Technology
Intelligence
Health

MS
Proactive Health Informatics
School of Informatics and Computing
Indiana University, Bloomington IN USA
2014/2015

PhD
Introduction

Students who graduate from the Proactive Health Informatics programs in the School of Informatics and Computing at Indiana University understand how to combine cutting edge, innovative technologies with the latest in data analytics to design, implement, and evaluate technologies to help people better understand, manage, and improve their health. Students increase their impact in their research community and the world by empowering patients outside of the clinical setting where people live, work, and play.

The Proactive Health Informatics MS and PhD programs consist of a rigorous course sequence that introduce students to the fundamentals of design, implementation, data analytics, and evaluation. Students choose between a Design-focused or Data-focused degree, selecting electives that fit their interests. Students tailor their degree with an emphasis on a particular health domain.
Proactive Health Informatics Program Structure

The incoming MS students in the Proactive Health Informatics track are a single cohort, but are split into two clusters depending on their Informatics focus: Data and Design. Both clusters will take all of the required core courses, but in different orders to provide them with the necessary skills to start their capstone projects in the second year. There are a total of 36 credits in the Proactive Health Informatics MS program. The recommended sequence is shown on the right.

Required Courses (21 cr):
- Introduction to Health Informatics
- Mobile & Pervasive Design
- Field Deployments
- Applied Machine Learning
- Privacy & Security of Health Information
- Qualitative Analysis (one from a list on p.6)
- Statistics (one from a list on p.6)

Cluster Electives (6 cr):
Two elective courses are required for the concentration. The Data and Design clusters each have a list of approved courses that satisfy the concentration requirement (listed on page 6).

Health Electives (3 cr):
One graduate level course must be taken in the health field. Several courses have been approved for this requirement. The director of Proactive Health Informatics may approve others. Relevant units include:
- School of Public Health
- Psychology
- Human Biology Program
- IUPUI Health Informatics (online)

Capstone (6 cr):
In their second year, students must complete a two-semester Capstone project, and submit a portfolio.

ProHealth Colloquia (0 cr):
Students must attend health related colloquia on campus their first year.
Proactive Health Informatics Program Structure

The incoming PhD students in the Proactive Health Informatics track are a single cohort, but are split into two clusters depending on their Informatics focus: Data and Design. Both clusters will take all of the required core courses, but in different orders to provide them with the necessary skills for their Research Rotations in the second year. There are a total of 90 credits in the Proactive Health Informatics PhD program. The recommended sequence for the first two years of coursework is shown on the right.

Informatics Required Courses (6 cr):
- 501: Introduction to Informatics
- 502: Informatics Management

Proactive Health Informatics Required Courses (21 cr):
- Introduction to Health Informatics
- Mobile & Pervasive Design
- Field Deployments
- Applied Machine Learning
- Privacy & Security of Health Information
- Qualitative Analysis (one from a list on p.6)
- Statistics (one from a list on p.6)

Cluster Electives (9 cr):
Three courses are required for the concentration requirement. The Data and Design clusters each have a list of courses that satisfy the concentration requirement (on p.6).

Health Electives (9 cr):
Three graduate level courses must be taken in the health field. Several courses have been approved for this requirement. The director of Proactive Health Informatics may approve others. Relevant units include: School of Public Health, Psychology, Human Biology Program, IUPUI Health Informatics (online)

ProHealth Colloquia (0 cr):
Students must attend health related colloquia on campus their first year.

Research Rotations (6 cr):
In their second year, students must complete two research rotations with different faculty across the campus.

Health Seminar Course (6 cr):
Students must enroll in two 3-credit seminar courses after their first year. Part of the seminar courses will be to act as a mentor in the 1st-year ProHealth Colloquia.
Courses

Core Courses

I507: Introduction to Health Informatics
The aim of this course is to provide students with the ability to describe and apply sociotechnical interventions that improve health and well-being. We discuss past, ongoing, and emerging research in health informatics; summarize health informatics research at Indiana University; and provide students with the skills to conduct intra-, inter-, and transdisciplinary research.

I526: Applied Machine Learning
The aim of this course is to provide students with practical skills required to get learning algorithms to work on real data. We will cover a few important but practical learning algorithms and spend more time on practical skills for getting these algorithms to work. The focus will be on health care, business, natural language and mobile data.

I527: Mobile and Pervasive Design
The aim of this course is to provide students with the ability to design novel user interactions with mobile and pervasive technologies. We discuss new interaction paradigms and gain experience with different technologies. Students will learn how to design, build, implement and refine mobile and pervasive computing applications for their domain of interest, including health.

I535: Privacy & Security of Health Information
The aim of this course is to understand the unique demands for sharing medical data, the ethical issues related to sharing, and current approaches to protecting the privacy of individuals. The course will cover HIPPA Safe Harbor, de-identification, re-identification, linked databases and other privacy risks.

I530: Field Deployments
The aim of this course is to provide students with the skills necessary to effectively design a field study that evaluates a sociotechnical system and execute the study in a small scale, real world setting. Students will learn how to design a study; identify relevant scholarly work; plan and execute a field study; and write the methods for professional dissemination.

Capstone (M.S. Only)
The two-semester capstone provides students with the ability to apply their skills to a real world health informatics problem. Students will work in teams to design, develop, and evaluate a health-related system. Students will participate in professional development opportunities to prepare them for the next steps in their careers.
Courses
Electives

All MS and PhD students must take one qualitative and one quantitative methods elective. MS students take two cluster electives (either data or design) and PhD students take three cluster electives. MS students must take one health elective, and PhD students must take three health electives. Pre-approved electives are listed below. Other electives may be approved by the Health Informatics Director.

Methods Electives (examples)

- EDUC-Y 611 – Qualitative Inquiry in Education
- EDUC-Y 612 – Critical Qualitative Inquiry I
- SPH-X 580 – Introduction To Qualitative Inquiry In Public Health Research
- SOC-S 652 – Topics In Qualitative Methods
- PSY-P 553 – Advance Statistics In Psychology 1
- SPH-Q 501 – Intro To Stats In Public Health

Data Cluster Electives

- AI B551, B552, B659, I601, I611
- Machine Learning I529, I690(as appropriate), B553, B555, B565, B551
- Data bases and NLP B561 B651
- Statistics S501, S503, S625, S626, S682

Design Cluster Electives

- I543 Interaction Design Methods
- I541 Interaction Design Practice
- I528 Participatory Design
- I604 Design Theory
- I544 Experience Design

Health Electives

Any health-focused course from a variety of department/school, including the Schools of Public Health, Medical Sciences, Nursing, Optometry, and Speech and Hearing; the Departments of Psychology, Sociology, Human Biology and Social Work; the Kinsey Institute, and IUPUI online courses.
Colloquia/Seminar

ProHealth Colloquia (0 credits)

Attendance at a regular ProHealth informatics colloquia is required for all health informatics students in their first year. Invited speaker presentations will expose the students to new and exciting research directions. The invited speakers will be world-renowned experts in related topics from academia and industry. The colloquia will teach valuable professional development and networking skills between peers and senior researchers within their community.

Ph.D. Seminar Requirement (6 cr):

Ph.D. students are required to take 1609 and 1709, a seminar in informatics, after their second year in the program. The seminar includes students presenting current research (including their own), writing grant proposal and papers, and other professional development activities. Students must take the 1609 section specifically for Health Informatics PhD students, but may take the 1709 section for other Informatics tracks.
Portfolio

Students are required to maintain an online portfolio of the work they complete during their degree progress that identifies:

- Professional bio
- Affiliation – including informatics focus
- Professional Experience
- Completed Projects with pictures, paragraph description, and any accompanying multimedia or deliverables.
- Contact Information
- Resume or Vita

Each course in the Health Informatics program sequence will provide students with portfolio material. Students are encouraged to create an easily accessible, web enabled portfolio when they enter the program and add to their portfolio as they develop materials for courses. Students also will add materials they create as part of internships, research experiences, and capstone.

Indiana University provides each student with web space. The portfolio requirement is part of the capstone for MS students and earns the student one credit.
PhD Research Rotations

PhD students must perform two research rotations with different faculty members during their second year. Students are expected to work on the research of the sponsoring faculty member and participate in their research lab. Research rotations allow students to get hands-on experience in doing research and gain exposure to more than one potential advisor. Students should approach faculty members their first year to arrange for their rotations.

Kay Connelly
Kay Connelly’s research interests are at the intersection of mobile and pervasive computing and healthcare. In particular, she is interested in issues that influence user acceptance of health technologies, such as privacy, integration into one’s lifestyle, convenience, and utility. She works with a variety of patient groups, including very sick populations who need help in managing their disease, healthy populations interested in preventative care, and senior citizens looking to remain in their homes for as long as possible. Her work is funded by NSF, NIH, the Lilly Foundation & MSR.

Raquel Hill
Raquel Hill’s primary research interests are in the areas of trust and security for distributed computing environments and privacy of medical related data. She received her B.S. and M.S. in Computer Science from Georgia Institute of Technology, and her Ph.D. in Computer Science from Harvard University. Her research is funded by the Center for Applied CyberSecurity Research (CACR) and the National Science Foundation (NSF).

Sriram Natarajan
Sriram Natarajan is interested in the fields of Artificial Intelligence and Machine Learning with emphasis in Learning from structured multi-relational data and their application of health informatics problems. He is interested in health status, adverse events, and disease susceptibility from electronic health records, natural language studies, medical images, mobile and demographic data. His research is supported by DARPA, NSF, ARO and NIH. He has been awarded Army Research office Young Investigator award and is an active member within AI and ML communities.

Katie Siek
Katie Siek’s primary research interests are in human computer interaction, health informatics, and ubiquitous computing. More specifically, she is interested in how sociotechnical interventions affect personal health and well being. Her research is supported by the National Institutes of Health, the Robert Wood Johnson Foundation, and the National Science Foundation including a five-year NSF CAREER award. She has been awarded a CRA-W Borg Early Career Award and a Scottish Informatics and Computer Science Alliance Distinguished Visiting Fellowship.