



# ON THE WEB

COUNCIL ON UNDERGRADUATE RESEARCH

Spring 2014 | Volume 34, Number 3

## HUMAN RIGHTS AND UNDERGRADUATE RESEARCH

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# **Quarterly** COUNCIL ON UNDERGRADUATE RESEARCH

Volume 34, Number 3

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## Cover Photo:

*Faculty and students from various disciplines contemplate the implications for freedom and tyranny, the topic of their collaborative interdisciplinary faculty-student research seminar at The College of New Jersey, as they listen to a student presentation on peacekeeping. (Photo Credit: TCNJ Staff Photographer)*

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***CURQ on the Web, Spring 2014 edition***  
***[http://www.cur.org/publications/curq\\_on\\_the\\_web/](http://www.cur.org/publications/curq_on_the_web/)***

Joseph L. Murray, Sean D. Fortney, Anna E. Gioni, Zoey G. Goldnick,  
Kevin L. LeValley, Scott R. Sechler, *Bucknell University*

## Personalizing History Using Course-based Research on a Student's Own University

This article builds upon one published in the spring print edition of the *CUR Quarterly*, in which author Murray discussed using course-based research on students' own institution as a means of familiarizing undergraduate students with methods of historical research. In this article, descriptions of five student projects completed in a course on the history of American higher education illustrate the diversity of topics and methodologies that can be brought to bear on such an assignment.

The student researchers' ability to tailor their projects to their own personal interests was found to enhance their intrinsic motivation to learn. Links between the course content and students' previous knowledge and interests also facilitated meaningful learning and reinforced their understanding of the practical utility of historical research methods and the relevance of history to their lives.



Anna Gioni reviews archival documents with Isabella O'Neill, curator of Special Collections and University Archives.

The recent article in the print edition of *CUR Quarterly* advocated the use of such course-based research in teaching undergraduates history, citing its potential for cultivating both mastery of the existing historical record and the development of skills in historical inquiry. In this article, we offer further elaboration on the five students' approaches to completion of their course assignment to illustrate how institutional research can be used to personalize the study of history within the undergraduate curriculum.

In previous literature, course-based projects have been cited as a key strategy for expansion of undergraduate research opportunities (Martinetti et al 2009; Mateja 2011), and the humanities and social sciences have been recognized as areas in which such expansion is needed (Malachowski 2003). Proponents of undergraduate research have advocated an instructional sequence in which students are introduced to research early in their college careers and then assisted in building more advanced research skills over time (Brownell and Swaner 2010; Jenkins et al 2003; Karukstis 2004; Willison 2009). Despite well-intentioned efforts to enact such a vision, however, the time constraints of the traditional academic calendar have posed a persistent challenge to its realization (Manske and Chaplin 2000).

Further challenges specific to the humanities and social sciences include perceived limitations in students' research skills and backgrounds, relative to the complexity of potential topics of investigation (Gesink 2010; Howery 2001; LeMahieu 2009; McDorman 2004; Rogers 2003; Schantz 2008; Uffelman 1995), as well as the tradition of independent scholarship that has prevailed in many fields outside the natural sciences (Armstrong 2009; Dean and Kaiser 2010; Schantz 2008).

Within the field of history, the prevalence of the lecture-based survey course, widely deemed to be essential to a firm grounding in historical context, is uniquely problematic insofar as it has often left non-majors with a view of the discipline that does not reflect the analytical and interpretive

orientation toward the study of the past that is embraced by trained historians (Calder, Cutler, and Kelly 2002; Glew 2007; Grim, Pace, and Shopkow 2004; Roth, 2005; Sipress and Voelker 2009). Students tend to view history simply as a collection of facts to be absorbed.

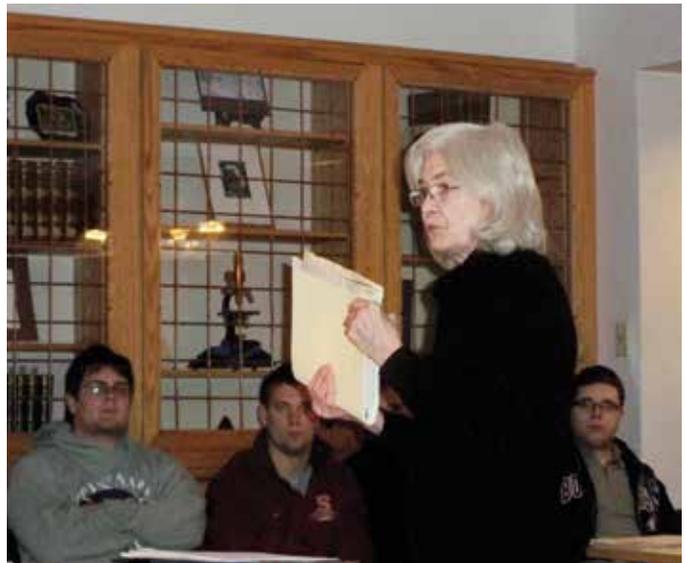
This disconnect has prompted a growing number of history educators to call for curricula that cultivate both an understanding of historical context and the skills of inquiry, argumentation, and criticism (Hounsell and Anderson 2009; Roth 2005; Sipress and Voelker 2009). Glew (2007), in particular, has explained how early use of primary sources can foster students' independence in critically analyzing history and how complex research projects can be made less intimidating to novices by organizing them as a series of more narrowly focused subtasks. The Bucknell institutional history project exemplified all aspects of this emerging vision of undergraduate education in history.

The project was situated in a course that focused on the history of American higher education and its enduring impact on current educational practices. Common readings for the course were drawn primarily from two course texts, one consisting of a collection of essays highlighting various methods of historical inquiry, as applied to the study of higher education (Gasman 2010), and the other a unified overview of the historical development of the American higher-education system (Cohen and Kisker 2010). Weekly issues of *The Chronicle of Higher Education* served as supplementary sources of content for class discussion on contemporary problems in academe.

The primary course assignment for the semester was a report on an aspect of Bucknell's history, chosen by each student. The final paper was to be based on a combination of primary and secondary sources. Students were encouraged to draw support from the archives staff at the university, as well as the staff of the campus writing center. Throughout the semester, students were also assigned weekly readings in the Gasman (2010) text and were asked to complete writing assignments in conjunction with these readings. Through these assignments, students were able to gain experience in applying various research methods to the study of Bucknell's history and to make continuous progress toward completion of their final reports. These assignments also served as a basis for class discussion throughout the semester.



*Anna Gioni consults with Joseph Murray on a writing assignment.*



*Isabella O'Neill, curator of Special Collections and University Archives, conducts an informational session on the resources available through her department.*



*Joseph Murray makes some use of lecture to establish a common context for examining the history of American higher education.*

An important aspect of the project was giving each student the responsibility to choose both the topic of the investigation and the specific methods used to pursue it. Undergraduate research is grounded in constructivist learning theory (Hu et al 2008), which characterizes knowledge as understandings generated by the learner through active engagement in academic discourse, within a community of learners (Fosnot 2005). Gagnon and Collay (2001) have put forth a model for “constructivist learning design” that incorporates six fundamental elements that contribute to an engaging educational environment, all of which were present in the design of the Bucknell higher-education course and the institutional research project: (1) a structured context for learning, (2) opportunities for interaction within groups of learners, (3) establishment of links between newly introduced subject matter and students’ prior knowledge, (4) use of questioning to promote deeper engagement with the subject matter, (5) provisions for exhibition of student work, and (6) opportunities for students to engage in

thoughtful analysis of their emerging individual and shared understandings.

Closely related to constructivist learning theory is the concept of meaningful learning (Oldfather et al 1999), which occurs only when “new symbolically expressed ideas (the learning task) are related in a nonarbitrary, and nonverbatim fashion, to what the learner already knows” (Ausubel 2000, 67). A critical component of meaningful learning is the personalization of subject matter. According to Ausubel (2000), the connections that are made between newly acquired knowledge and prior understandings occur at the level of the individual, so each learner’s unique bank of knowledge must serve as the basis for these associations. Meaningful learning helps both mastery of the historical record and an applied understanding of historical research methods, so that the ability to use procedural knowledge in new situations, widely known as “transfer,” is affected by links to accumulated knowledge (Ausubel 2000).

A common criticism of undergraduate instruction in history is that faculty members too often employ what has sometimes been termed a “coverage” model, in which students are treated simply as consumers of knowledge generated by the professor, often with a focus on memorization of factual content (Sipress and Voelker 2009). Placing emphasis instead on the meaning that students make of course content, Roth (2005) has argued that “if we expect students to take history seriously as a tool or an approach to their understanding of themselves and their lives in society, then we need to select the subject matter with them in mind and make a case for the relevance of history to learning something that is or ought to be important to them” (8).

The literature on motivation offers further support for a more personalized approach to the study of history and more direct engagement of students in shaping aspects of their learning activities. Influential educational theorists have long recognized the strength of inherent motivation (Bruner 1966, Kohn 1999), which has been linked in the psychological literature to a sense of self-determination and control (Csikszentmihalyi 1991, Deci and Ryan 1985). Classroom-based observational research suggests that intrinsic motivation is perhaps most closely associated with conditions of high “cognitive autonomy support,” in which students are encouraged to think in original ways about the subject matter of a given course of instruction (Stefanou et al

2004). Constructivist learning theory itself has been linked to intrinsic motivation within the educational literature (Oldfather et al 1999).

Although the institutional history project described here was not lacking in structure, undergraduates enrolled in the course found ample opportunity within its parameters to pursue inquiries that were of personal interest to them, using a variety of research methods. Below, a review of the projects completed by the co-authors of this article illustrates the widely varied directions in which an assignment of this nature can lead and serves as the basis for discussion of the project’s impact on students’ meaningful learning, depth of understanding, and intrinsic motivation.

### **The Bucknell Community-College Scholarship Program: A Story of Collaboration, Success, and Dreams**

Sean Fortney’s project traced the origins of an academic scholarship program for talented community-college transfer students, which was established with a grant from the Jack Kent Cooke Foundation. This program serves the dual purpose of expanding educational opportunities for economically disadvantaged students and enhancing the diversity of social and cultural perspectives represented within the undergraduate student body. Participants in the



*Zoey Goldnick uses a document projector to incorporate historical university publications into a classroom presentation.*



*Zoey Goldnick uses a pencil and notebook to record information from archival documents.*

program not only receive full financial support, but also draw social support from designated faculty mentors and from one another.

At first blush, an historical analysis of this topic struck Fortney as premature, since the current scholarship program only dates from 2007. However, as he delved more deeply into the topic, it became increasingly evident to him that the historical roots of the program ran much deeper than he had initially thought and that they were inextricably linked to the personal histories of numerous individuals

on whose vision the program had been built. Interviews with campus administrators associated with the program, along with a review of existing background literature on the philanthropist Jack Kent Cooke, revealed the degree to which the life experiences of key individuals fueled their passion for the scholarship program and their personal commitment to its underlying purpose.

Accordingly, Fortney's historical analysis of the program was heavily influenced by the genres of biography and life history. This aspect of his investigation was uniquely

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The overall goals of the conference are to encourage broad participation in undergraduate research and to make visible its benefits to students, faculty, colleges and universities, and communities. Students who participate in undergraduate research are better prepared in their fields of study as well as more informed as citizens as they learn skills of problem-solving, critical thinking, and communication. But as faculty and institutions still face barriers to giving every student a significant research experience, this conference focuses on creative ideas and practical solutions for meeting those challenges. Conference participants will share strategies and models that have helped strengthen undergraduate research in their institutions—in plenary talks, an exciting variety of conference sessions, and through the informal networking that is a hallmark of CUR conferences.

illustrative of points raised in the assigned readings, where the influence of historians' own life experiences on their articulation and interpretation of biographical narratives was discussed (Urban 2010). The topic of Fortney's report was deeply personal for him, as he had transferred into the university with the aid of a scholarship from the program just one semester prior to his enrollment in the higher-education course. Through class discussion, both he and his peers benefitted from his reflections on the potential influence of this experience on his interpretation of the historical record.

Another distinguishing feature of Fortney's project was his analysis of both Bucknell's community-college scholarship program and the broader national initiative of which it was a part. In discussion of an assigned reading on the concept of "horizontal history," meaning the history of organizations that exert influence on multiple educational institutions simultaneously (Thelin 2010), Fortney's research on the Jack Kent Cooke Foundation proved to be a fine example illuminating how powerful such influence can be.



*An online photo collection maintained by the university allows Sean Fortney to access historical images from a remote location.*

## **The History and Present Condition of Athletic Merit Aid at Bucknell University**

Like Fortney, Kevin LeValley addressed the theme of educational access in his research project. In his case he focused on the introduction of athletic merit aid into the Patriot League and resultant changes to institutional policies at Bucknell. LeValley's sources included published literature, archival documents, and interview data. In conducting his investigation, he interviewed a senior athletic administrator, the chair of a faculty committee on athletics, and the president of the university. The research related closely to LeValley's personal interests because he was a highly accomplished student athlete himself and had competed in intercollegiate wrestling throughout his enrollment at Bucknell.

While Fortney's project sought to place the community-college scholarship program in the context of the lives of its creators, LeValley sought to understand the events leading up to contentious financial-aid policy decisions from the perspectives of observers who were not themselves

instigative of the controversy. While the people Fortney interviewed emerged, to varying degrees, as central figures in the resultant narrative, LeValley's were informed observers who directed his attention to events that did not spring from their own backgrounds. This point of contrast was important in illustrating distinctions among related historical genres. While Fortney's project drew inspiration primarily from the traditions of biography, LeValley's use of interviews was more representative of the approach used by oral historians.

His project also added a further dimension to class discussion of the concept of "horizontal history," because his analysis of the merit-aid issue incorporated details of the organizational histories of the National Collegiate Athletic Association (NCAA), the Patriot League, and the Ivy League, in addition to the institutional history of Bucknell. The historical account

that he presented underscored not only the influences of external organizations on collegiate institutions, but also the organizations' influences on one another.

### **The Road to Coeducation at Bucknell University**

Anna Gioni was one of several women in the class who chose to examine the history of women's education at Bucknell, further illustrating the degree to which the theme of access resonated with students as a persistent struggle facing American higher education. Although an affiliated pre-collegiate institute for female students was established early in Bucknell's history, it was not until almost 40 years after the university's founding that women were finally permitted to enroll in college-level courses. The focus of Gioni's investigation was on the interim period between the establishment of the institute and women's regular admission to Bucknell, during which the expansion of educational opportunities for women at Bucknell was debated and ultimately approved.

Occurring in the second half of the nineteenth century, the events that formed the substance of Gioni's narrative could be ascertained only through the use of documentary evidence. However, the availability of several published volumes on the early history of the university allowed her to make more extensive use of secondary sources than would have otherwise been possible. Using several of these works, as well as related archival documents, she was able to piece together a timeline that led her to propose that admission of women to the university might have been based as much on economic considerations as on the moral arguments that figured more prominently in the published literature. She also found evidence to suggest that William Bucknell, the benefactor for whom the university was ultimately named, might have played a role in advancing the movement toward coeducation.

Without the luxury of surviving witnesses, Gioni's project enabled her to experience firsthand the challenges that historians face in constructing detailed narratives of the distant past. For example, in her readings she found that an early female applicant to the university shared the surname of a faculty member who had advocated strongly on her behalf,

yet the available documentation yielded no conclusive evidence as to whether or not a familial relationship existed between them. Gioni's experience with the project illustrates the potential for such an assignment to cultivate students' ability to propose tentative interpretations based on limited evidence, while simultaneously recognizing the uncertainty that attends to such interpretations. King and Kitchener (1994) have cited this aspect of critical thinking, which they have termed "reflective judgment," as an important outcome of undergraduate education.

Although Gioni's research dealt primarily with the early days of the university, she ultimately juxtaposed her findings with more recent data on the representation of women in contemporary higher education, both nationally and at Bucknell. In so doing, she reinforced the significance of history as a source of insight about the present. In an activity related to an assigned reading on the use of photographs as artifacts (Bieze 2010), she also drew contrasts between a contemporary photograph of a familiar women's residence hall and an earlier image of the same building. As she shared the two images with the other members of the class, the resultant discussion illustrated how changes in the physical environment of the campus can offer clues about concurrent changes in the institutional culture.

### **Curricular Changes in an Era of Turmoil: Adaptation During World War II**

Zoey Goldnick's project dealt with the university's adjustment to the international crisis posed by the onset of World War II. While the general literature pertaining to the war's impact on higher education typically has centered on the influx of veterans to American colleges and universities upon their return from duty, owing to passage of the Servicemen's Readjustment Act of 1944 (Cohen and Kisker 2010), Goldnick's research primarily emphasized the war's impact on the university during the conflict itself. In particular, she examined curricular adaptations undertaken in response to the practical needs of a nation at war and the significance of these reforms to public perceptions of higher education as a patriotic alternative to military service. The long-term impact of these changes at the institutional level was significant, in that they contributed to a broadening



*Zoey Goldnick reviews archival documents with Isabella O'Neill, curator of Special Collections and University Archives.*

of the curriculum beyond the liberal arts, a change that has persisted to this day and become a central element of Bucknell's unique institutional identity.

Like Gioni, Goldnick relied entirely on documentary evidence to carry out her project. However, in doing so, she was able to benefit from a far more extensive body of relevant archival documents than was available to Gioni. In particular, promotional literature and other formal communications pertaining to the university's role in the war effort offered a window on both the cultural mood of the time and its impact on the public image that the institution sought to craft for itself. Amidst military recruitment efforts—strongly reinforced by public sentiment—that emphasized a young man's patriotic duty to serve, the university faced the challenge of positioning college attendance as a respectable alternative to enlistment. In her investigation of institutional efforts toward this end, Goldnick made effective use of archival documents to directly examine the rhetoric used to make the case for enrollment.

In addition to contributing to her own understanding of historical research, the project helped illuminate key concepts raised in class discussion. For example, one of the assigned readings introduced the concept of "presentism," meaning the tendency to interpret historical events through the lens

of contemporary sensibilities (Hutcheson 2010). In further discussion of the concept, Goldnick cited the importance of historical context in understanding the apologetic stance on college attendance that was common during World War II—in stark contrast to the social desirability ascribed to college attendance today. This example further reinforced the need for a general understanding of historical context and the appropriate use of both primary and secondary sources.

### **Bucknell Graduates' Economic Performance: A Comparative Examination**

Scott Sechler used longitudinal institutional data on Bucknell's tuition and fees and the starting salaries of its graduates, together with general economic indicators, to conduct a comparative analysis of the immediate financial return on the investment in a Bucknell education of members of the graduating classes of 1968 and 2010. In carrying out his analysis, he first compared the percentage increase in average first-year salaries against the rate of inflation for the same period, in order to determine which class had fared better in real economic terms. He then compared the percentage increase in tuition and fees for the same period against the rate of inflation to determine the comparative tuition burdens borne by members of the two classes. Finally, he calculated the average first-year salary for each class as a percentage of the corresponding tuition and fees, as a basis for comparison of the average return on investment for members of the respective classes.

A major strength of Sechler's report was his measured interpretation of the findings. For example, in comparing first-year salaries for the two classes, he noted that results varied widely when data were compared for specific majors. Additionally, he observed that, nationally, the inflation rate for college tuition and fees during the period of analysis exceeded the overall rate of inflation for the same period. Finally, he cautioned against the assumption that the value of a college education can be measured solely in financial terms, citing an historical essay on the timeless philosophical question of what purpose higher education ultimately serves (Perlmutter 1958). This question had emerged as a recurrent theme in the Cohen and Kisker (2010) text, which served

as a common point of reference in establishing historical context.

Sechler's approach to the assignment was unique, in that he alone made use of quantitative data as the primary basis for drawing conclusions about the past. His final report illustrated certain benefits of quantification that were cited in the course readings (Robbins 2010)—for example, that use of tabular data enabled him to present extensive detail on his findings in a concise and easily understood format. His project also reinforced the relevance of historical analysis to understanding contemporary issues since the rising cost of higher education was among the current problems in academe examined over the course of the semester. Like many of the other students' projects, Sechler's study affirmed the salience of educational access as a matter of concern to undergraduates.

## Discussion

What becomes clear from this review of individual student projects is that authentic historical research can be carried out by undergraduates drawn from a variety of academic majors, within the time constraints of a single academic semester, when their institution is recognized as a legitimate

source of historical data. What becomes equally clear is the potential for such research to personalize the study of history in ways highly conducive to learning.

By virtue of their enrollment at Bucknell, all students in the higher-education course could reasonably be expected to feel some degree of connection to the university's institutional history. In examining the specific topics that students chose to research, one can also see how uniquely relevant their projects were to their individual interests. For example, it should come as no surprise that Gioni and Fortney might take a personal interest in educational opportunities for women and community-college transfer students, respectively, and to take seriously the need for an accurate understanding of Bucknell's progress toward more inclusive admissions policies and recruitment practices. As a political science major, Goldnick was able to draw upon her primary disciplinary perspective by examining institutional issues within the context of national and world events and by interpreting historical artifacts with an eye toward the rhetoric of persuasion and strategic messaging. Similarly, Sechler's quantitative analysis of returns on investment reflected his perspective as a management major and future businessman. As a student athlete and aspiring athletic administrator, LeValley had an interest in athletic merit aid that was of both immediate and potential long-term consequence.

In addition to the diversity of topics chosen by the students in the course, the range of research methods employed and their suitability to the chosen topics were likewise striking. For example, both Fortney and LeValley employed interviews as their primary sources of data, taking advantage of fresh memories and personal insights to gain understanding of topics in recent history. In contrast, both Gioni and Goldnick relied more heavily on analysis of documents in studying earlier periods in the institution's historical development. Finally, Sechler's analysis of quantitative data was uniquely suited to his examination of the institution's financial history. In each instance, the student's selection of a particular methodology exemplified appropriate transfer of procedural knowledge that had been presented in the course readings within a completely different research context.



*Zoey Goldnick consults with Joseph Murray on a writing assignment.*

Consistent with constructivist learning theory, students were actively engaged at each step in the planning and execution of their studies. Reflecting principles of meaningful learning, their prior knowledge was brought to bear on both the subject matter and methodology of their investigations. For example, while the use of quantitative data in the examination of history might have been new to Sechler, his previous use of economic data in analyzing contemporary business problems clearly informed his approach to the design of his study. Focusing on an era that is heavily emphasized in history curricula at both the high-school and college levels, Goldnick similarly was able to benefit from her general knowledge of world events to contextualize her examination of institutional curricular issues.

As might be expected, the students exhibited high levels of inherent motivation in carrying out their projects. For example, the interest that Fortney and LeValley had in existing institutional programs and policies drove their curiosity about the chains of events that helped shape these facets of the university's current functioning; their research questions flowed naturally from this innate curiosity. Even such potentially cumbersome tasks as Sechler's transcription of detailed numerical data or Gioni's deciphering of handwritten notes from nineteenth-century faculty meetings were made more palatable by the light that they helped shed on matters that innately interested these students.

Although a course studying the history of higher education might be seen as more readily conducive to campus-oriented projects than most undergraduate history courses (Murray 2014), the projects reviewed here also offer tangible evidence of the relevance of such institutional research to broader historical themes. For example, the curricular revisions that Goldnick identified in her research could be traced directly to the economic impact of a major war. In his examination of more recent economic trends, Sechler brought to light the impact of such shifting patterns on the financial interests of the individual. LeValley's research on athletic merit aid raised questions about the value assigned to various talents and competencies within an evolving economy. Fortney's study of the community-college scholarship program drew similar attention to the theme of socioeconomic mobility as a timeless issue in complex societies. Finally, Gioni's study of

coeducation at Bucknell addressed the evolution of gender roles as a significant aspect of socio-cultural history. Clearly, each of the students' projects dealt in its own way with a major historical theme, but in such a manner as to make it of immediate personal interest to the researcher. Such an experience holds the potential to advance meaningful learning and produce a deeper understanding of history in courses addressing a wide range of historical topics.

## Conclusion

Based on this review of individual students' projects, research into their own campuses appears to be a powerful means by which to introduce students to methods of historical inquiry within the undergraduate curriculum. In addition to providing authentic experience in the conduct of original research, the course assignment described here established the relevance of history to the lives of current undergraduates. The structure of the assignment was found to offer an optimal level of support to first-time researchers, while simultaneously challenging them to assume an active role in their own learning. Consistent with contemporary theories of learning and motivation, the project was found to engage students deeply with the subject matter of the course, to draw upon their previous knowledge in developing their understanding of the course's content, and to capitalize more fully on their natural curiosity to maximize their incentive to learn.

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# From Washington Partners

## Why is *Posters on the Hill* Important?

Advocacy can take a variety of forms—pleading your case to a professor or dean, asking for more resources for a project, asking your mayor to do something about local crime, or writing your U.S. Senators or member of Congress about a policy issue that you feel is important. For CUR, advocacy means talking to elected lawmakers and their staff about federal policies that support the endeavor of undergraduate research and the faculty and students who pursue it. Year in and year out, CUR, Washington Partners, and undergraduate researchers and institutions debate how federal policies might be changed to better support undergraduate research. And, year in and year out, we have all come to rely on the centerpiece event that has become crucial to those efforts—*Posters on the Hill*.

Every day across the nation, undergraduate students engage in research that is reshaping their educational plans and strengthening the research enterprise. Yet many of the 535 members of the Senate and the House remain largely unaware of what those experiences mean to undergraduates and their long-term positive effects on the students, the institutions, industry, and science. *Posters on the Hill* provides the opportunity for accomplished undergraduate researchers to travel to Washington, D.C., to present their research, engage in some advocacy, and learn a bit about the policy-making process. Many students meet with the three people who represent them on Capitol Hill and share the details of their research and how this experience fits into their career plans.

The experience includes attending an evening reception on Capitol Hill that features the researchers, their research, and their advisors. Members of Congress, Congressional staff members, federal-government officials, and other stakeholders attend the recep-

tion and are always eager to meet the undergraduate researchers. The event highlights the importance of providing federal support for undergraduate research opportunities, given their clear benefits and outcomes. It also provides what is important to any effective advocacy effort—faces and stories from real people and familiar institutions.

The event has played an important role in positive policy changes. In recent years, several members of Congress have proposed new policies that recognize the benefits of undergraduate research. There have been multiple reports from the White House that point to undergraduate research as an important strategy for encouraging interest in certain fields and helping students finish their courses of study. This year marks the 18th annual *Posters on the Hill*, and the event will once again celebrate undergraduate research and the work of CUR and its members and give supporters a chance to better explain and define undergraduate research for lawmakers, academics, and the public. By raising Representatives' and Senators' awareness of undergraduate research and leading Congressional staff members to become strong supporters of federally supported undergraduate opportunities, this event plays a crucial role in CUR's national advocacy efforts in Washington, D.C. CUR members should either try to attend or look for reports from CUR and Washington Partners on the event and its results.

### **Washington Partners, LLC**

*Washington Partners is a full-service, government-relations firm in Washington, D.C., that works with CUR to promote the interests of undergraduate research with legislators and other key policy leaders.*

# CURQ Web Vignettes

## Applying Community-based Learning in Teaching and Researching Contemporary Slavery

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Over the past several years, student demand for courses, research opportunities, and internships in the realm of human rights and modern-day slavery has reached a tipping point, for several reasons. First, social media have made contemporary slavery a familiar issue. MTV's Exit Campaign (<http://mtvexit.org>), for instance, has informed at least 20 million people about the subject since the campaign's launch in 2004. Second, Hollywood has taken notice. With films like 2009's *Taken*, starring Liam Neeson as a father who single-handedly (even if unrealistically) rescues his daughter from the clutches of sex traffickers in Europe, students know trafficking is a moral evil that should be fought. Third, policymakers have transcended partisan politics and embraced legislation to fight modern-day slavery. In February 2013, for instance, the U.S. Senate voted unanimously in support of an amendment to the Violence Against Women Act to help child victims of sex trafficking. President Obama gave a major speech on modern-day slavery in 2012 (<http://www.whitehouse.gov/endttrafficking>). Accordingly, a growing number of incoming college freshmen not only want to major (or concentrate) in the study of human rights, but also want to spend part of their careers tackling human-rights abuses, including contemporary slavery.

In the past two years, I have compiled a teaching and research portfolio on modern-day slavery using community-based learning. Here I highlight some lessons learned and suggest next steps to deepen this teaching and research agenda, particularly for institutions such as mine, a small liberal arts college in the American South. This is especially appropriate given the recent 150th anniversary of President Lincoln's signing of the Emancipation Proclamation.

### Community-based Learning

Community-based learning (CBL) has proven invaluable in developing a teaching and research agenda on contemporary slavery. At the University of Richmond, CBL encompasses any type of experiential learning in which students connect with the community. However, CBL is more than the occasional field trip or guest speaker. Rather, as Terry Dolson of the campus's Bonner Center for Civic Engagement has said, CBL challenges students to become co-educators rather than passive participants as they engage members of the community, reflect on their experiences, and add their own insights to course content. At the same time, there is no geographic boundary with CBL. Thus, although some of my students have interned with two local antislavery non-governmental organizations in Richmond, Virginia, another student (inspired by a class module I taught on human trafficking) applied for and received a grant for summer 2013 to research the relationship between contemporary slavery and environmental degradation alongside graduate students at the University of Denver's Joseph Korbel School of International Studies. Another student applied for and received a grant to conduct an original survey with Esperanza International (<http://www.esperanzaint.org>) in the Dominican Republic on the extent to which micro-finance can mitigate forced labor. Moreover, in fall 2013 my class on human rights and modern day slavery (<http://livinglearning.richmond.edu/ssir/slavery/index.html>) visited the Freedom Center in Cincinnati, Ohio, to attend the first annual conference held by Historians Against Slavery (<http://historiansagainstsavery.org/conference.htm>). I anticipate that this experience will inspire some of these students to find creative ways to research contemporary slavery this summer. It is a mutually reinforcing cycle—the teaching of course content motivates students to go out and conduct original research and then return to the classroom to share what they have learned with their peers.

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### Lessons Learned

The first lesson I have learned in using CBL is the importance of identifying the unique strengths of the surrounding community, even if those strengths are rooted in a traumatic history. In my case, the task has been to view contemporary slavery through the lens of the abolitionism of the past. Richmond, Virginia, where I live and teach, is a city still coming to terms with its legacy of being the capital of the Confederacy and the heart of the slave trade in the American South. Rather than look upon this as a badge of shame, I see this history as a powerful pedagogical tool. Accordingly, in the fall of 2013, for the class I teach on human rights and modern day slavery I scheduled a visit to Lumpkin's Jail, a few miles off campus, and a walk of the Slave Trail in downtown Richmond, where African-Americans were held against their will some 200 years ago. On a more substantive level, I hope to lead more community discussions in the future in which citizens of Richmond can rally around the fight against contemporary slavery and thus further heal its past. One step in that direction was co-hosting a community-wide forum on human rights in the fall of 2012 with the Douglass Wilder School of Public Policy at Virginia Commonwealth University—our larger, sister university in Richmond.

A second lesson I have learned is to build consensus slowly over time, rather than force the issues in which I am interested. Although no one in principle would object to developing a teaching and research agenda on contemporary slavery, the fact remains that many of my colleagues are very busy and are reluctant to take on additional academic endeavors. So I have followed a model of inviting a number of key figures on campus to a series of informal luncheons during which we ponder what a human-rights teaching and research agenda might look like in the years to come for the campus and community. I strive to create plenty of breathing room to allow for a diversity of opinions to be expressed, and to listen carefully to what people say, given the sensitive nature of the subject.

A third lesson is to give students a significant amount of responsibility and expect excellent results. This mindset goes a long way. For example, during spring 2013 along with colleagues Blake Stake and Bryan Figura I advised the freshmen Bonner Scholars at the University of Richmond as they developed a weeklong trip to Washington, D.C., to learn more about human trafficking. I let the Bonner Scholars do all the heavy lifting in planning the event. This gave them a sense of ownership and pride in developing their plan of action, as they organized trips to the non-governmental organization Free the Slaves (<https://www.freetheslaves.net/SSLPage.aspx>) and the State Department's Office to Monitor and Combat Trafficking In Persons (<http://www.state.gov/j/tip>). They returned from their trip empowered and ready to delve deeper into the subject in future classes.

### Next Steps

I envision several next steps in the development of my teaching and research agenda on contemporary slavery. The first step is to continue a series of discussions on and off campus concerning where the work on human rights should be headed. We need more buy-in and consensus before institutionalizing any big changes, such as creating a major or minor on human rights. This may take at least several more years. Second, in the meantime, it is important to offer more classes on issues related to human rights as student demand for such courses grows substantially. Finally, it is important to be open to unexpected changes, given the fluidity of the contemporary anti-slavery movement. With high-tech giants like Microsoft and Google plunging into the antislavery discussion, national, regional, or even global attention on contemporary slavery may quicken in a manner that prior generations of activists could not foresee. We are at the beginning of something big.

### From Globe Trotter to Global Citizen: Researching Human Rights Through International Programs

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During May and June of 2010, I spent a lot of time on Swiss trains. I was the visiting faculty member for Pepperdine University's summer study abroad program in Lausanne, which put me just a short train ride away from the United Nations Library in Geneva. I seized on this fortuitous geography both to dive back into my research on the global expansion of human rights and to invite a student along for the journey.

I had successfully applied for an internal grant to conduct a summer project with Elena Juarez, a Pepperdine political science student who was participating in the Lausanne program. I was interested in the role of global institutions in spreading human-rights discourse and practices to individual nations. As a comparative historical sociologist, I was also confident that the United Nations Library would be an excellent site for research. Before we left for Switzerland, I invited Elena to develop a rationale for which type of human rights to study and which country would provide a compelling case study. She chose the United Nations Convention on the Rights of the

Child and its implementation in Cameroon. That summer, we made the trek to Geneva together six times, and we have been invited to revise and resubmit the paper that resulted from our work for publication. As the project evolved, I learned two broad lessons about the benefits and challenges of researching human rights in the context of studying abroad.

*Lesson #1: Careful planning and spontaneous exploration are equally valuable.*

Among the greatest challenges of conducting research abroad, for undergraduates and seasoned scholars alike, are the realities that there are substantial time limits on the research and that it is not easy to return for further work. Thus important planning must be done prior to the trip to distinguish between what must be done on site and what can be done on the home campus. For our project, planning involved familiarizing ourselves with how to gain access to the library, search the catalogue, and request materials. While at the library, we prioritized our work by checking on whether an item was available online or through Pepperdine's library, and then taking copious notes and making copies of all other potentially relevant materials. The vast majority of the paper was written after we returned to California. Such strategic research decisions would be still more pressing—and possibly require even more planning—for different methodologies in which data collection or analysis must be done on site.

As with any trip, however, the value of sightseeing and detours cannot be overstated. The benefit of conducting research at the United Nations Library—aside from enjoying the beautiful marble building and watching peacocks roam the grounds—was the ability to wander through the collections of books, magazines, and conference proceedings. We took time to simply peruse the books stacked near where our materials were located, to see what other topics were shelved in close proximity to children's rights, international treaties, and Cameroon. The library had prepared guides to certain topics, which helped us understand how the United Nations staff might look at these topics from a different perspective. Taking the detours allowed us to discover more than we expected.

*Lesson #2: Some things cannot be learned from the comforts of home.*

There is much that we can teach our students about human rights through textbooks, lectures, and the World Wide Web. We can easily trace the historical development of human rights treaties, identify the actors involved with protecting rights, and discuss which factors improve or worsen the daily lives of individuals around the globe. Yet there are intangible lessons that can only be learned "on the ground." For my student and me, our view of the United Nations would have been cartoonish without seeing the endless rows of books and pouring over the detailed meeting proceedings. The bureaucracy of the U.N. would have been abstract without the hassle of applying for library access. We might have underestimated the gap between those charged with protecting human-rights and those needing protection if we had not eaten lunch in the cafeteria next to U.N. staff and delegates. In short, conducting research on human rights in this international context gave us an understanding of what the framework for protecting human rights looks like from the inside.

Yet for those of us interested in studying human rights, there is a still more valuable—albeit elusive—lesson that we hope to impart on our students: what it means to be a global citizen. Promoting human rights is a critical undertaking, but that challenge can also



Elena Juarez Theisner taking notes at the United Nations Library in Geneva.

seem distant from students' daily lives. It is one thing for young scholars to affirm that all people should be guaranteed human rights, but it is something else entirely for them to see themselves as part of that human endeavor, wrapped up in a common fate, and to feel empathy for those who lack clean water or freedom of speech. By facilitating student research on such important topics while the students are living in new environments, travelling far outside their comfort zones, professors can foster that synergistic moment when students redefine themselves. My student, Elena, had taken an earlier trip to Africa during which she realized the importance of empowering individuals to help their own communities; our trips to Geneva helped her grasp the grand enterprise of world aid that too rarely reaches those on the ground. In her words, "When you go, you learn."

Today's undergraduates have unprecedented opportunities to travel and study abroad. The number of students participating in international programs has grown, as has the number and diversity of destinations. Such opportunities are undeniably still a luxury, but we should seize them nonetheless, encouraging our students to go and to learn.

#### **Undergraduates, Faculty Mentors, and Professional Disciplinary Societies Address Climate Change as a Global Human-Rights Issue**

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Climate change ranks among the greatest human-rights issues now and for future generations. The United Nations Human Rights Council has expressed concern "that climate change poses an immediate and far-reaching threat to people and communities around the world" and has recognized the United Nations Framework Convention on Climate Change (UNFCCC) as the "comprehensive global framework to deal with climate change issues." The ultimate aim of the UNFCCC is to stabilize greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic interference with the climate system ... within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner" (UNFCCC 2013, [http://unfccc.int/essential\\_background/convention/items/6036.php](http://unfccc.int/essential_background/convention/items/6036.php)). Negotiations to achieve such goals through legally binding multilateral agreements take place at the U.N.'s annual Conference of the Parties (COP).

For the past several years, students and faculty representing Moravian College, York College, and the American Chemical Society (ACS) have attended the COP meetings as official civil-society observers or with press credentials. These participants have gained a deeper understanding of science, sustainability, economic equity, social justice, and the difficulties involved in developing multilateral policy. Although people from many nations comprehend the gravity of the situation, the dearth of understanding of the complexity and urgency of global climate issues in the United States continues to thwart any real progress in national or international policy. It is our hope that by engaging in research and disseminating the results, students and faculty can help to counter the U.S. public's denial or lack of understanding of the scientific underpinnings of climate

change. National consensus on this issue is critical for meaningful policy to be adopted (Ding et al. 2011).

Prior to attending the international meetings, students conduct significant background research focusing on the UNFCCC process and relevant U.S. initiatives. For example, students representing the ACS meet at the national headquarters in Washington, D.C. with ACS staff from the Office of Public Affairs and then travel to Capitol Hill for off-the-record meetings with legislative staff involved with environmental affairs, including climate change. One student spent a day at the National Oceanic and Atmospheric Administration's (NOAA) Climate Program Office, meeting with its manager of the international programs, to investigate the U.S. government's policy position on climate change. Two other students met with Peter Tans, a senior research scientist at NOAA's Earth System Research Laboratory in Boulder, Colorado. Another student interviewed ACS President Bassam Shakhshiri about the society's Public Policy Statement on Climate Change, the ACS Climate Science Toolkit, and other documents. The information gleaned is shared in blog posts and on the ACS policy website (see <http://www.studentsonclimatechange.com/cop18-student-participants.html>).

The COP meetings go beyond being a fascinating learning experience; the conferences serve as an international multidisciplinary laboratory. Students interact with individuals from around the world, ranging from other youths attending as observers to high-ranking ministers, and with negotiators from the 195 U.N. member states that are parties to the UNFCCC. They gather data and information while attending interactive sessions run by governments, the Intergovernmental Panel on Climate Change (IPCC), and non-governmental organizations (NGOs). The students have interviewed negotiators, government officials, representatives from indigenous cultures, and youth from a multitude of countries to gather stories on how people around the globe are impacted by climate change, to identify which issues are of critical importance for the negotiations, and to learn why some individuals are driven to activism. Students learn first-hand how the disparate impact of



*Faculty mentors and students at COP18 in Doha, Qatar, December 2012, from left to right: Gregory Foy, Keith Peterman, Nikki DeLuca, Marla Bianca, John Siller, and Parker McCrary. (Photo Credit: Diane Husic)*

climate change is already being felt—most often by those who live closest to the land, in developing nations, and particularly the poor who have minimal capacity to adapt and who often have done little to contribute to the rising atmospheric levels of greenhouse gases that lead to climate disruption. After the students acquire, analyze, and synthesize this data, they integrate it into articles, blog posts, and presentations delivered at local and national meetings (see examples at <http://moraviancollegeatunfccc.blogspot.com/2013/08/faculty-and-student-scholarly-outcomes.html>).

These students participate in research, journalism, and the use of social media to communicate information to campuses, professional societies, and the broader public. Although the student observers are science majors, the outcome of their research produces interdisciplinary scholarship. The students must translate technical, scientific, policy, legal, and ethical information into formats accessible to multiple disciplines and audiences. Indeed, the student engagement in the COPs has provided the impetus for new scholarly endeavors on and beyond students' campuses. Some examples include student participation in the Eastern Pennsylvania Phenology Project (a study of the timing of seasonal events in nature which are highly dependent on weather; see <http://lgnc.org/research/phenology>); interviews with first responders and survivors impacted by Hurricane Sandy; the collection of oral histories of residents of coastal communities in Alaska and agricultural regions in Peru hit by water shortages due to diminishing snow pack and receding glaciers; and analysis of the environmental education and psychology literature in order to develop effective curricula for teaching the public (of all ages) about climate change. Educational materials that students have produced are being used by the National Park Service, regional nature centers, and coastal communities in New Jersey.

The faculty mentors model this interdisciplinary scholarship by contributing articles and interviews for blogs and the press (e.g., the *Huffington Post*, National Public Radio, and KYW/CBS); conducting climate-based research in areas ranging from ecological monitoring to adaptation and resilience at the community level; making presentations at regional and national conferences; and serving on steering committees focused on linking research to climate policy at the state and international levels.

The American Chemical Society's official Public Policy Statement on Climate Change recommends "Climate Change Literacy and Education" as one of four specific "actions" to mitigate and adapt to the consequences of climate change. The engagement of U.S. college and university students and faculty in the UNFCCC COP process as press representatives and observers for non-governmental organizations directly responds to the ACS-recommended "action." The participants employ the U.N. climate conference as a platform to promote literacy and education about climate change. This project broadens the "silo" of scientific understanding to one that engages a constellation of social, political, ethical, and economic issues. The resulting multidisciplinary scholarship provides a contextual framework for understanding the momentous challenge and the urgency of addressing climate change as fundamentally a human-rights issue.

#### Reference

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The *CUR Quarterly* Editorial Board is excited to announce the launch of the *CURQ* online archive. The content from the *CUR Quarterly* and *CURQ* on the Web is now searchable on the CUR website by Author, Title, Subject, and Institution. The search function can be found here:

[http://www.cur.org/publications/cur\\_quarterly\\_index\\_online\\_search/](http://www.cur.org/publications/cur_quarterly_index_online_search/)

# UNDERGRADUATE RESEARCH Highlights

**Jolitz RD, McKay, CP.** Quantitative 3D Model of Light Transmittance Through Translucent Rocks Applied to the Hypolithic Microbial Community. *Microbial Ecology*. 2013; 66: 112-119. (NASA Ames Research Center)

The study examines the light requirements to sustain microbes living on the subsurface edges of rocks in hyperarid deserts. A radiative transfer simulation was developed to predict the transmittance of photons through such a rock. Subsurface sides were determined to be 14-24 times brighter than the basal subsurface. This implies that inhabited rocks act as a "sail" for both light and water to sustain microbes in the perilitic habitat. Chris McKay is a research scientist in the Space Sciences Division at NASA's Ames Research Center. Rebecca Jolitz is currently a graduating undergraduate senior in the mathematics and physics departments at University of California at Berkeley. She began the study as a summer intern in 2009. This research was supported by NASA's Astrobiology Program and a fellowship from the Davidson Foundation awarded to Jolitz.

**D'Souza MJ, AlAbed GJ, Earley M, Roberts R, Gerges FJ.** Manipulating In-House Designed Drug Databases For The Prediction Of pH-Dependent Aqueous Drug Solubility. *American Journal of Health Sciences*. 2013; 4:3: 137-150. (Wesley College)

One goal of this project was to create a database with searchable parameters in order to predict anticancer activity of a drug based on its chemical structure. Initial results were published in *Pharmaceutical Reviews* and the U.S. Government Accountability Office picked up this work and used it to criticize the FDA (<http://srxawordonhealth.com/2010/07/26/fda-criticized-by-the-government-accountability-office/>). A second goal was to create an online database so that clinicians could add (or improve on existing) data. Malcolm J. D'Souza is a professor of chemistry and director of sponsored research at Wesley College. Natalia Roberts is an assistant professor of biochemistry at

Georgetown University. Fady J. Gerges is director of surgical pathology at Doctors Pathology Services. Ghada J. AlAbed completed this project as a senior and graduated in 2010. She is currently employed as laboratory supervisor of the science labs at Wesley College. Melissa Earley completed her part of the project in her senior year. She is currently employed as a software developer at Highmark Blue Shield in Delaware. The work was supported by grants from the National Institute of General Medical Sciences (8 P20 GM103446-13) at the National Institutes of Health.

**Chestler SR, Grosfils EB.** Using Numerical Modeling to Explore the Origin of Intrusion Patterns on Fernandina Volcano, Galapagos Islands, Ecuador. *Geophysical Research Letters*. 2013; 40: 4565-4569. (Pomona College)

Using numerical finite element models, and targeting the Fernandina volcano as a case study, this article demonstrates how minor, volcanologically plausible geometric variations in a magma reservoir system can lead to the emplacement of radial, circumferential, and corkscrew-style intrusions akin to those that characterize many volcanoes in the Galapagos and elsewhere. This result helps resolve a problem that has intrigued geologists for some time, and, excitingly, we have now identified conditions that can lead directly to lateral intrusion of radial dikes from a shallow magma reservoir. Eric Grosfils is the Minnie B. Cairns Memorial professor of geology. Shelley Chestler led the research effort for her senior thesis research, and is currently a graduate student at the University of Washington. This project was supported in part by NASA Planetary Geology & Geophysics grants NNX08AL77G and NNX12AO49G.

**Deibler K, Basu P.** Continuing Issues with Lead: Recent Advances in Detection. *European Journal of Inorganic Chemistry*. 2013; 7: 1086-1096. (Duquesne University)

Lead contamination continues to be a great concern in the environment even though some of the uses of lead, for example, leaded gasoline, have been severely reduced. Emerging technologies in water purification have been shown to increase lead concentration in water, and recent issues with lead contamination in toys were reported in the popular media. It is now recognized that no level of lead is safe for children. During the past several years, significant progress has been made in the area of lead sensors that can detect small quantities of lead in the presence of other contaminants. In this article, we summarized emerging sources of lead contamination, regulatory issues, and recent developments of lead sensors. We believe this manuscript will garner a wide readership, from inorganic environmental chemists to those who think deeply about issues concerning metals in biology. Partha Basu is a professor in the chemistry and biochemistry department at Duquesne University. This article is a direct result of Kristine Deibler's research experience as an undergraduate Crable Fellow, a flagship fellowship for our undergraduate students. She wrote and defended her honors thesis, and the current article came from the introductory chapter of her thesis. She worked on her project for two years, and an additional manuscript is expected to come out of her research. She continued to work on this manuscript after her graduation, and currently she is pursuing her PhD in chemistry at Northwestern University.

**Rosen LD, Whaling K, Carrier LM, Cheever NA, Rokkum J.** The Media and Technology Usage and Attitudes Scale: An Empirical Investigation. *Computers in Human Behavior*. 2013; 29: 6: 2501-2511. (California State University, Dominguez Hills)

The present study developed and tested a comprehensive measurement tool for assessing up-to-date media and technology use, plus attitudes toward technology and preference for task switching. This validated scale provides a common metric for researchers studying the impact of smartphones, tablets, social media, and emerging technologies. Larry D. Rosen is a professor of psychology

and past chair of the psychology department. Kelly Whaling is currently pursuing her master's degree at California State University, Northridge. Jeff Rokkum is currently pursuing his master's degree at California State University, Dominguez Hills and is in the process of applying to doctoral programs. Kelly Whaling was supported by the National Institutes of Health Minority Access to Research Careers Undergraduate Student Training in Academic Research Program (MARC U & #8260; Star Grant No. GM008683).

**Cummins A, Garza P.** Adolescent Self-Harm Behavior and Choke by Diana López. *New Review of Children's Literature and Librarianship*. 2013; 19: 2: 79-94. (University of Texas Pan American)

Participation in the choking game, self-asphyxial risk-taking behavior, threatens the well-being of adolescents. Focusing on this problem, Diana López's novel *Choke* helps to establish the genre of the young adult problem novel presenting a social issue within a realistic work of literary fiction. *Choke* represents literature portraying adolescent self-harm behavior that could be used in programs for prevention. Amy Cummins is an assistant professor of English. Polet Garza is currently a senior majoring in psychology and Spanish at the University of Texas Pan American and assisted with this study during her junior year.

**Elton ES, Zhang T, Prabhakar R, Arif AM, Berreau LM.** Pb(II)-promoted Amide Cleavage: Mechanistic Comparison to a Zn(II) Analogue. *Inorganic Chemistry*. 2013; 52: 19: 11480-11492. (Utah State University, Miami University, University of Utah)

Two new lead(II) complexes containing an amide appendage were prepared and characterized. The amide cleavage reactivity of one of the complexes was compared to that of a zinc analog. The presence of the larger lead(II) ion was found to result in a change in the rate-determining step of the reaction pathway leading to amide cleavage. Lisa M. Berreau is a professor of chemistry at Utah State University, Rajeev Prabhakar is an associate professor of chemistry at Miami University, and Atta M. Arif is the staff crystallographer at the University of Utah. Eric Elton was an undergraduate chemistry major at Utah State University who worked

on the synthesis and reactivity portions of the project during the 2011-2012 and 2012-2013 academic years and during summer 2012. Tingtang Zhang is a computational chemistry graduate student at Miami University. Elton is currently a PhD student in chemical engineering at the University of California, Davis. The Utah State University Office of Research and Graduate Studies supported the research via a 2012 Summer Undergraduate Research and Creative Opportunities (SURCO) award to Eric Elton; an award from the National Science Foundation supported the contributions of Tingtang Zhang and Rajeev Prabhakar.

**Schap D, Guest L, and Kraynak A.** Total Offset and Medical Net Discount Rates: 1981-2012. *Journal of Forensic Economics*. 2013; 24: 2: 191-204. (College of the Holy Cross)

Medical net discount rates (MNDRs) are calculated based on the medical Consumer Price Index and using annual percentage yields on various U.S. Treasury securities of short duration. Stationarity and other time-series properties are tested for each series. The somewhat mixed results are more supportive of “total offset” (i.e., a zero MNR) than previously published research findings have been. David Schap is a professor of economics. Lauren Guest is Holy Cross Class of 2013 and began work on the project as a research assistant during summer 2012 and continued her participation as part of directed research courses in fall 2012 and spring 2013. She now works for Trio Health, whose software tracks patient data for various chronic diseases. Andrew Kraynak is Holy Cross Class of 2012 and initiated the research as part of his economics department honors thesis research during fall 2011 and continued the work as part of a directed research project during spring 2012. Kraynak is now a U.S. Navy Explosive Ordnance Disposal Officer. A grant from the May and Stanley Smith Charitable Trust supported the summer research component in 2012.

**Kenemuth JK, Hennessy SP, Hanson RJ, Hensler AJ, Coates EL.** Investigation of Nasal CO<sub>2</sub> Receptor Mechanisms in Wild-type and GC-D Knockout Mice. *Chemical Senses*. 2013; 38: 9: 769-781. (Allegheny College)

This study examined the mechanisms of nasal CO<sub>2</sub> detection in mice. In addition to typical odorants, mice and other animals are able to detect CO<sub>2</sub> concentrations below that in the expired air. We found that a small subset of olfactory receptors neurons are sensitive to CO<sub>2</sub> and that they use unique mechanisms to detect this respiratory gas. This research relates to a larger project investigating the mechanisms and causes of Sudden Infant Death Syndrome. Lee Coates is a professor of biology and neuroscience and the director of undergraduate research, scholarship, and creative activities. This work reports results from student summer research and senior projects. Jessica Kenemuth and Allison Hensler are both in dental school at the University of Pennsylvania. Shane Hennessy is in medical school at the Edward Via College of Osteopathic Medicine (VCOM), and Ryan Hanson is in medical school at the Penn State Hershey College of Medicine. The research was funded by the Wells Foundation and the Class of 1939 Student Research Fund.

**Fu JC, Hao W, White T, Yan YQ, Jones M, Jan YK.** Capturing and Analyzing Wheelchair Maneuvering Patterns with Mobile Cloud Computing. *35th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. 2013; 1: 2419-2422. (University of Central Oklahoma)

Power wheelchairs are widely used to provide independent mobility to people with disabilities. Despite great advancements in power wheelchair technology, research shows that wheelchair-related accidents occur frequently. To ensure safe maneuverability, capturing wheelchair maneuvering patterns is fundamental to enable other research, such as safe robotic assistance for wheelchair users. In this study, we proposed to record, store, and analyze wheelchair maneuvering data by means of mobile cloud computing. Specifically, the accelerometer and gyroscope sensors in smart phones are used to record wheelchair maneuvering data in real-time. Then, the recorded data are periodically transmitted to the cloud for storage and analysis.

The analyzed results are then made available to various types of users, such as mobile phone users, traditional desktop users, etc. The combination of mobile computing and cloud computing leverages the advantages of both techniques and extends the smart phone's capabilities of computing and data storage via the cloud. Jicheng Fu is an assistant professor of computer science. Travis White was a senior in computer science at the University of Central Oklahoma. The research was supported by the Oklahoma Center for the Advancement of Science and Technology (OCAST), HR12-036, and the National Institute of General Medical Sciences of the National Institutes of Health through Grant Number 8P20GM103447.

**Bishop AC, Ganguly S, Solis NV, Cooley BM, Jensen-Seaman MI, Filler SG, Mitchell AP, Patton-Vogt J.** Glycerophosphocholine Utilization by *Candida albicans*: Role of the Git3 transporter in virulence. *Journal of Biological Chemistry*. 2013; 288: 47: 33939-52. (Duquesne University, Carnegie Mellon University, UCLA)

*Candida albicans* is a pathogenic fungus and the cause of many hospital-acquired infections. This study identified and characterized novel transport proteins responsible for the uptake of the lipid metabolite, glycerophosphocholine, by *C. albicans*. Importantly, this work identified the Git3 transporter as being required for the full virulence of the organism in a mouse model of infection. Jana Patton-Vogt is an associate professor in the department of biological sciences at Duquesne University. The undergraduate involved in these studies, Ben Cooley, separated and quantified glycerophosphocholine and related metabolites in the cell. Cooley was a senior when the experiments were performed and is currently a masters student in the forensic science program at Duquesne. The research at Duquesne University was supported by an NIHR15 grant.

**Chen S, Mason N, Middleton S, Salazar W.** An Examination of Behavioral Data and Testing Scores as Indicators of Student-athletes' Academic Success. *KAHPERD*. 2013; 51: 1: 34-43. (Morehead State University)

The researchers examined behavioral data and test scores of 186 NCAA Division-I student-athletes to verify the best indicators of student-athletes' academic performance for balancing academic achievement and athletic participation. It was found that participants' academic performance (grade point average) was found to be positively correlated ( $p < .01$ ; Pearson  $r = .497$ ) with the time spent attending classes and studying, and negatively correlated with the time spent in competition, practice, and leisure activities ( $p < .01$ ; Pearson  $r = -.357$ ). The results demonstrated the importance of balancing student-athletes' academic and athletic life. The researchers provided further discussion and practical suggestions on how to work with student-athletes concerning this conundrum. Steve Chen is an associated professor of management and marketing, Morehead State University. Nick Mason is currently a senior in Morehead State University's Sport Management Program. Mason has been an undergraduate research fellow for the last three years working with his mentor, Steve Chen. The project was funded by the Center for Regional Engagement of Morehead State University.