



E109 Engaging Freshman Undergraduate Students in Forensic Science Research to Improve Science, Technology, Engineering, and Math (STEM) Retention

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Learning Overview: After attending this presentation, attendees will have been introduced to two different grant programs that are supporting forensic science undergraduate research. An outline of the programs and the types of projects students have worked on will be presented. A discussion of how other institutions could run similar programs will be part of the discussion.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by informing attendees that there is great value in students having an authentic research experience in terms of the student's skill development and retention at a university. The impacts are intensified when students are recruited into laboratories in their freshman year.

Previous research shows there is great value in an authentic research experience for undergraduates.¹ Other studies have documented the importance of undergraduate research in developing student's scientific knowledge, basic laboratory skills, self-confidence, and personal motivation.^{2,3} These improvements are even more defined in traditionally underrepresented groups, so incorporating these students in the lab helps with Valparaiso University's (VU) commitment to diversity.³

Valparaiso University has two current grant programs that are aimed at improving freshman-sophomore retention in STEM majors by incorporating students in undergraduate research labs the first semester of their freshman year. Forensic science is one of the areas that students can choose to focus their research on, and it is a subject that most find interesting and accessible. The Freshman Research Engagement in Science (FRESH) program has been funded through the Indiana Space Grant Consortium for \$14,999 annually over the past four years. The grant provides a \$1,000 research stipend to the chosen students, along with supply/travel money for their project. The students are committed to participating in a research laboratory for two semesters, both in their freshman year. The grant does not provide money for programmatic activities outside of research and conference travel. The Establishing Practices Integrating Commuters (EPIC) is a National Science Foundation (NSF) Award in the sum of \$999,991. The grant provides a sizeable four-year scholarship (average of \$5,300 annually) in addition to supply and travel money. The aim of the grant is to use research laboratories as a basis for social integration to improve retention of commuter students. EPIC has funding for program activities, such as monthly meals, field trips, industry trips, a yearly retreat, and a writing circle.

Students in both programs have participated in forensic science research projects. The projects they have worked on are: (1) diurnal oviposition of blow flies, (2) characterizing the volatiles associated with decomposition, and (3) blow fly oviposition on wounds vs. natural openings. Only one forensic science student has not continued in their research lab after their freshman year ended. These students have presented the results of their research in a multitude of venues, including departmental colloquiums, VU's undergraduate research symposium, and the Indiana Academy of Science annual meeting. They have participated in the research ideas, experimental design, data collection, insect identification, data analysis, and both written and oral presentations.

Typical freshman-sophomore retention in a student's chosen STEM major at VU is around 65%. Both the FRESH and EPIC programs have shown significant improvement in retention at the 0.05 level. FRESH has retained 87.5% of students in their discipline after their first year and EPIC has retained 87% of students in the same period. Forensic science research has had an important role in recruiting and retaining students for both of these programs.

Reference(s):

1. Tinto, V. Leaving college: Rethinking the causes and cures of student attrition. *Univ Chicago Press*. 1987.
2. Brown A.M., Lewis S.N., Bevan D.R. Development of a structured undergraduate research experience: Framework and implications. *Biochem Mol Biol Educ*. 2016.
3. Lopatto D. Undergraduate research experiences support science career decisions and active learning. *CBE Life Sci Educ*. 2007;6:297-306.

Forensic Science Research, Freshman, Undergraduate Research