

Attracting Students to the Geosciences with a First-Semester Dune Research Experience

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For the past three years, the First-Year Research in Earth Sciences (FYRES): Dunes project has been inviting first-semester Calvin College students to try out the sciences with a dune research experience. Each fall, up to 24 first-year undergraduate students take a course that nurtures them through an authentic scientific research experience focused on the coastal dunes of Lake Michigan. Both science and non-science students are attracted to the atypical science-course format. Participation is limited to first-semester college students to foster a sense of shared experience as well as provide an early opportunity for some students to discover an Earth science major.

The students who take the FYRES course gain both an undergraduate research experience and general education science credit by the end of their first semester. The research focus on the nearby Lake Michigan coastal dunes provides the setting, purpose and motivation for student learning. Students begin by learning skills in research, field methods, and the practices of science through semi-guided, inquiry-based experiences at dune sites. Students finish the semester with a substantive team research project focused on an original research question of interest to local dune managers or the scientific community. The first-year students are mentored throughout their experiences by upper-level Earth science students who are majoring in geology, geography, environmental studies or environmental science.

Each research team presents their research results in two formats: a conference-style research poster presented at a campus/community poster session and a conference-style oral presentation to an audience which includes classmates, local dune managers, and campus/community members. After the semester ends, the FYRES Mentors continue each research project to complete a presentation at a regional conference and a written report. The first-year students have co-authorship on these results of their team research, and they are invited to attend the regional conference to see their results presented.

To date, 56 first-year students mentored by 15 upper-level Earth science majors have completed 13 original research projects. Students who participated in the first FYRES course in Fall 2011 are currently in their third year of college, so we do not yet have graduation data to report. Anecdotally, we can describe FYRES students who later changed their major to geology or environmental studies, who successfully obtained a summer research position after their first year of college, or who became FYRES Mentors in subsequent years. Preliminary results from FYRES project evaluation include increased enrollment in geoscience and STEM majors by student participants, increased enthusiasm and science literacy among student participants, and increased visibility for the relevance of Earth system science in answering questions that are important to west Michigan communities.

A continuing challenge of the FYRES project is recruiting students from groups traditionally underrepresented in the sciences. Female students are well-represented and constitute roughly half of the student participation. Students with disabilities and students from underrepresented ethnic and racial groups have lower rates of participation. Because most FYRES students are recruited after they have already made a decision to attend Calvin College, the recruitment pool is constrained by the overall diversity of the student body. Calvin College is a faith-based 4-year liberal arts college, with strong ties to a particular denomination that has a

strong ethnic (Dutch immigrant) heritage. In the 2013 Fall Day 10 report, the Calvin College student population was 75% white, 13% AHANA (African-, Hispanic-, Asian-, and Native-American) and 10% international students¹. The number of AHANA and international students coming to Calvin College has been increasing in recent years, but progress is remains slow.

More information about the FYRES project and its student participants is available from the website at www.calvin.edu/go/fyres/. The FYRES project has been funded by the National Science Foundation (Grant #0942344) and the Michigan Space Grant Consortium.

¹Multicultural Affairs Committee (2013). *2013-2014 State of the Campus Report*. Calvin College (Grand Rapids, MI). Available online at www.calvin.edu/admin/comm/mac/. 40 p.