

DISCIPLINARY DIFFERENCES OF UNDERGRADUATE COMPUTING PROGRAMS AT IUPUI

INDIANA UNIVERSITY SCHOOL OF INFORMATICS AND COMPUTING

Applied Data and Information Science prepares students for a data-driven workforce and society. The program teaches data curation, management, analysis, and dissemination to create actionable insights while addressing the sociotechnical implications of these practices, including ethics and policy. Students select a specialization in either applied data science, to develop mathematical and technological skills to analyze datasets, or information science, to develop skills to organize, access, and manage datasets.

Biomedical Informatics examines the use of biomedical data in problem solving, decision making, and scientific inquiry to improve healthcare delivery. Students select a specialization in bioinformatics, premedical bioinformatics, or health informatics. Bioinformatics students learn how to turn bio-repositories into tools for research and precision medicine; they use genomic, molecular, and patient data to diagnose and treat rare diseases, reduce harmful drug interactions, and repurpose drugs. Health informatics students develop skills to improve health-related research, the security of electronic medical records, and the ways patients obtain care. Health informatics allows patients to access and monitor their health information and aids researchers in detecting trends to contain outbreaks of disease. The biomedical informatics program prepares students for graduate study and careers in the biomedical industry.

Informatics combines principles from information technology, computer science, psychology, and sociology to prepare students for problems in business, healthcare, science, law, art, and entertainment. The core curriculum covers information management, application development, human-computer interaction (HCI), and legal and social aspects of information technology. Students complete a specialization, applying informatics to a field of their choice. Popular choices include business, HCI, media arts, the biological and health sciences, and legal informatics.

Media Arts and Science employs digital media to communicate, educate, engage, or entertain. The core curriculum explores the fundamentals of visual communication and digital storytelling. The degree includes specializations in 3D graphics and animation, digital storytelling, game design and development, video production and sound design, and web design and development. Many courses are project-based, enabling students to become fluent with contemporary tools. The program fosters communication, teamwork, and productivity, skills and qualities prized by employers.

PURDUE SCHOOL OF ENGINEERING AND TECHNOLOGY

Computer Engineering is the integration of the fields of electrical engineering and computer science to develop computer-based systems. Students get training in electrical engineering, software design, and hardware-software integration. Computer engineering students study many hardware and software aspects of computing. Computer engineers are usually involved in writing software and firmware for embedded microcontrollers and designing VLSI chips, analog sensors, and mixed signal circuit boards. Computer engineers can work on computer controlled mechanical devices, such as robots, which involve the control and communication of motors and sensors. Computer engineering students may choose areas of in-depth study mixing hardware and software in their junior and senior year.

Computer and Information Technology (CIT) students learn to identify, design, implement, and manage applied software and hardware solutions to business problems using current and emerging technology. The CIT program creates IT professionals who can employ and manage technology to best meet the information management needs of an organization. Students receive instruction in both front-end and back-end technologies. The CIT program is centered on hands-on experience and real-world problem-solving with experiential learning incorporated throughout the curriculum. After a thorough grounding in fundamentals, CIT students select one or more concentrations: networking systems, information security, Web and application development, and data management.

Computer Graphics Technology (CGT) prepares students to become the finest practitioners, managers, and leaders in the field of applied computer graphics technology and digital communication. Graduates are creative and technological problem solvers. Graduates gain proficiency in two-dimensional, three-dimensional, interactive, and time-based principles of computer graphics as they relate to practical applications demanded by business and industry. An innovative leader in its field, CGT provides practical experience through learning, discovery, and engagement on a domestic and international basis.

PURDUE SCHOOL OF SCIENCE

Computer Science is the original and the most popular computing discipline. Computer and Information Science department at IUPUI offers the following degrees and Certificates: B.S. in Computer Science, B.A. in Applied Computer Science, M.S. in Computer Science, B.S./M.S. Dual degree in Computer Science, M.S. in Computational Data Science (in collaboration with Statistics), Ph.D. in Computer Science, as well as a number of graduate and undergraduate certificate programs. The department also collaborates with the Biostatistics department in the School of Public Health on B.S. in Biohealth Data Science, and the School of Engineering and Technology on M.S. in Information Security degrees.

The offered academic programs include a wide variety of computer science coursework currently including courses in programming and software systems, principles and foundations of computing, artificial intelligence and machine learning, computer systems and security, graphics and visualization, computer networks and high performance computing, mobile and web computing, databases and data science, etc. Through these courses and programs, Computer and Information Science teaches the foundations of computing and information processing along with the necessary scientific and practical skills to prepare students to be able to adapt successfully to the demands of the ever-changing current and future computing industry.

Graduates of the Computer and Information Science department are able to devise, analyze, improve upon, and experiment with algorithms, system design principles, and software solutions for a wide variety of problems and to apply these skills to specific real-world application areas such as biology, medicine, engineering, environmental systems, business and industry, cyber security, and forensics. As a result of such intensive education and training combining computing theory and computing practices, there is near 100% job placement among the graduates of the department, with many graduates having multiple attractive job offers (including at well-known computing industry companies such as Google, Microsoft, Amazon, IBM, Intel, Oracle, etc).

Undergraduate research is encouraged in the department so that students may contribute to, as well as benefit from, the frontiers of computing. The department's faculty is extensively involved in externally funded research projects covering a wide range of computing research areas, particularly various aspects of data science. Through these research projects, theoretical and hands-on training is provided to undergraduate and graduate student research associates in many cutting-edge computer science research topics.