Computer Science is part of the Mathematics, Statistics, and Computer Science Department (MSCS), the largest department at Macalester. The department has 16 full-time faculty members and approximately 80 graduating majors per year. The department has close ties with economics, biology, chemistry, physics, neuroscience, and many of the social sciences through the college-wide quantitative thinking program. Students may major or minor in computer science.

**Computer Science Program**

Our computer science major and minor prepare students for a wide range of future career paths, from graduate studies in computer science to work in the tech industry. Our program imparts necessary skills in software development, but also emphasizes a broad view of rapidly changing technology and its place in the world.

**Faculty**

Professors Fox, Jackson, Sen, and Shoop primarily teach computer science. Professors Beveridge, Halverson, Kaplan, and Shuman also contribute.

**Tom Halverson**, MSCS chair, (PhD, University of Wisconsin–Madison), algebra and combinatorics.

**Susan Fox** (PhD, Indiana University) works in the area of artificial intelligence, programming robots that can navigate in the world and learn from their experiences. She enjoys working one-on-one with students from both MSCS and the neuroscience studies program on independent projects, capstone projects, and summer research.

**Bret Jackson** (PhD, University of Minnesota) works in the area of interactive graphics, where he combines methods from computer graphics, visualization, and human computer interaction to investigate spatial interaction. He teaches courses in data structures, Internet programming, and interactive graphics.

**Shilad Sen** (PhD, University of Minnesota) helps people become more effective contributors to online communities such as Facebook, Wikipedia, and YouTube. Professor Sen teaches a variety of classes including object-oriented programming, algorithms, Internet programming, and collective intelligence.

**Libby Shoop** (PhD, University of Minnesota) conducts research with students in bioinformatics, data visualization, and parallel computation over very large datasets, using cluster and cloud computing. She teaches courses in software development, parallel computing, databases, operating systems, and computational biology.

For more on the following faculty, see the academic updates for Mathematics and Statistics.

**Vittorio Addona** (PhD, McGill University), survival analysis, medical applications of statistics, Bayesian methodology

**Andrew Beveridge** (PhD, Yale University), combinatorics, graph theory, probabilistic methods

**Daniel Flath** (PhD, Harvard University), number theory, analysis and algebra

**Alicia Johnson** (PhD, University of Minnesota), statistics and Markov processes

**Danny Kaplan** (PhD, Harvard University), biomedical signal processing, nonlinear dynamics, computational science

**Karen Saxe** (PhD, University of Oregon), operator theory, functional analysis, the mathematics of elections and voting

**David Shuman** (PhD, University of Michigan), signal processing, stochastic processes

**Chad Topaz** (PhD, Northwestern University), nonlinear dynamics, pattern formation, mathematical modeling

**Lori Ziegelmeier** (PhD, Colorado State University), geometric and topological data analysis, image analysis

**Recent Honors Projects**

Samuel Horlbeck Olsen ’16 (Alameda, Calif.), “The Eagle Programming Language”

Jeffrey Lyman ’16 (Chaska, Minn.), “Blossom: A Language Built to Grow”


Eric Biggers ’14 (Verona, Wis.), “Porting the Embedded Xinu Operating System to the Raspberry Pi”

Aaron Laursen ’14 (Charleston, Ill.), “A Novel Tag-based File System”

Yu Zhao ’14 (Beijing, China), “Parallel Design Patterns and Program Performance”

Meg Naminski ’13 (Mountain View, Calif.), “Analyzing Approaches to the Simultaneous Localization and Mapping Problem”

Scott Tong ’13 (Hartsdale, N.Y.), “Roulette-Wheel Monte Carlo Tree Search for General Game-Playing”

**Resources**

Classroom labs feature 60 Mac and Windows workstations, high-end research and educational software, and high-speed fiber-optic network links to campus and Internet resources.

Research labs:
- The XMAC (eXperiment, Modeling, Analysis, and Computation) Lab integrates experimental and theoretical mathematical modeling.
- The Social Computing Systems Lab
- The Data Exploration Lab
- The Robotics Lab
- dsTRAIn: the Data Science Training Lab
- 3D Printing Lab

Public Artworks:
On display in the MSCS department are the department’s square-wheeled bicycle and a 6,000-pound granite sculpture, “Invisible Handshake,” resplendent with negative curvature.
**Student-Faculty Research**

Computer science students collaborate extensively with professors through paid summer research supported by grants from Macalester as well as agencies such as the National Science Foundation, the Keck Foundation, and the Howard Hughes Medical Institute. A sampling:

Professor Elizabeth Shoop, R. Brown, E. Biggers ‘14 (Verona, Wis.), M. Kane ‘13 (Ridgefield, Conn.), D. Lin ‘13 (Taipei, Taiwan), and M. Warner ‘12 (Greenbelt, Md.), “Virtual Clusters for Parallel and Distributed Education,” Proceedings of the 43rd ACM Technical Symposium on Computer Science Education SIGCSE ’12, New York, N.Y., USA: ACM

Professor Elizabeth Shoop with seven Macalester students, “Data Exploration Tools for the Gene Ontology Database,” Bioinformatics

**Summer Research**

Yu Zhao ’14 (Beijing, China), Sophors Khut ’14 (Banteay Meanchey, Cambodia), Ivana Marincic ’15 (Vrbovec, Croatia), Lee Jordan ’15 (St. Paul), Jeffrey Lyman ’16 (Chaska, Minn.), and Devin Bjelland ’17 (St. Peter, Minn.): NSF-funded research on increasing parallel and distributed computing in the undergraduate college curriculum (aka. “Having fun experimenting with cool parallel hardware all summer”)

Sibu Ngobese ’15 (Manzini, Swaziland), Annabelle Nichols ’15 (Henderson, Nev.), Brooke Boatman ’16 (Terre Haute, Ind.), and Alan Morales ’17 (Escuintla, Guatemala): A web application to assist the World Health Organization and several countries throughout the world in making the case for treating neglected tropical diseases (NTDs) by enlisting data analysis expertise from students

Scott Tong ’13 (Hartsdale, N.Y.), NSF-S-STEM project on “Extracting Image Features for Image Similarity Evaluation”

Cecylia Bocovich ’12 (Coon Rapids, Minn.), University of Alabama REU in Empirical Software Engineering

Ryan Kerwin ’12 (Colorado Springs, Colo.), Carnegie Mellon Robotics Institute Summer Scholars program

**Special Activities and Awards**

We have a lively seminar, often oriented for students, and a weekly department tea. The annual Math & Society Lecture brings internationally known speakers to campus.

MSCS students participate in many national and local competitions, including ACM’s programming competitions, the sectional competition of the Mathematical Association of America (MAA), and the Putnam competition. Macalester students are regular contributors and awardees at the JMM Undergraduate Poster Session.

Professors Bressoud, Flath, Halverson, Hutchinson (emeritus), and Saxe have received the MAA’s Award for Distinguished College or University Teaching of Mathematics. Professors Kaplan, Topaz, and Saxe have received Macalester’s Rossman Excellence in Teaching Award. Professor Bressoud has received Macalester’s Thomas Jefferson Award. Professors Bressoud, Halverson, and Topaz have received the Macalester Trustees’ Award. Professor Saxe was the 2013–14 Education Policy U.S. Congressional Fellow.

**Internships**

Three-quarters of all MSCS majors who graduated in May 2016 held at least one internship while at Macalester. Some recent examples are:

Henry Fender ’17 (Des Moines, Iowa), American Refugee Committee

Alexander Frank ’16 (Milford, Ohio), Citizens League of Minnesota, Water Policy

Derek Schindelman ’16 (Plymouth, Minn.), Solutran

Joseph Sengeh ’16 (Freetown, Sierra Leone), 3M corporate headquarters

Issa Ali ’15 (Minneapolis), Massachusetts General Hospital

Alese Halvorson ’15 (Maple Grove, Minn.), Minnesota Department of Health

Ivana Marinic ’15 (Vrbovec, Croatia), Work Effects

Shivangi Pattnaik ’15 (Bhubaneswar, India), TCF Bank

Ha Song Pham ’15 (Ho Chi Minh City, Vietnam), Metro Transit

**After Macalester**

Elizabeth Bacarella ’16 (Bryn Mawr, Pa.) works for Amazon.

Rebecca Gold ’16 (Scarsdale, N.Y.) will be working at Adobe in Seattle.

Jeffrey Lyman ’16 (Chaska, Minn.) will be working at Google in Boston.

Tyler Skluzacek ’16 (New Prague, Minn.) is developing his award-winning app for PTSD and pursuing a PhD at the University of Chicago.

Ari Weiland ’16 (Highland Park, Ill.) works at Google.

Issa Ali ’15 (Minneapolis) is a research fellow at Mayo Clinic, Rochester, Minn.

Brittany Ehmman ’15 (Island Lake, Ill.) is in a master’s program in electrical and computer engineering at the University of Minnesota.

Henry Fremont ’15 (Webster Groves, Mo.) is a data engineer at Epic Systems in Madison, Wis.

Margaret Giesel ’15 (Louisville, Ky.) is an associate information systems specialist at Dow Chemical Company in Midland, Mich.

Alese Halvorson ’15 (Maple Grove, Minn.) is a statistical programmer analyst at the Mayo Clinic in Rochester, Minn.

Hongshan Liu ’15 (Guangdong, China) is a software engineer at Renaissance Learning in Wisconsin Rapids, Wis.

Ivana Marinic ’15 (Vrbovec, Croatia) is in a PhD program in computer science at the University of Chicago.

Sam Naden ’15 (Middleton, Wis.) is a software engineer at Thomson Reuters.

Zixiao Wang ’15 (Chengdu, China) is a development engineer at Amazon Lab 126 in Sunnyvale, Calif.

Eric Biggers ’14 (Verona, Wis.) is a software engineer for Code42, in Minneapolis.

Aaron Larsen ’14 (Charleston, Ill.) works for Google.

Nathan Leech ’14 (Mound, Minn.) works for Amazon in Seattle.


Jie Shan ’14 (Shanghai, China) and Sophors Khut ’14 (Banteay Meanchey, Cambodia) are both software development engineers at Microsoft in Redmond, Wash.

Yu Zhao ’14 (Beijing, China) is a software developer with Epic in Madison, Wis.