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### **Undergraduate Field Research in Brazil: Encouraging Students Underrepresented in the Geosciences**

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The NSF-supported Research Experiences for Undergraduates program at the University of Minnesota, Morris (UMM) is a faculty-led, summer research-abroad program that involves two weeks of field research in Brazil and six weeks of field and laboratory research in Minnesota. The undergraduate research builds on a long-established collaborative research effort between faculty at UMM and the Universidade de Sao Paulo (USP). REU participants—all women, due to the underrepresentation of women in the geosciences, study glacial deposits of the Late Paleozoic Paraná lobe of Brazil and the Late Pleistocene Des Moines lobe of Minnesota to determine how often a presumed paleo-ice stream (Des Moines Lobe and Paraná Lobe) advanced, what the dynamics of movement were (sliding versus deformation), and if climate change or sea level changes were involved.

Participants employ varying geologic research techniques, including field mapping and correlation of striated and grooved surfaces and sediments; sediment analysis; and the characterization of sediment using basic field descriptions, sedimentary petrography and geochemistry analysis, and paleoecology assessments. The availability of a wide range of methodologies allows students to tailor their research projects to their own interests while learning about other methodologies as they are utilized by fellow students. Individual projects are selected and developed by participants in either or both of the field locations.

Several approaches are used to help students identify a research project of interest to them, including an introduction to previous research and how to build upon it, questions that remain from past projects, and geologic techniques that are frequently employed. In Minnesota, students learn outcrop

description, sample collection, basic Portuguese, and are introduced to local geology through daily lectures and fieldtrips. Discussion begins about potential projects and research methodologies before heading to Brazil.

In Brazil, an inquiry approach is taken. After a short introduction to the local geology, research begins with mapping the project areas. Intentionally, students are immersed in the known and unknown of the research topic. Students quickly begin to identify research questions of their own, and fieldwork morphs from instructor-led to student-led research. Both project ownership and team building are encouraged by group discussion of projects, shared field areas, and group field trips. Students are encouraged to collaborate on research projects, either by helping in data collection or by working on different facets of the same research question.

Upon return to Minnesota, students complete analyses of data collected in the field and prepare to present their findings at the program-culminating "Friends of UMM REU" conference, which is attended by faculty and geoscientists from several institutions and organizations.

In 2013 all participants were Native-American women, and this is planned again in 2015. Native-American women are extremely underrepresented in the geosciences, and the program provides peer support, develops confidence, and introduces participants to supportive role models. Throughout the program, students participate in several seminars and discussions on the development and improvement of writing skills, resumes, and graduate-school applications, as well as discussions on issues related to scientific ethics and the challenges for women in career development. The program helps them evaluate and develop a path toward their career and life goals, making students aware of issues and identifying strategies to help them to succeed. The program also involves place-based learning with field trips to localities that are traditionally significant to Native Americans, places of historical interest, and museums or parks in both Minnesota and Brazil.

Many of the lessons learned from international research are related to accessing study sites in a culturally sensitive manner. In Brazil, safety and the language barrier require faculty and students from both institutions to work together in the field. This provides an opportunity for the U.S. students to work closely with international peers. To further encourage the international bonding, Brazilian faculty and students visit UMM to become involved in the local glacial geology research. Additional bonding activities include the international travel experience, group living in a Brazilian B&B, and Brazilian/U.S. student socializing.

Assessment of the program occurs in two stages: one focusing specifically on the Brazil fieldwork and one assessing the program overall. Prior to research in Brazil, students are asked about their background, courses taken, previous research experience, and skill sets. In Brazil, REU participants are asked to fill out pre-fieldwork surveys and are interviewed by author Bacci concerning their motivations for participation, basic understanding of geological concepts, and the expected influence of the experience on their future plans and goals.

After returning from Brazil, the UMM students were asked what skills were acquired in the fieldwork, what was learned, what additional training students feel is needed, and the influence of the experience on their future plans and goals. On the last day of the eight-week program participants are asked to complete an evaluation of the overall program. This evaluation solicits feedback (statistical and anecdotal) on the strengths and weaknesses of the program, and how the program should be modified in the future. In this process the program evaluator reviews students' field and lab techniques in both Brazil and Minnesota, discusses project selection and research plans, assesses participant field books for development of thinking and scientific maturation, evaluates completed projects, conducts exit interviews with both the participants and the teaching assistant, and reviews students' completed evaluations.

An important goal of the REU program is to encourage a summer of exciting research and learning, learning that actually continues after the program ends. A strong support network and opportunities for collegial interaction continue after participants leave UMM. A newsletter has been produced by past participants in the UMM REU program and is now administered by author Cotter and is posted on the program's website (<http://www.mrs.umn.edu/academic/geology/REU/>). Contact is maintained with most of the REU alumni via phone, e-mail, web page, or occasional letters.

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### **Rhetorics of Pluralism and the Almost-Hidden Research Agenda**

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 Our liberal arts university hosts an annual interdisciplinary study-away program in Brussels, Belgium. During the fall semester, students intern with the European Parliament and private companies, under the direction of a Furman faculty member. Despite being a

pre-tenure faculty member invested in collaborative research and conferences, I was asked to lead the group when the program rotated to our department.

Not only was I accustomed to producing scholarly research, but our Department of Communication Studies also regularly mentors undergraduate research in the humanities. Fall semester was typically my time to encourage writing, confer with students about their research, and edit submissions of undergraduate papers for regional conferences.

Taking that model to Brussels would be difficult. I was assigned twenty students from a variety of departments across campus. Students had no particular research experience or training, and they would be busy. They would take two courses from a local university, conduct their internship for one course credit, and then have only one course left with me. The university expectation for that remaining course was to create an interdisciplinary survey of the history, politics, and culture of Europe that ties together all of the other aspects of the program. I might have considered just dropping student research completely.

Enter my hidden agenda—a research project disguised as this interdisciplinary course.

The course I devised took on twentieth-century argumentation, specifically regarding pluralism. How much diversity is required for legitimate, sustainable decision-making? Does there need to be a shared sense of community to ground competing arguments and foster good judgment? What kinds of affective bonds, of empathy, of honor, or of basic liberal tolerance allow groups to transcend incommensurable differences? The course was designed to provide some answers to those questions, covering authors who encouraged rhetorical, anti-positivist norms to overcome totalitarian regimes in twentieth-century Europe.

Given that students would juggle three college-credit courses, an internship, and personal weekend travel during the 15-week program, many took advantage of the opportunity to read over the summer. In this way, I could ensure some understanding of our course theme before we even arrived. The students read Chaim Perelman, Hannah Arendt, Michael Polanyi, and Stephen Toulmin, among others.

Those readings helped structure discussions at various sites: colonial legacies in the royal architecture of Brussels, the Great War battlefields of Ypres, the Deportation Memorial in Mechelen and the Concentration Camp of Fort Breendonk, the burnt synagogues of Antwerp, Der Philosophenweg (Philosophers' Way) in Heidelberg, the Cold War sights of Berlin, and the European Union institutions spread about the continent.