



Goergen Institute for Data Science

HISTORY & BACKGROUND

Established in 2015, the Goergen Institute for Data Science (GIDS) and its associated programs are a top priority of the University of Rochester. Data science is a burgeoning field that encompasses the concepts, methods, and applications of extracting meaningful information from complex, detailed, yet uncertain data. GIDS was one of the first data science institutes globally, thus putting the University ahead of the curve in this new space, and GIDS was also one of the first to offer an undergraduate degree in data science. It now offers successful and sought after BA/BS and MS programs in data science that attract rapidly increasing numbers of candidates. More than 70 faculty members from a variety of disciplines across the campus are affiliated with GIDS. With a unique structure, GIDS fosters industry engagement via two distinct entities that are part of its mandate: the Rochester Data Science Consortium and the Center of Excellence in Data Science. All of this puts GIDS in a globally prominent position to maintain a leading role in shaping the future of data science and enabling its use for improving human life and benefiting society broadly.

VISION & IMPACT

The vision and current plans for GIDS are aimed at the following objectives:

1. Maintain, and expand on, a leading global position in data science by effectively building on research strengths of the University of Rochester, and by empowering faculty to create new areas of strategic strength that cut across disciplines.
2. Enhance the broad research and education environments of the University, producing outcomes that cannot be achieved by traditional departments.
3. Provide students with a unique perspective and distinctive education in data science, enabling them to pursue successful careers and take leadership roles in industry, academia, and entrepreneurship.

GIDS builds on the University's existing strengths related to data science, many of which are dispersed across multiple departments and divisions; thus, allowing the sum to be greater than the individual parts. More than 70 faculty members from around 30 departments, with shared interest in the theory, techniques, and applications of data science, are affiliated with GIDS. Major areas of expertise of GIDS faculty include:

- artificial intelligence and cognition;
- audio and music engineering;
- augmented and virtual reality;
- economics and business data analytics;
- healthcare analytics and digital health;
- human-system interfaces;
- imaging science, visual science, and optics;
- life sciences and biomedical data science;
- linguistics and social data sciences;
- materials design;
- multisensory human and machine perception;
- network data science; and
- robotics.

Leveraging the diversity of interests and expertise of its faculty, GIDS facilitates major interdisciplinary research efforts across the entire University. These efforts have already attracted significant funding, including from NSF, NIH, and others. Through GIDS, the University continues to hire new faculty in areas in which data science plays a critical role.

UNDERGRADUATE & GRADUATE PROGRAMS

GIDS offers BA/BS and MS degrees in data science.

- Educational excellence is attained by a combination of core classes that provide students with a foundational background in computer science, programming, and statistics, complemented by concentrations in a variety of domains including business, biology, economics, physics, and political science to name a few.
- The undergraduate and graduate curricula culminate in Capstone and Practicum project courses, respectively, that provide opportunities for students to work with companies to conduct real-world analytics projects. Industry datasets are provided by sponsoring organizations, and these project-driven courses emphasize oral and written communication. Students also explore ethical issues related to the use of data science.
- Currently there are about 50 MS and 130 BA/BS students enrolled in data science. GIDS has also recently launched an advanced graduate certificate program in data science designed for students who are unable to commit to a full-time MS degree program.

Beyond the formal degree programs, the Institute is also active in interdisciplinary outreach initiatives sponsored by federal grants.

- GIDS is home to a National Science Foundation (NSF)-funded Research Experiences for Undergraduates (REU) grant for undergraduate research with an emphasis on computational methods for music, media, and the mind. Arts, Sciences, and Engineering (AS&E) faculty co-mentor students along with Eastman School of Music faculty. This collaboration provides a unique interdisciplinary research experience for students.
- Our NSF Research Traineeship (NRT) award for Graduate Training in Data-Enabled Research into Human Behavior and its Cognitive and Neural Mechanisms provides cross-disciplinary training for graduate students in Computer Science, Brain and Cognitive Sciences, and Data Science.

GIDS has also launched a pre-college (high-school) Introduction to Data Science program. This week-long program in July has attracted participants from across the USA, China, Haiti, and Spain. Course contents include introduction to machine learning, data visualization, GIDS-faculty lab demos, and invited guest lectures.

OPPORTUNITIES TO COLLABORATE

GIDS emphasizes industry engagement in its education and research activities. Undergraduate and graduate degree programs provide Capstone and Practicum project experience, respectively, through which students conduct real-world analytics projects using data provided by sponsoring organizations. GIDS provides the academic foundation for the Center of Excellence in Data Science (CoE) as well as the Rochester Data Science Consortium (RDSC). Created in 2017 and located in the heart of the Rochester Downtown Innovation Zone, the RDSC offers businesses and organizations a competitive edge through data expertise and data-driven solutions. RDSC staff apply university research to commercial problems, nurturing long-lasting relationships with local industrial partners. RDSC membership comprises major employers and universities in the Finger Lakes region, including L3Harris, Wegmans, RIT, and Corning, as well as new and growing startup companies. Through support from the New York (Empire) State Development's Division of Science, Technology, and Innovation (NYSTAR), the CoE helps drive regional economic development by supporting research, training, and business development partnerships in data science. All of these efforts support the growth of data science as a major contributor to educational and economic opportunities in the area and beyond.

GIDS is seeking support in the following areas:

- Unrestricted funding for undergraduate laboratories
- Travel scholarship(s) for students to attend and present at professional conferences
- Recognition awards for undergraduates and MS students
- Funding for interdisciplinary post-doctoral fellowships in Data Science
- Faculty lines dedicated for Data Science

Goergen Institute for Data Science

www.rochester.edu/data-science

Center of Excellence in Data Science

www.sas.rochester.edu/dsc/coe/

Rochester Data Science Consortium

<http://rocdatascience.com/>



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