IUPUI

SCHOOL OF SCIENCE

A PURDUE UNIVERSITY SCHOOL
Office of the Dean
Indianapolis

MEMORANDUM

TO: Dr. Queener
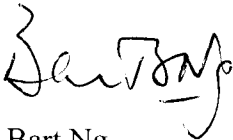Associate Dean
IU Graduate School

DATE: January 15, 2009

SUBJECT: New Indiana University Minor in Computer Science Proposal

Attached is a proposal for a new graduate minor in Computer Science. This is an Indiana University minor and not a Purdue University minor. The proposal has been endorsed by the School of Science Graduate Education Committee.

Please route this to the Graduate Affairs Committee for consideration.

Thank you.

Bart Ng
Acting Dean

:jlt

Attachment

Department of Computer and Information Science
School of Science, IUPUI

Request for a New Graduate Minor

To be offered at Indiana University-Purdue University Indianapolis

Approved by the faculty of the Department October 21, 2008

Objectives of the PhD Minor
The purpose of this Graduate Minor Program is to provide opportunities for current Indiana University or Purdue University doctoral students in other disciplines at IUPUI to learn and use Computer Science techniques and tools to solve problems in their academic fields. Such a minor is necessary, as the use of information technology in other academic areas proliferates, future researchers and faculty members must be familiar with the fundamentals of Computer Science to aid in their own research and discovery.

Unique Features and Strengths of the Program
The proposed Graduate Minor will serve many academic schools at IUPUI. Most notably, it will serve the needs of the Schools of Informatics and Medicine by providing technical skills needed to solve problems in the sub-domains of Bioinformatics, Health Informatics, Media Arts, Human-Computer Interaction as well as other Life Sciences areas. As IUPUI has been designated as Indiana University's life sciences campus, a Computer Science Graduate Minor would empower students performing cutting-edge life sciences research by making them proficient in computing techniques, tools and skills they need to accomplish their objectives. The proposed Minor would also strengthen existing strong ties between Computer Science and other academic schools on campus.

The Target Audience
The proposed minor targets students at IUPUI seeking advanced degrees in Indiana University programs, such as Informatics, Medicine, and others. The Department of Computer & Information Science has received numerous inquiries from IUPUI Schools regarding the possibility of minors as part of their doctoral studies.

Plan for Sustaining Steady-state Enrollment
In the first year (Fall 2009), up to ten students will likely participate in the program. It is anticipated that this number will rise to twenty per year in the next three to five years, as the awareness of the program increases.

New Resources
No new resources are needed. All courses are currently taught at IUPUI by existing faculty.

Proposed Date of the Initiation of the Minor Program
Proposed date of implementation is Fall 2009, assuming all necessary approvals have been met.

Implementation Plan
Pending approval, the Computer Science Department will begin accepting applications in the Spring 2009 term for Fall 2009 entry into the Graduate Minor program. The Department will inform the graduate program leaders of all IUPUI academic schools when the Minor is approved, and include information on application procedures and faculty contacts.

Once applications are received, the Graduate Admissions Coordinator will process them and notify applicants of their status. Once applicants are approved, the Graduate Minor designation will be added to their student record so that it can be awarded upon completion.

Students will be advised by a Graduate Minor Advisor, who will be full-time faculty member in the Computer and Information Science Department regarding minor requirements, in consultation with the student's doctoral research advisor.

Persons Designated as the Graduate Minor Program Administrators:

Dr. Yuni Xia, Assistant Professor, Department of Computer & Information Science, will be the Minor Program Coordinator.

Dr. Shiaofen Fang, Associate Professor and Chair, Department of Computer and Information Science will provide the department administrative oversight.

Dr. Rajeev Raje, Associate Professor and Associate Chair, Department of Computer and Information Science will provide admissions assistance.

This Committee will periodically assess the minor program and its outcomes for students in line with accrediting standards.

Faculty Initially Involved in the Graduate Minor Program and their Credentials

Murat Dundar
Ph.D., Purdue University, 2003
Email address: dundar@cs.iupui.edu   317-274-9746
Personal Web Page: http://www.cs.iupui.edu/~dundar
Dr. Dundar's research interests are in the areas of computational learning and statistical pattern recognition as applied to medical informatics, computer aided diagnosis, and remote sensing analysis.

Arjan Durresi
Ph.D., Polytechnic University of Tirana, 1993
Email address: durresi@cs.iupui.edu   317-274-8942
Personal Web Page: www.cs.iupui.edu/~durresi/
Dr. Durresi's research interests are network architectures, heterogenous ad hoc and sensor networks, network security, and traffic management/Quality of Service are just a few of Dr. Durresi's many research interests.

Shiaofen Fang
Ph.D., University of Utah, 1992
Email address: sfang@cs.iupui.edu   317-274-9731
Personal Web Page: http://www.cs.iupui.edu/~sfang
Computer graphics, scientific visualization and geometric modeling are Dr. Fang's research specialties. Currently he is collaborating with biomedical researchers to apply computer graphics and visualization techniques, in particular volumetric modeling and visualization, for medical imaging applications.

Yao Liang
Ph.D., Clemson University, 1997
Email address: yliang@cs.iupui.edu   317-274-3473
Dr. Liang's research interests include adaptive network control and resource allocation, wireless sensor networks, network quality of service, multimedia networks, machine learning, data mining, data fusion, data integration and management, and information systems. His work has been funded by NSF, NASA, and NOAA.

Snehasis Mukhopadhyay
Ph.D., Yale University, 1994
Email address: smukhopa@cs.iupui.edu   317-274-9732
Current research interests are adaption and learning in multi-level and distributed systems; information filtering and retrieval; modeling, simulation analysis and adaptive control of complex nonlinear systems using neural networks; design and analysis of intelligent controllers. Dr. Mukhopadhyay received a National Science Foundation Career Award.

Mathew Palakal
Ph.D., Concordia University, 1987
Email address: mpalakal@iupui.edu
Personal Web Page: http://www.cs.iupui.edu/~mpalakal 317-274-9735
The development of Artificial Neural Network (ANN) models as learning and decision-making systems for various AI-related problems are of primary interest. Dr. Palakal is involved in projects that include modeling Biosonar systems, neural network models to predict damages in materials and structures, and distributed information filtering. Dr. Palakal is now serving as Associate Dean for Research and Graduate Education in the Indiana University School of Informatics at IUPUI.

Rajeev Raje
Ph.D., Syracuse University, 1994
Email address: rraje@cs.iupui.edu
Personal Web Page: http://www.cs.iupui.edu/~rraje   317-274-5174
Dr. Raje is interested in the system and application aspects of the distributed computing. His current projects include the development of a seamless environment for net-centric applications, discovery systems, distributed tracking system, and service-oriented computing.

Mihran Tuceryan
Ph.D., University of Illinois-Urbana Champaign, 1986
Email address: tuceryan@acm.org
Web Page: http://www.cs.iupui.edu/~tuceryan   317-274-9736
Dr. Tuceryan's research interests include augmented reality, model-based video coding, 3D computer graphics, 3D computer vision, and pattern recognition. Augmented Reality combines technologies from 3D computer graphics, visualization, advanced user interfaces, and 3D computer vision.

Yuni Xia
Ph.D., Purdue University, 1999
Email address: yxia@cs.iupui.edu
Web Page: http://www.cs.iupui.edu/~yxia   317-274-9738
Dr. Xia's research focuses on the areas of databases, datamining, and pervasive computing.

Jiang Yu Zheng
Ph.D., Osaka University, 1990
Email address: jzheng@cs.iupui.edu
Web Page: http://www.cs.iupui.edu/~jzheng   317-274-9742
Dr. Zheng's research interests include Computer Vision, 3D Modeling, Dynamic Image Processing Image Processing, Multimedia, Internet, Scene Representation Graphics, Virtual Reality, Digital Museum Information Processing, and Robotics.

Xukai Zou
Ph.D., Dec., 2000, Computer Science, University of Nebraska-Lincoln
Email address: xkzou@cs.iupui.edu
Web Page: http://www.cs.iupui.edu/~xkzou   317-278-8576
Applied cryptography and network security, Secure group communication: dynamic key, management, key agreement and distribution, Access control in distributed systems, Authentication and digital signature, data integrity and hash functions, Communication networks and wireless/mobile networks, Software engineering and Web/Internet technologies, Design and analysis of computer algorithms, and Data/image processing compression.

Admissions Requirements and Procedures

General Admission Requirements for the Graduate Minor in Computer Science

Students who are enrolled in any Indiana University or Purdue University doctoral program at IUPUI may apply for admission to the Computer and Information Science Graduate Minor program. Students must submit an internal application to the Computer and Information Science Department for review. Admissions are done on a rolling basis. Applicants are required to have a background in Computer Science of at least CSCI 362: Data Structures (or equivalent). Exceptions to this requirement will be made in only rare cases to otherwise outstanding students.

Student Financial Support
It is expected that many of the students completing the Graduate Minor will have received funding from their academic department. The Computer and Information Science Department does not generally offer departmental aid for students pursuing the minor.

Completion Requirements and Audit and Certification Procedures

Course Requirements
The proposed minor will require a coursework totaling 12 graduate credit hours. These must include one core course selected from CSCI 503 (Operating Systems), 565 (Programming Language), and 580 (Algorithm Design, Analysis, and Implementation), and three elective Computer Science courses at the 500 level or above from the approved list (indicated below). Additional CSCI courses at the 500 level or above, such as independent studies, may be substituted for elective courses with the permission of a student's faculty advisor and the Minor Program Coordinator.

Approved Elective Courses: CSCI 506, 541, 549, 550, 552, and these variable topic courses: Cryptography & Network Security, Data Mining, Distributed Databases, Pattern Recognition/Data Mining, and Wireless Sensor Networks. These topics courses are offered as CSCI 590 and may acquire permanent course numbers in the future.

Minimum Overall GPA

Successful completion of the certificate requires at least a B average over all courses counting toward the minor. The minimum grade that will be accepted in any single course is C. Course grades of C- and below must be repeated and a C or higher grade must be earned.

Maximum Number of Transferable Credits

Applicants who have already earned credit for one or more of the equivalent courses from other institutions and other programs may request to apply up to a maximum of three credits of these courses toward the minor. Any waivers or substitutions have to be approved by the Minor Coordinator in consultation with the Graduate Committee of the Computer and Information Science Department. A maximum of three credits from another institution may be applied toward the Graduate Minor.

Maximum Number of Allowable Undergraduate Courses

No undergraduate courses can be applied to the minor program.

Maximum Time for Completion

All requirements for the certificate must be completed within four years. Most students enrolled in this program will be full-time students, and should attempt the minor during the early part of their studies.

Number of Allowable Credit Hours taken Prior to Admission to the PhD Minor

Up to 6 equivalent credit hours taken prior to admission to the Graduate minor, including a maximum of 3 credit hours taken from another institution (B grade or higher, or equivalent, required in all 3 credits), will be counted towards the minor. The rest of the courses must be completed at IUPUI within a four-year period from the time of admission. In the case of a student with 3 equivalent transfer hours, 9 additional credit hours must be completed at IUPUI in order to earn the minor. The completion timeline stated above applies in both cases. If a student completes any combination of equivalent credit hours prior to admission and transfer credit hours, the student must complete the remaining number of credit hours at IUPUI, which will be no less than six.

Curriculum and Accreditation

The proposed minor will conform to ABET accreditation standards insofar as they are applicable. Student progress will be measured by faculty evaluation in accordance with course syllabi and objectives, and the program will be periodically reviewed and assessed.

Procedures for Governing the Program including Construction of Committees that will Provide Oversight

The Graduate Committee of the Computer Science Department will oversee the program. All advising will be done by these faculty members. The Department of Computer and Information Science and the graduate admissions coordinator, will take responsibility for all record keeping and tracking of students.

Procedures for Program Evaluation including the Criteria for Success

Upon completion of the program, exit interviews will be conducted for all students to determine the effectiveness of the program in meeting their needs and to identify how they are using the skills and tools learned in the program in their major areas of study. Follow-up interviews will be conducted after three and five years. Given the projected enrollment of this program, it is anticipated that most students will be

tracked in this manner. Success of the program will be defined in terms of demand (enrollment) and the responses of the students surveyed upon completion of their degree and in the follow-up interviews.

Impact on Undergraduate and Graduate Programs
It is anticipated that the graduate minor would have no impact on undergraduate programs. The minor would be an option for graduate students in many fields, and would increase their options for doctoral minors. Some graduate programs have expressed particular interest in Computer Science competencies, and it is anticipated that most students will originate from other academic schools. The School of Informatics is particularly interested in the graduate minor program.

Employment Possibilities for Graduates
The Computer Science Graduate Minor will add value to the portfolio of doctorate recipients by increasing their theoretical and analytical computing skills and allowing them to apply this knowledge to their specialization of study. It is expected that the minor program will be a popular option for students in the life sciences, and will enhance their marketability for both academic and industry positions.

Comparison with other universities and Indiana University
The proposed Graduate Minor differs from the program at Indiana University Bloomington. The proposed program includes only graduate level courses, and requires four distinct courses for a total of 12 credit hours. Indiana University Bloomington's PhD Minor requires 9-11 credit hours and may include undergraduate courses. Purdue University doctoral programs require no minor area of study, and therefore comparison is not applicable.