

Project Name:	Expansion of L&S Faculty Lines in Chemistry
MIU Round(s):	1 & 2
Sponsor(s):	College of Letters and Science
Coordinator(s):	James Weisshaar
Partner(s):	Gary Sandefur, Nancy Westphal-Johnson
Report Date:	Year 1, July 2011; Year 2, July 2012; Year 3, July 2013

Project Goal and Measures	
Project Impact Measure(s)	<ul style="list-style-type: none"> • Enhance the laboratory component of introductory Chemistry courses. • Expand intensive research opportunities for both Chemistry and non-Chemistry majors. • Develop new faculty-taught topical, interdisciplinary courses. • Enhance the undergraduate experience in large, 100-300 level introductory courses.
Project Impact Data Source(s)	Department of Chemistry and APIR-provided data.
Baseline Measure(s)	2009-10 staffing and resource levels.

MIU Impact Measures	
C	<p>Increased capacity for high-impact practices</p> <ul style="list-style-type: none"> • Develop structured research experiences in the form of new laboratory experiments for introductory lab courses. • Help connect students to research opportunities in Chemistry labs.
D	<p>Increased student learning and teaching excellence</p> <p>Use “super TA” positions to provide administrative support to General Chemistry faculty instructors enabling them to spend more time with students.</p>
E	<p>More tenured, tenure-track faculty teaching undergraduate courses</p> <p>Covered in project goals. Progress was not able to be measured in 2010-11 due to unsuccessful faculty searches.</p>
F	<p>Decreased achievement gaps</p> <p>Since 2009, the Department of Chemistry has been engaged in ongoing work with the Vice Provost for Teaching and Learning in a large-scale experiment in Chemistry 103 called “Closing the Achievement Gap”. The project is designed to understand the genesis of the achievement gap in Chemistry 103 and implement high impact practices to ameliorate the gap.</p>

Expansion of L&S Faculty Lines in Chemistry, Page 2

G	Attention to diversity in new hires	Faculty positions were advertized in <i>Chemical and Engineering News</i> and <i>Diversity</i> magazines in the hopes of attracting women and under-represented minority applicants. Around 25 members of the Chemistry Department participated in and NIH workshop aimed at retention and advancement of outstanding women faculty, a follow up to an earlier WISELI workshop. New hires increased the gender diversity of the Chemistry faculty. 40% of MIU-funded faculty positions were filled by women, compared to around 20-25% in the typical applicant pool.
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Progress Reports

Year 1, 2010-11

- Searches for the five funding faculty lines were unsuccessful in 2009-10. Year 1 progress reported reflects the goals that were able to be addressed by the hiring of an Undergraduate Research Coordinator and the use of 5 new 50% TA lines.
- Conducted faculty searches for the 2011-12 academic year.
- Hired an Undergraduate Research Coordinator to work in collaboration with the lab directors for general, analytical, and organic Chemistry courses.
- Implemented four new lab experiments into the curriculum and began development of additional ones.
- Organized three different events (with 280 total student participants) to connect students with research opportunities. Efforts resulted in an 18% increase in the number of undergraduates who did Chemistry research in Spring 2011 compared to past spring semesters.
- Strengthened connections with companies who host research interns and developed a new web page linked from the Chemistry web site for students interested in research internships.
- Developed method of tracking student internship activity in order to measure participation.
- Utilized three "super TAs" in four sections of Chemistry 103, Chemistry 344, and five sections of Chemistry 104.

Year 2, 2011-12

- Planned for final MIU faculty search in 2012-13.
- Concluded successful faculty searches for 3 faculty members (one full professor and 2 assistant professors). All will begin teaching in Fall 2012.
- Implemented four new structured research experiences in new laboratory experiments in introductory Chemistry courses: Synthesis and Study of Geminal Surfactants (Chem 104), Preparation of Fragrant Esters (Chem 104 and 109), Molecular Geometry (Chem 103 and 109H), and Synthesis and Analysis of a Mixed Alum (Chem 103).
- Tested Calibrated Peer Review (CPR) software in Chemistry 311. This software helps students more effectively prepare lab reports and gives them the opportunity to practice peer review.
- Implemented a new advanced undergraduate capstone course – Atmospheric and Environmental Chemistry which also serves as an elective course for the Environmental Science major.

Expansion of L&S Faculty Lines in Chemistry, Page 3

Year 2, continued

- The MIU-funded Undergraduate Research Coordinator organized four events to help students find research groups: Chemistry Connections (general information about the Chemistry department for freshman and sophomores), Intro to Research (for students interested in learning about research opportunities), Undergraduate Research Symposium (poster sessions featuring the work of 37 chemistry-related student research projects) and Chemistry Careers (program about chemistry-related careers including contacts with local companies that hire UW undergraduates and support summer research interns). As the result, around 120 undergraduates enrolled in Chemistry research courses in spring 2012 compared to around 75 in spring 2010.
- Implemented a new course Entering Research designed to actively help students find undergraduate research experiences and also teach students how to become effective, conscious, and thoughtful researchers. Students reported increases in their ability to contribute to a research team, to explain a research topic to other scientists, to write a research paper, and to effectively read scientific articles.
- Increased the number of general chemistry sections taught by faculty and senior academic staff between 2010 and 2012.

Year 3, 2012-13

- Conducted successful faculty search for an associate professor who will join the department in January 2014. This new faculty member plans to develop a new course in Industrial Chemistry, fulfilling a longstanding need for a capstone course in both Chemistry and Engineering.
 - Used MIU funding for supplies to continue upgrading undergraduate instructional facilities and equipment. These upgrades, combined with the super TA positions, allowed for the development of new undergraduate laboratory experiences.
 - Implemented two new structured research experiences in new laboratory experiments in introductory Chemistry courses (on top of the four that were new in 2011-12): Kinetics of the Fenton Reaction (Chemistry 104 and 109) and Project Lab (Chemistry 103).
 - Implemented Calibrated Peer Review, a software developed at UCLA to help students improve the quality of lab reports through a structured self-critiquing methodology.
 - As in Year 2, the MIU-funded Undergraduate Research Coordinator organized four events to help students find research groups.
 - Implemented new departmental standards for teaching of large, introductory lectures designed to increase the number of introductory courses taught by faculty. This resulted in an increase in introductory courses taught by faculty (50% in 2010-11 to 64% in 2011-12).
 - Observed marked decreases in the rates of unsuccessful course outcomes for targeted minority students in introductory Chemistry courses in Fall 2012. If these trends persist, it may be evidence that the cumulative effect of innovations and increased resources are making a difference in student success in Chemistry.
 - Assessment: No assessment of student learning outcomes was reported.
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