# COMPUTER SCIENCE AND ENGINEERING

*Frank M. Freimann Professor of Computer Science and Department Chair:*
Jane Cleland-Huang

*Professor and Associate Chair:*
Michael Niemier

*Associate Professor and Director of Graduate Studies:*
Timothy Weninger

*Teaching Professor and Director of Undergraduate Studies:*
Ramzi K. Bualuan

*Associate Professor and Director of Inclusive Excellence and Engagement:*
Taeho Jung

*Assistant Teaching Professor and Director of the Bachelor of Arts in Computer Science Program:*
William Thiesen

*Professor and Vice President and Associate Provost for Teaching and Learning:*
Ronald Metoyer

*Frank M. Freimann Professor and Director of Lucy Family Institute for Data and Society:*
Nitesh Chawla

*Clare Boothe Luce Assistant Professor of Computer Science and Engineering:*
Karla Badillo-Urquiola

*Professor of the Practice and Director, Center for Civic Innovation:*
Jay B. Brockman

*Snyder Family Mission Collegiate Professor of Computer Science:*
Erin Chambers

*Fritz Duda Family Professor of Engineering:*
Patrick J. Flynn

*Leo E. and Patti Ruth Linback Professor of Engineering, Computer Science and Engineering:*
X. Sharon Hu

*Ted H. McCourtney Professor of Computer Science and Engineering:*
Peter M. Kogge

*Dennis O. Doughty Collegiate Professor of Engineering:*
Walter Scheirer

*Galassi Family Collegiate Professor in Computer Science and Engineering:*
Yanfang Ye

*Leonard C. Bettex Collegiate Professor of Computer Science:*
Xiangliang (Lynn) Zhang

*Professors:*
Danny Z. Chen; Tijana Milenkovic; Yiyu Shi; Aaron Striegel; Douglas Thain; Chaoli Wang

*Associate Professors:*
David Chiang; Adam Czajka; Meng Jiang; Collin McMillan

*Assistant Professors:*
Tingyu Cheng; Diego Gómez-Zará; Siddharth Joshi; Fanxin Kong; Jia-Jun (Toby) Li; Spyridon Mastorakis; Joanna da Silva Santos

*Assistant Professor of the Practice:*
Dan Rehberg

*Teaching Professor:*
Peter Bui

*Associate Teaching Professors:*
Aaron Dingler; Shreya Kumar; Paul “Will” McBurney; Matthew Morrison

*Professor Emeritus:*
Kevin W. Bowyer

*Research Professor Emeritus:*
Gregory R. Madey

## Program of Studies

The Department of Computer Science and Engineering offers programs of study that lead to the degrees of bachelor of science in computer science and bachelor of science in computer engineering. The program in computer engineering is accredited by the Engineering Accreditation Commission of ABET, abet.org (https://www.abet.org). The program in computer science is accredited by the Computing Accreditation Commission of ABET, abet.org (https://www.abet.org). The department also offers programs that lead to a master of science in computer science and engineering, and a Ph.D.

## Program Goals

The goals of the programs in computer science and computer engineering are

1. to prepare all students for careers in the public or private sector;
2. to prepare outstanding students for graduate study;
3. to develop lifelong learning skills in all students;
4. to provide comprehensive education in computer science, including theoretical foundations, software and hardware systems, and applications; and
5. to ensure significant design experience including working in teams.

## Computer Science Program Educational Objectives

Graduates of the Computer Science program will achieve the following objectives:

1. They will be technically qualified for practice in the profession; they will demonstrate the ability to specify, design, and implement software and/ or hardware-software systems to meet customer requirements or to advance the state of the art; the ability to employ modern computer languages, environments, and platforms in such tasks; and the ability to apply knowledge of science and mathematics to such tasks;
2. They will be effective technical communicators, orally and in writing, and effective team members capable of working effectively in groups on computing problems;
3. They will be ethical professionals, capable of evaluating personal and professional choices in terms of codes of ethics and ethical theories

and understanding the impact of their decisions on themselves, their professions, and on society;
4. They will be successful as graduates, either through professional employment in the private or public sector, or as students in graduate study. They will also be able to employ life-long learning tools and techniques to maintain their currency in the field.

# Computer Engineering Program Educational Objectives

Graduates of the Computer Engineering program will achieve the following objectives:

1. They will be technically qualified for practice in the profession; they will demonstrate the ability to specify, design, implement and verify software and/or hardware-software systems to meet customer requirements or to advance the state of the art; the ability to employ modern computer languages, environments, and platforms in such tasks; the ability to follow applicable engineering standards in the execution of such tasks; and the ability to apply knowledge of science and mathematics to such tasks;
2. They will be effective communicators, orally and in writing, and collaborative team members capable of working in groups across software/ hardware/data boundaries on complex problems;
3. They will be ethical individuals, capable of evaluating personal and professional choices in terms of codes of ethics and ethical theories and understanding the impact of their decisions on themselves, their professions, and on society;
4. They will be successful as computer engineering graduates, either through professional employment in the private or public sector, or as students in graduate study. They will also be able to employ life-long learning tools and techniques to maintain their currency in the field.

# Programs

Programs in the Department of Computer Science and Engineering follow the four-year curricula listed below. These include required and elective courses in the basic, pure, and applied sciences, as well as the humanities, Computer Science engineering, computer science, and computer engineering. Emphasis is on developing a mastery of the key principles underlying the organization, operation, and application of modern computers to real problems, with a solid grounding in math and science to permit a quantitative analysis of such solutions. In addition, central to both programs is the development of the ability to function, both independently and in multidisciplinary teams, and to be prepared for continued change in future computing technology and what effects it will have on all aspects of society. Opportunities for specialization in several professional computer disciplines are available. Students are individually assisted and advised in their choices of elective courses.

The Department of Computer Science and Engineering offers concentrations in five areas: Bioinformatics and Computational Biology, Media Computing, Mobile Computing, Cloud Computing, and Cyber Security. Each concentration is designed to offer a structured set of elective courses around an organized theme. Upon a student's successful completion of a CS/CPEG program with a chosen concentration, the concentration will appear on the student's transcript.

Further information about computer science and computer engineering programs may be found on the web at cse.nd.edu (https://cse.nd.edu/). Information about the Bachelor of Arts in computer science may be found at altech.nd.edu/programs/ba-in-computer-science (https://altech.nd.edu/programs/ba-in-computer-science/).

- Computer Engineering (BSCP) (https://catalog.nd.edu/undergraduate/engineering/computer-science-engr/computer-engineering-bscp/)
- Computer Science (BSCS) (https://catalog.nd.edu/undergraduate/engineering/computer-science-engr/computer-science-bscs/)