**The Sciences at Mount Holyoke—Updated Spring 2020**

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As a women’s college that affirms gender diversity, Mount Holyoke is deeply committed to advancing women’s access to STEM fields where they have historically been underrepresented. We are equally committed to global diversity, equity, and inclusion, as well as to affordability for low-income students through generous financial aid.

***Demographic Profile*** In 2019 Mount Holyoke had an enrollment of 2,190 undergraduates from 45 states and 76 countries, of whom 25% identify as domestic students of color (US citizens) and another 27% who are international students, making Mount Holyoke among the most diverse liberal arts colleges in the United States. Approximately 19% are Pell-eligible. 52% of incoming first-year students were in the top 10% of their high school classes. In the widely-publicized study of economic mobility at U.S. colleges (Chetty, Friedman, et al., 2017), Mount Holyoke’s MFI ($110,400) was among the lowest among highly selective private colleges (HSPCs); as was our share of students from the top 20% in MFI (65th of 71 HSPCs), while our share of students from the bottom 20% was higher than most (15th). Approximately 17% of our students represent the first generation in their families to attend college. 79% of current students receive some form of financial assistance from the College or federal government (close to $45 million in College aid was awarded in 2019-20).

***Growth and Success in the Sciences*** The College has played a pivotal role in producing women scientists since its founding in 1837 by chemist and education pioneer Mary Lyon. Her early emphasis on learning in the laboratory is widely credited with setting the standard for modern science education in a liberal arts setting. And, for more than 50 years (from 1968-2018) the College has produced the greatest number of women who go on to earn STEM doctorates in the life sciences among all baccalaureate colleges.[[1]](#footnote-1) Mount Holyoke is in the top 50 of all U.S. institutions including R1s for producing women research doctorates.[[2]](#footnote-2)  Such data speak to the quality and rigor of Mount Holyoke’s science pedagogy and research program. Moreover, although the science gender gap is closing, as recently as 2019, the number of women earning Ph.Ds.in science lag behind the number of men. Changing the paradigm of women in science is at the heart of what a Mount Holyoke education strives to offer—an education comparable to many graduate programs in the sciences.

In the last few years, among declared majors, over 35% of Mount Holyoke students have chosen a STEM major, well above the proportion of women who typically major in math or science at comparable co-educational institutions, and the College’s summer science research program attracts approximately 80 students each year.

In 2017 and 2018, 95% of graduates were employed, in school or participating in an internship six months post-graduation. Typically 20% of graduates go directly on to graduate, professional and post-baccalaureate programs. Nearly 80% enroll in advance degree program within 10 years after graduation. Top schools for MHC graduates include Yale, Harvard, Columbia, NYU, University of Michigan, University of Pennsylvania, and Duke. Top employers of the 69% who are employed post-graduation include Google, Massachusetts General Hospital, Boston Children’s Hospital, Peace Corps and Goldman Sachs.

***Support for Science Education and Research*** Collaborative research among faculty and students is a critical element of the academic culture at Mount Holyoke, providing students with outstanding mentoring and access to sophisticated scientific instrumentation and techniques that few undergraduates experience. Most of our science majors spend their summers doing independent research, and most write senior theses based on research with faculty.

Mount Holyoke’s faculty is comprised of active scientists who consistently win grants for academic research as well as teaching awards. Of 62 full-time science faculty members, 65 percent are women, and 19 percent are individuals of color. The College has invested in an exceptional group of young science faculty – 15 in the last five years alone. The science faculty have been awarded nearly $15M in research grants in the last five years. We have had ten NSF CAREER award winners including two recipients of Presidential Early Career Awards for Scientist and Engineers (PECASE), the most prestigious federal government award for young scientists. Additionally, Mount Holyoke faculty members have been recipients of several other honors, including: the NASA Mars Science Laboratory Participating Scientist Program; NIH Director’s New Innovator Award; Research Corporation for the Advancement of Sciences Cottrell Scholar; and the James S. McDonnell Foundation 21st Century Science Initiative in Understanding Human Cognition Scholar Award.

Many science faculty have strong interdisciplinary interests, resulting in a culture of cross-disciplinary curricular initiatives and research projects, which involve students from different departments. Indeed, faculty research agendas are transforming the science curriculum.

While maintaining its core STEM curriculum, Mount Holyoke is breaking new ground in computer science, data science, and restoration ecology. Transformation of the traditional sciences, such as physics, chemistry, and biology, through computational thinking and algorithmic problem solving, is increasingly evident at Mount Holyoke. These efforts have won generous assistance from foundations and government agencies, including NSF, NIH, NASA, the Clare Boothe Luce Fund, the Sherman Fairchild and Dreyfus foundations, and HHMI. In 2015 Mount Holyoke received significant grants from Google for its computer science program and from the Massachusetts Mutual Life Insurance Company ($1.2 million) to help establish a new Women in Data Science program, a collaboration with Smith College. In 2019 the College received a $500,000 MRI grant from NSF for an integrated laser scanning/spinning disk confocal microscopy system to advance multidisciplinary research and training in biology, neuroscience, physics, and chemistry.

Also, in collaboration with Smith College, Amherst College, and Hampshire College, Mount Holyoke has helped to build the Four College Biomathematics Consortium (4CBC) – a multi-campus community committed to research-centered education and the training of young scholars capable of making significant contributions to this emerging field.

***state-of-the-art facilities and operations*** Ranked among the best in the U.S. by the 2019 Princeton Review, our Science Center comprises four interconnected buildings with labs dedicated to molecular biology, genetics, advanced physics, and optics. The complex houses the departments of biology, chemistry, physics, neuroscience and behavior, geology, computer science, environmental science, and math. All faculty research labs and shared instrumentation spaces are located here. It includes two vivarium facilities for neuroscience and biology research programs, a new BSL-2 level biosafety lab, and two BSL-1 labs. Life science faculty are also supported by a stockroom, machine shop and technician, electronics technician, animal care technician, technology liaisons, microscopy lab director and the science center director. The Microscopy Facility, located in the basement of Clapp Laboratory, is managed by a full-time director. Starting as early as their first year, Mount Holyoke’s science students get practical hands-on experience with sophisticated equipment, such as scanning and transmission electron microscopes, a custom-built Mössbauer spectrometer, DNA sequencing equipment, complete video microscopy capabilities, NME spectrometers, and atomic force microscopes. The recent acquisition of an integrated laser scanning/spinning disk confocal microscope is dramatically improving our imaging capabilities and research infrastructure, enabling teaching staff and faculty to develop new and innovative course offerings across Mount Holyoke's life and physical science curriculum.

***support for outstanding faculty*** Mount Holyoke provides extensive resources to ensure faculty are able to perform high-caliber research. In addition to robust facilities and equipment, faculty have a low teaching load (2/2) compared to many peer institutions, which affords them time to dedicate to research and student mentoring. New faculty receive startup funds of between $125,000 and $250,000, depending on their needs, and up to $250,000 for lab upgrades or renovation. Additional restricted funds for science research is managed by Associate Dean of Faculty and Science Center director Dr. Gary Gillis. In addition, each science department oversees restricted funds for equipment, supplies, and research activities. Additional faculty supports include:

* a course release in a faculty’s first year to help establish their research lab;
* a generous sabbatical policy, on par with elite universities, with a full-pay semester after three years pre-tenure and first post-tenure, and every four years thereafter;
* an annual travel allowance for attendance and presenting at professional gatherings;
* an internal faculty grants program for research support, student research assistance, and additional conference or research-related travel; eligibility for a $150,000 Fund the Future grant, awarded every three years to a pre-tenure STEM faculty member; and two competitive sabbatical fellowships awarded annually;
* support to participate in special trainings in scientific workshops and seminars, including Project Kaleidoscope, a symposium on new innovations in science pedagogy, and a weeklong scientific teaching conference at Princeton;
* support of the Office of Sponsored Research, which works with each faculty member to chart a multi-year plan for raising external funding to support their research program; and
* substantial faculty development and career enrichment offerings by the College’s Teaching and Learning Initiative.

***preparing students as future scientists and leaders*** We challenge our future scientists with rigor, raising them to high levels of achievement in distinctive ways:

*Intensive faculty mentoring* Students have much greater access to faculty than at many peer institutions because we have fewer students in classes and labs. As a result, they receive one-on-one mentorship throughout their four years. We also search out, hire, and foster a community of exceptional scholar-teachers as mentors, including Clare Boothe Luce professors, who serve as models for their students.

*Funding advanced faculty-led research.* A significant proportion of our science majors participate in faculty-led research during the academic year and during their summers, supported in part by robust external funding. The College’s research programs are funded by NSF, NIH, NASA, the Henry Luce Foundation, American Chemical Society, Research Corporation for Science Advancement, and Microscopy Society of America, among others. Since 2008, the annual NSF HERD[[3]](#endnote-1) survey shows Mount Holyoke consistently among the top 12 undergraduate liberal arts colleges in federally funded expenditures. Just in the past five years, science faculty have secured more than $14.8 million in external research awards. Among our ranks are 10 NSF CAREER award winners, including two Presidential Early Career Awards for Scientist and Engineers (PECASE). Other honors include the NIH Director’s New Innovator Award, two Cottrell Scholars, and the James S. McDonnell Foundation 21st Century Science Initiative in Understanding Human Cognition Scholar Award. Over the past three years, more than 50% of our full proposals to NSF have been funded compared with the agency-wide average of 24%.

*Guaranteed research or internship opportunity* Mount Holyoke is one of the few colleges that guarantees a paid research/internship opportunity to every student. This is part of a signature initiative, the Lynk, connecting rigorous coursework, experiential learning, advising, alumnae mentoring and professional development. To date, the Lynk has provided more than $1 million each summer to fund up to 450 students conducting summer research or internships – close to 2,000 projects overall. Department resources and faculty grants are also leveraged each year to support even more undergraduates doing summer research on and off campus. This emphasis on student research clearly pays off, highlighting the outstanding success Mount Holyoke graduates experience in pursuing and earning STEM Ph.D.s.

*Unique lab environments and mentoring opportunities*  There are several unique attributes of the research ecosystem at Mount Holyoke. For example, it is uncommon to have more than one research lab studying bacterial systems at a small liberal arts college; at Mount Holyoke, we have three. One professor, who teaches in the chemistry and biochemistry curriculum, has colleagues in the biology department who also run microbiology research labs including another professor who studies the molecular mechanisms of gene regulation in B. subtilis sporulation, and a third colleague who studies host-pathogen interactions of Chlamydia trachomatis. They jointly hold weekly “MicroMeetings” to share expertise, expose students to a broader world of bacterial research, and give them regular opportunities to present to a larger group.

*Presenting and networking opportunities* Students share their research findings at department meetings and two major campus wide public events—the LEAP Symposium (in fall, focused on summer research and internship experiences) and the Senior Symposium (in spring, focused on independent research and senior theses). In addition, the College has hosted the Gordon Research Conference in Microbial Stress Responsesevery other year since 2004. With travel funding support, students present at more than a dozen regional and national meetings and conferences, including the Boston Bacterial Meeting and American Chemical Society; American Society of Biochemistry and Molecular Biology; and American Society for Microbiology, the Northeast Undergraduate Research Organization for Neuroscience Conference (NEURON); Molecular Genetics of Bacteria and Phages Meeting; and Society for Neuroscience. The College also sponsors two high profile chemistry events annually for talks and private meetings with students: the Five College Chemistry Lecture series and the Lucy Weston Pickett Seminar to bring leaders of chemical sub disciplines.

*Peer mentoring programs for leadership development* Mount Holyoke’s peer mentoring programs in the STEM disciplines have been recognized as national models. Mount Holyoke was one of only a handful institutions selected for a Google capacity grant to create and refine the model that has informed the preparation of peer mentors in gateway biology, chemistry, physics and mathematics courses.

1. Source: National Center for Science and Engineering Statistics, Survey of Earned Doctorates, RTI Special Tabulation, June 2020. [↑](#footnote-ref-1)
2. Source: National Science Foundation, National Institutes of Health, U.S. Department of Education, National Endowment for the Humanities, Survey of Earned Doctorates, 2018. [↑](#footnote-ref-2)
3. According to the most recent Higher Education Research and Development Survey (2017) [↑](#endnote-ref-1)