

Finally, from a second engineering major (female): “This ... course is totally unlike any you have ever taken before. The professors act more as guides rather than traditional professors. You can converse about any topic, but they leave most of the learning and teaching up to you individually. In this class you will explore ideas that you have never even considered, diving deep into moral and ethical obligations in relation to the environment. These discussions can be challenging and you may not see where others are coming from, but if you keep an open mind and stay true to your opinions, it will allow for a more fruitful discussion. ... This semester I truly took a responsibility for what I learned in class ... (working) on a project that analyzed water usage at the University of Dayton, from past to present and created solutions for the future. I truly took responsibility and felt possessive of the subject I studied and found out so many things about myself and the University of Dayton that I had never known.”

Although there are challenges to teaching a course of this type, ranging from institutional hurdles in organizing team-teaching in an equitable fashion, to the legwork necessary for coordinating and developing potential projects with university divisions and community partners, the clear benefits that arise from allowing students to follow their passion and take charge of the learning process are clear rewards for the initial effort. 

Creating Value Through Prizes for Undergraduate Research in Sustainability

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Gale-Cengage Learning, a leading e-research and educational publisher, has established a successful prize program recognizing undergraduate interdisciplinary research into sustainability issues, in collaboration with several universities. The research awards offered by this program support institutional faculty and student needs in teaching and learning, particularly regarding the growing need to recognize interdisciplinary research. Collaborations involve Temple University, the University of Delaware, the College of Wooster, and, most recently, Pennsylvania State University.

Temple University

Gale-Cengage Learning approached Temple University Libraries in 2010 with a proposal to fund a prize to be awarded by the libraries for undergraduate research on sustainability and the environment. With another well-established library prize already in place, Gale's offer represented a new

opportunity for the libraries to expand their recognition of outstanding undergraduate research that encourages the development of students' competencies in information literacy. The libraries accepted the offer and a reception each spring features presentations by student winners and their faculty mentors. It is a celebration of the partnership among librarians, university administration, faculty, and students in students' learning.

The traditional Library Prize for Undergraduate Research receives entries primarily from students in the humanities and social sciences. Partnering with Gale on the added Library Prize on Sustainability and the Environment has enabled the libraries to reach out to students in science, engineering, and other areas in which students study sustainability and the environment. The libraries have welcomed this opportunity to support and highlight student research excellence.

In addition to supporting student-learning goals, the Library Prize on Sustainability and the Environment enables librarians to demonstrate campus leadership on these important issues and creates an opportunity for librarians to work with Temple's Office of Sustainability. The director of that office serves on the panel judging entries in the award competition each year, along with faculty members and librarians, and thus sees a full range of student research on these topics. The prize also supports the university's goals as part of the American College and University President's Climate Commitment to accelerate educational efforts about climate change.

University of Delaware

The Sustainability Prize was established by the University of Delaware's Undergraduate Research Program and Gale to encourage undergraduate research and projects in the area of sustainability. The sustainability prize is an integral component of the Summer Scholars Programs at the university. More than 300 students are eligible to apply for the award, and they may be from any discipline. Their projects may encompass research and/or service. This prize is awarded in conjunction with Gale providing access to GREENR for University of Delaware students and faculty. This database supports sustainability research and reference topics on the environment, energy, and natural resources.

Established in academic year 2010-2011, four projects were selected to receive awards. Student Matthew Fischer was the first-place prize winner for a paper entitled Kinetics of Arsenite Oxidation by Manganese Oxide Minerals: Importance for Water Quality and Environmental Sustainability. In 2012, four prizes were given and the first-place winner was Taylor Smith for a project titled Biochemical Processes Utilizing Electrogenic Bacteria. The 2013 first-place awardee was

public-policy major Nicole Seymour for her project titled *The Car-Free Guide: An Outcome of the Assessment of Transit-Friendliness in the City of Newark, Delaware*.

The application students submit requires them to:

1. Write and submit as part of your application a 500-word abstract, with the following sections, a. motivation/problem statement, b. methods/procedure/approach, c. results/findings/products, and d. conclusions/implications/potential benefits of your research/project to environmental sustainability.
2. Include a brief statement (150-200 words) about the impact of this research/project on your personal and career goals.
3. Include a resume.

After the applications are received, they are evaluated by three faculty reviewers according to the rubric in Figure 1.

The award is presented at the conclusion of the 10-week Summer Scholars Programs, at the university's annual Undergraduate Research and Service Celebratory Symposium.

College of Wooster

The College of Wooster is the most recent institution to become involved in Gale's initiative for research awards. Mentored undergraduate research is a hallmark of a Wooster education and since 1947, every graduate has participated in the college's distinctive Independent Study (I.S.) Program (<http://www.wooster.edu/research>), which pairs every senior with a faculty mentor for a yearlong research project. As Wooster officials considered how the Gale-Cengage awards might best work at the institution, it seemed natural to design a scholarship program that honored the most outstanding I.S. projects on sustainability.

The college's I.S. Research Prize in Sustainability and the Environment recognizes projects that contribute to understanding of sustainability and the environment, but it also considers "originality, depth, breadth, or sophistication in the use of information resources, as well as exceptional ability to select, evaluate, synthesize, and utilize information resources in the creation of a project in any media." During each year of the program, first-place, second-place, and honorable-mention awards are given for the top three projects. The winners of the first round of awards were selected in spring 2013, and the three recipients were featured on a panel during Wooster's Research Symposium (<http://www.wooster.edu/research/symposium>), an annual event at which seniors share their research through presentations, digital

Figure 1. Evaluation Criteria for the University of Delaware's Interdisciplinary Undergraduate Research in Sustainability Prize

Criteria	Beginning (1 point)	Competent (2 Points)	Excellent (3 points)
Thesis	Develops a relevant thesis.	Develops a manageable scope and focus; poses an interesting question or problem.	Modifies thesis to incorporate initial findings and surprising insights.
Synthesis	Connects several ideas from a few sources to the thesis.	Draws on multiple ideas from several sources to form conclusions.	Synthesizes ideas from many sources to reach original conclusions or novel insights.
Originality	Interesting topic but not very original.	A highly imaginative topic or approach	A new twist on previous research; an original contribution to the field.
Topic	Interesting topic related to sustainability and the environment.	Highly imaginative ideas about an aspect of sustainability and the environment, or sustainable practices.	Creates important new knowledge about sustainability and the environment, or proposes/improves upon practices that may have a significant impact.
Initiative	Closely guided by faculty at all stages of research.	Fairly independent throughout, though seeking advice when necessary.	Highly independent throughout, though seeking advice when necessary.
Faculty letter of support	Faculty mentor indicates that the students' work has the potential to be successful, but is in the beginning stages.	Faculty mentor indicates that the students' work is somewhat successful, innovative, and important.	Faculty mentor indicates that the students' research/project is highly successful, innovative, and important.
Relationship to future goals	Research/project has very little relationship to the student's future goals.	Research/project is somewhat related to the student's future goals.	Research/project is directly related to the student's future goals.

projects, and poster sessions. The three presenters discussed their individual projects and also the unique ways each student approached the research process. The session was a very effective means of highlighting undergraduate research on sustainability, and we anticipate future recipients will participate in similar panel presentations each year.

Conclusion

The libraries at Temple University, the College of Wooster and the University of Delaware, as well as the undergraduate research program at the University of Delaware, have found working with Gale to be a rewarding partnership. The librarians and undergraduate research programs have developed a new prize to enhance outreach and promote all relevant library resources. Gale has benefitted from opportunities to collect feedback from faculty, students, and librarians on resources to support teaching and learning in these areas. Notably, Gale has provided the opportunity for winning entries to be peer-reviewed and included in the GREENR database, helping talented students develop resumes and a research experience that may enhance their academic careers. 

Caring for a Shared Place: Undergraduate Research to Restore an Urban Watershed

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Much has been written about service-learning as a pedagogy that strengthens undergraduate education. In the late 1990s Calvin College, like many other institutions across the country, experienced considerable growth in academically based service-learning. In 1997, the Calvin Environmental Assessment Program (CEAP) emerged as an effort to integrate service-learning into the natural science curriculum. CEAP has involved faculty members in creating regular lab assignments or course projects to collect data that contribute to an overall assessment of the environment of the campus and surrounding community. The program also has been integral in creating institutional practices that foster sustainability and providing a context for meaningful links between the college and the broader community. From this work we discovered that the creek draining the watershed in which our college exists is highly degraded. The realization of our institutional and collective personal complicity in its degradation led us to organize an initiative for restoration of the watershed that has become known as Plaster Creek Stewards.

Plaster Creek Stewards is a collaboration of Calvin College faculty, staff, and students, working with local schools, churches, and community partners to foster sustainability and restore the health of the watershed. The initiative focuses

on three areas: research, education, and on-the-ground restoration. Education and outreach are needed to increase awareness of the problems; on-the-ground restoration addresses the degradation this stream has experienced; and research is needed to help us learn more about the creek and how to best work toward its restoration.

Involving undergraduates in this research has been an important development. Students are eager to invest themselves in research that has real-world implications, especially when the “real world” is the very watershed in which their college exists. We currently advise four active research programs connected to the watershed:

1. A research-methods class (Biology 250) is the fourth semester of our core biology sequence. The Plaster Creek Watershed serves as the laboratory for this class; students perform experiments and write research reports that inform our restoration activities.
2. Faculty in the natural sciences have mentored a number of summer research students on projects related to water quality, bird diversity and behavior, bacterial dynamics, Geographic Information Systems modeling, and restoration of native habitat.
3. Senior engineering students have been involved in yearlong projects addressing stormwater runoff, de-channelization, and bio-swale design for large-scale stormwater retention.
4. A Calvin faculty member in the social sciences has directed students in an oral history project documenting the life experiences of long-time residents of the watershed. A history professor has directed students in documenting past urban and rural land-use practices and their impacts across the watershed.

By promoting sustainability on a watershed-wide scale, we have created opportunities to engage students in authentic interdisciplinary, place-based research. In addition, faculty members from a wide array of disciplines (history, English, biology, environmental science, engineering, urban studies, geography, education) are increasingly drawn to this watershed restoration initiative for their scholarly activity. This work has garnered more than \$1.5 million in grants for ongoing research and on-the-ground restoration activities, and it continues to inspire our campus and our local community to live more sustainably in the Plaster Creek Watershed. 