

# Spanning the Gulf Between the Public and Science: Undergraduates as Bridges in the Scholarship of Engagement

## A SENCER BACKGROUNDER\*

*“Education is all a matter of building bridges.”* Ralph Ellison

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### Abstract

*Based on experiences of campus-community partnerships fostered by the GLISTEN (the Great Lakes Innovative Stewardship Through Education Network) project of the National Center for Science and Civic Engagement, a model of undergraduate student facilitators of the scholarship of engagement is presented. Called “undergraduate stewardship liaisons” (USLs) these students serve as stewards for the environment and bridges among faculty, other undergraduates, and community-based organizations. Their stewardship entails promoting knowledge generation and direct action by their fellow undergraduates in the form of service-learning components of undergraduate courses; in addition, it involves building the capacity of both community-based and campus stakeholders for sustained collaboration focused on restoring and conserving the earth’s largest source of available fresh water. Details on USL recruitment, training, activities and challenges are presented, along with recommendations for broad replication of this model in campus-community partnerships.*

It is the first week of class during the fall semester at hundreds of colleges and universities throughout the United States. During this week, undergraduate science faculty are distributing and reviewing their syllabi, clarifying learning goals, and setting expectations for their classes. They may be introducing graduate teaching assistants who will lead review, recitation or laboratory sessions, and assist with grading in large classes. In addition, these faculty are likely to recommend peer-led academic support services such as supplemental instruction and tutoring that help their undergraduates clarify, review, and reinforce the course content from lectures and materials such as text-

books and lab manuals.

On many campuses in the Great Lakes states, however, undergraduate peer leaders of a different type are being introduced. It is clear from the way they explain their role that it differs significantly from traditional forms of academic support provided by students. These peer leaders have been involved with faculty in planning aspects of the course itself, a course during which those undergraduates will create and reinforce disciplinary knowledge by engaging in scholarly scientific activity that meets needs of the larger community in which the campus is located. With faculty guidance, and by serving as “bridges” to the

\* Throughout this backgrounder, hyperlinks offer access to resources where readers can learn much more on specific topics (by clicking on the green underlined text).

larger community', these student leaders will be helping their peers find answers to unanswered questions and solutions to unsolved problems. Together, they will even create new knowledge that is to be found neither in the professor's lectures, nor in the case studies or problem sets contained in their textbooks. Inspired themselves by unique perspectives developed during an intensive summer experience addressing the same unsolved problems, these student leaders will attempt to motivate their peers to engage seriously in such scholarly inquiry because it will make a difference. Not only will deeper learning be promoted, but actionable information will be provided to non-scientists making decisions about the restoration and stewardship of one of the most precious and fragile resources on the planet the Great Lakes ecosystem.

As peer leaders, then, these students have become partners with faculty in what has been called "public science," a form of scholarship during which scientists "enter into partnerships with citizens from other professions or sectors in work that closely links knowledge

<sup>1</sup> David Weert and Lorilee Sandmann (2010) used the term "boundary-spanning roles" that promote community engagement at research universities, but considered only administrators, faculty, and other higher education professionals as individuals who assumed such roles.

<sup>2</sup> In their report emanating from the 2005 Conference on Research Universities and Civic Engagement, the co-conveners, Campus Compact and Tufts University's College of Citizenship & Public Service, concluded that "universities, especially research universities, must entertain and adopt new forms of scholarship—those that link the intellectual assets of higher education institutions to solving public problems and issues." In that report, Cynthia Gibson (2006), drawing on the works of Boyer (1990), Ramaley (2004), and Schön (1995), articulated a key principle of the scholarship of engagement: that "major advances in knowledge tend to occur when human beings consciously work to solve the central problems confronting their society." Specifically, according to the report, this form of scholarship is a synthesis of

- The scholarship of **discovery**, which contributes to the search for new knowledge, the pursuit of inquiry, and the intellectual climate of universities.
- The scholarship of **integration**, which makes connections across disciplines, places specialized knowledge in larger contexts such as communities, and advances knowledge through synthesis.
- The scholarship of **application**, through which scholars ask how knowledge can be applied to public problems and

creation with public problem-solving and policy-making" (Peters et al., 1999, p. 35). As such partners, they have become engaged in an epistemological approach emerging in higher education over the past twenty years, the "scholarship of engagement."<sup>2</sup> In the conduct of such scholarship, students and citizens off campus are considered key contributors to academic knowledge generated in partnership with faculty who are "collaborating *with* publics instead of providing information to or services *for* publics" (Barker, 2004, p. 127). In what Donald Stokes (1999) has called "use-inspired basic research" they are "finding solutions to improve the lives of people and communities in which institutions are located" (p. 13).<sup>3</sup>

Drawing on the works of the above proponents of the scholarship of engagement as well as Dewey (1916), Harkavy (2010), and Zlotkowski (2006), John Saltmarsh (2011) has clearly articulated the epistemological implications of such scholarship for students: that they are not simply receptacles or consumers of knowledge, but can, and **should be** creators of knowledge themselves. Such knowledge can inform the processes of teaching, learning, and community-based problem solving

<sup>2</sup> See inset below.

<sup>3</sup> See inset on next page.

issues, address individual and societal needs, and use societal realities to test, inspire, and challenge theory.

- The scholarship of **teaching**, which includes not only transmitting knowledge, but also transforming and extending it beyond the university walls. (Gibson, 2006)

When melded, these forms of scholarship have implications for key stakeholders at every level:

**At the institutional level**, engaged scholarship connects the intellectual assets of higher education institutions, including faculty expertise and high-quality graduate and undergraduate students, to public issues.

**At the faculty level**, engaged scholarship is a vehicle through which faculty can participate in "academically relevant work that simultaneously fulfills the campus mission and goals, as well as community needs" (Sandmann, 2003, p. 4).

**At the student level**, engaged scholarship can enhance academic learning and knowledge generation because of its ability to blend research, teaching, and service. (Gibson, 2006)

3 Derek Barker, in “The Scholarship of Engagement: A Taxonomy of Five Emerging Practices” (2004), extends the universe of stakeholders to include the general public:

Instead of seeing the public as a passive recipient of expert knowledge, engaged scholarship stresses that the public can itself contribute to academic knowledge. In their undergraduate teaching, engaged scholars typically make a conscious effort to stress the pedagogical value of collaborating *with* publics instead of providing information *to* or services *for* publics ...

Similarly, engaged scholars are showing how research and outreach scholarship can be enhanced by collaboration with the public, exposing scholars to new sources of data and providing opportunities for greater experimentation in the production of academic knowledge. These scholars are showing that civic engagement is not just charity that academics do on their own time in addition to their work. Rather, engaged scholars see collaboration with the public as itself constituting scholarly practice that fulfills traditional academic functions. (127)

because “the experience and knowledge that students contribute to the learning process, the diversity of their cultural perspectives, and the authority of knowledge that they possess *necessarily contribute to the construction of new knowledge*” (350).<sup>4</sup>

Such a democratic view of knowledge production – which values the critical role of students and community members in the scholarship of engagement – has resonated with faculty from many disciplines.<sup>5</sup> Nevertheless, there remain significant institutional challenges to their fully embracing it. One challenge is the perception by some faculty members that public engagement is undervalued and even unrewarded in tenure and promotion decisions.<sup>6</sup> Other, purely operational challenges at a more basic level have been articulated by faculty at Virginia Tech, including “the time needed to develop partnerships and other engagement logistics, funding for engagement activities, and the differences between academic and community cultures” (Franz et al., 2012).

## Undergraduates and the Scholarship of Engagement: Opportunities and Challenges

In light of these challenges, which may ring true with faculty at many other institutions, we are left with a series of questions. How can the enthusiasm, energy, and intellect of undergraduates be tapped to support faculty committed to the scholarship of engagement? In the

faculty-driven culture of higher education today, and especially in the highly-departmentalized STEM disciplines, how can students, and particularly undergraduates, play roles in the scholarship of engagement other than as “learners”? More specifically, how can they be more than just recipients of the benefits of the scholarship of engagement, i.e., seen and empowered also as

6 Many faculty “hold values and beliefs about service scholarship that doubt and devalue its scholarly purpose, nature and products” was what Kerry Ann O’Meara concluded in a 2002 study of promotion and tenure (p. 76).

The recent experience of a tenured faculty member at an up-and-coming public research university is a classic case study of what can happen when faculty are torn between these conflicting views of scholarship. She recounts the events leading up to her decision to resign her faculty position so that she would not be forever caught in the crosshairs between them. In her experience, the more “the process of institutional advancement unfolded,” the more “the university’s incentive structure evolved in ways that made it more difficult to do work with public relevance” (Synder-Hall, 2012, p. 13). Because her research had “always been driven by a general desire to contribute to the public good” (p. 14), she found it “a challenge to publish normative work, even when it was rooted in academic literature” because some of her faculty colleagues, who “claim to do objective research ... do not consider normative work scholarly” (p. 16).

She faced other challenges in her post-tenure efforts to increase civic engagement activities on campus. After a lackluster response from students to a co-curricular campus-wide initiative and finding an ally in a new administrator charged with revising the general education curriculum, she was finally able to develop some capstone courses with civic engagement themes. The civic engagement components of these courses were modest, focusing on future-oriented plans to “make the world a better place” after graduation: she did not have the resources for her students to engage in off-campus service-learning activities such as community-based research associated with these courses. Although her students responded very positively to these courses, she decided to leave the university, convinced that these contributions would play only a peripheral role in her promotion to full professor.

4 Emphasis added by the author.

5 Examples are highlighted in Richard Battistoni’s *Civic Engagement Across the Curriculum: A Resource Book for Service-Learning Faculty in All Disciplines* (2002). A multi-disciplinary approach to the scholarship of engagement at the University of Pennsylvania is highlighted in Harkavy and Hartley’s “Pursuing Franklin’s Dream: Philosophical and Historical Roots of Service-Learning” (2010).

6 See inset.

resources to promote its benefits among their peers, the faculty and at the highest levels of the institutions where they are enrolled?

At the National Center for Science and Civic Engagement, we have attempted to answer these questions in the STEM disciplines by envisioning a new model for undergraduate student leadership in “public science.” This model has been implemented through the Center’s environmental service-learning project, GLISTEN (the Great Lakes Innovative Stewardship Through Education Network),<sup>7</sup> and has fostered a new peer leadership role for undergraduates, one that directly promotes the scholarship of engagement: the Undergraduate Stewardship Liaison (USL). The development, implementation, and outcomes of this unique role are the subject of

<sup>7</sup> See inset.

this Backgrounder.

What follows is (1) an overview of previous academically-based student leadership models from which the USL role has evolved, (2) a detailed description of the how the USL role was developed and implemented in the GLISTEN project, (3) an overview of USL effectiveness in promoting the scholarship of engagement in the STEM disciplines, and (4) recommendations for replication of the USL model in other STEM-based campus-community partnerships.

## Prior Models of Undergraduate Leadership in the Academic Arena

In creating the vision for and deploying GLISTEN Undergraduate Stewardship Liaisons, we have built on a rich tradition of undergraduate peer leadership models

<sup>7</sup> Funded in 2009 by the [Learn and Serve America Higher Education program of the Corporation for National and Community Service](#) and 2012 by the [Environmental Protection Agency](#), GLISTEN is a Great-Lakes-wide environmental service-learning project that integrates Great Lakes ecosystem stewardship and restoration with undergraduate coursework in the STEM (science technology, engineering and mathematics) disciplines through the incorporation of environmental service-learning components into these courses.

GLISTEN was conceived as a “hands-on,” service-learning-based application of the link between civic engagement and science education at the heart of the National Center’s flagship program, SENCER (Science Education for New Civic Engagements and Responsibilities, [www.sencer.net](http://www.sencer.net)). Funded by the National Science Foundation since 2001, SENCER “improves science education by focusing on real world problems” and thereby “extends the impact of this learning across the curriculum to the broader community and society” by developing “faculty expertise in teaching ‘to’ basic, canonical science and mathematics ‘through’ complex, capacious, often unsolved problems of civic consequence” (NCSCE, 2009, p.5). A key ideal of SENCER is that it “locates the responsibility (the burdens and the pleasures) of discovery as the work of the student” (ii).

By focusing undergraduate curriculum development efforts, academic courses, research, fieldwork, and other resources on a single but multi-faceted civic issue, GLISTEN builds the capacity of STEM faculty and departments to:

- + improve learning in the STEM disciplines,
- + engage students in direct action (i.e., service-learning and community-based research) to benefit resource-strapped governmental and community-based organizations,

- + position students to take advantage of “green” professional opportunities upon graduation,
- + provide students with the 21st century skills (such as critical thinking, capacity for collaboration, as well as associated civic engagement skills), and
- + help students as well as members of the broader community become enlightened stakeholders who practice active stewardship behaviors in their private and civic lives.

To accomplish these goals, “Collaborative Clusters” of higher education institutions, community-based organizations and institutions of informal science education (ISE) in the 8 Great Lakes states engage in the following:

- + undergraduate student leadership development and career preparation
- + curriculum development, dissemination and the creation of a community of practice
- + evaluation and assessment to promote program effectiveness

Because of GLISTEN’s decentralized Cluster-based structure in and near US environmental “hot spots” (i.e., Areas of Concern identified in the bi-lateral Great Lakes Water Quality Agreement) throughout the Great Lakes ecosystem, each Cluster embodies these principles and practices them in different ways and to different degrees. The environmental focus of each Cluster has varied from invasive terrestrial species control to assessment and restoration of wetlands to collecting previously unavailable baseline data for headwater streams of major Great Lakes tributaries.



that promote academic success. While not examples of student leadership in the scholarship of engagement specifically, these models demonstrate that undergraduates can engage successfully in supporting and enhancing STEM discipline curriculum development and implementation. Most of these are classroom and lab-based, although some involve roles in coordinating civic engagement activities benefiting both undergraduates and community-based organizations.

### *A. Classroom and Lab-Based Models*

Funded by the National Science Foundation, Peer-Led Team Learning (PLTL) employs undergraduate peer leaders to facilitate small group problem-solving and discussion groups based on the course material. Originating in the chemistry department of the City University of New York, it has now been employed in many other STEM disciplines at higher education institutions nationwide (see [www.pltl.org](http://www.pltl.org)).

In the Undergraduate Science Literacy Program Scholars at the University of Oregon, undergraduates can participate in designing and/or delivering a 100-level science course for non-science majors at the university level, pairing with faculty from the participating departments (biology, chemistry, geological sciences, or physics), assisting with course development, lecture preparation, lecture presentation, in-class demonstrations, and office hours.

Teaching interns with the department of physics and astronomy at the University of Rochester provide instructional support in teaching laboratories, recitations, and the use of technology in the classroom. Undergraduate preceptors in the departments of chemistry and biochemistry at the University of Arizona serve as instructional assistants in seminars and laboratories.

There are some cases in which undergraduates perform curriculum-centered “bridging” roles with respect to the student body and the off-campus community at large. Student preceptors at Wofford College (Spartanburg, SC), for example, have played a significant role in developing and piloting a major reform of the undergraduate biology curriculum, as well as serving as ambassadors for that initiative among their peers (Goldey, 2012). A noteworthy and instructive aspect of this model is that the preceptors engaged in intensive curriculum planning with faculty during the summer months, as

well as implementation of, and supplying informative feedback on, the new curriculum during the academic year:

The preceptors tested out ideas for open-ended experiments, identified course readings, and contributed remarkable energy and creativity to the process. Once they trusted that we valued their input, they became more confident in expressing their opinions, and their insights were invaluable. The preceptors also served as laboratory facilitators ... , troubleshooting unanticipated problems (there were several), training the other laboratory assistants on each week’s activities, and being strong role models for all students. Because the preceptors shared “ownership” of the new course, they also championed it across the campus, thus calming suspicion and anxiety (especially among the students) regarding the curriculum reform. (3)

### *B. Civic Engagement Models*

In a further extension of the preceptor role at St. Mary’s College (Moraga, CA), upper division students have been employed as preceptors and co-instructors in an interdisciplinary learning community focused on plans for restoring and repurposing a former military base and Superfund site to benefit the contiguous community (Bachofer and Martinelli, 2005). The preceptors served not only as co-instructors, but also as “field assistants” who coordinated community-based course activities with off-campus partners, including public presentations of student research relevant to the redevelopment of the Superfund site.

At Indiana State University, an undergraduate student leadership team provides peer support for a wide variety of courses that address civic issues through hands-on learning and embrace ideals of the NSF-supported SENCER (Science Education for New Civic Engagements and Responsibilities) program. (See [http://www.indstate.edu/sencer/SENCER\\_Classes.htm](http://www.indstate.edu/sencer/SENCER_Classes.htm)).

In the Service and Sustainability Learning Program at Kapi’olani Community College in Honolulu, Hawai’i, student leaders support service-learning students and community partners in the college’s interdisciplinary Education, Environmental, Health, and

Bridging Generations issue pathways. These pathways extend across more than 90 course sections per semester. Student pathway leaders orient, place, and conduct reflection sessions with service-learning students in these courses, which lead to associate degree completion and baccalaureate transfer.

At Duke University, students in the LEAPS (Learning through Experience, Action, Partnership, and Service) program design and facilitate peer-led reflection sessions in undergraduate service-learning courses. The University of Massachusetts at Amherst, which recently consolidated its disparate civic engagement initiatives within a campuswide Office of Civic Engagement and Service-Learning (UMass CESL), deploys undergraduate “campus/community liaisons” that

have already successfully completed a service-learning course and “are recommended by the faculty member of that course to return for one or more subsequent semesters as a Liaison between the course, a community partner and UMass CESL.” The flagship program of the office is the Citizen Scholars Program, a leadership development program offered by faculty from the Department of Anthropology and School of Education that “integrates theory and practice to help students develop the knowledge, skills, and vision they need to build community, be effective citizens, and advocate for social justice.” Based on a set of courses that consider the “good society” and strategies for achieving it, the program’s curriculum, policies, and procedures are developed “with substantial input from students” (Uni-

## Undergraduate Stewardship Liaison Profile: Heather Dulaney



Heather Dulaney is a 2014 graduate of Valparaiso University with a B.S. degree in environmental science. While looking for a permanent professional

position, she is working at the Indiana Dunes National Lakeshore through a partnership between the National Park Service and the Student Conservation Association.

Heather was a student at Ivy Tech Community College intending to major in physics when she had her first experience with an introductory chemistry course that had incorporated a GLISTEN environmental service-learning component. This component engaged undergraduates in monitoring the water quality of Salt Creek, a major tributary of Lake Michigan in northwest Indiana. This experience gave her a new perspective on the subject:

*“I was surprised by how this component made chemistry more relevant to everyday life. I remember being prompted to consider the combined impact that thousands of single-drop ‘mini-spills’ of gasoline at self-service filling stations could have on the quality of local waterways and Lake Michigan.”*

In the summer of 2011, Heather began serving as a GLISTEN undergraduate stewardship liaison for that same chemistry course. Taught by Louis Fadel, it involved a partnership with Save the Dunes, a local environmental non-profit organization. Water quality data collected and analyzed by undergraduate service-learning students under Heather’s leadership helped Save the Dunes determine to what extent goals of the state-approved 2008 Salt Creek Watershed Management Plan were being met, and establish baselines used to seek support in meeting those goals. In order to lead her peers in collecting the highest quality data possible, Heather received training in protocols of Hoosier Riverwatch, a program of the Indiana Department of Environmental Management’s Watershed Planning and Assessment Branch.

Heather later transferred to Valparaiso University, an institution in the same GLISTEN Collaborative Cluster as Ivy Tech. She credits GLISTEN and her role as a USL at Ivy Tech Community College with her ultimate choice of major and acquiring valuable technical skills. At a SENCER Summer Institute and a Washington Symposium, she benefited from opportunities to hone her communication skills by presenting her work to legislators and faculty from around the country.

versity of Massachusetts Amherst, 2012).

A similar program has been developed at California State University Monterey Bay, where undergraduates in the Student Leadership in Service Learning (SL2) Program help peers “examine the highly charged issues related to diversity and social justice that they encounter through service-learning.” These undergraduates support service-learning faculty by “working as a teaching partner who co-develops and facilitates critical reflection activities” and “maintaining contact with community organizations during the course of the semester.” Some student leaders “serve on-site with selected community organizations to provide support for the service learners who are working at that site” and “often act as an additional staff member at their community organization” as well as a “bridge” to the campus. Many faculty and students in the social sciences and education benefit from such models, although other disciplines such as public health are also represented. Service-learning sites are often focused on K-12 support (e.g. tutoring, mentoring) or other types of service that lend themselves to addressing identified inequities in the distribution and availability of basic services to vulnerable populations, some living within a few blocks of campus. In keeping with this social justice focus, students learn to communicate effectively with diverse populations, reflect on inequities in society, and consider how service relates to bigger public policy issues.

## Role of the GLISTEN Undergraduate Stewardship Liaison

At the National Center for Science and Civic Engagement, the experiences reflected in the prior examples suggested peer leadership opportunities for undergraduates on an even broader scale in the STEM disciplines, opportunities that would foster more “public science” as the curricular basis for engaged scholarship in those disciplines. By making Undergraduate Stewardship Liaisons (USLs) a key element of GLISTEN, an eight-state project that uses restoration and stewardship of the Great Lakes ecosystem through environmental service-learning as its organizing theme, we have found that undergraduates not only can take on the challenge of serving as critical bridges among public science partners, but welcome the opportunity to do so.

The expectation that undergraduates will play that

central bridging role was built into the structure of the GLISTEN project itself. We made strategic subgrants from our initial sponsor, the Corporation for National and Community Service, based on the premise that communities needed to collaborate broadly – across traditional town-gown and institutional boundaries – to address significant challenges to the health of the Great Lakes ecosystem. Among these challenges were invasive species, toxic algae, disappearing wetlands, and contaminated beaches.<sup>8</sup> We solicited subgrant proposals that articulated a community-wide strategy to address specific challenges through partnerships – “Collaborative Clusters” – consisting of multiple higher education institutions and community-based organizations. Service-learning courses at each Cluster’s higher education institutions were linked to community-based environmental partner organizations actually engaged in addressing specific local challenges on the ground. This approach, in the view of one collaborating faculty member, promoted “‘cross-pollination’ ... between schools in our cluster and ... [generated] new and added opportunities for service projects.”<sup>9</sup>

The Undergraduate Stewardship Liaison position was created to serve as the logistical glue that would keep the partners on track while providing undergraduates with peer leadership experience, as well as opportunities to prepare for the green jobs of the future. Our choice of the word “stewardship” in the title was intentional, because USLs serve not only as environmental stewards, but also as stewards of the environmental service-learning relationships between and among their campuses and community partners. A USL from Ivy Tech Community College in Indiana has clearly articulated the mutually-beneficial logistical goal of this stewardship role:

USLs eliminate/reduce the time the organizations need to spend on arranging/coordinating work efforts, both with administratively arranging

8 Referred to as Beneficial Use Impairments (BUIs), they are associated with Great Lakes Areas of Concern—environmental hot spots identified in the bi-national Great Lakes Water Quality Agreement (for detailed information, see <http://www.epa.gov/greatlakes/aoc/>).

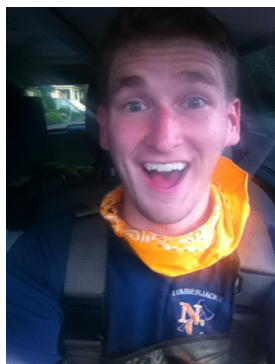
9 Quotations are from responses to online surveys by 22 faculty, 18 community partners, and 52 USLs conducted by the author from October to December of 2012.

service-learning, and ensuring the service-learning (classroom goals) would be beneficial to the organizations.

One of the limitations of service-learning in terms of substantial benefits to community partners is the short-term and often episodic nature of faculty and student involvement. In many cases, this amounts to only one course per semester in a particular department during the entire academic year. We attempted to address this lack of continuity in two ways. First, we set the expectation that USLs would serve for at least a calendar year. This service usually begins with USLs assisting community partner organizations on-site full-time during

the summer. It includes curriculum development activities in collaboration with faculty and those community partner organizations during the summer, as well. During the academic year that follows, liaisons engage in campus-based service that entails coordination and leadership of service-learning activities by their peers. These activities benefit those same community partner organizations in the form of well thought-out service-learning components of undergraduate courses. These components are developed in collaboration with faculty and the community partners during the summer preparation period. In order to promote continuity of service throughout the academic year, we encouraged the use of USLs to support service-learning activities of multiple

## Undergraduate Stewardship Liaison Profile: Alex Bruns



Alex Bruns graduated from Northland College (Ashland, Wisconsin) with a B.S. degree in Environmental Chemistry in 2011. He then went on to Michigan Technological University and received a Master's Degree in Environmental Engineering Science in the 2014. His

graduate research focused on why invasive zebra and quagga mussels are not spreading in Lake Superior to the same degree they have spread in the other Great Lakes and lakes and streams nationwide. He is currently a field engineer with Baker Hughes working as a Surface Logging Specialist on a deep ocean oil rig in the Gulf of Mexico, where he acquires and analyzes real time operational and geological data to increase safety and enhance production by proactively avoiding any drilling problems.

In the spring of 2010, Alex began serving as an undergraduate stewardship liaison for a course taught by chemistry professor Sharon Anthony at Northland College, "The Chemistry of Natural Waters." Under Alex's leadership, students in the course collected water quality data for the Bad River Watershed Association. "I had been taught some of the traditional skills that every chemist has had in class and in lab, but it was not

until I started working on real-world projects that I actually understood and could explain it to others," he says of his USL experience. The data collected will serve as a critical baseline for water quality in the region, now that a major mining initiative is about to be launched in an area of the watershed containing headwaters of the Bad River.

Alex credits his GLISTEN experience with enabling him to compete successfully when he was a candidate for his current position:

*"It gives you the interdisciplinary knowledge and skills that employers or graduate schools are wanting; it also gives you the technical training that is required in the environmental field.*

*During my interview at Baker Hughes, multiple people commented on my vast experience in the field, as well as my leadership experience from coaching to leading and being active in community programs. I whole-heartedly believe that I would not have gotten to where I am today if it were not for my experiences that gave me the opportunity to go to graduate school and then land a job. Anyone can get a formal education; not everyone can get an experience. Through my experience with GLISTEN while at Northland College, I received both."*



faculty members (and even departments) benefiting the same community partner throughout the academic year and during the summer, if feasible. We were delighted when campuses in some Clusters shared USLs inter-institutionally for a similar purpose. For example, when scheduling conflicts prevented USLs from coordinating service-learning activities for a course on their own campuses, USLs from other campuses in the Cluster, who had been placed with the same community partner organizations for the summer, would coordinate those activities for that semester.

A template for the USL position description has been provided in Appendix I. Details on how the liaisons are selected, trained, and deployed, along with their perception of themselves as environmental leaders, have been described previously (Odenbrett, 2012). The focus in this Backgrounder, therefore, is to highlight four key aspects of the USL role which promote engaged scholarship in the STEM disciplines:

1. How USLs engage with community partners to be sure that environmental needs are met,
2. How USLs build the capacity of campus and community stakeholders to create sustained service-learning partnerships,
3. How USLs ensure reciprocity among all stakeholders (community, faculty, peers), and
4. How USLs address unexpected challenges.

Conclusions are drawn on the basis of USL self-assessments as well as assessments by the faculty and community partners with whom they collaborated and served. Recommendations for those wishing to adopt the USL model in the STEM disciplines are presented in the concluding section.

### ***1. Making Community Connections and Addressing Community Priorities***

A fundamental goal of the scholarship of engagement is to address problems and issues that are a priority for a given community or set of off-campus stakeholders. In creating the USL positions, we included considerations of how USLs could facilitate this process. We provided funding for GLISTEN Collaborative Clusters, with the expectation that each Cluster would have at least one two-year and one four-year higher education

institution, preferably with an articulation agreement between them, for two reasons. The first reason was to create environmental service-learning pathways for two-year-college students to a baccalaureate degree. Heather Dulaney of Ivy Tech Community College, who later graduated from Valparaiso University with a Bachelor's degree, pursued such a pathway, which she called "a very fulfilling experience that helped shape my future educational plans." The second reason was to ensure the participation of undergraduates and USLs who were more likely to have "grown up" – or be more than transients – in the same communities where their colleges were situated. The assumption was that the students and faculty from these institutions, as well as four-year public institutions with large enrollments of commuters, would have more direct and personal connections to community concerns.

Embedding USLs full-time with community-based environmental organizations during the summer – a significant investment in time and dollars – was a strategy to ensure that USLs would develop a community-partner "public science" perspective on how science-based environmental service-learning activities could best address the needs that the community-based organizations were addressing. This strategy proved critical to USLs' success regardless of how involved USLs were in the local community at the time of their recruitment. In some cases, where organizations had existing or emerging non-academic "citizen science" programs, the USLs created synergy between those programs and the service-learning efforts of their peers. One example of such synergy occurred in northeast Wisconsin, where biology faculty member Sharon Anthony responded to the renewal of iron ore mining in the region. This mining is supported by some as a jobs creator, but opposed by a local Native American tribe as an environmental threat. Service-learning students, under the leadership of Northland College USLs Alex Bruns and Angelena Koosmann, complemented the work of volunteer citizen scientists by sampling small tributaries of the Bad River, focusing on significant rain events. This sampling, right after such rain events, provided data not available from the regularly-scheduled samples collected by the volunteers. The USL-generated measurements will help serve as a baseline for maintaining high water quality in this area, especially if the proposed

mining initiative proceeds.

In another example, on-the-ground undergraduate research coordinated by a USL under Case Western Reserve University faculty supervision has assisted natural resource managers and the Board of Trustees of the Cleveland Metroparks, a group of non-scientists, in making management decisions about a degraded wetland property the Metroparks had just acquired. The students produced a set of recommendations based on harmonizing existing and incomplete data sets with new data collected and analyzed in a series of biology courses at Case Western Reserve University. It was Alayna Dorobek, the USL assigned to those courses, having spent the previous summer working directly with Metroparks staff, who provided the critical link between the service-learning students collecting the data during one semester, those analyzing it during the following semester, and then creating a report that the Board members could understand and on which action could be taken.

In both cases, the role of the USL was critical to ensuring that data collection met a community priority as well as high-quality technical standards, and that the data were analyzed and communicated in a format that citizens could understand and utilize when addressing civic issues in the broader society. It also highlighted the essential role of community partners in framing the issues that became the focus for collaborative, engaged scholarship.

## ***2. Involving and Supporting Community-based Organizations as Partners***

Another key principle of the scholarship of engagement is the contribution of the public, or community, to the generation of academic knowledge. With GLISTEN's USLs, this contribution is made principally by community-based environmental organizations, which identify the needs to be met by, and host the service-learning activities of, undergraduates from local campuses. To function optimally, campus-community partnerships based on the scholarship of engagement should not create additional administrative and logistical burdens for community partner organizations that divert resources from other critical areas, but rather significantly build the capacity of those organizations to address environmental restoration and stewardship needs in ways that

generate new knowledge. The purpose for embedding the USLs full-time with these community-based organizations in the summer is, first and foremost, to augment staff capacity that is currently limited by resource constraints. Summer is a time in the Great Lakes region that is optimal for outdoor activity, and summers last long enough to ensure that the USLs can acquire the technical skills and community-based organizational perspective requisite for leading their peers in ongoing partnership-based restoration and stewardship work during the academic year. As Nicole Houze, a USL from the University of Akron, put it:

We were essentially part-time employees. We actively contributed to daily projects and were given individual responsibility. As far as the service-learning project, we were the driving force in finding a project, communicating back with the school, and scheduling meetings and due dates.

Concurring with this assessment, a community partner representative from the Shirley Heinze Land Trust in northwest Indiana stated:

Our USLs provided assistance as needed with a variety of projects, but also functioned as dependable, semi-independent staff for our organization, able to take an assigned project and implement it after some training.

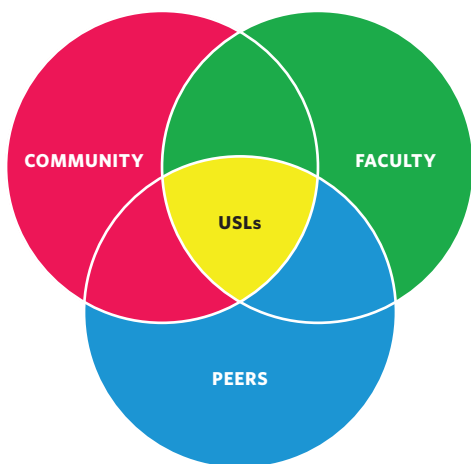
Functioning in such a capacity for the summer, USLs are well-equipped to represent the interests of community partners to their peers and the faculty during the academic year.

## ***3. Promoting Reciprocity by Serving as "Triple Ambassadors"***

With the scholarship of engagement come new, multi-directional forms of knowledge transmission among faculty, students, and community partners. Our USLs serve as the nexus of this exchange. By doing so, they develop a unique awareness of the perspectives of their supervising faculty, their undergraduate peers, the leaders in the community-based organizations to which they are assigned, and the general public. As "community experts" oriented and acclimated during the summer in

the mission, goals, structure, activities, and operational culture of their assigned community-based environmental organizations, the liaisons are able to provide GLISTEN-affiliated faculty with critical insight into ways that service to these organizations can enhance students' learning in undergraduate coursework. For one faculty member from Ivy Tech Community College, this meant that USLs had "a wealth of knowledge" and were "very good at relaying this knowledge and skills to the students." Viewing higher education from a student's perspective, USLs represent to faculty and community partners the student perspective on linking classroom learning to civic engagement. With newly-gained insight into how faculty view curriculum, USLs communicate to other students with the authority that comes from their experience the expectations of faculty and community partners. They become "a conduit," as Alayna explained, for "resources from the community ... and student projects." Robert Young, a USL from Ivy Tech Community College, expressed this role as follows:

I feel that immersing the undergraduate with all aspects of the program - meeting with instructors, students, organizations, and other students - is one of the most important roles that a USL can



*Undergraduate Stewardship Liaisons as "Triple Ambassadors" at the nexus of knowledge flow in the scholarship of engagement*

have. This promotes a coordinating role that makes the USL think of all aspects of a problem and, exposes them to all parties involved.

#### 4. Addressing Challenges and Potential Pitfalls

Up to this point, we hope we have presented a picture of the role that USLs can play in fostering the scholarship of engagement that has been very positive and, in some cases, inspiring. There are clearly cases when starting from scratch can strengthen one's ability to empathize and help others who follow, as evidenced by the following USL response to a survey question pre-service training: "I was thrown into plant species identification without knowing anything previously and that experience allowed me to guide others past some difficulties in botany." But there have been cases in the early history of the GLISTEN project when the implementation of the USL model has fallen short of achieving its full potential.

One major cause was confusion of the USL role with that of an undergraduate intern. To facilitate understanding the distinction, the following chart summarizes the USL role and that of an undergraduate intern, as it is defined in sample descriptions from a variety of undergraduate internship guides (for example, see Appendix 2). As is evident from the chart, undergraduate internships typically involve roles modeled after existing staff positions that do not involve peer leadership. USLs, on the other hand, not only take on duties that mirror those of others in the organization on a paraprofessional level, but as "triple ambassadors" serve a unique function that does not fit squarely within the professional roles of community partner staff or faculty experience, for the most part.

During the first year of the GLISTEN project, when the first cohort of USLs began their summer of full-time service prior to their coordination of service-learning activities (and despite a generic position template that had been disseminated widely), there were cases in which the USLs were treated as summer interns without consideration of how the activities in which they were engaged would relate to service-learning components of STEM coursework on their campuses in the fall. The USLs in this situation found themselves without a clear purpose once the academic year began:

We were given a professor and a community partner with no regards to whether they were compatible. Our community partner wanted

Position	Undergraduate Intern With Public or Private Non-profit Organization	Undergraduate Stewardship Liaison
Purpose (principal)	Apply course-acquired knowledge to real world settings per learning contract Gain career-related experience	Manage service-learning relationships and associated projects so peers can learn from applying course-acquired knowledge to real world settings Gain career-related experience
Duration	A semester/term, academic year, or summer full-time or part-time	At least one calendar year, with a full-time summer preceding an academic year of part-time service
Supervision	Direct supervision by off-campus company/organization personnel	Shared supervision by campus faculty/staff and agency personnel
Faculty/Community Relationship	Subordinate to faculty and community partner representatives	Considered as near-peer or peer to faculty and community partner representatives
Responsibilities	Perform at para-professional level responsibilities of company/organization staff or generate specific product per learning contract	Manage service-learning relationships between campuses and community-based organizations; typically involves supervision of peers
Outcomes	Application of knowledge learned in the college setting Mastery of skills directly related to professional position with company/organization	Application and production of knowledge by peers resulting from service-learning activities planned and coordinated in collaboration with faculty and community partner organizations Stronger campus/community service-learning partnerships
Evaluation	Highly individualized; developed by faculty, career services center and/or company/organization, usually based on report by company/organization supervisor to faculty, if academic credit is to be granted	Standardized, using project-wide version of national SALG evaluation to measure peer learning gains from USL-led service-learning activities; other project-wide evaluations measure community partner organization and faculty perspectives on USL performance

to do water quality, but our professor only did geography and GIS. A better way would be to take our professor's skills and expertise and find a community partner that wanted to do GIS work.

Other disconnects occurred when the USLs and community partner representatives had not been involved in a collaborative, 3-way curriculum planning during the summer with a faculty member, resulting in a lack of clear alignment, in the minds of service-learners, of course learning outcomes and service-learning activity on the ground:

The projects [that the] service-learning students were involved in felt very forced .... most students that were involved seemed disengaged and did not fully understand the bigger picture of what we were trying to do ... Not all, but most students acted as though it was over and above what they should be doing for the class they had signed up for.

In other cases, while appropriate for the knowledge

level of the service-learners, the service-learning activity may have been of very limited value to the community partner. In one USL's view,

... there was not enough collaboration due to time constraints and lack of knowledge in the class (as it was an introductory course) .... So even though there was time and effort put into the project, the output was not to the highest standards.

In another's view, the

... project itself was not essential to the community organization. The community organization had to find a project specifically for the students to complete. It was something that the community organization appreciated but it wasn't high on their priority list.

Lack of sufficient communication among the partners was clearly an issue for those USLs who were not explicitly empowered to facilitate proactively such communication in advance, especially when it involved ini-



tiating the process of solving unforeseen problems. As an example, one summed it up as follows:

Communication is essential ... I can only recall a couple times we actually all sat down together. It should be required that all members at a university ... meet bi-weekly (or at least once a month) to discuss progress, struggles, and direction of the projects. This will help hold everyone accountable for what needs to be done on their end.

Despite such challenges, for those USLs who have experienced – and in many cases fully realized – the full potential of this unique position, tangible personal and career-building rewards are to be reaped. For many, the USL model represents a significant advance in academically-based student leadership. Comments such as these from USLs at Case Western Reserve University, Valparaiso University, and Calvin College clearly reveal how USLs have promoted the scholarship of engagement:

These projects are not easy. It takes hard work and commitment. USLs must understand that this is NOT a typical internship or campus job. This requires investment and passion. But do realize that the consequences of dedication to these projects are very rewarding and beneficial for the USLs career and academic future.

GLISTEN provides highly relevant opportunities within ... fields of study that are unavailable elsewhere. Furthermore, the importance of service-learning curriculums cannot be understated. The GLISTEN program gives hands-on experience to students that is of actual use to non-profits in their restoration efforts. The classroom becomes a place that no longer participates in arbitrary data collection, but instead effectively engages with the community and environment.

It gives students the chance to engage in “real-world” problems regarding environmental stewardship. They get a chance to work with community partners, many faculty members, and other students to tackle huge problems, often successfully.

Given the success of the USL model as an advance over

traditional approaches to undergraduate student leadership, the question arises: Can this model be successfully replicated to address other large-scale civic challenges? In light of our successes and pitfalls, we believe that the recommendations that follow will help those interested in doing so.

## Recommendations for Replication

Based on our experience with GLISTEN over the past four years, we have learned many lessons and developed best practices in response to those lessons. For those considering a replication of the USL model as an opportunity to establish, enhance and/or expand scholarship of engagement partnerships, we present these recommendations for USL recruitment, selection, training, placement, support, and financing.

### A. Recruitment

When the USL position is first developed and introduced, and while there are no veterans to share their experiences, it is critical that candidates understand the distinction between a USL position, which requires a significant amount of project management activities, and a typical undergraduate internship in the STEM disciplines, which typically does not. There is usually far less direct supervision of a USL than there is of an intern, since interns are typically placed “in” or “with” departments or organizations on- or off-campus. Most USLs, in contrast, function “between” them, especially during the academic year, but also in the summer when, ideally, faculty and community partners engage in joint service-learning curriculum planning. So USL candidates whose terms of service begin in the summer must be given an opportunity to understand the difference between a full-time summer internship and a year-long commitment. Their commitment begins with a full-time summer component to build skills and identify and develop curricular service-learning activities in collaboration with community partner representatives and faculty. The commitment extends well beyond the summer so that the USLs can lead their peers in follow-on activities during the academic year. The time commitment and project management elements of the USLs role should be highlighted in recruitment materials, so that candidates are fully aware of them long before the final selection stage of the process.

Another key point to emphasize during USL recruit-

ment is a description of activities associated with the scholarship of engagement. For example, recruiters of USLs should ensure that candidates understand the distinction between data collected and analyzed in a strictly academic context (e.g., during a typical on-campus undergraduate lab period for purposes of generating an individual or group lab report) and decision-relevant data collected and analyzed at the request of a community partner. Key to this distinction is the issue of communication: data will need to be delivered in a format that is comprehensible and useful for that partner in a potentially public decision-making process. Issues such as confidentiality and “chain of custody” may not arise frequently, but need to be addressed if USLs will be involved in handling data that may be challenged in public or in legal proceedings.

In terms of the actual recruitment process of potential USL candidates, the best candidates may be found by searching in a variety of sources. The most obvious source is referral by a faculty member into whose course(s) a USL-led service-learning component is to be integrated. Other on-campus sources could include student employment and/or Work-Study offices, service-learning and/or civic engagement offices, and student organizations with a focus on the issues related to those to be addressed by the service-learning components (e.g., environmental clubs, Engineers Without Borders, or disciplinary honor societies). If feasible, community partners should also be involved in the recruitment process (particularly in cases in which the campus partners have many large classes and significant part-time enrollments), since they may be aware of potential candidates already associated with their organizations in a volunteer capacity. For campuses with high enrollment from outside the area in which the service will take place, special efforts could be made to recruit commuters or resident students from the local community, as their community connections may serve both as a motivator to focus on, and unique source of information about, community needs to be addressed through service-learning initiatives.

## B. Selection

Our GLISTEN experience has shown that the following six factors lead to the selection of optimal USL candidates. How heavily each of these factors is weighted in the overall selection process will depend on the particular courses(s) and community partner activities to be linked through

service-learning with USL assistance, as well as the institutional resources available to support the USLs. The six considerations are:

1. Overall academic performance,<sup>10</sup>
2. Superior academic performance in introductory coursework related to the discipline and focus of the service-learning activities (especially if a USL candidate has taken the course for which s/he would be serving),
3. Mode(s) of transportation to service site(s) available to the candidate, especially in the summer, and a valid driver’s license (if necessary given the location)<sup>11</sup>
4. Peer leadership potential (previously demonstrated and/or identified through an interview process),
5. Career interest related to the discipline of the course(s) and/or community partner focus, and
6. Federal Work-Study eligibility (not required, but preferred in order to promote long-term sustainability of the campus financial contribution).

Regarding the selection per se, our experience has shown that input of community partner representatives in the process, including interviews, is crucial to long-term success of USL-facilitated service-learning partnerships. Input from prior USLs, if available, also strengthens the selection process significantly.

## C. Training

Because GLISTEN is a multi-campus initiative, there are opportunities to provide pre- and in-service training to groups of USLs, thereby making the contributions of trainers more cost-effective (in terms of in-kind time) and providing the opportunity to build a regional USL network across institutions. While it is a challenge to provide comprehensive training, the following topics were considered “important” and “very important” by over 75% of surveyed GLISTEN USLs:<sup>12</sup>

- 10 While academic success in STEM courses is important, this does not mean that only ‘A’ students should be considered for the position. More critical, particularly in cases when a service-learning component is being introduced for the first time with USL assistance, is that USLs be credible role models of learning who can demonstrate how to apply knowledge to the solution of problems off-campus.
- 11 Some GLISTEN service-sites at federal Fish and Wildlife Refuges now offer on-site summer housing to USLs.
- 12 Percentages represent an aggregate of both categories.

- Introduction to Great Lakes restoration and stewardship challenges (98%),
- Introduction to environmental service-learning (88%),
- Technical training related to needs of environmental service-learning partners (87%),
- Opportunities for reflection on the USL experience with faculty, community partner organization staff, and/or fellow USLs (85%),
- Communication skills (79%), and
- Project management skills (79%).

Student leadership training also ranked fairly high in the survey (68%), but the higher emphasis on other “soft” skills such as communication and project management implies that USLs see stakeholder relationship-building and maintenance as key challenges of the position for which special training is warranted. When we have had the opportunity to intensively train USLs from multiple campuses in the Great Lakes region, we have focused on precisely these areas including role clarification, problem solving, and action planning, as well as building a vibrant and supportive multi-campus USL network throughout the eight Great Lakes states.<sup>13</sup>



GLISTEN USLs, faculty and staff at the “Collaboration Web” during June 2014 training session

In addition to being emphasized by the USLs, these areas all relate to 21st Century Skills promoted by the National Academy of Sciences (2010), such as adaptability, non-routine problem-solving, and systems thinking.

GLISTEN USLs have emphasized how critical such training can be to success in their special bridging roles. Our experience has shown that the most effective USLs are those who have received intensive orientation

<sup>13</sup> For a summary of this training, see <http://serc.carleton.edu/sencer/newsletters/73316.html>.

and training prior to placement with community partners in the summer.

#### D. Placement

Just as community partners should play a role in the selection of USLs who promote the scholarship of engagement, placement of USLs should also involve community partner representatives to the greatest extent possible. USLs’ own placement preferences should be taken into consideration, of course, especially since so much of their responsibility can consist of relationship management. Of critical importance is that the USLs’ summer service be related in some way to the need to be met by the service-learning activities they will be facilitating during the academic year. Such continuity enables community partners to engage students in longer-term, more impactful projects that have the potential for deeper curricular connections and learning outcomes for service-learning students.

Our GLISTEN experience confirms that a **minimum** of two USLs per campus should be a goal, particularly if they do not have peers at other institutions in the region with whom they can form a supportive, team-based network. Besides ensuring a source of mutual support, this team approach also helps campuses avoid the risk of an entire service-learning program being dependent on only one person. The pairing can provide continuity should health, scheduling conflicts, or other factors keep one USL from serving.<sup>14</sup> Another strategy to promote continuity and teamwork is to overlap terms of service; in such an arrangement, new USLs are recruited, trained, and peer mentored by experienced USLs in the spring before the summer and academic year in which they assume their full responsibilities.<sup>15</sup>

#### E. Support

There are a number of critical ways that USLs should be supported in their efforts to facilitate successful campus/community service-learning partnerships. These entail key practices involving the relationships among USLs, fac-

<sup>14</sup> Where inter-institutional networks of USLs exist in some regions, campuses have shared USLs on occasion when scheduling conflicts have made it impossible for USLs to lead service-learning activities of courses offered at their own campuses. This arrangement works very well if the USLs have been trained together and have formed inter-institutional teams assigned to the same community partners.

<sup>15</sup> The total time commitment would therefore be about 18 months, as compared with a 12-month term beginning in the summer.



ulty, and community partners.

*First, explicitly empower USLs by giving them both an invitation and permission to bring issues to the attention of the campus and/or community partner representatives, including convening opportunities for resolving those issues.*

Because USLs operate in a para-professional context that makes them conduits for communication among key stakeholders with perceived (and real) power and authority over them, USLs can be reluctant to raise issues that challenge service-learning partnerships in a frank and timely manner. One way of facilitating timely and honest USL feedback is to use the RACI Model.<sup>16</sup>

<sup>16</sup> See [http://en.wikipedia.org/wiki/Responsibility\\_assignment\\_matrix](http://en.wikipedia.org/wiki/Responsibility_assignment_matrix) for a description of the RACI Responsibility Assignment Matrix, including multiple references. A copy of the Matrix developed specifically for use by GLISTEN USLs, faculty, and community partners is available from the author upon request.

Faculty and community partners can use the RACI matrix together with their USLs to identify degrees of responsibility, autonomy and accountability that the USLs may exercise. The completed matrix can then be referred to in sensitive cases that require immediate attention.

*Second, directly involve USLs in joint curriculum development and implementation.*

There is sometimes the perception that it is the sole responsibility of the faculty member to focus on learning goals for their service-learning students, and of the community partner to identify the needs to be met by those students. When the faculty and community partner representative(s) do not discuss and align these two aspects of the service-learning experience (particularly in the summer before course syllabi are finalized) then it is likely that a mismatch of expectations will occur. USLs

## Undergraduate Stewardship Liaison Profile: Alayna Dorobek



Alayna Dorobek is a graduate student in the School of Environment and Natural Resources at The Ohio State University, where she leads environmental service-learning components of undergraduate courses.

She is a 2013 graduate of Case Western Reserve

University (CWRU) with a B.S. degree in biology. Like many students in her high school, she came to college planning to major in biology as part of a program in pre-medical studies. However, during the summer between her freshman and sophomore years, she was recruited by Dr. Joseph Koonce to become a GLISTEN Undergraduate Stewardship Liaison assigned to the Cleveland Metroparks, where she worked as a hydrologist. The following year, she coordinated the service-learning components of two linked undergraduate biology course that assisted the Metroparks in developing a stewardship plan for a newly-acquired wetland property. By this time she had changed her academic concentration within the biology department to ecology.

Since then, Alayna has become an outspoken champion of the USL position, making well-received presentations on her work at such notable venues as the annual conferences of the International Association for Great Lakes Research, the Healing Our Waters Coalition, and the Washington Symposium and Capitol Hill Poster Session of SENCER (Science Education for New Civic Engagements and Responsibilities).

Reflecting on her experience as a USL, Alayna has said:

*“The gains from this position were two-fold. First, I created a strong professional and academic network relevant to my career goals that will serve as a foundation of opportunity and knowledge-sharing. Second, this position absolutely shaped my leadership through the development of strong inter-personal and communication skills. Overall, I would recommend this position because it is very rewarding if you are passionate about the projects and if your GLISTEN community is invested in not only creating successful service learning projects, but also in your own personal growth.”*



are in the unique position of seeing this relationship from both sides – as well as the additional perspective of their peers. They should be engaged as much as possible in facilitating such multilateral communication, to which they can bring their own unique perspective centered in their experience as students. In addition, it is advisable to have at least one consultation per month of the faculty, community partner(s), and USL(s), convened by the USL(s) if necessary, to review progress, make mid-course corrections, and address emerging issues. Having grown up in a “wireless” world infused with social media, USLs are often adept at facilitating such consultations virtually, in addition to employing traditional methods such as face-to-face meetings and conference calls.

## F. Financing

Because of the administrative responsibilities that USLs have with respect to forging and maintaining mutually-beneficial campus-community partnerships, their service should be well-compensated. This means that institutional student wage guidelines for undergraduates, particularly those associated with the federal Work-Study Program, may have to be modified upward in recognition of the advanced roles that USLs play.<sup>17</sup> While campuses may launch a USL-based service-learning program by contributing all USL wages, it is important for community partners to incorporate at least a portion of those wages into operating and grant proposal budgets in future years, to cover the cost of having USLs engage in full-time direct service to those organizations during the summer. This practice strengthens the argument that the campuses should fully support the USLs during the academic year, when most USL-led course-based service-learning activities take place.

Ideally, regardless of the various sources for their wages, USLs should be compensated using the student payroll system of the higher education institutions at which they are enrolled for their entire terms of service. This practice serves three purposes. First, it reinforces the fact that a USLs responsibilities, despite the shift of organizational “homes” between the community in the sum-

<sup>17</sup> A minimum wage guideline for GLISTEN USLs was \$10/hour as long ago as 2009. To meet this guideline, campuses may apply for supplemental Work-Study allocations to be used for community service. See <http://ifap.ed.gov/fsahandbook/attachments/0910FSAHbkVol6Master.pdf>, p. 6-45.

mer and the campus during the academic year, constitute **one** continuous position. Second, it enables USLs to facilitate service-learning partnerships with more than one community-based organization. Third, doing so relieves resource-strapped community-based organizations of additional administrative burdens that most campuses are better equipped to bear.

In our experience, consistent employment of these best practices has enabled USLs on GLISTEN-affiliated campuses to form a multi-state corps of young leaders with a common vision. This vision for “public science” that restores and preserves a healthy and resilient ecosystem is supported by common administrative and environmental activities appropriate for translating this vision into reality on a large scale in eight states.

## Conclusion

As Zlotkowski (2006) and others have insisted when promoting the role of “students as colleagues” in service-learning, undergraduate student leaders “should be seen as involved in a genuinely reciprocal undertaking” in which “they not only make decisions concerning their own specific spheres of activity, but help define the shape and significance of the work as a whole” (275). Given the gulf between scientific consensus and public opinion on critical issues of the early 21st century (e.g., causes and potential consequences of climate change), it is more important than ever for undergraduates to engage in science-based activities enabling them to understand and address such issues in their professional and private lives. Campus/community service-learning partnerships based on the scholarship of engagement and involving undergraduates directly in the production and application of actionable scientific knowledge are pedagogically effective when operational challenges are effectively met.

The National Center for Science and Civic Engagement’s experience with the GLISTEN project has demonstrated that undergraduate stewardship liaisons can be highly effective facilitators of scholarship of engagement partnerships and activities focused on public science. Keys to their effectiveness as facilitators of the scholarship of engagement are appropriate recruitment, orientation, training, deployment, compensation, and empowerment not typical at the undergraduate level. The commitment of institutional resources commensurate with this unique role,

including support from college/university faculty/staff and community partners, is key to the long-term success of a student leadership model that requires undergraduates to “stretch” into “bridges” connecting the faculty, undergraduate, and community stakeholders in vibrant scholarship of engagement partnerships. As they do so, USLs become stewards not only of the Great Lakes ecosystem or whatever civic challenge they are engaged to meet, but also of the very partnerships themselves. In the process, these new student and community leaders can foster the democratic and mutually-beneficial, cross-fertilizing flow of knowledge generated and shared among students, community members, and faculty alike.

# Appendix 1: Prototype of GLISTEN USL Recruitment Announcement



## Year-long Environmental Employment Opportunity Undergraduate Stewardship Liaison GLISTEN (Great Lakes Innovative Stewardship Through Education Network)

**Who:** Undergraduate students interested in environmental sustainability, green jobs, and Great Lakes ecosystem restoration and stewardship

**What:** Great Lakes Innovative Stewardship through Education Network (GLISTEN) at (specify campus) now accepting applications for Undergraduate Stewardship Liaison positions.

**Compensation:** \$10/hour up to \$5,000 year; eligibility for a Work-Study award during the 20XX – 20XX academic year is preferred, but not required.

In this program students will work to connect the classroom to the community by helping to develop and conduct service-learning projects with community groups. GLISTEN undergraduate stewardship liaisons are expected to work closely with faculty members and with community groups to organize specific projects. The stewardship liaisons will serve as the logistical “glue” linking participating faculty and community-based organizations that will benefit from GLISTEN-sponsored service-learning (including course-based research) activities. These students will provide critical project leadership, ensuring that the program maintains an optimal balance among curricular goals, community needs, and student interests. Student leaders will also receive specialized training to prepare them to excel in the “green jobs” of the future.

### Position Overview:

- Work directly in the field with environmental community non-profits
- Assist with community-based Great Lakes ecosystem stewardship including field work involving outdoor physical activity, data analysis, community outreach and education

- Assist undergraduate faculty with Great Lakes ecosystem stewardship projects integrated into undergraduate coursework
- Lead student community projects to support Great Lakes ecosystem stewardship in collaboration with faculty and community partners
- Support and engage in training, service, and networking activities of GLISTEN’s Great-Lakes-wide undergraduate stewardship liaison corps including attending regional/national meetings and conferences
- Measure and report success (quantitative and qualitative data collection)
- **Timeframe:** This is a year-long position with an anticipated starting date in May or June. The selected participants would work 20-30 hours/week during summer months and 5 -10 during the academic calendar months.
- **TimeLine:**  
*May-August:* Fieldwork and project development - Work with community agencies conducting field work focused upon Great Lakes ecosystem preservation and setting up undergraduate service-learning projects connected to course curriculum during the academic year.  
*August-April:* Project Implementation - Work as the link between the community partner and faculty members to assist in the project management of service-learning projects for students.

**Qualifications:** You must be a registered student at (campus) for (academic year). You must also have a valid driver’s license.<sup>18</sup>

<sup>18</sup> With respect to requiring a minimum GPA or other evidence of academic achievement, see footnote 10 on page 26.

**Preferred Skills:**

- + Available for community-based employment during the summer of 20xx
- + Natural sciences education and experience (e.g., biology, chemistry, ecology, geology, environmental science, and/or any related discipline)
- + Sustainable development education and experience
- + Service-Learning experience
- + Independent and self-directed
- + Strong communication skills
- + Proficient with Web2.0 media (E-mail, Wiki, Facebook)
- + Please apply at (website if applicable, or faculty contact phone and email address).



## Appendix 2

**Heidelberg University** describes its undergraduate internship program as “an opportunity to enhance the student’s intellectual development through the application of knowledge” and “to apply knowledge obtained through coursework to an on-the-job work experience” which “allows students to ‘try-out’ an occupation to determine whether or not they intend to pursue that career” while gaining a “valuable repertoire of transferable skills” that will “increase their marketability in any field.”

(Heidelberg College Undergraduate Internship Program Handbook, 2010, p. 3).

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The goal of undergraduate internships at **Medaille College** is “to enhance the student’s professional and personal growth and further his/her understanding and appreciation of the role and duties of the professional in a variety of settings.” During such internships, students may:

- + evaluate and apply the theoretical information they learn in the classroom to practical problems and issues in a work environment;
- + practice thinking, communication, and interpersonal/professional skills;
- + gain additional knowledge and awareness of developing trends in their field;
- + become more independent, self-reliant learners who know how to learn from experience;
- + become more skilled reflective practitioners and integrative learners;
- + explore career choices;
- + compare personal goals and expectations to career requirements;
- + prepare for career advancement by becoming more competitive in the job market;
- + bridge the gap between formal education and the working world;
- + access specialized equipment and facilities that

- may not be available on campus;
- + develop self-understanding, self-discipline, maturity and confidence;
- + develop networking/mentoring relationships;
- + investigate organizational culture; and
- + provide service to their intended profession and the community.

(Medaille College Undergraduate Internship Guidelines and Resource Manual, 2009, p. 6).

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Internships at **Indiana State University** “provide a means for students to identify areas of strength and weakness and an opportunity to practice, improve, and evaluate skills, techniques, principles, and theories they would have been exposed to through coursework”

(Undergraduate Internship Manual, Indiana State University Department of Kinesiology, Recreation, and Sport, p. 2).

## References

- Bachofer, S. et al. 2005. Renewable Environment: Transforming Urban Neighborhoods. Retrieved on June 12, 2014 from [http://serc.carleton.edu/sencer/urban\\_renewable/index.html](http://serc.carleton.edu/sencer/urban_renewable/index.html).
- Barker, D. 2004. The Scholarship of Engagement: A Taxonomy of Five Emerging Practices. *Journal of Higher Education Outreach and Engagement*, Vol. 9, No. 2: 123–137.
- Battistoni, R. 2002. *Civic Engagement Across the Curriculum: A Resource Book for Service-Learning Faculty in All Disciplines*. Providence, RI: Campus Compact.
- Boyer, Ernest. 1990. *Scholarship Reconsidered: Priorities of the Professorate*. Princeton: The Carnegie Foundation for the Advancement of Teaching.
- \_\_\_\_\_. 1996. The Scholarship of Engagement. *Journal of Public Service and Outreach*, Vol. 1, No. 1: 11–20.
- California State University Monterey Bay, Student Leadership in Service Learning (SL2) Program. Retrieved June 12, 2014 from <http://service.csUMB.edu/about>.
- Dewey, J. 1916. *Democracy and Education*. New York: The Free Press, 1966.
- Duke University. 2013. Learning through Experience, Action, Partnership, and Service (LEAPS) Program. Retrieved June 12, 2014 from <http://servicelearning.duke.edu/students/leaps>.
- Franz, J. et al. 2012. "Assessing the Culture of Engagement on a University Campus". *Journal of Community Engagement and Scholarship*, Vol. 5, No. 2. Retrieved on June 12, 2014 from <http://jces.ua.edu/assessing-the-culture-of-engagement-on-a-university-campus/>.
- Gibson, C. 2006. *New Times Demand New Scholarship: Research Universities and Civic Engagement*. Boston: Campus Compact and Tufts University.
- Goldey, E. et al. 2012. Biological Inquiry: A New Course and Assessment Plan in Response to the Call to Transform Undergraduate Biology. *CBE—Life Sciences Education* Vol. 11, Winter 2012: 1-11.
- Harkavy, I. and Hartley, M. 2010. Pursuing Franklin's Dream: Philosophical and Historical Roots of Service-Learning. *American Journal of Community Psychology*: 46(3-4): 418-427.
- Heidelberg College. 2010. Undergraduate Internship Program Handbook. Retrieved on June 12, 2014 from <http://www.heidelberg.edu/sites/default/files/awensowi/images/internship-handbook-nov-2011.pdf>.
- Indiana State University. 2011. Undergraduate Internship Manual, Department of Kinesiology, Recreation, and Sport. Retrieved on June 12, 2014 from <http://www.indstate.edu/krs/pdfs/guidelines/internship-manual.pdf>.
- National Center for Science and Civic Engagement 2009. *Science Education for New Civic Engagements and Responsibilities*.
- Odenbrett, G. 2012. The Unique Leadership Role of GLISTEN Undergraduate Stewardship Liaisons: Recruiting, Orienting, and Training the Next Generation of Great Lakes Ecosystem Stewards. In D. R. Gallagher (ed.). *Environmental Leadership: A Reference Handbook*. San Francisco: SAGE Publications.
- O'Meara, K., 2002. Uncovering the values in faculty evaluation of service as scholarship. *Review of Higher Education*, 26(1), p. 57–80.
- Peters, S. et al. 1999. Toward a public science: Building a new social contract between science and society. *Higher Education Exchange*, 34–47.
- Medaille College. 2009. Undergraduate Internship Guidelines and Resource Manual. Retrieved on June 12, 2014 from <http://www.medaille.edu/files/pdf/academics/internships-handbook-2009.pdf>.
- NASPA - Student Affairs Administrators in Higher Education. Student Leadership: Reviewing Our History, Embracing the Movement. Retrieved on June 12, 2014 from <http://www.naspa.org/kc/slp/Resources/Student%20Leadership%20Handout.pdf>.
- National Academy of Sciences. 2010. Exploring the Intersection of Science Education and 21st Century Skills: A Workshop Summary. Retrieved on June 12, 2014 from <http://www.nap.edu/catalog/12771.html>.
- Ramaley, J. 2004. Higher education in the 21st century: Living in Pasteur's Quadrant. Presentation at the American Association of Colleges and Universities' Network for Academic Renewal Conference, March 4, 2005 (Long Beach, California).
- Reiff, J. et al. Best Practices for Promoting Student Civic Engagement: Lessons from the Citizen Scholars Program at the University of Massachusetts. *Amherst Journal of Higher Education Outreach and Engagement*, Vol.16, No. 4, p. 105-127.
- Saltmarsh, J. 2011. "Engagement and Epistemology." In Saltmarsh, J. and Zlotkowsk, E. In *Higher Education and Democracy: Essays on Service-Learning and Civic Engagement*. Philadelphia: Temple University Press.
- Sandmann, L. 2003. When doing good is not good enough. Good to great: The scholarship of engagement. Address to the National Extension Director/Administrator Conference, February 12, 2003 (Fort Lauderdale, Florida).
- Schön, D. A. 1995. The New Scholarship Requires a New Epistemology. *Change*, Vol. 27, No. 6: 26–35.
- Stokes, D. (1999). *Pasteur's quadrant: Basic science and technological innovations*. Washington, D.C.: Brookings Institution Press.
- Synder-Hall, C. 2012. Tales from Anti-civic U. *Higher Education Exchange*: 13 – 23.
- University of Arizona Chemistry and Biochemistry Preceptor Program. Retrieved on June 12, 2014 from [http://www.biochem.arizona.edu/preceptor\\_program](http://www.biochem.arizona.edu/preceptor_program).
- University of Massachusetts Amherst Office of Civic Engagement and Service-Learning. Citizen Scholars Program. Retrieved on June 12, 2014, from <http://cesl.umass.edu/citizenscholars>
- University of Oregon Undergraduate Science Literacy Program Scholars. Retrieved on June 12, 2014 from <http://scilit.uoregon.edu/>.
- University of Rochester Department of Physics and Astronomy Teaching Internship Program. Retrieved on June 12, 2014 from <http://www.pas.rochester.edu/special/internship.html>.
- Weerts, D. et al. 2010. Community Engagement and Boundary-

Spanning Roles at Research Universities. *The Journal of Higher Education*, Vol. 81, No. 6 (November/December 2010), p. 632 - 657.

Zlotkowski, E. et al. 2006. *Students as Colleagues: Expanding the Circle of Service-Learning Leadership*. Providence, RI: Campus Compact.

## About the Author



Glenn Clayton Odenbrett is project director of the Great Lakes Innovative Stewardship Through Innovation Network (GLISTEN), an initiative funded by the Corporation for National and Community Service in 2009 through its Learn and Serve America

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