

## STEM background

Science, technology, engineering and math (STEM) continue to have a growing impact on our lives and economy. According to the Minnesota Department of Employment and Economic Development, occupations requiring STEM knowledge are some of the fastest growing careers in the state. So building the necessary foundation through education is critical.

### Private colleges' commitment

At the 17 institutions that are members of the Minnesota Private College Council, STEM education has long been a cornerstone commitment.

- Minnesota's private colleges and universities are significant contributors of bachelor's degree graduates, awarding 27% of STEM degrees.
  - Among students of color who earn undergraduate STEM degrees, 24% do so at one of our colleges.
  - Among women who earn undergraduate STEM degrees, 47% do so at one of our colleges.
- Our share of undergraduate degrees is even higher for some key STEM-related areas:
  - **49% of all physical science degrees**
  - **35% of all math degrees**
  - **33% of all biological and biomedical science degrees**
- No matter their majors, we prepare all of our graduates with critical thinking skills that are essential in our global economy — a key benefit of our focus on the liberal arts.

### STEM examples

There are many examples of our colleges' STEM contributions. Here are just a few:

- Over the last three years, **Augsburg University** has provided National Science Foundation scholarships to 66 junior and senior STEM majors—of whom 39% began their college career at a community college and 36% are students of color. Each summer, about 60 students engage in on-campus undergraduate research and another 15 conduct research across the country at Research Experiences for Undergraduates (REUs).
- **Bethany Lutheran College's** commitment to STEM disciplines is highlighted by its bachelor of arts in engineering science degree program, which is different than traditional, structured engineering programs in that it relies on the liberal arts foundation to produce graduates who are more than just builders, but rather they are problem solvers. Bethany's engineering program produces graduates who are critical thinkers who understand and solve complex problems for the betterment of society.
- **Bethel University** was awarded its sixth National Science Foundation (NSF) research grant for new physics work in conjunction with CERN in Switzerland. Bethel recently added a number of undergraduate STEM majors — including computer engineering, neuroscience, math and data science and software engineering — and enrollment in these fields grows steadily. In 2017, the university expanded and renovated its physics and engineering department, adding specialized spaces for advanced labs. Bethel is also home to a human anatomy suite, 247 acres of lakeside environmental laboratories and a total of 47 specialized lab spaces in the sciences, technology engineering and math.

- **Carleton College** is a national leader in the number of students who go on to earn PhDs and is ranked first among baccalaureate colleges in Geosciences, second in both the Life and Physical Sciences and fifth in Computer Science. In specific disciplines, Carleton ranks first in Chemistry, Earth Science and Astronomy; second in Biological Sciences and Physics; sixth in Mathematics and Statistics and seventh in Computer Science. Carleton is second among baccalaureate institutions in the number of students going on to obtain PhDs between 1966 and 2014.
- The Future Chemists Scholarships and Support (FoCuS) program is a program for students interested studying chemistry or biochemistry at the **College of Saint Benedict** and **Saint John's University**. Students accepted into the program receive a scholarship and valuable mentoring in their field. They gain academic, leadership and research experiences that help prepare them for careers in chemistry or biochemistry. Incoming students are eligible for this program, which is supported by a grant from the National Science Foundation.
- **The College of St. Scholastica** created the National Center for Computer Science Education, a hub of innovative computer science education projects, including the Computer Science through Concurrent Enrollment project, funded by the National Science Foundation. This three-year project supports high school teachers teaching a computer science course to their students for college credit and is building sustainable relationships to support high school computer science education and college pathways. In addition, the college's Shoot for the Stars program provides underrepresented and low-income middle school students a free week-long on-campus experience, providing valuable STEM enrichment and exposing the students to STEM career options.
- **Concordia College** dedicates an academic day to Celebration of Student Scholarship, which provides an opportunity for hundreds of students, many from STEM programs, to present their undergraduate research. Concordia recently created a neuroscience major and a computer science major with data analytics and computing concentrations and opened its \$45 million Integrated Science Center. The renovation of two existing buildings unifies the STEM fields in a new collaborative space.
- **Concordia University, St Paul** provides STEM students with opportunities to engage in novel collaborative projects that are externally funded. Teams of our research students have participated on projects ranging in topics from developing tissue-engineering materials, to detection of disease biomarkers, to providing interactive consent forms for visually disabled patients.
- **Gustavus Adolphus College** is widely recognized for its annual two-day Nobel Conference, which draws about 6,000 people to campus each year. The Conference links a general audience, including high school students and teachers, with the world's foremost scholars and researchers in discussion on contemporary issues relating to the natural and social sciences. Gustavus has also successfully implemented a first-year research program (FYRE) that provides opportunities for students to conduct research alongside members of the Gustavus faculty the summer after their freshman year.
- **Hamline University** has a long history of providing undergraduate STEM students with collaborative research experience as early as the summer of their first year — with the potential to continue research over multiple years. Collaborative teams of students work in a vibrant community on transformational projects ranging from nanomaterials and solar batteries to genetic adaptation of plants and the synthesis and study of bioactive compounds and proteins.
- **Macalester College** ranks 10th among all U.S. liberal arts colleges in the percentage of graduates who later earn science and engineering doctorates, according to the NSF's 2013 report on the Baccalaureate Origins of U.S. Doctorate Recipients. Students often start on this path with a collaborative research experience at Macalester. Within the last five years, approximately 130 students per year conducted research over the summer. Most of these students worked in STEM fields, and Macalester faculty currently hold nine active NSF grants.

- The **Saint Mary's University of Minnesota** hosts several unique opportunities for STEM students. The Fellow at Gundersen, established in 2013, is a partnership between Saint Mary's and the Gundersen Medical Foundation in La Crosse, Wis., through which students are immersed each year in research at the Kabara Cancer Research Institute. Saint Mary's also recently launched its 3+2 Physician Assistant program in collaboration with Mayo Clinic, which allows students to begin their careers in just five years. In 2019, Saint Mary's will host its second Advancing Regenerative Medicine Workshop, which exposes students majoring in the sciences to scientific discovery in regenerative medicine and tissue regeneration.
- **St. Catherine University** students have the opportunity to engage in undergraduate collaborative research projects with talented faculty and present their work at local, state and national conferences. Clare Booth Luce STEM Scholars receive scholarship support and special programs to enhance their education and career prospects. St. Kate's also offers a STEM minor and certificate for undergraduate education students as well as graduate programs in STEM and technology for licensed educators and Montessori teachers to enhance their competency in teaching STEM subjects.
- **St. Olaf College** STEM faculty build upon their disciplinary strengths to promote interdisciplinary programs that include neuroscience, mathematical biology, biomolecular science, and environmental studies. Faculty members work collaboratively each summer with 50 to 60 undergraduate researchers and offer an average of 160 academic research experiences during the academic year. Thirty-seven percent of the majors awarded each May are in STEM fields. In addition, St. Olaf seeks to inspire younger students to pursue STEM majors through hosting the Science Olympiad, supporting Upward Bound, and participating in TRIO mentoring.
- The **University of St. Thomas** offers over 25 different STEM majors and received a \$1 million grant from the Howard Hughes Medical Institute to support efforts to engage all students in science. Students planning to major in science, mathematics and/or engineering are eligible to compete for two full-tuition scholarships and two renewable \$8,000 awards. Students engage in graduate-style research alongside faculty and the Undergraduate Research Opportunities Program provides grants to undergraduates conducting research under the guidance of a faculty mentor. In the Center for Applied Mathematics, students work on research topics such as mathematical modeling of weather phenomena, mathematical biology and financial mathematics with companies including U.S. Bank, 3M and Corning. Annually, 275 students conduct student-faculty research outside of the classroom. St. Thomas also has opportunities for engineering and science students to study abroad.

### Shared STEM efforts

- Eleven of our colleges participate in the **Mayo Innovation Scholars Program** — a program that provides multidisciplinary teams of students the opportunity to analyze inventions and discoveries in translational medicine and technology transfer at the Mayo Clinic.
- Three of our colleges are part of the **NorthStar STEM Alliance**, which aims to double the state's minority STEM graduates in the next five years.

Visit [www.mnprivatecolleges.org](http://www.mnprivatecolleges.org) for more information — including on the Minnesota Private College Fund's Galileo Scholarship Fund.