



**INDIANA UNIVERSITY**

SCHOOL OF MEDICINE

Graduate Division

Sherry F. Queener, Ph.D.  
Director of the Graduate Office, IUPUI  
Associate Dean of the Indiana University Graduate School

July 25, 2010

Dear Dr. Queener,

Please find attached proposals for:

- A new M.S. degree in Translational Science
- A new certificate in Translational Science
- A new Indiana University Graduate School Ph.D. Minor in Translational Science

As you know, the M.S. degree is part of the specific aims of the funded NIH Clinical and Translational Sciences Institute (CTSI) grant that is coordinated by the Indiana University School of Medicine and also includes other IUPUI schools, Indiana University Bloomington, Purdue University West Lafayette, and the University of Notre Dame. This degree therefore represents a collaborative educational effort that will offer resources to students at three Indiana universities.

The proposals have been authored by Dr. R. Mark Payne of Pediatrics and his colleagues at the CTSI.

Please let me know if I or Dr. Payne can answer any questions.

Thank you for your consideration,

Simon J. Rhodes, Ph.D.  
Associate Dean for Graduate Studies  
Indiana University School of Medicine  
srhodes@iupui.edu

**Indiana University**  
**Request for a New Ph.D. Minor Program**

**Campus:** Indiana University – Purdue University of Indianapolis

**Proposed Title of Ph.D. Minor Program:** Minor in Translational Science

**Projected Date of Implementation:** Fall 2010

**Faculty Member Developing / Submitting Proposal:** R. Mark Payne

**TYPE OF MINOR: (check one)**

UNDERGRADUATE MINOR

**PH.D. MINOR**

**I. Why is this Minor needed? (Rationale)**

Over the last decade, a number of disciplines, including biochemistry, immunology, cellular and molecular biology, have experienced a rapid series of bold advances. In spite of these advances, there has been a ‘lag time’ between discovery and application of these new findings, which creates a high demand for a new breed of scientist with a hybrid training of basic science and clinical medicine who can bridge this gap. The proposed Minor in Translational Science provides an option for currently enrolled Ph.D. students to enhance their current scientific training with translational research techniques. This 12-credit hour Minor is designed to provide students with the opportunity to develop the necessary skills for future translational research. Locally and nationally, there is a high demand for translational researchers. According to the Bureau of Labor Statistics, employers in the research and development field require new doctoral employees to participate in extensive post-doctoral fellowships in order to develop the skills needed to design and conduct independent research. This program would provide our graduates with an edge by giving them some of that needed experience and knowledge. Graduates should experience increased opportunities for advancement and employment opportunities in university, industry, or government research settings.

**II. List the major topics and curriculum of the Minor**

- A. Requirements:** Minimum of 12 credit hours: 9 to 11 core credit hours, including Tools and Techniques in Translational Research (G667); Quantitative Aspects of Translational Research (New); Introduction to Research Ethics or Ethical and Policy Issues in International Research or Responsible Conduct of Research (RCR) (G504 / G505 / P555 / New); Biostatistics I or II (G651, G652, or approved equivalent). Credit may be given for up to 6 hours of student’s pertinent graduate level coursework. Additional coursework (electives) is adapted to fit the needs of the student up to a total of 3 credits. Focus is on translational research training in the basic and clinical sciences for future research scientists. All required coursework is offered at the IUPUI campus.

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**B. Completion Requirements and Procedures for Minor in Translational Science**

1. Total number of credits required: 12 credits

2. Specific course requirements (Core Classes)

✓	Tools and Techniques in Translational Research	(G667)	3 credits
✓	Quantitative Aspects of Translational Research	(New – Grad G668)	3 credits
✓	Introduction to Research Ethics or Ethical & Policy Issues in International Research or Responsible Conduct of Research (RCR)	(G504/G505/P555/New)	1 – 3 credits
✓	Biostatistics I or II	(G651, G652, or approved equivalent.)	3 credits
	Electives Credits (Graduate Level Courses – approved by the Program Director)		1 – 3 credits
	Total Credits		12 credits

- Minimum GPA requirements
  - ✓ Minimum overall GPA for all courses applied to M.S. 3.0 GPA
  - ✓ Minimum grade for any course to be applied to M.S. B-
- Maximum number of credits that may be transferred from another institution 6 credits
- Maximum number of credits from undergraduate level courses that may be used toward the degree 0 credits
- Maximum time allowed for the completion of M.S. degree 5 years
- Number of credits that can be applied both to this M.S. program and another degree or certificate program (i.e., overlapping credits) 6 credits

**Table 1: Required Courses for Ph.D. Minor**

Course Title	Course #	Credits	Ph.D. Minor
Tools & Techniques in Translational Research	GRAD G667	3	X
Quantitative Aspects of Translational Research	New	3	X
Introduction to Research Ethics or Ethical and Policy Issues in International Research or Responsible Conduct of Research (RCR)	GRAD G504/ G505 or PHIL P555 or New	1 to 3	X
Biostatistics I or II (or approved equivalent)	GRAD G651 or G652	3	X
Electives (graduate level and approved by Program Director)	GRAD XXX	up to 3	X
<b>Total Required Credits</b>			<b>12</b>

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**C. Existing Core Courses:** Most or all of the courses necessary to deliver the curriculum will be offered on an annual basis.

1. **Tools and Techniques in Translational Research (G667): 3 credits** This course is offered in the fall semester and provides the advanced student with an understanding of the basic technologies and techniques used in translational research today. Key to this training is understanding how and when to use these technologies, and how to interpret their results and pitfalls. The trainees develop an understanding of the components for protecting human subjects, and how to move a novel concept from the lab to a patient. Finally, the student will understand how to identify and measure target endpoints in patients, and how to assemble a multi-disciplinary team to conduct translational research. The course will use a case-based approach whereby specific technologies and problems are demonstrated in readings drawn from the textbook. This course is a new offering (initiated spring 2009) and is supported by the Indiana CTSL. Course Director: R. Mark Payne. Offered once in Spring 2009 and is being offered Fall 2010.
2. **Research Ethics (Responsible Conduct of Research - RCR) (G504/G505/P555): 1 - 3 credits** All students must enroll in coursework related to RCR if they have not completed this coursework during their graduate training.
  - a. **Introduction to Research Ethics (G504): 2 - 3 credits** More intensive course than G505. Taught by the Department of Medical and Molecular Genetics and The IU Center for Bioethics. Course Director: Kimberly Quaid de Cordon. Offered 3 times in the past 3 years (every fall).
  - b. **Introduction to Research Ethics (G505): 1 credit** Offered in the fall semester. G505 includes lecture and small group discussion formats and covers important issues in biomedical research, such as: 1) Scientific misconduct, 2) Conflict of interest, 3) Animal rights and welfare, 4) Ownership of data, intellectual property, and copyright management, 5) Authorship and scientific manuscripts, and 6) Informed consent and human subjects. Course Director: Michael J. Klemsz. Offered 3 times in the past 3 years (every fall).
  - c. **Ethical and Policy Issues in International Research (PHIL P555): 3 credits** If students are contemplating international research, they may opt for this course. This course examines ethical and policy issues in the design and conduct of transnational research involving human participants. Topics discussed

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include: economic and political factors; study design; the role of ethics review committees; individual and group recruitment/informed consent; end of study responsibilities; national and international guidelines. Course Director: Eric M. Meslin. Offered 3 times in the past 3 years (every fall).

d. **Responsible Conduct of Research (New): 3 credits** A new course currently being developed by John Baumann, Ph.D. (Executive Director, Research Ethics, Education and Policy, Office of Vice President for Research, Indiana University) Course Director: John Baumann

3. **Biostatistics I (G651 or approved equivalent): 3 credits** G651 is an introductory level biostatistics course designed for healthcare professionals. It is the first in the G651 and G652 series on biostatistics methodology. The course covers topics such as data description and presentation techniques, probability and probability distributions, sampling distributions, statistical inferences from small and large samples, analysis of categorical data, analysis of variance, correlation and simple linear regression analysis. Upon completion of the course, students will achieve a basic understanding of the concepts and techniques of data description and statistical inferences. Students will also acquire a working knowledge of SPSS, a commonly used statistical computation program. Students will be able to understand and interpret the statistical analyses in research articles published in medical journals. Course Director: B. Katz. Offered 6 times in the past 3 years (spring and fall semesters).

**OR**

4. **Biostatistics II (G652 or approved equivalent): 3 credits** G652 is an advanced applied biostatistics course designed for students with an interest in the health sciences. Students are expected to have completed at least one semester course of basic biostatistics. Knowledge of probability and probability distributions, concepts of estimation and hypothesis testing are assumed. Topics covered in this course include multiple linear regression, multi-factor analysis of variance, analysis of covariance, analysis of repeated measures, logistic regression model, and survival analyses. Upon completion of the course, students are expected to understand the appropriate statistical models for various outcomes and be able to interpret results using statistical techniques covered in this course. Students are also expected to conduct simple analyses using SPSS on personal computers. Course Directors: S. Gao & P. Monahan. Offered 3 times in the past 3 years (every fall).

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**Request for a New Ph.D. Minor Program**

5. **Electives: (1 - 3 credits)** Electives must be graduate level, be tailored to the student's particular research interests and approved by the Program Director.

**D. New Course - Quantitative Aspects of Translational Research, (New - Grad-G668): 3 credits.**

Quantitative Aspects of Translational Research is an interdisciplinary weekly seminar series offered in the spring semester. Targeted toward the advanced graduate student and clinical or research based postdoctoral fellows, it will provide a forum for both Level 1 (bench to bedside) and Level 2 (clinical studies to practice) translational researchers to work together in learning both the key concepts and principles required to develop medically relevant solutions. Through a systematic exploration of diabetes mellitus, students will be exposed to the process of learning about any disease. Lecturers will represent the multiple disciplines with a stake in dealing the various aspects of disease; thus, providing students with a better global understanding. **Course Director:** Robert Bies, Ph.D. and Jamie Dananberg, M.D.

- E. Required Courses Not Offered at IUPUI:** All required courses will be offered at the Indianapolis campus.

**III. List the major student outcomes (or set performance based standards) for the proposed minor**

**A. STRATEGIES for SHORT-TERM OUTCOMES: The Translational Science Program of Indiana (TSPI) will:**

1. Educate translational researchers who regularly read research literature in both basic and clinical areas, who can state the hypothesis for planned research, who can critically evaluate and choose appropriate research tools, who can explain the fundamental concepts in the discipline, and who can defend methods for analyzing data or scholarly product.
2. Educate translational research students who can apply sophisticated biochemical, molecular and engineering approaches to directly impact the understanding of the mechanisms of human disease.
3. Educate translational scientists and engineers who can move productively between basic and clinical settings.
4. Educate scientists and engineers who can act as teachers or mentors for basic and clinical colleagues.

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5. Educate translational scientists and engineers who can develop novel molecular approaches to treat human disease utilizing their understanding of complex clinical problems.
6. Provide a program (involving graduate students, special courses and faculty) that will promote 'translational' research.

**B. LONG-TERM OUTCOMES and IMPACT: The Translational Science Program of Indiana (TSPI) will:**

1. Greater awareness of basic science methodologies and how to apply them to medical problems.
2. Leadership of research teams by Translational Science program graduates.
3. Ongoing partnerships and collaborations between biomedical scientists, engineers and physician scientists.
4. Greater integration of basic, translational, and clinical research.
5. Improved medical practice (i.e., applications for the treatment of disease) using/applying new biological knowledge, tools, and approaches.

**IV. Explain how student learning outcomes will be assessed (student portfolios, graduate follow-up, employer survey, standardized tests, etc.) and describe the structure / process for reviewing assessment findings for the purpose of ensuring continuous improvement of the minor.**

**A. Overview**

The TSPI Leadership and Executive Committee (described in IX, A1) will monitor each student's performance, progress, and timely completion of requirements, and monitor each student's transition to further graduate education or to a professional career. Moreover, the IU Graduate School monitors all of its programs and periodically holds extensive program reviews in cooperation with the Office of Planning and Institutional Improvement. The minor program will be approved by the student's advisory committee which will take into consideration the student's total didactic experience. The advisory committee may approve additional and/or substitution of appropriate courses to complete the degree requirements. The minor representative on this Committee will be selected from outside the student's major department.

**B. Procedures**

1. Each student in the Translational Science program will have semi-annual Program Director meetings during the summer-fall (Jul-Oct) and winter-spring (Jan-Apr) time

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periods. At these individual meetings, the Program Director will discuss with each student intended and completed coursework, selection of electives, and progress to date in the program. A summary of each meeting will be dictated and maintained in the student's file

2. Students complete a course evaluation form for each course, providing an overall rating as well as specific comments on what would further improve the course. The results are tabulated, reviewed by the Program Director, and provided to the course director.
3. Every spring, TSPI Students will complete a Translational Science Program Evaluation Form, in which they will be able to rate specific aspects of the program and provide comments and feedback for program improvement.

**V. Describe the student population to be served**

The proposed Ph.D. Minor is designed for students who are in the process of completing their basic science doctoral degree. The proposed Ph.D. Minor will provide the formal training needed to prepare for a translational research career. Students from IU Bloomington, IUPUI, and Purdue University West Lafayette, who meet these criteria, will be actively recruited by announcement via the department chairs and program directors, by advertising the program over campus electronic newsletters, and by faculty recommendation of students.

All entering students will be provided with a brochure through the graduate school describing the program at the time of their matriculation. All students expressing interest will be encouraged to speak with the program director (Payne) or one of the Executive Committee members (Rhodes, Kroenke, Moe, Fife, Hetrick, or Heath) for further details. We will also provide the brochure for undergraduates visiting the school as part of our general recruiting programs, for distribution to minority-based colleges and universities during recruiting visits (to help develop a pipeline of trainees), and through our web sites.

**VI. List and indicate the resources required to implement the proposed program. Indicate sources (e.g., reallocations or any new resources such as personnel, library holdings, equipment, etc.)**

- A. **Existing Learning Resources:** This minor program will be administered by the same faculty and staff established for the Master's Degree Program in Translational Science (currently submitted for approval).

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**(Core Leadership Team)**

<u>Program Director</u>	<b>R. Mark Payne, M.D.</b> (Professor in Indiana University School of Medicine)
<u>Program Coordinator</u>	<b>Carrie Hansel</b>
<u>Executive Committee</u>	<b>Simon J. Rhodes, Ph.D.</b> (Professor and Associate Dean in Indiana University School of Medicine)  <b>Kurt Kroenke, M.D.</b> (Chancellor’s Professor of Medicine, Director of Clinical Investigation and Translational Education (CITE) Program, Senior Scientist in Regenstrief Institute, Director of Indiana Clinical and Translational Sciences Institute (CTSI) Education Programs, and Associate Director of Education in the General Clinical Research Center)  <b>Hunter Heath, III, M.D.</b> (Adjunct Professor of Medicine, Division of Endocrinology and Metabolism, Indiana University School of Medicine)  <b>Sharon M. Moe, M.D.</b> (Professor of Medicine and Vice-Chair for Research in Indiana University School of Medicine)  <b>Rose Fife, M.D., M.P.H.</b> (Associate Dean for Research, Associate Director of the Indiana CTSI, Co-Director of the IU Family Violence Institute, Barbara F. Kampen Professor of Women’s Health, Professor of Medicine and Biochemistry and Molecular Biology, Indiana University School of Medicine)  <b>William P. Hetrick, Ph.D.</b> (Professor of Psychological and Brain Sciences and of Neuroscience at Indiana University, Bloomington, Adjunct Professor of Clinical Psychology in the Department of Psychiatry, IU School of Medicine)

**B. Resource Materials**

Indiana University has an extensive array of learning resources and facilities that will be available to the proposed Ph.D. Minor in Translational Science Program in support of its educational and research mission. These include system, campus and participating school resources. State-of-the-art data, video and voice technologies are present to create a sophisticated learning environment.

Students in the Ph.D. Minor Program of Translational Science will need access to the libraries, journals and databases on the IUPUI and IU Bloomington campuses. Additionally, students will need access to various opportunities on campus, including but not limited to: seminars, study groups, lectures, and research experiences.

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**C. New Learning Resources Needed**

The program requires the above-mentioned faculty, an administrative support position, additional funds for supplies and expenses, office space, secure location for filing confidential student information and funds for additional financial assistance. (This Ph.D. minor program will use the same resources and be administered by the same faculty and staff established for the Master's Degree Program in Translational Science - currently submitted for approval.)

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

**A. Distinctive Features & Strengths of the Program:** Currently, training in human disease at both a basic and clinical level is not well-addressed by current training programs, which leaves a nationally unmet need for translational scientists. The proposed program will fill this unmet need by offering basic science students a Ph.D. Minor in Translational Science that is specifically designed for them. The final product will be a graduate with a Ph.D. Minor in Translational Science who understands human disease at both the basic and clinical level.

In addition to the direct opportunities and objectives of the Translational Science Program of Indiana, several indirect benefits are expected. This program will facilitate the interaction of scientists and engineers interested in common problems and increase the cross-pollination of ideas between scientists and engineers in basic and clinical departments. A program which achieves both the specific goals and the indirect benefits outlined above will prepare these translational scientists with a better understanding of basic and clinical science and the implications on their research in the area of human disease and facilitate desperately-needed translational research in all areas of medicine and science. We believe that these innovations are critically important at a time when advances in basic science can rapidly impact the diagnosis and treatment of human disease.

Fundamental changes in academic and pharmaceutical biomedical operations have dictated the need for the training of more 'translational' researchers. For example, managed care has put more pressure on those with clinical training to participate in patient care. As a result, those scientists with the most clinical insight are spending much less time carrying out basic research as it relates to clinical problems. At the same time, there has been a major emphasis by national, private and industrial granting organizations to fund basic research that has the potential to immediately impact human disease. The NIH, for example, has recognized this need and responded with several RFAs. Additionally, in the pharmaceutical and biotechnology industries, most traditional

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departments have now been restructured with major foci on disease areas. Thus, it is becoming increasingly important for scientists who move into these industries to be well versed in basic science methodologies as well as to have an intimate understanding of human disease. The Translational Science Program of Indiana (TSPI) has been designed to train researchers, who will fill the critical niches described above in major medical centers and industry.

The Ph.D. Minor Program in Translational Science at IUSM is a natural outgrowth of the planning and implementation of the Indiana Clinical Translational Science Institute (CTSI) that was awarded in 2008 by the NIH. It was jointly designed by several basic and physician scientists, who have worked together on models of human disease and on training in translational research in the Departments of Internal Medicine, Pediatrics, Biochemistry and Molecular Biology, and Physiology/Pharmacology. This group realized that historically in the best major medical centers in this country, there has been a very valued group of scientists, who has worked at the interface of basic science and human health. This program has been designed to enhance the basic science training of doctoral students with translational science approaches to focus on the application of these approaches to human disease. This program differs from other graduate programs by offering a new pathway for basic scientists to incorporate a comprehensive knowledge of translational science methodologies, as well as, learn how to collaborate with other scientists in a translational research environment, regardless of their specialty. An overall goal of TSPI is to produce exceptional ‘translational’ researchers in a fashion that saves both time and expense when compared to more conventional translational’ training routes.

### **B. Collaborative Arrangements**

The program will offer training to the partnering institutions: Indiana University-Purdue University Indianapolis, Purdue University West Lafayette, University of Notre Dame, as well as the IUSM biomedical programs in Indianapolis and Bloomington. A common academic system allows students to readily assimilate components into their programs. The long term goal is to establish a training program that addresses the critical need for generating talented research scientists, who can pursue a career that lies at the interface between basic and clinical investigative medicine.



## SCHOOL OF MEDICINE

INDIANA UNIVERSITY  
Office of the Dean

July 19, 2010

TO: Indiana Commission for Higher Education  
Indiana University Trustees  
Indiana University – Purdue University of Indianapolis Graduate Committee  
Indiana University Bloomington Academic Leadership Committee

RE: R. Mark Payne, M.D.  
Professor of Pediatrics (Cardiology)

On behalf of the Indiana University School of Medicine (IUSM), R. Mark Payne, M.D., Professor of Pediatrics in IUSM's Department of Pediatrics, has prepared a proposal for the Translational Science Program of Indiana (TSPI). The Translational Science Program of Indiana (TSPI) is designed to allow physicians and medical students in training to integrate translational research into their training utilizing the wealth of resources available through IUSM and the Indiana Clinical and Translational Sciences Institute (ICTSI).

As Dean of the IUSM and on behalf of its basic and clinical sciences faculty and departmental chairs, I enthusiastically support this proposal. Specifics of the program are detailed in the proposal itself, but the long-term goal is to establish a training program to address the critical need for generating translational research scientists who are able to operate at the interface between basic and clinical investigative medicine. Operationally, the program will be open to all interested 4<sup>th</sup> year medical students, fellows, junior faculty, and ultimately all life sciences graduate students, including those of the IUSM in Indianapolis and Bloomington, at Indiana University - Purdue Indianapolis (IUPUI), and at Purdue University in West Lafayette. TSPI students will be able to choose from options ranging from coursework, a minor, a graduate certificate in molecular medicine, or a Master of Science in Translational Science.

This program builds upon existing collaborative relationships with Purdue (i.e., the M.D. / Ph.D. program) and IUPUI (interdisciplinary cross-campus Ph.D. programs in medical neuroscience, biophysics, and biomolecular imaging). The TSPI fits well with the developing strengths of the CTSI, and represents a University commitment to develop translational training programs as detailed in the CTSI application. The IUSM is committed to the long-term success of the TSPI and will commit necessary faculty and staff time to develop and maintain the program. Because an understanding of translational medicine is fundamental to all life sciences researchers, including both physicians and basic scientists, it is clear that the TSPI program will provide a common academic system which will allow students and trainees to move forward with careers in translational science. Therefore, I urge you to give this proposal your utmost consideration.

Sincerely,

D. Craig Brater, M.D.  
Dean and Walter J. Daly Professor

June 1, 2010

TO: Indiana Commission for Higher Education  
Indiana University Trustees  
Indiana University – Purdue University of Indianapolis Graduate Committee  
Indiana University Bloomington Academic Leadership Committee

RE: R. Mark Payne, M.D.  
Professor of Pediatrics (Cardiology)

**Review Committee,**

The Weldon School of Biomedical Engineering at Purdue University is pleased to be a contributing partner to the Translational Science Program of Indiana (TSPI) described in this proposal being submitted by Dr. Payne. We were immediately supportive of this new proposal given the successes of our previous and ongoing collaborations with the Indiana University School of Medicine (IUSM), especially around our Medical Scientist Training Program (MSTP) and the new Indiana Clinical and Translational Sciences Institute (CTSI). The proximity of our campuses, the many strong research collaborations, and the fact that many of our faculty and students already utilize the Indianapolis campus as a critical base, make this an extremely feasible curricular complement. The curricular program will be greatly facilitated also by the extant mechanisms for efficient communication and educational delivery between the two campuses which currently serve our two joint doctoral programs.

The translational and cross-disciplinary nature of the research and educational programs of the Weldon School require that our graduate students have direct and repeated exposure to clinical mentors, collaborators, and medical educational training. At the inception of our doctoral program we established a requirement for such clinical exposure. We are very excited that the TSPI program will offer biomedical engineers the opportunity to train side-by-side with biomedical scientists and physician scientists in very objective-based experiences, including projects and workshops. The multiple clinical and translational arenas proposed will match well with the diversity of interests of our biomedical engineering students. We are convinced that in order for our students to become the next generation of leaders in translating medical devices and technologies, they absolutely need to understand how to comprehensively conduct research in clinical settings. This must include learning how to participate in multi-disciplinary teams, how to develop and implement effective therapeutic interventions, and how to collaboratively establish quantitative endpoints for clinical outcomes, which are all components of this program.

We have a long-term commitment to this proposed program's success and will provide resources in support of our students participating in this program if needed. We believe strongly that our students will benefit enormously from the training offered in the TSPI program. This integrated and additional training will not only make our exceptional engineers uniquely able to contribute to

critical clinical programs in their career, but will greatly impact their research focus even during their graduate studies.

As Head of the Weldon School, I assure you that the curricular program described in this proposal has our full and enthusiastic support. We are confident that the implementation will be successful and that the educational outcomes of the all of the schools involved will be very positively impacted.

Sincerely,



George R. Wodicka  
Professor and Head



**DEPARTMENT OF  
PSYCHOLOGICAL AND  
BRAIN SCIENCES**

INDIANA UNIVERSITY

Bloomington

June 1, 2010

TO: Indiana Commission for Higher Education  
Indiana University Trustees  
Indiana University – Purdue University of Indianapolis Graduate Committee  
Indiana University Bloomington Academic Leadership Committee

RE: R. Mark Payne, M.D., Professor of Pediatrics (Cardiology)  
Translational Science Program of Indiana

This letter is to confirm the interest of the Indiana University Bloomington in your proposed the Translational Science Program of Indiana (TSPI) which is to provide graduate training for basic and clinical investigators. IU Bloomington has a strong interest in clinical translational science, especially pre- and postdoctoral training opportunities in this area because translational research is an increasingly important avenue for scientific discovery and transfer of basic knowledge to human care. Your program will permit us to provide cutting-edge training to our current students as well as attract new translational scientists.

Investigators at Indiana University Bloomington are consistently funded by NIH/NCI, NIH/NIDR, and foundation/industry support. Translational investigator training has been a significant challenge. To date, it has been provided primarily by individual instruction and mentoring by experienced translational investigators, and by scientists serving as secondary investigators in controlled trials to develop both experience and credibility. These junior investigators also attended existing graduate courses in biostatistics and clinical research methodologies. However, more extensive training in translational tools and techniques, research ethics, grantsmanship, manuscript writing, and scientific presentations was not possible and was acquired only through experience—often incidental experiences.

Thus, the existence of the proposed Translational Science Training Program will not only provide a much more intensive and complete background for junior translational investigators, but it will also provide a much higher quality of training in a much more efficient manner. As a result we anticipate that some of our research-oriented graduate students in the basic sciences and applied science will take advantage of this program to prepare for a career in translational research. Postdoctoral students and research scientists might also appreciate the opportunity to specialize in this exciting area. Therefore, we strongly support the proposed program and hope that it will be given favorable consideration.

Sincerely,

William P. Hetrick, Ph.D.

Professor of Psychological and Brain Sciences, Neuroscience, and of Psychiatry  
Director, Bloomington Office of the Indiana Clinical Translational Science Institute



INDIANA UNIVERSITY

June 23, 2010

TO: Indiana Commission for Higher Education  
Indiana University Trustees  
Indiana University – Purdue University of Indianapolis Graduate Committee  
Indiana University Bloomington Academic Leadership Committee

RE: R. Mark Payne, M.D.  
Professor of Pediatrics (Cardiology)

As the leaders of the Ph.D. programs at IU School of Medicine, the Basic Science Council has reviewed and discussed the new graduate proposal entitled, “*The Translational Science Program of Indiana (TSPI)*.” We are in strong support of this new graduate program. If approved, this program would broadly benefit the life science graduate students in our programs at Indiana and Purdue University campuses. The design of the program will allow Ph.D. students in the life sciences to participate. The TSPI program will permit these students to choose from mentored training experiences ranging from coursework to improve their knowledge of clinical and translational science in to completing interactive clinical experiences in order to earn a Ph.D. degree minor or a graduate certificate in Translational Science.

We believe this program fills a critical need in our training programs by increasing the clinical understanding and improving training of our doctoral students in a multi-disciplinary setting. We anticipate the students will bring this knowledge to their research projects. The program will thereby improve the quality and clinical relevance of research performed in our various units, promote basic/clinical student and faculty interactions, promote collaborative research between the Departments, the Schools, and the Universities, and most importantly will produce students that will be leaders in future translational research teams. We look forward to working with Dr. Payne on this new and exciting training program.

Sincerely,

Michael R. Vasko, Ph.D.  
Chair, Basic Science Council  
Paul Stark Professor of Pharmacology



INDIANA UNIVERSITY

July 20, 2010

TO: Indiana Commission for Higher Education  
Indiana University Trustees  
Indiana University – Purdue University of Indianapolis Graduate Committee  
Indiana University Bloomington Academic Leadership Committee

RE: R. Mark Payne, M.D.  
Professor of Pediatrics (Cardiology)

Dear Review Committee,

As the Chair of the Department of Internal Medicine, I am writing to express my strong support of the training program entitled, the Translational Science Program of Indiana (TSPI), submitted by Dr. Payne. This translational research program will blend in beautifully with the Indiana CTSI, extending earlier educational offerings in translational research, and represents a training commitment within the original Indiana CTSI. If approved, this program will broadly benefit the many medical and life sciences students in our programs at the Indiana and Purdue University campuses, including physicians in training.

I am supportive of this program, which will provide an avenue for interdisciplinary collaboration between clinical and basic scientists. The program will bolster the basic science background of physicians who want to work in translational research, while providing a clinical immersion experience for Ph.D. graduate students in our departments. We fully support this concept and will work with Dr. Payne to help structure appropriate, supervised rotations for the students. We will also help to identify appropriate faculty to provide clinical mentorship for the students.

This is an important and exciting program that will increase collaborations between our multiple departments, campuses, and faculty in ways that advance translational research both here, and nationally. By awarding a Minor, a Graduate Certificate, or a Master of Science degree in Translational Science to these students, the value of their dual degrees and training will be markedly increased. This will continue to maintain high quality students in our programs and provide leaders in future translational research programs. We look forward to beginning work on this program.

Sincerely,

David W. Crabb, MD  
John B. Hickam Professor  
of Medicine  
Chair, Dept. of Medicine

Indiana University – Purdue University, Indianapolis



INDIANA UNIVERSITY

July 20, 2010

TO: Indiana Commission for Higher Education  
Indiana University Trustees  
Indiana University – Purdue University of Indianapolis Graduate Committee  
Indiana University Bloomington Academic Leadership Committee

RE: R. Mark Payne, M.D.  
Professor of Pediatrics (Cardiology)

Dear Review Committee,

As the Chairs of the Departments of Pediatrics and Radiology, we are writing to express our strong support of the training program entitled, the Translational Science Program of Indiana (TSPI), submitted by Dr. Payne. This translational research program will blend in beautifully with the Indiana CTSI and represents a training commitment within the original Indiana CTSI. If approved, this program will broadly benefit the many medical and life sciences students in our programs at the Indiana and Purdue University campuses, including physicians in training.

We are excited that the program will provide an avenue for interdisciplinary collaboration between clinical and basic scientists. The program will bolster the basic science background of physicians who want to work in translational research, while providing a clinical immersion experience for Ph.D. graduate students in our departments. We fully support this concept and will work with Dr. Payne to help structure appropriate, supervised rotations for the students. We will also help to identify appropriate faculty to provide clinical mentorship for the students.

This is an important and exciting program that will increase collaborations between our multiple departments, campuses, and faculty in ways that advance translational research both here, and nationally. By awarding a Minor, a Graduate Certificate, or a Master of Science degree in Translational Science to these students, the value of their dual degrees and training will be markedly increased. This will continue to maintain high quality students in our programs and provide leaders in future translational research programs. We look forward to beginning work on this program.

Sincerely,

Valerie P. Jackson, MD  
Eugene C. Klatter Professor  
of Radiology  
Chair, Dept. of Radiology

D. Wade Clapp, MD  
Richard L. Schreiner Professor  
of Pediatrics  
Chair, Dept. of Pediatrics



# INDIANA UNIVERSITY

INDIANA CLINICAL AND TRANSLATIONAL  
SCIENCES INSTITUTE  
School of Medicine

July 8, 2010

TO: Indiana Commission for Higher Education  
Indiana University Trustees  
Indiana University – Purdue University of Indianapolis Graduate Committee  
Indiana University Bloomington Academic Leadership Committee

RE: R. Mark Payne, M.D.  
Professor of Pediatrics (Cardiology)  
Translational Science Program of Indiana

On behalf of the Indiana Clinical and Translational Sciences Institute (ICTSI), R. Mark Payne, M.D., Professor of Pediatrics in IUSM's Department of Pediatrics, has prepared a proposal for Master's Degree in Translational Science Program. The Translational Science Program of Indiana (TSPI) is designed to allow for cross-pollination of ideas between scientists in basic and clinical research by utilizing the wealth of resources available through IUSM and the Indiana Clinical and Translational Sciences Institute (ICTSI); thus, providing the foundation for translational research. As one of the specific aims listed on our CTSA grant, the TSPI provides the means of training future translational researchers for our state. Furthermore, by opening the program to all interested 4<sup>th</sup> year medical students, fellows, junior faculty as well as all life sciences graduate students, collaborative research opportunities will open among the partnering institutions (Indiana University – Purdue University of Indianapolis, Indiana School of Medicine, Indiana University Bloomington, and Purdue University) in addition to other entities within the region as they join the ICTSI.

In an effort to make the training more accessible to individuals at various stages of their careers, TSPI students will be able to choose from options ranging from coursework, a minor, a graduate certificate in Translational Science, or a Master of Science in Translational Science. Building upon existing collaborative relationships among Purdue University, Indiana University, IUPUI, and several public and private organizations, the Translational Science program will produce scientists and physicians who are able to operate at the interface between basic and clinical investigative medicine. As the Associate Dean for Translational Research, I enthusiastically write in support of this proposal.

ICTSI is committed to the long-term success of the TSPI and will commit necessary resources, faculty and staff time to develop and maintain the program. Because an understanding of basic science and clinical medicine is essential to translational research, we believe the TSPI will provide a common academic system that will allow both physician and basic scientists to advance their careers in translational science. Therefore, I urge you to give this proposal your utmost consideration.

Sincerely,

Anantha Shekhar, MD, PhD  
Director, Indiana CTSI  
Associate Dean for Translational Research  
Raymond E. Houk Professor of Psychiatry  
Professor of Pharmacology and Neurobiology  
Indiana University School of Medicine