *J. Mol. Biol.* 319:463-477.
24. Hammen, P.K., Allali-Hassani, A., Hallenga, K., **Hurley, T.D.**, and Weiner, H. (2002) Multiple conformations of NAD^+ and NADH when bound to human cytosolic and mitochondrial aldehyde dehydrogenase. *Biochemistry* 41:7156-7168.
25. Sanghani, P.C., Robinson, H., Bosron, W.F., and **Hurley, T.D** . (2002) Human glutathione-dependent formaldehyde dehydrogenase. structures of apo, binary and inhibitory ternary complexes. *Biochemistry* 41:10778-10786.
26. Sanghani, P.C. Bosron, W.F., and **Hurley,T.D.** (2002) Human glutathione-dependent formaldehyde dehydrogenase: structural changes associated with ternary complex formation. *Biochemistry* 41:15189-15194.

C. Research Support:

ONGOING:

R01 AA11982 7/1/98 – 6/30/03 NIH (NIAAA)
PI: T.D. Hurley
X-ray Structure of Human Aldehyde Dehydrogenase

The overall goal of this project is to elucidate the structural mechanisms which give rise to the functional properties of the mitochondrial form of aldehyde dehydrognease and to determine the molecular basis for the low activity of the ALDH2*2 gene product.

R01 DK27221 08/15/00-7/31/05 NIH (NIDDK)
PI: P.J. Roach
Hormonal Control of Glycogen Metabolism
The goal of this proposal is to understand the detailed mechanism of glycogen accumulation in mammals as well as the signaling pathways involved.

Pending
R01 DK063285 07/03-06/08 NIH (NIDDK)
PI: T.D. Hurley
Structural Determinants of Glycogen Initiation
The goal of this proposal is to determine the mechanism by which glycogenin catalyzes the initial steps of glycogen synthesis from both a chemical and enzymatic point of view.

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Montrose, Marshall

NAME	POSITION TITLE
Marshall H. Montrose	Professor of Cellular & Integrative Physiology

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Univ. of Maryland, College Park, MD	B.S.	1977	Mathematics
Univ. of Maryland, College Park, MD	B.S.	1977	Zoology
Univ. of Rochester, Rochester, NY	M.S.	1981	Biophysics
Univ. of Rochester, Rochester, NY	Ph.D.	1984	Biophysics
Univ. of Zurich, Switzerland	None	1985-88	Physiology

A. Positions and Honors. List in chronological order previous positions, concluding with your present position. List any honors. Include present membership on any Federal Government public advisory committee.

1976-1979	Biologist, National Institutes of Health
1980-1984	Graduate student, University of Rochester, Department of Biophysics (laboratory of G.A. Kimmich), Ph.D. Thesis: *Coupling of Na^+ and Cl-fluxes by isolated chick enterocytes*
1985-1988	Postdoctoral fellow, University of Zurich, Physiology Institute (Laboratory of H. Murer)
1988-1992	Assistant Professor of Medicine (and Physiology), Johns Hopkins University
1993-1998	Associate Professor of Medicine (and Physiology), Johns Hopkins University
1998-present	Professor of Physiology and Biophysics, Indiana University

Editor, American Journal of Physiology/GI and Liver Physiology (7/2003- 2009); Associate Editor, American Journal of Physiology/GI and Liver Physiology (1997-2003); Editorial Board, American Journal of Physiology/Cell Physiology (1996-2004); NIH Study section member (National Center for Research Resources, 1995-96, 99,00; Cystic Fibrosis RFA, 1996; Special Emphasis Panel, 1997,1998; GMA2, 2002); Director, JHU Imaging Core (1989-1998) and Confocal Microscopy Facility (1994-98); Director of Admissions, JHU Cellular and Molecular Medicine graduate program (1996-1998); President, Chesapeake Society for Microscopy (1995-1996, local affiliate of Microscopy Society of America); Director, IU MedSci Imaging Facility (1999-present), Councilor, AGA Intestinal Disorders Section (1998-present)

B. Selected peer-reviewed publications (in chronological order). Do not include publications submitted or in preparation.

1. **Montrose**, M.H., Lester, R., Zimniak, P. Anwer, M.S. and H. Murer. Bile acids increase cellular free calcium in cultured kidney cells (LLC-PK_1). Pflugers Arch. 412:164-171, 1988.

2. **Montrose**, M.H., Knoblauch, C., and H. Murer. Separate control of regulatory volume increase and Na/H exchange by cultured renal cells. Am. J. Physiol. 255: C76-C859, 1988.
3. **Montrose**, M.H. and H. Murer. Polarity and kinetics of Na^+/H^+ exchange in cultured opossum kidney (OK) cells. Am. J. Physiol. 259:C121-C133, 1990.
4. Montrose-Rafizadeh,C., Guggino, W.B., and M.H. **Montrose**. Cellular differentiation regulates expression of CFTR mRNA and Cl- transport in human intestinal cells. J. Biol. Chem. 266:4495-4999, 1991.
5. Watson, A.J.M., M. Donowitz and M.H. **Montrose**. Serum regulates Na^+/H^+ exchange in Caco-2 cells by a mechanism which is dependent on f-actin. J. Biol. Chem. 267:956-962, 1992.
6. Montrose-Rafizadeh, C., Blackmon, D.L., Hamosh, A., Olivia, M.M., Hawkins, A.L., Curristin, S.M., Griffin, C.A., Yang, V.W., Guggino, W.B., Cutting, G.R., and M.H. **Montrose**. Regulation of CFTR gene transcription and alternative RNA splicing in a model of developing intestinal epithelium. J.Biol.Chem267: 1929-19305, 1992.
7. Rowe, W.A., D.L. Blackmon and M.H. **Montrose**. Propionate activates multiple ion transport mechanisms in the HT29-18-C_1 human colon cell line. Am. J. Physiol. 265:G564-G571, 1993.
8. Rowe, W.A., M.J. Lesho and M.H. **Montrose**. Polarized Na^+/H^+ exchange function is pliable in response to transepithelial gradients of propionate. Proc. Natl. Acad. Sci. 91:6166-6170, 1994.
9. Chu, S. and M.H. **Montrose**. A Na-independent short-chain fatty acid transporter contributes to intracellular pH regulation in murine colonocytes. J. Gen. Physiol. 105:589-615, 1995.
10. Chu, S. and M.H. **Montrose**. Extracellular pH regulation in microdomains of colonic crypts: Effects of short-chain fatty acids. Proc. Natl. Acad. Sci. 92:3303-3307, 1995.
11. Chus, S., W.E. Brownell, and M.H. **Montrose**. Quantitative confocal imaging along the crypt-to-surface axis of colonic crypts. Am. J. Physiol. 269:C1557-C1564, 1995.
12. Fine, D.M., C.F. Lo, L. Aquillar, D.L. Blackmon, and M.H. **Montrose**. Cellular chloride depletion inhibits cAMP-activated electrogenic chloride fluxes in HT29-18-C1 cells. J. Membrane Biol. 145:129-141, 1995.
13. Levine, S.A., S.K. Nath, C.H.C. Yun, Y.W. Yip, M. **Montrose**, M. Donowitz, C. M. Tse. Separate C-terminal domains of the epithelial specific brush border Na/H exchanger isoform NHE-3 are involved in stimulation and inhibition by protein kinases/growth factors. J. Biol. Chem. 270: 13716-13725, 1995.
14. Nath, S.K., C.Y.Hand, S.A.Levine, C.H.C.Yun, M. **Montrose**, M.Donowitz, C.M.Tse. Hyperosmolarity inhibits Na/H exchanger isoforms NHE2 and NHE3: an effect opposite to that on NHE1. Am. J. Physiol. 270:G478-G483, 1996.
15. Chu, S. and M.H. **Montrose**. Nonionic diffusion and carrier-mediated transport drive extracellular pH regulation of mouse colonic crypts. J. Physiol. (London) 494: 783-793,1996.
16. Montrose-Rafizadeh, C., J. Kole, L.M. Bartkowski, L.H. Lee, D.L. Blackmon, S.E. Behnken, J.D. Gearhart, J.A. Cohn, and M.H. **Montrose**. Gene targeting of a CFTR allele in HT29 human epithelial cells. J. Cell. Physiol. 170:299-308, 1997.
17. **Montrose**, M.H. Imaging drug therapy and pH in gastrointestinal tissue with confocal and two-photon microscopy. Scanning 20:148-9, 1998

18. Janecki, A.J., M.H. **Montrose**, P. Zimniak, A. Zweibaum, C.M. Tse, S. Khurana, and M. Donowitz. Subcellular redistribution is involved in acute regulation of the brush border Na/H exchanger isoform 3 in human colon adenocarcinoma cell line Caco-2. Protein kinase C-mediated inhibition of the exchanger. J. Biol. Chem. 273(15):8790-8798, 1998
19. Yang H, J.M. Egan, Y. Wang, C.D. Moyes, J. Roth, M.H. **Montrose**, and C. Montrose-Rafizadeh. GLP-1 action in L6 myotubes is via a receptor different from the pancreatic GLP-1 receptor. Am. J. Physiol. 275:C675-C683. 1998
20. Wasicko M.J., L.M. Sterni , O.S. Bamford , M.H. **Montrose** , and J.L. Carroll. Resetting and postnatal maturation of oxygen chemosensitivity in rat carotid chemoreceptor cells. J Physiol (Lond) 514(2):493-503 , 1999.
21. Gonda T, D. Maouyo , S.E. Rees , and M.H. **Montrose**. Regulation of intracellular pH gradients by identified Na/H exchanger isoforms and a short-chain fatty acid. Am J Physiol 276:G259-G270, 1999.
22. Chu, S., S. Tanaka, J.D. Kaunitz, and M.H. **Montrose**. Dynamic regulation of gastric surface pH by luminal pH. J. Clin. Invest. 103(5):605-612, 1999
23. Bamford, O.S., L.M. Sterni, M.J. Wasicko, M.H. **Montrose**, and J.L. Carroll. Postnatal maturation of carotid body and type I cell chemoreception in the rat. Am. J. Physiol. 276:L875-L884, 1999.
24. Janecki A.J., M.H. **Montrose** , C.M. Tse , F.S. de Medina, A. Zweibaum, and M. Donowitz. Development of an endogenous epithelial Na/H exchanger (NHE3) in three clones of Caco-2 cells. Am. J. Physiol. 277:G292-G305, 1999
25. Maouyo, D., S. Chu, and M.H. **Montrose**. pH heterogeneity at intracellular and extracellular plasma membrane sites in HT29-C1 cells. Am. J. Physiol 278:C973-C981, 2000.
26. Vijay L., R. I. Alam, D.Q. Phan, G.L. Ereso, T.H.T. Phan, S..A. Malik, M H. **Montrose**, S. Chu, G.L. Heck, G.M. Feldman, and J.A. DeSimone. Decrease in rat taste receptor cell intracellular pH is the proximate stimulus in sour taste transduction**.** Am. J. Physiol. 281: 1005-1013, 2001.
27. Coskun, T., S. Chu and M.H. **Montrose**. Intragastric pH regulates conversion from net acid to net alkaline secretion by the rat stomach. Am. J. Physiol: 281(4):G870-7, 2001.
30. Chu, J., S. Chu and M.H. **Montrose**. Apical Na^+/H^+ exchange near the base of mouse colonic crypts. Am. J. Physiol. 283:C358-C372,2002.
31. Coskun, T., H.K. Baumgartner, S. Chu, and M.H. **Montrose**. Coordinated regulation of gastric chloride secretion with both acid and alkali secretion. Am J Physiol 283:G1147-G1155, 2002.
32. Hanson, G.T., T.B. McAnaney, E.S. Park, M.E. Rendell, D.K Yarbrough, S. Chu, L. Xi, S.G. Boxer, M.H. **Montrose**, and S.J. Remington. Green fluorescent protein variants as ratiometric dual emission pH sensors. 1. Characterization and preliminary applications. Biochemistry 41:15477-15488, 2002.
33. Baumgartner, H.Kl, U. Kirbiyik, T. Coskun, S. Chu, M.H. **Montrose**. Endogenous cyclooxygenase activity regulates mouse gastric surface pH. J. Physiol. (London) 544:871-882, 2002.
34. Tanaka, S., S. Chu, M. Hirokawa, M.H. **Montrose**, and J.D. Kaunitz. Direct measurement of acid permeation into rat esophagus. Gut (*in press*)

C. Research Support.

Active

RO1 DK54940 (PI: M. H. Montrose.) 8/15/99 - 8/14/04
40%
NIH $194,000
Sensing pH at the gastric surface

The major goal of this project is to use mouse and rat models of gastric function to study the coordinated regulation of acid and alkali secretion in the stomach, using predominantly confocal and two photon microscopy in vivo.

RO1 DK42457 (PI: M. H. Montrose.) 9/1/01 - 8/31/06
40%
NIH $235,000
Subcellular regulation of colonic ion transporters

The major goal of this project is to use mouse and HT29 cell models to explore the regulation of Na^+/H^+ exchangers in the apical *versus* basolateral membrane of colonocytes. Experiments utilize normal and mutant mice (NHE2, NHE3 knockout) as well as normal and mutant NHEs (NHE tagged with pH-sensitive or pH-insensitive GFP variants) to test the hypothesis that pH microdomains and regulated insertion of NHE into the plasma membrane are dominant modes of NHE regulation.

Relevant funding in past 3 years

RO3 TW00889 (PI: M. H. Montrose.) 7/1/98 - 6/31/01
NIH Fogarty Center $25,000
Regulation of Na,K-ATPase by short chain fatty acids

The major goal of this Fogarty International Research Collaboration Award (FIRCA) project is to use normal rat colonic epithelium and HT29-C1 cells to determine the mechanism underlying activation of the basolateral Na,K-ATPase by short-chain fatty acids.

S10 RR13712 (PI: M. H. Montrose) 4/1/99 - 3/31/01
NIH-NCRR $345,000
Multi-photon Microscope

This shared instrumentation grant has provided a Zeiss LSM510 NLO confocal scanning microscope outfitted with a Ti:Sapphire laser for multi-photon excitation and Ar and HeNe lasers for conventional confocal imaging at Indiana University.

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Moreno, Alonso

NAME	POSITION TITLE
Alonso P. Moreno	Associate Professor of Medicine

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
A. Eistein College of Medicine	Postdoctoral	89-91	Biophysics of Channels
Center fro Research and Adv. Studies, Mexico City	Ph.D.	1982-1988	Physiology and Biophysics
National School of Biological Sciences, Mexico City	BS	1974-1981	Biology

A. Positions and Honors

Positions

Research Associate at Albert Einstein College of Medicine. Characterization of gap junction channels expressed in tumor ell lines. 1989-1991

Assistant Professor at Albert Einstein College of Medicine. Dept of Neuroscience. Modulation of gap junctions by phosphorylation. Studies in transfected tumor cell lines, Leptomeningeal and Smooth muscle cells. Studies on calcium mobilization using fluorescent dyes.1992-1993

Research Assistant Professor at the State University of New York. Buffalo, NY.1993-1996
Research on modulation of Gap junction permeability and conductivity by tyrosine phosphorylation.

Associate Director for the Grass Foundation Fellowship Program, at the Marine Biological Laboratory. Woods Hole Mass. 1994 and 1995

Associate Professor of Medicine at the Krannert Institute of Indiana University School of Medicine 1996-

Honors

Undergraduate: National School of Sciences fellowship. (10 best students) 1976-1982

Graduate: Consejo Nacional de Ciencia y Tecnologia Fellowship

Postdoctoral: Grass fellow Summer 1990 in Woodshole Mass.
Katz Prize for Basic Cardiovascular Research from the American Heart Association with G.I.Fishman, M.D., L.A.Leinwand and D.C.Spray. (1991)
International J. Impotence. Award with the best poster presentation from a young investigator for basic research on penile erection (1991)

Faculty: Investigatorship and Grant in Aid. American Heart Association, New York City Affiliate. Phosphorylation of human cardiac gap junctions. (1992)
Grant in Aid. American Heart Association. New York State Affiliate (1993).Phosphorylation of cardiac gap junctions.

B. Selected peer-reviewed publications

Perez-Armendariz E.M., Romano M., Luna J., Miranda C., Bennett M.V.L and Moreno A.P. (1994). Characterization of gap junctions between pairs of Leydig cells from mouse testis. *Amer. J. Physiol*. 267:C570-C580.

Moreno, A.P. Laing, J.G., Beyer, E.C., and Spray, D.C. (1995). Properties of gap junction channels formed of connexin45 endogenously expressed in human hepatoma (SKHep1) cells. *Amer. J. Physiol*. 268: C256-C365.

Goldberg, G.S., Moreno A.P., Bechberger J.F., Heam S.S., Shivers R.R., Daniel H. M, Zhang Y., Naus, C.C.G. (1996). Evidence that disruption of connexon particle arrangements in gap junction Plaques is associated with inhibition of gap junctional communication by glycyrrhetinic acid derivative. *Experimental Cell Research* 222:48-53.

Goldberg G.S. and Moreno A.P. (1997) Inhibition of Connexin43 junctional conductance by 2,3 Butanedione monoxime (BDM).) Research. In "Gap Junctions" ISO Publishing, The Netherlands. Ed R. Werner 210-214.

Hassan R., R.G. Johnson and A. P. Moreno. (1997) Gap junction-like currents detected from membrane channels of Novikoff and NRK cells cells. Research. In "Gap Junctions" ISO Publishing, The Netherlands. Ed R. Werner 30-34.

M.Biermann, A. Joshian-Dorant, M. Rubart, A.P. Moreno and D.P. Zipes. (1998) Cytochalasin B immobilizes heart muscle without altering its electrophysiological properties. *J.Cardiovasc. Electrophysiol*. 9: 1348-57.

O'Leary E.A., Maass-Moreno R., Sih H.J., Moreno A.P., Soonpaa M.H. and E.J. Berbari. (1998) Cardiac activation mapping in a trangenic mouse model of cardiac hypertrophy. Computers in Cardiology. IEEE Computer Society Press, Los Angeles

Sergio Elenes, Michael Rubart, A. P. Moreno. (1999) Junctional communication between isolated pairs of canine atrial cells is mediated by homogeneous and heterogeneous gap junction channels. *J. Cardiovasc. Electrophysiol.* 10;990-1004.

Anumonwo, J.M.B., Taffet, S.M., Moreno A.P. and M. Delmar. (2001) The carboxyl terminal domain regulates the unitary conductance and voltage-dependence of Cx40 channels. Circ. Res. 2001 88(7): p. 666-673.

Elenes S. Martinez, A., Beyer E.C. and A. P. Moreno.(2001) Heterotypic docking of Cx43 and Cx45 connexons blocks the fast gating of Cx43. Biophys. J. 81: 1406-1418.

Chen-Izu, Y., R. A. Spangler, and A. P. Moreno (2001). A two opposing gates model for the asymmetric voltage gating of gap junction channels. Am.J. Physiol. 281: C1604-C1613.

Moreno A.P., Chanson M, Anumonwo J, Scerri I, Gu H, Taffet S.M. and Delmar M. Role of the Carboxyl Terminal of Connexin43 in Transjunctional Fast Voltage Gating. Circ Res. 2002;90:450-457

.

Heteromeric mixing of connexins: compatibility of partners and functional consequences (2001). Beyer E.C., Gemel H., A. Martinez A., Berthoud, V.M., Valiunas V., Moreno A.P. and Brink P.R. Cell communication and adhesion, 8 (4-6);1-6

Martinez, A.D., Hayrapetian, V., A. P. Moreno, Beyer E.C. (2002) Regulation by phosphorylation of heteromultimeric connexons formed by cardiac connexin43 and connexin45. Circ. Res. 90:1100-1107.

Goldberg S.G., Moreno A.P. and Lampe P.D. (2002) Heterotypic and Homotypic Gap Junction Channels Mediate the selective transfer of endogenous molecules between cells. J. Biol. Chem. 277; 36725-36730.

Zhong G., Matel, P., Jiang X., Jarry-Guichard T., Gros, D., Labarrere, C., and A.P. Moreno. (2003) LacSwitch II-regulation of Cx43 cDNA expression enables gap junction single channel analysis. Biotechniques. In press May

C. Research Support.

Ongoing Research Support

NIH R01HL63969-01. 07/01/00-6/30/04.
(Principal investigator)
Heteromultimeric gap junction channels. Active
We plan to undergo through the characterization (communication, permeability and voltage dependence) of channels from wild type and mutants of Cx43, Cx40 and Cx45, expressed in transformed and not-transformed cells. The data obtained will help us to understand the mechanisms of gating and permeability in multi-hetero-oligomeric channels.

Showalter. Methodist Research Institute. 07/01/02-6/30/04
(Principal investigator)
Mechanism for Cardioprotection: Modulation of junctional communication by omega-3 fatty acids.
The main objective of this study is to determine the modulatory effects of omega-3 fatty acids in the gating of cardiac gap junction channels and to determine their effects in the propagation velocity of neonatal mouse cardiocytes.

IUPUI 07/01/00-06/30/03
RIF Complementary Grant
In aid of NIH R01HL63969-01

American Association for the Advancement of Science. 08/01/02-07/31/03
(Principal Investigator)
Identification of the main unitary currents that determine intercellular coupling in mouse pancreatic β-cells. Study of their functional modulation by gap junctional uncoupling agents.
In this study we will characterize the gating properties of gap junction channels located between β cells from the mouse pancreas and correlated its gating with the secretory properties of the cells.

NIH (R01) 07/01/02-06/30/08

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(Principal Investigator)
Cardiac Repair. Communicating myocytes and fibroblasts. Submitted
This study is focused in dtermining ways to improve intercellular communication between cardiocytes and fibroblast by inducing expression of Connexin43 and or voltage dependent channels.

Completed Research Support

Showalter. Methodist Research Institute. 07/01/01-06/30/02

(Principal investigator)
Cardiac Tissue Repair: Communication between Cardiocytes and Fibroblasts *in vitro* and *in vivo*.

NIH (R01) 1997-2000

PI Ross G. Johnson
Gap Junction Assembly: Mechanisms and Regulation

NIHSCOR Seccion 1 1996-1999

PI Seccion 1. Alonso P. Moreno
Cardiac connexins in Sudden Cardiac Death

NIH(R-29) 1995-1999

(Principal Investigator)
Cardiac Gap Junction Channels. Effects by Phosphorylation

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Naumann, Christoph A.

NAME	POSITION TITLE
Naumann, Christoph A.	Assistant Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
University of Leipzig	Master of Physics	1990	Physics
University of Jena	None	1991	Biology
Technical University Munich	Ph.D.	1995	Biophysics

Postdoctoral Studies (09/95 – 07/99):

-Stanford University, Department of Chemical Engineering, Polymer Research Group. Research Advisor: Curtis.W. Frank. Rheological characterization of polymer-lipid composite films and their stabilization by tethering (12/96 – 07/99).

-Max-Planck-Institute for Polymer Research Mainz, Material Science Group. Research Advisor: Wolfgang Knoll. Biofunctionalization of solid substrates (04/96 - 11/96).

-Technical University Munich, Physics Department, Biophysics Group Research Advisor: Erich Sackmann. Investigation of coupling phenomena between membrane-proteins and phospholipid membranes at the molecular level (09/95 - 03/96).

APPOINTMENTS

Assistant Professor of Chemistry (since 08/99):

-Indiana University - Purdue University Indianapolis, Department of Chemistry.

Adjunct Assistant Professor in Biomedical Engineering (since 08/02):

-Indiana University - Purdue University Indianapolis, Biomedical Engineering Program.

SELECTED PUBLICATIONS

Foreman, M. B., Coffman, J. P., Murcia, M. J., Cesana, S., Jordan, R., Smith, G. S., Naumann, C. A. (2003) Gelation of amphiphilic lipopolymers at the air-water interface: 2D analogue to 3D gelation of colloidal systems with grafted polymer chains? *Langmuir 19*, 326-332.

Coffman, J. P., Naumann, C. A. (2002) Molecular weight dependence of viscoelastic properties in two-dimensional physical polymer networks: Amphiphilic lipopolymer monolayers at the air-water interface. *Macromolecules 35*, 1835-1839.

Naumann, C. A., Prucker, O., Lehmann, T., Ruehe, J., Knoll, W., Frank, C. W. (2002) Polymer-supported phospholipid bilayer: Tethering as a new approach toward substrate-membrane stabilization. *Biomacromolecules* 3, 27-35.

Ke, P. C., Naumann, C. A. (2001) Single molecule fluorescence microscopy of phospholipid monolayers at the air-water interface. *Langmuir17*, 3727-3733.

Ke, P. C., Naumann, C. A. (2001) Hindered diffusion in polymer-tethered phospholipid monolayers at the air-water interface. *Langmuir17*, 5076-5081.

Naumann, C. A., Brooks, C. F., Wiyatno, W., Knoll, W., Fuller, G. G., Frank, C. W. (2001) Rheological properties of lipopolymer-phospholipid mixtures at the air-water interface: A novel form of physical gelation. *Macromolecules 34*, 3024-3032.

Prucker, O., Naumann, C. A., Ruehe, J., Knoll, W., Frank, C. W. (1999). Photochemical attachment of polymer layers to solid surfaces via monolayers of benzophenone derivatives. *J. Am. Chem. Soc.* 121, 8766-8770.

Naumann, C. A., Brooks, C. F., Wiyatno, W., Knoll, W., Fuller, G. G., Frank, C. W. (2001) Rheological properties of lipopolymer-phospholipid mixtures at the air-water interface: A novel form of physical gelation. *Macromolecules 34*, 3024-3032.

Naumann, C. A., Brooks, C. F., Fuller, G. G., Knoll, W., Frank, C. W. (1999). Viscoelastic properties of lipopolymers at the air-water interface - A combined interfacial stress rheometer and film balance study. *Langmuir* 15, 7752-7761.

Naumann, C. A., Dietrich, C., Behrisch, A., Bayerl, T. M., Schleicher, M., Bucknall, D., Sackmann, E. (1996). Hisactophilin mediated binding of actin to lipid lamellae - A neutron reflectivity study of protein membrane coupling. *Biophys. J.*71, 811-823.

SYNERGISTIC ACTIVITIES

- Participation in Biomedical Engineering Program, which is a joint program among the Purdue School of Science, the Purdue School of Engineering, and the IU Medical School.

Teaching of a graduate-level course on *Biomaterials*.

- Co-Director of IUPUI-Nanoscale Imaging Center

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Pavalko, Fredrick

NAME	POSITION TITLE
Pavalko, Fredrick M.	Associate Professor

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.*)

INSTITUTION AND LOCATION	DEGREE (*if applicable*)	YEAR(s)	FIELD OF STUDY
Guilford College, Greensboro, NC	BS	1982	Biology
Florida State University, Tallahassee, FL	Ph.D.	1987	Cell Biology

EMPLOYMENT

Aug. 1982 - Sept. 1987	Graduate Research Assistant, Department of Biological Science, Florida State University, Tallahassee, FL
Oct. 1987 - June, 1991	Postdoctoral Fellow (with Dr. Keith Burridge), Department of Cell Biology and Anatomy, University of North Carolina, Chapel Hill, NC
July 1991 - June, 1997	Assistant Professor, Department of Physiology and Biophysics, Indiana University School of Medicine, Indianapolis, IN
July 1997 - present	Associate Professor, Department of Physiology and Biophysics, Indiana University School of Medicine, Indianapolis, IN

Selected Publications

Pavalko, F.M., Otey, C.A., Simon, K.O. and Burridge, K. (1991) □-Actinin: a direct link between actin and integrins. Biochemical Society Transactions 19:1065-1069.

Pavalko, F.M. and LaRoche, S.M. (1993) Activation of human neutrophils induces an interaction between the integrin ß$_2$ subunit (CD18) and the actin-binding protein □-actinin. Journal of Immunology 151:3795-3807.

Pavalko, F.M. and Otey, C.A. (1994) Role of adhesion molecule cytoplasmic domains in mediating interactions with the cytoskeleton. Proceeding of the Society for Experimental Biology and Medicine 205:282-293.

Pavalko, F.M., Adam, L., Wu, M.F., Walker, T.L. and Gunst, S.J. (1995) Phosphorylation of the dense plaque proteins talin and paxillin during tracheal smooth muscle contraction. American Journal of Physiology: Cell Physiology 268:C563-571.

Pavalko, F.M., Schneider, G., Burridge, K. and Lim, S.S. (1995) Immunodetection of □-actinin in focal adhesions is limited by antibody inaccessibility. Experimental Cell Research 217:534-540.

Pavalko, F.M., Walker, D.M., Graham, L., Goheen, M., Doerschuk, C., and Kansas, G.S. (1995) The cytoplasmic domain of L-selectin interacts with cytoskeletal proteins via □-actinin: receptor positioning in microvilli does not require cytoskeletal associations. Journal of Cell Biology 129:115-1164.

Garcia, J.G.N., **Pavalko, F.M.**, and Patterson, C.E. (1995) Vascular endothelial cell activation and permeability responses to thrombin. Blood Coagulation and Fibrinolysis 6:609-626.

Pavalko, F.M. (1995) Cytoskeleton-plasma membrane interactions. In: Encyclopedia of Molecular Biology and Molecular Medicine, R.A. Myers, ed.,VCH Publishers, Inc. New York, NY. 1: 451-460.

Kansas, G.S. and **Pavalko, F.M.** (1996)The cytoplasmic domains of E- and P-selectin do not constitutively interact with □-actinin and are not essential for leukocyte adhesion. Journal of Immunology 157:321-325.

Wang, Z., **Pavalko, F.M.** and Gunst, S.J. (1996) Tyrosine phosphorylation of the dense plaque protein paxillin is regulated during smooth muscle contraction. American Journal of Physiology: Cell Physiology 271:C1594-1602.

Schaphorst, K.L., **Pavalko, F.M**., Patterson, C.E., and Garcia, J.G.N. (1997) Thrombin-mediated focal adhesion plaque reorganization in endothelium: role of protein phosphorylation. American Journal of Respiratory Cell and Molecular Biology 17:443-455.

Sampath, R., Gallagher, P.J. and **Pavalko, F.M.** (1998) Cytoskeletal interactions with the leukocyte integrin β2 cytoplasmic tail: activation-dependent regulation of associations with talin and α-actinin. Journal of Biological Chemistry 273: 33588-33594.

Pavalko, F.M., Chen, N.X., Turner, C.H., Burr, D.B., Atkinson, S., Hsieh, Y.-F., Qiu, J. and Duncan, R.L. (1998) Fluid shear-induced mechanical signaling in MC3T3-E1 osteoblasts requires cytoskeleton-integrin interactions. American Journal of Physiology: Cell Physiology 275:C1591-C1601.

Turner, C.H. and **Pavalko, F.M.** (1998) Mechanotransduction and functional response of the skeleton to physical stress: The mechanisms and mechanics of bone adaptation. Journal of Orthopaedic Science 3:346-355.

Turner, C.E., Duncan, R.L. and **Pavalko, F.M.** (1998) Mechanotransduction: an inevitable process for skeletal mainenance. In: Novel Approaches to Treatment of Osteoporosis. Russel, Skerry and Kollenkirchen, (eds.). pp157-178.

Hurley, J.H., Bloem, **F.M. Pavalko**, L.J., Liu, J., Tian, M, Simon, J.R., and Yu, L. (1999) A G-protein-coupled receptor with eight hydrophobic domains: function and topology. Journal of Neurochemistry 72:413-21.

Chen, N.X., Ryder, K. **Pavalko, F.M.**, Turner, C.H., Burr, D.B., Qiu, J. and Duncan, R.L. (2000) Calcium regulation of cytoskeletal reorganization and gene expression in osteoblasts in response to fluid shear stress. American Journal of Physiology: Cell Physiology, 278:C989-C997.

Knepler, J.L., Taher, L.N., Gupta, M.P., Patterson, C., **Pavalko, F.M.**, Ober, M.D. and Hart, M.C. (2001) Peroxynitrite ($ONOO^-$) causes endothelial cell monolayer barrier dysfunction. American Journal of Physiology: Cell Physiology 281: C1064-1075.

Sawyer, S.J., Norvell, S.M., Ponik, S.M. and **Pavalko, F.M.** (2001) Regulation of PGE_2 and PGI_2 release from human umbilical vein endothelial cells by actin cytoskeleton. American Journal of Physiology: Cell Physiology 281: C1038-1045.

Torrungruang. K., Shah, R., Alvarez, M., Bowen, D.K., **Pavalko, F.M.**, Elmendorf, J., Hock, J., Rhodes, S.J. and Bidwell, J.P. (2002) Osteoblast Intracellular Localization of Nmp4 Proteins. Bone 30: 931-936

Pavalko, F.M., Gerard, R.L., Ponik, S.M., Gallagher, P.J., Jin, Y., and Norvell, S.M**.** (2002) Fluid shear stress inhibits TNF-α-induced apoptosis in osteoblasts: a role for shear stress-induced activation of PI3-kinase and inhibition of caspase-3. Journal of Cellular Physiology 194: 194-205.

Pavalko, F.M., Norvell, S.M., Burr, D.B., Turner, C.H., Duncan, R.L. and Bidwell, J.P. (2003) A Model for Mechanotransduction in Bone Cells: The Load-Bearing Mechanosomes. Jouranl of Cellular Biochemistry 88:104-112.

RESEARCH GRANTS
ACTIVE

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Funding Agency/Grant Title	Dates/Total $ Award	% Effort

NIH/NIAMS 4/1/03 – 3/31/08 30%
R01 AR049728-01 $1,026,000 (Direct costs)
Title: Fluid shear stress and osteoblast apoptosis

This goals of this project are to determine the signaling mechanisms through which mechanical stimulation promote cell survival.

NASA 10/1/02 – 9/30/05 20%
FSB-0000-0086 $575,641 (Direct costs)
Title: Regulation of osteoblast apoptosis by fluid shear stress (PI: Pavalko)
The goal of this project is to study the cellular mechanisms regulating apoptosis in osteoblasts subjected to fluid shear stress.

NIH/NIAMS 2/1/00 – 1/31/04 20%
P01 AR45218-01 $822,570 (Direct costs)
Title: Cytoskeletal-Integrin Interactions in Mechanotransduction (PI: Pavalko)
Program Project: Mechanotransduction in Bone (Project Director: Burr)

The goal of this project in this PPG is to understand the role of cytoskeletal interaction with integrins in mediating fluid flow-induced mechanotransduction in osteoblasts.

NIH/NIAMS 2/1/00 - 1/31/04 10%
P01 AR45218-01 $449,077 (Direct costs)
Title: Cell Biology Core (PI: Pavalko)
Program Project: Mechanotransduction in Bone (Project Director: Burr)

The Cell Biology Core in this PPG is designed to support the cell culture and microscopy needs of the projects.

Cook Biotech, Inc. 1/1/01 – 6/1/03 5%
$102,384 (Direct costs)
Title: Effects of Endothelial Cells on SIS Material (PI: Pavalko)

This award from Cook Biotech, Inc. is to investigate the effects endothelial cells on a novel submucosal membrane (SIS) used for tissue engineering.

Indiana University Cancer Center 2/1/01 – 1/31/02 0%

Bone Cancer Research Fund $30,000
Title: β-catenin signaling in osteosarcoma (PI: Pavalko; co-PI: Dr. Suzanne Norvell)

This pilot project award supports studies of the co-investigator, Dr. Suzanne Norvell, to investigate the role of β-catenin in osteosarcoma cells compared to normal osteoblasts.

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NASA 7/1/00 – 6/30/03 0%
NGT5-50291 $66,000
Effects of integrin-extracellular matrix
Adhesion on fluid shear-induced
Prostaglandin metabolism in osteoblasts

This predoctoral fellowship award provides a stipend for a graduate student, Suzanne Ponik, plus $6,000/yr for travel supplies and indirect.

RECENT PREVIOUS

NIH/NIAMS 9/30/98 – 8/31/01
R03AR45831 $223,958
Title: Cytoskeletal Function in Osteoblast Mechanotransduction.

American Heart Association-Midwest 7/1/99 – 6/30/01
AHA 9920538Z $70,000
Title: Role of the contractile actin cytoskeleton in fluid shear-mediated production of nitric oxide in endothelial cells.

American Heart Association-National 1/1/98 - 12/31/00
AHA GIA 9750403N $165,000
Title: Cytoskeletal-Integrin Interactions in Fluid Shear-Mediated Endothelial Mechanotransduction.

American Heart Association- National 7/1/95 – 6/30/98
AHA GIA 95007090 $132,000
Title: Cytoskeletal regulation of leukocyte integrins.

NIH/NIGMS 9/16/94 – 9/15/96
R55 GM47333 $100,000
Title: Cytoskeletal-integrin interactions in neutrophils.

American Lung Association-National 7/1/93 - 6/30/95
ALA 70496-05 $50,000
Title: Cytoskeletal regulation of airway smooth muscle.

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Stillwell, William

NAME	POSITION TITLE
Stillwell, William H.	Professor of Biology, Indiana University-Purdue University, Indianapolis (IUPUI)

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
SUNY-Albany	BS	1967	Biology
Pennsylvania State University	MS	1973	Biochemistry
Pennsylvania State University	Ph.D.	1974	Biochemistry

A. Positions and Honors.

Positions

1974-1975	Postdoctoral Fellow in Origin of Life, Inst. Molec. Cell. Evolution, Coral Gables, FL
1976-1978	Postdoctoral Fellow in Membrane Biophysics, Michigan State University,
1978 –1982	Assistant Professor of Biology, Indiana University-Purdue University, Indianapolis (IUPUI), Indianapolis, IN
1982-1993	Associate Professor of Biology, IUPUI, Indianapolis, IN
1990	Visiting Professor, Institute fur Biowissenschaften, University of Wurzburg, Federal Republic of Germany
1993-present	Professor of Biology, IUPUI, Indianapolis, IN
1989-present	Adjunct Professor, Medical Biophysics, Indiana University,
2002-present	Adjunct Senior Investigator, Methodist research Institute

B. Selected Publications (1997-2002)

(Publications listed only for the last 5 years out of a total of 107 full papers)

1. Stillwell, William, Jenski, L. J., Crump, F. T., and Ehringer, W. Effect of omega-3 fatty acids on mitochondrial bioenergetics of young and old mice, Lipids 32: 497-506, 1997.
2. Zerouga, M., Jenski, L. J., Booster, S., and Stillwell, William. Can docosahexaenoic acid inhibit metastasis by decreasing deformability of the tumor cell plasma membrane? Cancer Lett. 119: 163-8, 1997.

3. Scherer, J. M., Stillwell, William, and Jenski, L. J. Spleen cell survival and proliferation are differentially altered by docosahexaenoic acid. Cell. Immunol. 180: 153-61, 1997.
4. Schofield, M., Jenski, L. J., Dumaual, A. C., and Stillwell, William. Cholesterol versus cholesterol sulfate: effects on properties of phospholipid bilayers containing docosahexaenoic acid. Chem. Phys. Lipids 95: 23-36, 1998.
5. Williams, E. E., Jenski, L. J., and Stillwell, William. Docosahexaenoic acid (DHA) alters the structure and composition of membranous vesicles exfoliated from the surface of a murine leukemia cell line. Biochim. Biophys. Acta 1371: 351-362, 1998.
6. Kafrawy, O., Zerouga, M., Stillwell, William, and Jenski, L. J. Docosahexaenoic acid in phosphatidylcholine is more effective than other fatty acids in mediating cytotoxicity. Cancer Lett. 132: 23-29, 1998.
7. Williams, E. E., May, B. D., Stillwell, William, and Jenski, L. J. Docosahexaenoic acid (DHA) alters the phospholipid molecular species composition of membranous vesicles exfoliated from the surface of a murine leukemia cell line. Biochim. Biophys. Acta 1418:185-196, 1999.
8. Stillwell, William, Jenski, L. J., Zerouga, M., and Dumaual, A. C. Detection of lipid domains in docosahexaenoic acid-rich bilayers by acyl chain-specific FRET probes. Chem. Phys. Lipids 104: 113-132, 2000.
9. Dumaual, A. C., Jenski, L. J., and Stillwell, William. Liquid crystalline/gel state phase separation in docosahexaenoic acid-containing bilayers and monolayers. Biochim. Biophys. Acta 1463: 395-406, 2000.
10. Jenski, L. J., Nanda, P. K., Jiricko, P., and Stillwell, William. Docosahexaenoic acid-containing phosphatidylcholine affects the binding of monoclonal antibodies to purified Kb reconstituted into liposomes. Biochim. Biophys. Acta 1467: 293-306, 2000.
11. Thakkar, R. R., Wang, O. L., Zerouga, M., Stillwell, William, Haq, A., Kissling, R., Pierce, W. M., Smith, N. B., Miller, F. N., and Ehringer, W. D. Docosahexaenoic acid reverses cyclosporin A-induced changes in membrane structure and function. Biochim. Biophys. Acta 1474: 183-185, 2000.
12. Stillwell, William. Docosahexaenoic acid and membrane lipid domains. Curr. Org. Chem. 4: 1169-1183, 2000.
13. Williams, E. E., Cooper, J. A., Jenski, L. J., and Stillwell, William. Bilayer curvature and cholesterol content alter the transbilayer distribution of specific molecular species of phosphatidylethanolamine in phospholipid membranes. Mol. Membr. Biol. 17: 157-164, 2000.
14. Jenski, L. J., and Stillwell, William. The role of docosahexaenoic acid in determining membrane structure and function: Lessons learned from normal and neoplastic leukocytes. In: Fatty Acids: Physiological and Behavioral Functions (Mostofsky, D. I., Yehuda, Y., and Salem, N. Jr., Eds.), Nutrition and Health Series (Bendich, A., Ed.), Humana Press, Inc:, Totowa, NJ., In press., 2001.
15. Siddiqui, R. A., Jenski, L. J., Neff, K., Harvey, K., Kovacs, R. J., and Stillwell, William. Docosahexaenoic acid induces apoptosis in Jurkat cells

by a protein phosphatase-mediated process. Biochim. Biophys. Acta 1499: 265-275, 2001.
16. Shaikh, S.R., Dumaual, A.C., Jenski, L.J. and Stillwell, William. Lipid phase separation in phospholipid bilayers and monolayers mode;ing the plasma membrane. Biochim. Biophys. Acta 1512, 317-328, 2001.
17. Shaikh, S.R., Brzustowicz, M.R., Stillwell, William. and Wassall, S.R. Formation of Hexagonal Phase in SDPE as Observed by Solid State 31P NMR. Biochem. Biophys. Res. Comm. 286, 758-763, 2001.
18. Siddiqui, R.A., Jenski, L.J., Wiesehan, J.D., Hunter, M.V., Kovacs, R.J. and Stillwell, William. Prevention of Docosahexaemoic Acid-Induced Cytotoxicity by Phosphatidic Acid in Jurkat Leukemic Cells: The Role of Protein Phosphatase-1 Biochim. Biophys. Acta, 1541, 188-200, 2001.
19. Brzustowicz, M.R., Cherezov, V., Caffrey, M., Stillwell, William. and Wassall, S.R. Solid state 2H NMR and X-Ray Diffraction studies of cholesterol in polyunsaturated model membranes: Mechanism for domain formation.. Biophysical Journal 82, 285-299, 2002.
20. Zerouga, M., Stillwell, William. and Jenski, L.J. Synthesis and characterization of a proliferation-inhibiting phosphatidylcholine conjugated to docosahexaenoic acid and methotrexate. Anti-Cancer Drugs. 13, 301-312, 2002.
21. Shaikh, S.R., Brzustowicz, M.R., Gustafson, N., Stillwell, W. and Wassall, S.R. Monounsaturated PE Does Not Phase Separate From Lipid Raft Molecules Sphingomyelin and Cholesterol: Role for Polyunsaturation? Biochemistry 41, 10593-10602, 2002.
22. Stillwell, W. and Jenski, L. Cellular and molecular aspects of w-3 fatty acids and cancer workshop. J. Lipid Research 43, 1-2, 2002.
23. Brzustowicz, M.R., Cherezov, V., Zerouga, M., Caffrey, M., Stillwell, W. and Wassall, S.R. Controlling membrane cholesterol content. A role for polyunsaturated (docosahexaenoate) phospholipids. Biochemistry 41, 12509-12519, 2002.
24. Ehringer, W.D., Su, S., Chiang, B., Stillwell, W. and Chen, S. Destabilizing effects of fructose-1,6-bis phosphate on membrane bilayers. Lipids 37, 885-892, 2002.
25. Siddiqui, R.A., Jenski, L.J., Harvey, K.A., Wiesehan, J.D., Stillwell, W. and Zaloga, G.P. Docosahexaenoic acid induces cell cycle arrest by inhibiting phosphorylation of retinoblastoma protein in Jurkat Leukemic cells Biochem. J. 371, 621-629 2003
26. Katzer, M. and Stillwell, W. Partitioning of ABA into bilayers of di-saturated phosphatidylcholines as measured by DSC: Site of integration and effect of chain length. Biophys. J., 84, 314-325, 2003
27. Armstrong, V.T., Brzustowicz, M.R., Wassall, S.R., Jenski, L.J. and Stillwell, W. Docosahexaenoic acid and phospholipid flip-flop. Archives Biochem. Biophys. 414, 74-82, 2003.

C. Completed Research Projects

Ongoing Research Support

R01CA57212 Stillwell, Jenski (Co-Pis) 2001-2005
National Institutes of Health
Omega-3 Fatty Acids and Tumor Membrane Structure/Function
The major goal of this project is to investigate the role of omega-3 fatty acids in membrane structure/ function as it affects tumor growth and survival.

Completed Research Support

R21GM57371 Jenski, Stillwell (Co-PIs) 1999-2002
National Institutes of Health
Novel Drugs Involving Methotrexate and Omega-3 Fatty Acids
This is an exploratory grant proposal to synthesize and initially characterize the activity of a novel phospholipid with methotrexate in the sn-1 position and docosahexaenoic acid in the sn-2 position. There is no overlap in specific aims and minor overlap in methodology. The principal investigators receive no salary from this grant; it funds only supplies, expenses, and the salary of one postdoctoral fellow.

No Number Jenski, Stillwell (Co-PIs) 1996-2001
Phi Beta Psi
Anti-cancer properties of Docosahexaenoic Acid (Graduate Fellowship)
This small grant provided part of a graduate student stipend.

R01CA57212 Stillwell, Jenski (Co-PIs) 1996-2001
National Institutes of Health
Omega-3 Fatty Acids and Tumor Membrane Structure/Function
The major goal of this project is to investigate the role of omega-3 fatty acids in membrane structure/ function as it affects tumor growth and survival..

RO1CA57212 Jenski, Stillwell, Siddiqui, Donner (Co-PIs) 1998-1999
National Institutes of Health
Omega-3 Fatty Acid Consortium
This grant was an administrative supplement and facilitated a new collaboration between four PIs.

Tuceryan, Mihran

NAME	POSITION TITLE		
Tuceryan, Mihran	Professor of Biomedical Computer and Information Science		
EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*			
INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Massachusetts Institute of Technology	B.S.	1978	Computer Science and Engineering
University of Illinois, Urbana	Ph.D.	1986	Computer Science

Professional Experience

- **Indiana University Purdue University Indianapolis (IUPUI)**, Indianapolis, Indiana, Associate Professor, (March 1997 – Present).
- **Information in Place, Inc.**, Bloomington, Indiana (Summer 2002), Consulting through Indiana University.
- **Siemens Corporate Research**, Princeton, New Jersey, Visiting Professor (Summers of 1999, 2000, and 2001).
- **Texas Instruments**, Dallas, Texas, Member of Technical Staff, (October 1995 – March 1997).
- **European Computer-Industry Research Centre (ECRC)**, Munich, Germany, Senior Research Scientist, (September 1992 – September 1995).
- **Michigan State University**, East Lansing, Michigan, Assistant Professor of Computer Science, (September 1986 – August 1992).

Publications Relevant to Proposed Research (Selected Recent Publications)

1. Y. Genc, **M. Tuceryan**, and N. Navab, “Practical Solutions for Calibration of Optical See-through Devices," *Proceedings of the IEEE and ACM International Symposium on Mixed and Augmented Reality (ISMAR '02)*, pp. 169-175, Darmstadt, Germany, 2002.
2. **M. Tuceryan**, Y. Genc, and N. Navab, “Single point active alignment method (SPAAM) for optical see-through HMD calibration for augmented reality,” *Presence: Teleoperators and Virtual Environments*, vol. 11, pp. 259–276, 2002.
3. E. McGarrity, Y. Genc, **Mihran Tuceryan**, and N. Navab, “A new system for online evaluation of optical see-through augmentation,” in *Proceedings of the second IEEE and ACM International Symposium on*

Augmented Reality (ISAR '01), pp. 157–166, October 29–30, 2001, New York, NY.

4. Y. Genc, F. Sauer, F. Wenzel, **M. Tuceryan**, and N. Navab, "Optical See-Through HMD Calibration: A Novel Stereo Method Validated with a Video See-Through System," in *Proceedings of the IEEE and ACM International Symposium on Augmented Reality,* pp. 165–174, Munich, Germany, October, 2000.
5. D. Koller, G. Klinker, E. Rose, D. Breen, R. Whitaker, and **M. Tuceryan**, "Real-time Vision-Based Camera Tracking for Augmented Reality Applications." In *Proceedings of the Symposium on Virtual Reality Software and Technology (VRST-97)*, Lausanne, Switzerland, September, 1997.
6. M. Davis and **M. Tuceryan**, "Coding of Facial Image Sequences by Model-Based Optical Flow." In *Proceedings of the International Workshop on Synthetic-Natural Hybrid Coding and Three Dimensional Imaging (IWSNHC3DI'97)*," pp. 192–194, Rhodes, Greece, September, 1997.
7. Gudrun J. Klinker, Klaus H. Ahlers, David E. Breen, Pierre-Yves Chevalier, Chris Crampton, Douglas S. Greer, Dieter Koller, Andre Kramer, Eric Rose, **M. Tuceryan**, Ross Whitaker, "Confluence of Computer Vision and Interactive Graphics for Augmented Reality." In *PRESENCE, Special Issue on Augmented Reality*, vol. 6, no.4, pp. 433–451, August, 1997.
8. **M. Tuceryan**, D. S. Greer, D. E. Breen, R. T. Whitaker, C. Crampton, E. Rose, and K. Ahlers, "Calibration Requirements and Procedures for a Monitor-Based Augmented Reality System," In *IEEE Transactions on Visualization and Computer Graphics*, vol. 1, no. 3, pp. 255–273, September 1995.
9. S. Fang, **M. Tuceryan**, and K. Dunn, "Three-Dimensional Microscopy Data Exploration by Interactive Volume Visualization," in *Journal of Scanning Microscopies*, vol. 22, pp. 218–226, July/August 2000.
10. S. Fang, T. Biddlecome, and **M. Tuceryan**, "Image-Based Transfer Function Design for Data Exploration in Volume Visualization," In *Proc. IEEE Visualization'98*, pp. 319–326, 1998.
11. T. Biddlecom, S. Fang, K. Dunn, and **M. Tuceryan**, "Image-guided interactive volume visualization for confocal microscopy data exploration," in *Proceedings of SPIE International Symposium on Medical Imaging*, 1998.

Yokota, Hiroki

NAME	POSITION TITLE
Yokota, Hiroki	Assistant Professor of Biomedical Engineering, Anatomy and Cell Biology

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
University of Tokyo, Japan	Ph.D.	1983	Astronautics
Indiana University, Bloomington, IN	Ph.D.	1993	Molecular, Cellular and Developmental Biology
University of Washington, Seattle, WA	postdoctoral	1993-1998	Molecular Biotechnology

A. Positions and Honor

Positions and Employment

1983-1988 Research Assistant Professor, Institute of Space and Astronautical Sciences, Japan.
1985 Visiting Engineer, International Solar Terrestrial Physics Project, Goddard Space Flight Center, NASA, Greenbelt, MD.
1989-1993 Associate Instructor, Department of Biology, Indiana University, Bloomington, IN.
1993-1998 Senior Fellow, Department of Molecular Biotechnology, University of Washington, Seattle, WA.
1998-present Assistant Professor of Biomedical Engineering, of Mechanical Engineering, and of Anatomy and Cell Biology, Indiana University - Purdue University Indianapolis, Indianapolis, IN.
2000-present Assistant Professor of Biomedical Engineering (courtesy), Purdue Univ., West Lafayette, IN.

Other Experience

1983-1985 Control systems design of Halley's comet mission
1985-1988 Trajectory design of GEOTAIL spacecraft in International Solar Terrestrial Physics Project

B. Selected peer-reviewed publications (in chronological order)

1. H Yokota, G van den Engh, JE Hearst, RK Sachs, BJ Trask (1995). Evidence for the organization of chromatin in megabase pair-sized loops arranged along a random walk path in the human G_0/G_1 interphase nucleus. *J. Cell Biol*. 130:1239-1249.

2. H Yokota, MJ Singer, G van den Engh, and BJ Trask (1997). Regional differences in the compaction of chromatin in human G_0/G_1 interphase nuclei. *Chromosome Research* 5:157-166.

3. H Yokota, F Johnson, H Lu, R Robinson, A Belu, M Garrison, B Ratner, B Trask, and D Miller (1997). A new method for straightening DNA molecules for optical restriction mapping. *Nucleic Acids Res*. 25:1064-1070.

4. H Yokota, DA Nickerson, BJ Trask, G van den Engh, M Hirst, I Sadowski, and R Aebersold (1998). Mapping a protein-binding site on straightened DNA by Atomic Force Microscopy. *Analytical Biochem*. 264:158-164.

5. PS Weiss, H Yokota, R Aebersold, G van den Engh, LA Bumm, JJ Arnold, TD Dunbar, and DL Allara (1998). Creating, tailoring, and using one-dimensional interfaces in two-dimensional films. *J. of Physics*: *Condensed Matter* 10, 7703.

6. H Yokota, K Fung, BJ Trask, G van den Engh, M Sarikaya, and R Aebersold (1999). Sharp DNA bends as landmarks of protein-binding sites on straightened DNA. *Anal. Chem*. 71:1663-1667.

7. HB Sun, J Shen, O El-Mounayri, and H Yokota (1999). Biological systems analysis at molecular and subcellular levels - chromosome positioning inside human nuclei. *Critical Reviews in Biomedical Engineering* 26:402-403.

8. H Yokota, J Sunwoo, G van den Engh, M Sarikaya, and R Aebersold (1999). Spin-stretching of DNA and protein molecules for detection by fluorescence and atomic force microscropy. *Anal. Chem*. 71:4418-4422.

9. HB Sun, and H Yokota (1999). Correlated positioning of homologous chromosomes in daughter fibroblast cells. *Chromosome Research* 7:603-610.

10. HB Sun, J Shen, and H Yokota (2000). Size-dependent positioning of human chromosomes in interphase nuclei. *Biophysical J*. 79:184-190.

11. HB Sun, and H Yokota (2000). MutS-mediated detection of DNA mismatches using atomic force microscopy. *Anal. Chem*. 72:3138-3141.

12. H Yokota, HB Sun, and GM Malacinski (2000). Review: Future Opportunities for Life Science Programs in Space. *Korean J. Biol. Sci*. 4:239-243.

13. HB Sun, GN Smith Jr, KA Hasty, and H Yokota (2000). Atomic force microscopy-based detection of binding and cleavage site of matrix metalloproteinase on individual type II collagen helices. *Anal*. *Biochem*.283:153-158.

14. HB Sun, H Yokota, XX Chi, ZC Xu (2000). Differential expression of neurexin mRNA in CA1 and CA3 hippocampal neurons in response to ischemic insult. *Molecular Brain Research* 84:146-149.

15. HB Sun, and H Yokota (2001). Altered mRNA levels of matrix metalloproteinase 13 in MH7A synovial cells by mechanical loading and unloading. *Bone* 28:399-403.

16. HB Sun, and H Yokota (2001). Messenger RNA expression of matrix metalloproteinases, tissue inhibitors of metalloproteinases, and transcription factors in rheumatic synovial cells under mechanical stimuli. *Bone* 28:303-309.

17. HB Sun, L Qian, H Yokota (2001). Detection of abasic sites on individual DNA molecules using atomic force microscopy. *Anal. Chem.* 73:2229-2232.

18. HB Sun, and H Yokota (2002). Suppression of cytokine-induced expression and activities of MMP-1 and MMP-13 by mechanical strain in MH7A rheumatoid synovial cells. *Matrix Biology* 21:263-270.

19. L Qian, Y Liu, HB Sun, and H Yokota (2002). Systems analysis of matrix metalloproteinase mRNA expression in skeletal tissues. *Frontiers in Bioscience* 7:a126-134.

20. HB Sun, GM Malacinski, and H Yokota (2002). Promoter competition assay for analyzing gene regulation in joint tissue engineering. *Frontiers in Bioscience* 7:a169-174.

21. HB Sun, Y Ruan, ZC Xu, and H Yokota (2002). Involvement of calcium-independent receptor for □-latritoxin in brain ischemia. *Molecular Brain Res*. 104:246-249.

22. HB Sun, R Nalim, H Yokota (2003). Reduction in expression and activities of matarix metalloproteinases by oscillatory shear stress in rheumatic synovial cells. *Connective Tissue Res.* 44:42-49.

C. Research Support

<u>Ongoing Research Support</u>

R01EB01019-01 Yokota (PI) 09/30/02 – 08/31/04
NIH/NIBIB
Mechanical Loading and Matrix Metalloproteinase
The long-term objectives of this project are to develop a piezoelectric in vitro loader and investigate gene expression and activities of a family of matrix metalloproteinases under mechanical loading.
Role: PI

R21RR17012-01 Yokota (PI) 05/10/02 – 04/30/04
NIH/NCRR

Promoter-Based Estimation Analysis
The long-term objective of this project is to develop an integrated computational, biochemical tool for genome-wide gene regulation. The specific aim is to build the linear mathematical model for mRNA expression of a family of matrix metalloproteinase genes under mechanical shear.
Role: PI

Yokota (PI) 09/01/02 – 08/31/03
The Whitaker Foundation
Piezoelectric Biomolecular/Cellular Loader
The long-term objective of this project is to develop a piezoelectric device capable of sensing force exerted by biomolecules and cells.
Role: PI

R03AR47628-01 Sun (PI) 08/01/02 – 07/31/05
NIH/NIAMS
Arthritis and Physical Treatment
The long-term objective of this project is to elucidate the effects of mechanical stimuli to tissue degradation of rheumatoid arthritis.
Role: Co-PI

Datta (PI) 08/04/00 – 04/04/03
21st Century Research and Technology Funds
Center for Nanoscale Electronic/Biological Devices
The objective of this project is to establish a center for bio-MEMS, molecular electronics and computational nanotechnology.
Role: Co-Investigator

Ben Miled (PI) 07/01/01 – 06/30/04
NSF
BACIIS: Biological and chemical integrated information system
The goal of this project is to design and implement an integrated system for life science database.
Role: Co-Investigator

Research Support Completed in 2001 and 2002

Yokota (PI) 09/01/99 – 08/31/02
The Whitaker Foundation
Digital DNA Imaging using Fluorescence and Atomic Force Microscopy
The long-term objective of this project is to develop a high-resolution digital DNA typing system that characterizes large-scale variations of human genome using fluorescence microscopy and atomic force microscopy.
Role: PI

P60AR20582-22 Brandt (PI) 04/01/99 – 03/31/01
NIH/NIAMS

Structural Analysis of Type II Collagen under Mechanical Stress using Atomic Force Microscopy
The long-term objective was to elucidate the stress-mediated structure-function relationship of type II collagen. The specific aims were to investigate the morphology of type II collagen under mechanical stress and to determine the in vitro rate of site-specific cleavage by collagenases with and without mechanical stress.
Role: Co-Investigator

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Yu, Weiming

NAME	POSITION TITLE
Yu, Weiming Ph.D.	Assistant Professor of Medicine

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
University of Science & Technology Shanghai	PRC BS (5/85)	1981-85	Chemistry
Institute of Nuclear Research, Chinese Academy of Science	MS (5/88)	1985-88	Biophysics
Biochemistry Institute, Swiss Federal Institute of Technology, Zurich, Switzerland	Ph.D. (5/94)	1990-94	Biology
Laboratory for Fluorescence Dynamics, University of Illinois at Urbana-Champaign	Postdoc	1994-97	Biophysics

Professional Experience (Academic Appointments)

1985-1988 Assistant Researcher, Chinese Academy of Science, PRC
1988-1990 Researcher, Chinese Academy of Science, PRC
1990-1994 Research Assistant, Swiss Federal Institute of Technology
1994-1997 Research Associate, University of Illinois at Urbana-Champaign
1997-2000 Staff Scientist, University of Illinois at Urbana-Champaign
2000-2002 Research Assistant Professor, Northwestern University
4/2002-present Assistant Professor, Indiana University

Professional Affiliations

Member of Biophysical Society
Member of American Association for the Advancement of Science

Publications

1. Cholesterol modulates Na/Pi cotransport activity and protein expression in OK cells. Hubert K. Zajicek, Nabil Halaihel, Tiziana Parasassi, **Weiming Yu**, Enrico Gratton, Eleanor Lederer and Moshe Levi. *J. Biol. Chem.* (Submitted)
2. Mechanistic Studies of the Contraction of Poly-acrylate Gel Particles while under Potential Influence. James Day, **Weiming Yu** and Enrico Gratton. *Analytical Chemistry* (Submitted)
3. Differential intracellular Ca2+ signaling determines directionality in circadian clock resetting. Liana Kuriashkina, **Weiming Yu**, Enrico Gratton and Marta Gillette. *Proc. Natl. Acad. Sci.* (Submitted)
4. Two-Photon Excitation Microscopy for Image Spectroscopy and Biochemistry of Tissues, Cells, Organelles, and Lipid Vesicles Under Physiological Conditions. Tiziana Parasassi, Luis Bagatoli, **Weiming Yu**, Moshe Levi and Enrico Gratton. In Confocal and Two-Photon Microscopy: Foundations,

Applications and Advances. (Alberto Diaspro Ed.), John Wiley & Sons, Inc. pp. 137-193 (2002)

5. Two-photon fluorescence of aorta fibers shows proteolysis induced by LDL hydroperoxides. T. Parasassi, **Weiming Yu**, L. Kuriashkina, D. Durbin, N. Maeda, E. Gratton, F. Ursini. *Free Radical Biology & Medicine* 28(11), 1589-1597 (2000)
6. Two-photon autofluorescence microscopy and spectroscopy of an Antarctic fungus: a new approach for studying the effect of UV-B irradiation. C. Arcangeli, **Weiming Yu**, S. Cannistraro and E. Gratton. *Biopolymers*, 57(4):218-25 (2000)
7. Highly Nonlinear Photoluminescence Threshold in Porous Silicon. M. Nayfeh, O. Akcakir, J. Therrien, Z Yamani, N. Barry, **Weiming Yu** and E. Gratton. *Applied Physics Letts.* 75(26): 4112-4114 (1999)
8. Detection of membrane lipid microdomain by two-photon fluorescence microscopy. Tiziana Parasassi, Enrico Gratton, Moshe Levi, Hubert Zajicek and **Weiming Yu**. IEEE special issue of Engineering in Medic ine and Biology: Multiphoton fluorescence microscopy and spectroscopy. 18 (5): 92-99 (1999)
9. Fluorescence Lifetime Imaging – New Microscopy Techniques. **Weiming Yu**, William W. Mantulin and Enrico Gratton. In Emerging Tools for Cell Analysis: Advances in Optical Measurement. (Gary Durack and J. Paul Robinson Ed.), John Wiley & Sons, Inc. pp. 137-193 (2000)
10. Dynamic Properties of the Monomeric Insect Erythrocruorin-III from Chironomus thummi-thummi: Relationships between Structural Flexibility and Functional Complexity. Ernesto E. Di Iorio, Ivano Tavernelli and **Weiming Yu**.Biophysical Journal 73: 2742-2751 (1997).
11. Two-Photon Fluorescence Microscopy of Laurdan Generalized Polarization Domains in Model and Natural Membranes. Tiziana Parasassi, Enrico Gratton, **Weiming Yu**, Paul Wilson and Moshe Levi. Biophysical Journal, 72: 2413-2429 (1997)
12. Fluorescence Generalized Polarization of Cell Membranes - A Two-Photon Scanning Microscopy Approach. **Weiming Yu**, Peter T. C. So, Todd French and Enrico Gratton. Biophysic al Journal 70: 626-636 (1996).
13. Time-Resolved Fluorescence Microscopy Using Two-Photon Excitation. P.T.C. So, T. French, **Weiming Yu**, K.M. Berland, C.Y. Dong and E. Gratton. Bioimaging 3: 49-63 (1995).
14. Two-Photon Fluorescence Microscopy: Time-Resolved and Intensity Imaging. P.T.C. So, T. French, **Weiming Yu**, K.M. Berland, C.Y. Dong and E. Gratton. In Fluorescence Spectroscopy and Fluorescence Imaging. (B. Herman and X. F. Wang, Ed.), John Wily & Sons (1996).
15. Stereodynamic properties of the cooperative homodimeric Scapharca inaequivalvis hemoglobin studied through optical absorption spectroscopy and ligand rebinding kinetics. Alberto Boffi, Daniela Verzili, Emilia Chiancone, Maurizio Leone, Antonio Cupane, Valeria Militello, Eugenio Vitrano, and Lorenzo Cordone, **Weiming Yu** and Ernesto Di Iorio. Biophysical Journal Vol.67, pp.1713-1723, October 1994.
16. Protein dynamics in minimyoglobin: Is the central core of myoglobin the

conformational domain? E.E. Di Iorio, **Weiming Yu**, C. Calonder, K.H. Winterhalter, G. De Sanctis, G. Falcioni, F. Ascoli, B. Giardina and M. Brunori. Proc. Natl. Acad. Sci. USA, Vol.90, pp. 2025-2029, March 1993.

Other Support

Research Award (Institute for Bioengineering and Nanoscience in Advanced Medicine, Northwestern University):
Development of Silicon Nanoparticle as Fluorescent Tag and Photo-sensitizer.
Initial support: $45,000 (2000-2001)
Time commitment: 10%
Biomedical Research Award (Indiana University School of Medicine): Two-photon Fluorescence Imaging of Aortic Wall
Under Oxidative Stress. $40,000 (2002-2003)
Time commitment: 20%

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Appendix B – Course Changes

Appendix C – Chairman Recommendations

Review of proposal for a Biomolecular Imaging Program leading to a Ph.D. in Medical Biophysics

This is a well-written proposal with extensive documentation. The proposed faculty are strong in biological imaging of several kinds.

My only major concern is that the program proposed is not a biophysics program. That is, the proposed curriculum would produce students well-grounded in cell biology and imaging, but with little education in biophysics.

For example, the core courses include cell and molecular biology and physiology, with some courses in imaging of biomolecules and cells. There would be a little physics (mainly optics) in the proposed imaging courses, but not much else. Thus, a student could easily take all the core courses and yet never have heard of many of the basic concepts in biophysics. Moreover, traditional biophysics programs are heavily math-based, while the core courses proposed are not.

I know that it is harder to get a new degree program approved than to modify an existing one, but it doesn't look like an appropriate fit to modify this existing degree program. Students graduating with a degree that says "Biophysics" should have a reasonable education in that field. This is a proposal for educating cell and molecular biologists with special experience in certain methods. A few years ago, those methods required a fair bit of physics knowledge to operate the machines properly and to interpret the data. That's probably why it seems like "biophysics" a little bit. Such is really not the case today, and the biologists who learn these methods do not need to have a strong physics and math background. Biophysicists do need to have a strong physics and math background.

I recommend that this program be put forth as a new Ph.D. program, or folded into something else. It is not a biophysics program.

A minor concern: The imaging related electives will be inaccessible to a typical cell and molecular biology student. The physics and engineering courses require a strong math/physics background. The computer science courses require a computer science background.

I would suggest that there is a need for imaging courses that are accessible to biology students. This would only strengthen the proposed Biomolecular Imaging Program.

Outline for Reviewers Comments

Review of Proposal for …

Documents reviewed: **Biomolecular Imaging Program leading to a PhD in Medical Biophysics**

Summary: The proposal is to revise the current PhD and minor course structure in order to accommodate technological advances and, furthermore, by doing so, bring state of the art thinking and practice to the discipline at IU. This will place the program at the forefront, regionally and nationally. The revisions are clearly defined and a mechanism for ongoing evaluation has been delineated.

Recommendation: **Accept with discussed revisions**

Discussion: The discipline of imaging has gained increasing importance in many fields of the physical and biological sciences, and is set to become yet more significant. IU already has an established cadre of expert scientists working in a collaborative, multi-disciplinary organization. Part of the remit of this group is to oversee the Interdepartmental PhD program within Medical Biophysics, that is under the overall direction of Dr. Thomas Hurley. The revision requested would create an option for a PhD track or a minor in *Biomolecular Imaging*. The proposal clearly outlines the case for undertaking this revision, identifies the potential student pool and explains how the course modifications and additions will satisfy standing requirements. There is also a description of procedure that will serve to evaluate the program, thus identifying subsequent areas of further evolution.

The reviewer is satisfied that the revisions meet all conditions and regulations of The University, and commends the authors on their vision.

As a minor criticism, there are several points of syntax and grammar that could be adjusted in order to ensure that the document reflects the high standards of The Department. These are itemized separately.

One question: on page 26, 3.3, Trainee evaluation. Is there a mandate for the students to secure funding? If simply encouragement, is there any detriment to progress for any who are unsuccessful?

Suggested corrections to text:

1. The Tracking Tool has been used to suggest alterations to that part of the text available in a Word document form.

2. Suggested changes to other sections of the PDF version are as follows:

In the table of contents, the last item is given page 1019

page 10, B, para 2….few student applications..omit ‘s’

page 17, 4. para 2, line 4…omit ‘by the’

5. lines 4/5….suggest change to ‘will not qualify as thesis mentors’…

page 18, list of faculty….under specialization, *Cellular* requires qualification to the uninitiated…..that is, cellular what?

page 20, 6. Suggest re-order of sentence……‘In support of its educational and research mission, Indiana University has an extensive array of learning resources and facilities that will be available to the student’

page 24, para 2, line 2, mo**n**th

page 26, 2. last sentence, suggest ‘**The’** program administrator….

page 30, under ‘Clientele to be served’, suggest ‘group’ or ‘population’ rather than audience.

Review of Proposal for Medical Biophysics Program
focus in Biomolecular Imaging

Documents reviewed: Proposal outlining Goal of Biomolecular Imaging Program leading to **PhD** or **minor** in Medical Biophysics (including revision of medical biophysics curriculum, introduction of biomolecular imaging minor and 3 core course revisions for new program)

Summary: Changes to update existing Medical Biophysical PhD to better prepare scientists trained in the theory and application of imaging to the biomedical sciences. The changes are consistent with the heightened role of imaging in modern biomedical and biophysical research, and make the program attractive to a larger pool of undergraduate science students. The curriculum includes pre-existing core courses and 3 revised courses. The PhD is 90 credits; the minor 12 credits. Projected implementation is fall 2004.

Recommendation: Accept without revisions

Discussion: The proposal presents a strong rationale for a fit within IUPUI's existing academic strengths (Basic Sciences, Biomedical Engineering and the INGEN initiatives), fit with national research priorities and funding options (emphasis on imaging sciences and new NIH institute), existing faculty expertise and modern imaging equipment. It appears to energize an existing program, using primarily current fiscal and faculty resources, and prepares graduates for promising job and research opportunities. It continues an interdisciplinary emphasis (a plus for this reviewer). They have a faculty steering committee infrastructure to oversee the program, and lead them to training grant submission in several years. The evaluation plan seems sufficient and relevant. This newly-focused PhD and minor would be an asset to our IUPUI offerings.

November 21, 2003

Dr. Sherry F. Queener
Associate Dean, Indiana University Graduate School
Director of IUPUI Graduate Programs

Dear Sherry,

We wish to than you and the three reviewers for thoughtful consideration of the new proposal from the faculty at the School of Medicine to change the focus of the Medical Biophysics Ph.D. to Biomolecular Imaging. The purpose of this letter is to directly address the issues raised in the reviews for presentation to the GAC.

One review recommended 'acceptance without revisions'. A second review recommended 'acceptance with discussed revisions'. We appreciate the detailed suggestions that this reviewer made in the document and virtually all of these recommendations have been incorporated in the revised version. The question whether there was a mandate that students secure funding is addressed in the revised document (the answer is no). The third review, raised fundamental issues that 'the program proposed is not a biophysics program' and recommended that this proposal 'be put forth as a new Ph.D. program, or folded into something else.' While we recognize that this program will not be a classical biophysics training program, we argue that biomolecular imaging represents a legitimate research and training focus within biophysics. In support of this position, we enclose an Email from the Chair of the IU Bloomington Physics Department, Dr. James Musser, who is very supportive of the new program and wishes to collaborate with us on the development of courses for the program. We also offer more detailed discussions on the following changes and discussion points: 1) a proposed change in curriculum to include an introductory course in biophysics, when appropriate, 2) a review of graduate and undergraduate programs listed on the Web site of the Biophysical Society and 3) a proposal to review the program after 3 years to see if it is meeting the stated goals, which are to provide outstanding research training opportunities to students who have interests in medically related biophysics and biomolecular imaging.

Curriculum change to include an Introductory Biophysics course, when appropriate: The reviewer was concerned that the program did not provide students with a broad exposure to classic Biophysics topics. The faculty steering committee for Medical Biophysics met, and agreed with this concern. We have worked in the interim to identify routes to incorporate an "Introduction to Biophysics" course into the curriculum to provide such orientation for students. In brief discussions, Dr. Gatam Vermuri of Physics at IUPUI identified long-term common interests in teaching in the area (as well as expanding the topic area through the new recruits they are planning in IUPUI Physics), and the possibility of developing a course on campus in the intermediate future based out of Physics. As shown in the attached email, our immediate goal of having a course will be satisfied by working with Dr. Jim Muesser, Chair of Physics IUB. He is also

supportive of the program and their department will reactivate their Introduction to Biophysics course in Fall, 2004. Moreover, IUB Physics wants to collaborate with us in the project. We are excited by this opportunity to work with IUB and will finalize the details for getting their course accessible to our students as well as integrating any of their students into our core courses (in which they have expressed strong interest). At this point, we have agreed to do the course by 2-way video in the classroom at the Biotechnology Research and Training Center.

We propose the following plan to incorporate the "Introductory Biophysics" course into our existing curriculum. We will let students take three out of four from the following courses (the first 3 are already part of the proposed curriculum).

Eukaryotic Cell Biology	G817	3
Molecular and Cellular Physiology	F705	4
Fundamentals of Molecular Biology	G865	3
Introductory Biophsyics	P575 IUB?	3

This will allow us to tailor the program for each student, based on their past experience during their undergraduate training, while keeping the total number of core credits the same. This will enhance our ability to adapt to the diverse student pool that we anticipate will be entering the program.

Review of graduate and undergraduate programs on the Biophysical Society site: There are about 50 biophysics training programs listed on the training program Web site of the Biophysical Society. With regard to names: about ¼ use biophysics, ¼ physiology and biophysics (the prior name of our current Department of Cellular and Integrative Physiology), ¼ structural or molecular biophysics and the remainder use a wide variety of names. The classical biophysics programs seem to be associated with strong undergraduate institutions while physiology and biophysics is used at medical schools. Our Medical Biophysics name is unique. Many programs focus narrowly on structural and molecular biology. The Ph.D. program in Structural Biology and Biophysics at Purdue at the Markey Center for Structural Biology is an example of a narrowly focused training program in the areas of X-ray crystallography, NMR and high-resolution EM. While there are no programs specifically focusing on Biomolecular Imaging, we believe that this is equally legitimate as a training focus. Moreover, the focus of our Medical Biophysics degree toward biomolecular imaging is consistent with the training goals of the new National Institute of Biomedical Imaging and Bioengineering at NIH. It is our goal to be the leader in biomolecular imaging at the national level with excellent research resources in the Indiana Center for Biological Microscopy and Center for Structural Biology.

Three-year program review: In the past, the School of Medicine faculty, Graduate Division and IUPUI Graduate Office have worked together to conduct 3- or 5-year reviews of new graduate proposals. One example was the review of

the MSMS program, which is a professional MS degree not affiliated with the IU Graduate School. We expect to do a similar study of the MS in Clinical Research program that was started about 2 years ago. In these reviews, we convene a faculty committee to examine: surveys of teaching faculty, surveys of students, surveys of basic science chairs and all available course materials and student grades. In some cases, we ask the Director of the program to prepare a written self study of the program. The faculty review committee prepares a written report on the program. The review committee is charged to identify specific problems in the program and propose solutions. The report and recommendations are given to the Deans of the School of Medicine and Graduate School for action. In the case of the Medical Biophysics program, we will specifically ask the committee to evaluate whether the training program should be named Medical Biophysics.

Medical Biophysics program leadership: There will need to be a transition in leadership of the program when Dr. Chip Montrose leaves the University in March 2004. Dr. Bill Bosron will assume interim leadership of the program, until a permanent leader for the program is found within the basic science departments of the School of Medicine. It is anticipated that the program will be stably incorporated into either the Department of Cellular & Integrative Physiology (the current administrative center) or the Department of Biochemistry and Molecular Biology. Both departments are currently in the final stages of recruiting new chairs. It is not possible at this time to define the final home of the program. In particular, all of the 3 final candidates for the Physiology chair specifically expressed interest in the program based on the areas they propose to grow the department. The uncertainty should not be a concern, because the School of Medicine is committed to support the program and the program has broad faculty support. The other option would be to establish Medical Biophysics as an independently chartered program without a single departmental alliance. This would require action by the Dean of the School of Medicine to establish a new administrative base for the program.

Dr. Chip Montrose and I prepared this document with the assistance of the Medical Biophysics faculty steering committee. I hope that this answers the key questions in the review of the program. We believe that the review process has strengthened the proposal.

Sincerely,

William F. Bosron, Ph.D.
Professor of Biochemistry and Molecular Biology
Assistant Dean for Graduate Studies.

-----Original Message-----
From: Musser, James A.
Sent: Thursday, November 20, 2003 12:35 PM
To: Bosron, William F.
Cc: Montrose, Marshall H; Glazier, James A.; De Ruyter, Robert R.; Beggs, Jeri Mullins; Setayeshgar, Sima
Subject: RE: Medical Biophysics at IUSOM

Bill:
I've read through your proposal, and it looks like a big step in the right direction. I expect that our biophysics group would be quite interested in cross listing your three imaging courses, if we could work out the logistics. Are these courses forseen to have a lab component? (in which case travel would be a issue for our students) We would also need to find a room with suitable AV resources here. We're not really set up for distance learning in our department but I expect we could find
the resources if there is sufficient interest. On our end, a 'new' intro to biophysics course will be offered next fall and if there is interest on your end we could discuss how to extend this offering to Indianapolis.
Regards
Jim

Quoting "Bosron, William F." <wbosron@iupui.edu>:

> Jim
>
> Here is a draft of the proposal. Please let me know whether you think
> that there are areas on cooperation/collaboration with this graduate
> program at the School of Medicine. Dr. Chip Montrose is the key
> person here for the Biomolecular Imaging proposal.
>
> I had an Email from James Glazier today and it looks like we may be
> able to meet November 17 to discuss how this fits into his NIH grant
> plans, among other things.
>
> Thanks and let me know what you think about the proposal and how you
> want to proceed.
>
> Bill
>
>
>
> -----Original Message-----
> From: Musser, James A.
> Sent: Tuesday, November 11, 2003 7:46 PM
> To: Bosron, William F.
> Cc: Glazier, James A.
> Subject: Re: Medical Biophysics at IUSOM

>
>
> Bill
> I would be happy to look over your proposal. We are currently
> expanding our biophysics offerings, which would include an
> introductory biophysics course. I'll have to talk with the
faculty
> involved (including James), but in principle this sounds like a
good
> idea. Jim
>
>
>
> Quoting "Bosron, William F." <wbosron@iupui.edu>:
>
> > Drs Musser and Glazier
> >
> > I organize the graduate programs for the School of Medicine.
We
> > have
> > a Medical Biophysics PhD program that has been 'broke' for
some time.
>
> > I stopped recruitment about one year ago and asked the
faculty to
> > refocus the program. We decided to focus the program on
> > 'biomolecular
>
> > imaging' that would use faculty expertise in X-ray
crystallography
> > http://www.csb.iu.edu/ and Indiana Center for Biological
Microscopy
> > http://www.nephrology.iupui.edu/imaging/. We have prepared a
> > proposal
>
> > to the IUPUI Graduate Affairs Committee on the program.
Would you
> > be
> > willing to look at the proposal for me and give me your
comments? We
> > have a meeting at the IUPUI committee at the end of the month
and then
>
> > it goes to the IU Graduate School for approvals. Your
comments will
> > be important for this process.
> >
> > Obviously, I am interested in areas where we could
collaborate. I
> > know that faculty here were involved in the biocomplexity
grant. As
> > you can probably guess, one of the driving factors in this
> > reorganization of the Medical Biophysics program was to put
us in a
> > position to apply for an T32 NIH training grant from the
NIBIB.
> > Last week, the faculty discussed the need to have access to a
good

> > 'Introductory Biophysics' course for those students who enter
our
> > focused PhD program without such a course. Is P425/P575 still
being
> > taught at IUB and would there be interest in doing this as a
video
> > course with us? I am sure that some of the faculty here may
be
> > willing to do some guest lectures on imaging topics.
> >
> > Thanks
> >
> > Bill Bosron
> > Professor of Biochemistry and Molecular Biology
> > Assistant Dean for Graduate Studies
> > Director of Biotechnology Training Program
> >
>
>
>