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UNDERGRADUATE RESEARCH GOES ABROAD



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About the cover: Stetson University students
participate in a field trip as part of a 2016
spring break seminar in Shanghai. Photo
courtesy of CET Academic Programs.

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A Delicious Connection: Global Learning through Structured Multimedia Dialogue

Abstract

Global connections are key to undergraduate research, but educators and students rarely connect globally using media that can make education interdisciplinary, engaged with local communities, and maximally sustainable. This article discusses a project that accomplished the aims of the Association of American Colleges & Universities “global learning” criteria, involving interdisciplinary study, external engagement through documentary production and photography, and cultural sharing focused on sustainability. Coordinated by anthropology, Asian studies, and communication studies faculty and carried out with students from these fields and sustainability science, the project combined social sciences, natural sciences, and the humanities to address cultural differences and changes in food production in the United States and China. Outcomes and assessment of independent study and work-study are examined, and recommendations are offered based on lessons learned.

Keywords: *documentary filmmaking, food production, global learning, interviewing, Southern agriculture (U.S.), southwest China, sustainability,*

It did not start with a major revelation but with a last-minute grant idea: what if anthropology research in China could be brought to the local level in the United States by teaming up university faculty and students interested in local media work?

Global learning should be key to undergraduate research, but efforts usually are focused on international study programs. Media, when used appropriately, can help educators to cross disciplinary boundaries, assist students and faculty in engaging with local communities, and foster a focus on sustainability.

Building on trust established through interdisciplinary work at the university, the faculty members in communication studies and Asian studies submitted the grant application. Two grants, to be applied to technology, local travel, and student pay, came from the Associated Colleges of the South (ACS) and the Duke Endowment, under the working title of “Food Systems Transitions in Southwest China and South Carolina: Fostering a Multimedia-Enhanced Dialogue.” Student-faculty teams then were created to produce videos, work on subtitles for the videos, and nurture dialogue on the videos through in-person and online screenings.

According to the Association of American Colleges & Universities (AAC&U), global learning entails an education that “prepares students to critically analyze and engage with complex global systems, their implications for the lives of individuals, and the sustainability of the earth” (Whitehead 2015). Students participating in this project were charged not only with deploying critical analysis skills and negotiating the complexity that might be a part of any global humanities course or independent study but also with drawing connections between different disciplines and translating knowledge in a practical and personal dialogue across global contexts. We argue that multimedia dialogue can accomplish these goals of global learning sustainably, both in terms of foci and resource usage.

One faculty-student team developed a documentary and photo exhibit about food and farming in South Carolina, focusing primarily on the upstate region where Furman University is located. Another team worked with footage and photographs from previous trips to China to create a documentary and photo exhibit about similar topics in Yunnan, a southwestern province. With three students enrolled in independent study during the 2015 spring semester and additional students contributing on an ad hoc basis, the projects were completed in time for summer screenings at Furman University and in Yunnan, China. From conception to completion, the project required students to collaborate on multiple levels that began within the institution, moved to community outreach and engagement with local food producers, and ultimately expanded to international dialogue facilitated by media exchanges.

Discussed below are three topic areas (interdisciplinary approaches, local community engagement, and international dialogue), lessons learned, and the application of the global learning rubric of AAC&U (2014). The analysis indicates that multimedia dialogue offers global learning opportunities for other faculty-student teams. Particularly well suited to ecological issues with interdisciplinary interest and practical implications, it can be adapted to a wide variety of other topics of global importance.

Interdisciplinary Approaches

The two faculty members involved in this grant, Tami Blumenfield and Brandon Inabinet, were members of Furman University’s David E. Shi Center for Sustainability’s Affiliate

Faculty Program. Affiliate faculty frequently exchange information on small grant awards, invite speakers from the local community whose work connects to research and pedagogy of multiple faculty, and provide input to Furman's sustainability goals. Thus it was a natural fit to connect personal interests such as sustainable agriculture and organic farming with specific research interests in southwest China and South Carolina. Faculty members regularly present ongoing research at the center, attracting collaborators and making the often-obscure disciplinary "silos" of research familiar to one another (Halfacre et al. 2013).

Students were invited to participate in the project through various advisers and majors. Efforts to provide context and understand the topics for exploration came first. The reviewed literature ranged from underpinnings of Southern Agrarians and local food traditions in the U.S. South (Grey 2014; Prody and Inabinet 2014; Prody 2013) and articles on the environmental impacts of agriculture and the U.S. Farm Bill (Quinn and Halfacre 2014; Foley et al. 2011) to a study in multimedia ethnographic research methodology (Tobin and Hsueh 2007). Students also learned about the culture of the Na and Nuosu villages of southwest China to gain deeper understanding of the audiences that would participate in the media exchange (Blumenfield 2003; Blumenfield 2014). Such background knowledge would be key to understanding how to communicate across differing cultural norms and move from preparatory knowledge to interaction (Deardorff 2006).

Students discussed the literature in a weekly reading group around a circular table in the campus dining hall. Informed by different disciplines, these discussions shaped pre-production plans, as students designed interview questions of *where* people farm (economic systems), *why* they farm (social systems), and the technical information of *how* they farm (environmental systems). Students subdivided these questions into six subheadings of food production: economic systems into agricultural inputs and markets, social systems into education and values, and environmental systems into management practices and forecasting measures. Even though the list of questions could take more than an hour of interview time, farmers appreciated the students' thoughtfulness in adjusting liberal arts concerns to the requirements of agriculture.

Interdisciplinary systems-thinking and collaboration also occurred in adding English and Chinese subtitles in the post-production process. Students worked to translate difficult terms between cultures. For example, relatively common key terms such as *farmer* and *food producer* in the Chinese subtitles had connotations of *peasant*. Given that the types of U.S. food producers portrayed included large-scale agribusiness, Christian nonprofit community gardening, and organic and

hydroponic rooftop tomato producers, the Chinese subtitles needed further clarification that revealed cultural difference in terms of social class and politics. Chinese students also viewed archived footage from a previous faculty research trip to southwest China, transcribed the content, and added English subtitles. Student collaboration with peers from other majors and cultures allowed the film in the early and late stages to undergo rigorous discussion from multiple academic perspectives and capitalized on students' unique strengths in translating systems-thinking to common, practical parlance and in adjusting language between cultures for intercultural competence.

Local Community Engagement

Students next engaged individual farmers and community gardeners in South Carolina, with a central component of global learning to connect large-scale systems to individual practices and beliefs. After consensus on the interview questions was reached via the weekly lunch discussions, students then worked in the second month of the semester to contact local food producers. Contacts initially were made through lists held by area farmers' market organizers and from university personnel who regularly consult with farmers in the area. The two communication studies students (Amanda Richey and Callie Yow) leading the videography portion of the project interviewed two small-scale farmers and three urban community gardeners who work with low-income populations. To also portray local agribusiness, the professor monitoring the work interviewed a large-scale conventional farmer during the university's spring break.

Interview sessions in South Carolina were composed of a two-part process. Students began by interviewing food producers for an hour using pre-established questions, then asked them to lead walking tours of the properties, to illustrate agricultural production practices and capture "B-roll" footage that could be added over the interview audio. With novice interviewers and farmers eager to talk, questions that appeared later in the list often would be answered at the outset of the interview. Although coached on technique, students would still sometimes respond or laugh during interview segments, making the footage unusable. Students worked with more than eight hours of footage and roughly 100 photographs. By cutting and color-coding the useful footage in a video sequence in Adobe Premiere Pro, achieving a usable narrative became much easier. Outtakes were used after the credits to reveal the very human connection established with local farmers during the process, as students began to really enjoy learning from the people who grow their food.

By the end of the semester, the larger group of students had finished discussion of the readings, and the two independent-

study students had conducted and coded all interviews. Faculty then had to work quickly in the early summer to use grant funds for hiring work-study students and editing the footage into final form. Obviously, since the emphasis had been on global learning rather than technical expertise, this worked well to accomplish the goals of the grant. Faculty learned about each other's fields in the process: the ease and importance of acquiring good technology in communication studies, the methods of storytelling in anthropology, and the competencies of the students in the two different majors.

In June 2015, students and faculty members hosted a screening at the Shi Center for Sustainability of nearly complete versions of the two films: *Growing Food in South Carolina: Farmers' Perspectives* and *Food Systems and Farming in Southwest China*. The farmers and food producers who were filmed earlier in the semester were invited to attend and to share their questions and concerns. Interviewees commented on the "professionalism" of the student interviewers but wished the work could have been done in June, when the bounty of the fields would be evident.

The reaction to the film documenting Yongning's food culture was even stronger, as farmers in South Carolina questioned the accuracy of the peasant farmer transition toward urban and rural tourism portrayed and imagined the "real story" was closer to the American one, in which a wider diversity of pressures were at work. Given the recent banning of the documentary exposé *Under the Dome* and China's ecological disasters near the major cities of northern and coastal China, Americans were especially interested to see the reflection of large-scale news stories rather than the individual transition more common to daily life in southwest China. Both videos also reflected the cultural lens of American farmers-as-media-consumers, who primarily expected the narrative of agriculture to focus on the controversy between sustainable practices and agribusiness in South Carolina and China. Yet the interviews revealed more concern for intergenerational living situations and concerns about the feasibility of "back-to-the-land" rhetoric (Prody 2015).

Farmers were appreciative of the chance to work with a local liberal arts college, as their primary contact for farming research had often been the agricultural extension office of the major land-grant university 30 miles away. Only two of the six interviewed food producers had previous connections with the institution. As a result of this project, local farmers were able to witness and discuss communities unlike their own. This liberal arts benefit, described by Martha Nussbaum, was realized when food producers, as global citizens, debated representations and political issues surrounding people they had never met but for whom they now imagined a narrative and vested interest (Nussbaum 2002).

Overall, students' global learning benefited from the exterior community engagement component of the project. In many cases, students are still in contact with the farmers and gardeners that they interviewed—either through volunteer work with their community gardening organizations or through weekly encounters at the farmers' market. In their reflective essays at the end of the term, students who received course credit for the project reported being "more invested in the outcome of the project and therefore more invested in the learning process" than a traditional classroom experience. Students left the bucolic, gated campus to meet food producers in declining urban neighborhoods, worksites full of recycled goods, or warehouses and fields not yet reflecting a harvest that would allow the farmers to thrive another year. Students reported gaining "more nuanced conceptions of agriculture in the American South" that gave a cultural appreciation and illuminated individual stories that often become lost in global systems theories.

International Dialogue

Global learning depends on reflection and dialogue across borders—critical engagement with a diversity of audiences to foster self-awareness and responsibility. The overarching goal of this project was the "deliverable" of connecting two disparate groups in dialogue about the common challenge of food production and sustainability. During summer 2015, faculty from Furman University traveled to Yunnan Province, where they conducted several film screenings. The first screening followed a format similar to the screening at Furman University earlier in the summer and hosted community members, educators, and students from Yunnan Minzu University and farming families. Subsequent screenings were much less formal, taking place in the homes of village families with just a few people gathered around a TV set (see Figure 1). At these screenings, anthropologist Blumenfeld (who had spent several years in the villages) was the only outsider present, which provided a very different dynamic from the first screening.

Attendees at the screenings raised many questions about South Carolina's food system and, by extension, about food production and consumption practices in the United States. For example, one community gardener featured in *Growing Food in South Carolina* discussed his work employing teenagers at Mill Village Farms to encourage entrepreneurship within low-income communities in Greenville, South Carolina. Elderly women who saw the film in Yunnan were shocked that young people could be paid high hourly wages for doing very basic farm work and wanted to know exactly how much they earned. Another difficult issue was an explanation to the rural Chinese audiences for the high-sugar, high-carbohydrate diet of many Americans. It was hard for

them to understand why the South Carolina farmers were so passionate about growing their own food and changing cultures of food consumption, because they could not imagine a lifestyle where people did not eat hot meals prepared from scratch every day. Thus Blumenfield, who was translating the *Growing Food* film for village audiences who could not read the Chinese subtitles, had to pause and explain how junk food had become common in the United States, subsidized by federal support with nearly untraceable constituent ingredients and piled on shelves in huge stores.

Although villagers could empathize with South Carolina farmers who described children leaving farms for service-sector jobs in the cities, they had a hard time understanding the other part of the “back-to-the-earth” movement in which luxury consumerism was attached to food sourcing in small-scale, often inefficient, local gardens in the United States. After all, the Chinese government was in the midst of promoting increasingly mechanized agricultural production, one component of a nationwide push to reduce rural populations and expand urban ones (Blumenfield 2014).

The other profound conversation topic that recurred at several of the screenings was that the Yongning villagers had farmed organically in the past, using organic waste as fertilizer, but without much effect. They could never produce enough to keep starvation at bay, until the synthetic agricultural products of the Agricultural Revolution arrived. Nearly everyone attending the screenings still remembered those hungry days when organic farming was a necessity. The fascination of U.S. farmers with long-discarded cultivation methods seemed foreign, especially as a consumer lifestyle choice.

When Blumenfield and Inabinet returned to Furman University in the fall, they shared questions and observations with the students in the project. Late in the fall 2015 semester, students and faculty again collaborated to capture these final layers of dialogue via a website that seeks to model the project for replication and alteration to other contexts and themes in higher education (Ferguson, Inabinet, and Blumenfield 2016; see <http://medialogues.wixsite.com/home>). Because of the central role of multimedia in this project, students were able to help foster an international conversation without leaving South Carolina. Expenditures and travel were minimal when compared to a traditional semester program of study abroad, yet students still reaped the benefits of heightened global awareness and personal connection.

Challenges and Lessons Learned

Learning does not happen in a protected space. Students must take risks with new skills and technologies in work with communities beyond their comfort zone. The students

who participated in the multimedia project were mostly unfamiliar with videography, video editing, minority communities in China, or even the culture of the food producers and farmers in their own neighborhoods. Even with frequent faculty consultation and oversight, most questions were only answered when students were out in the field. Students had to troubleshoot technology and methods during their interviews, from working with backup equipment when the brand new Canon DSLR failed to capture video (because of a slower writing speed of the memory card) to going off-script to ask a taciturn farmer about genetic modification or the limits of sustainable agriculture. Students also found that getting lost on winding rural roads on a stormy afternoon could be an enjoyable and refreshing break from typical schedules.



Figure 1. Chinese Villagers Gather for a Home Screening of *Growing Food* in South Carolina: Farmers’ Perspectives and Food Systems and Farming in Southwest China.

Back on campus, students charged with editing and transcribing the footage learned that the post-production process spurs self-reflection as well. Lengthy interviews hid narrative threads. Coding the footage took so long that the students who envisioned the entire project had little part in constructing the final videos. Post-production challenges slowed the project until after the semester, when most students had left campus, requiring an unplanned editing marathon by Inabinet. The additional time required for these steps left barely enough time to add subtitles to the videos before the trip to China.

A few suggestions may be offered to meet these challenges. First, a careful plan should be made for effective communication among team members. Instead of relying entirely on conventional forms of communication such as e-mail and face-to-face appointments, an online document, discussion

board, listserve, or even group text-messages may be useful. These mechanisms can help student leaders in the project boost morale and offload some of the supervision from faculty. Second, some structures will make more sense than others for involving students in the project. Will independent studies offer the greatest incentives for engaged participation, or will paid work opportunities be more enticing? Work-study hours funded through a grant might be better motivation and could create intentional global learning for both work-study and independent-study participants.

In addition to communication with students about the work, finding the right balance of practical remedies in environmental, economic, and social systems is key. It was anticipated that food producers in China would be especially interested in learning new and old technologies like hydroponics and *hugelkultur*. This turned out to be a correct assumption, but differences in social value of the food produced—the efficiency mind-set of American consumers and the luxury market attached to the slow food movement—had been forgotten. Similarly, although social systems—the family connection and loss of younger generations to service-sector urban living—would be common to the two cultures, the importance of land pricing and economics had not been factored into that discussion. In all of these areas, additional editing time was necessary to determine which interview threads and dialogue would best serve the film. Systems-learning takes time.

Given the constraints on fitting a complex project into one semester with a few students, moving the project to one undertaken as a special-topic “action course” (or Problem-Based Learning course) could be a better strategy. Such a scenario would allow a sense of full devotion for at least several phases of the project. This might also allow the dialogue in all its phases to be undertaken in the course. Asynchronous, edited dialogue would allow students and faculty to post and circulate reactions to the interviewed clips to find the greatest points of global learning (such as those that best embody important global systems in individual practice, garner most self-awareness or perspective taking, and foster a higher sense of responsibility and care toward others).

We recommend six phases for effectively structuring multimedia dialogues:

- Phase 1: Establish infrastructure for effective collaboration, including file sharing of electronic files (PDFs) and others for joint editing.
- Phase 2: Film interviews and take photographs on location, ideally using DSLR cameras.
- Phase 3: Code and edit the video using Adobe Premiere or similar software.

- Phase 4: Conduct synchronous viewing and dialogue sessions with local participants.
- Phase 5: Hold curated, asynchronous international dialogue sessions with curated photograph displays or social media posts.
- Phase 6: Build an accessible public presence for long-term sharing of the entire project, on platforms such as Wix websites and university institutional repositories.

Conclusion

Incorporating structured multimedia projects with a global focus into traditional undergraduate research can greatly affect not only student education but also help address global challenges. It can serve as an effective “milestone” on the global learning spectrum, one that can be furthered with coursework as well as undergraduate and graduate experiences outside the United States. In the case described here, the U.S. students who interviewed farmers developed some locally relevant intercultural skills as they learned to navigate relationships with people whose lives and backgrounds diverged from their own. The Furman students from China who participated in the project—who had to juggle acculturation issues, disciplinary pursuits, and project work, unlike their U.S. classmates—learned more about U.S. farming practices as they watched the documentary footage and worked on subtitles.

Through this process, U.S. students attained some of the same personal intellectual experiences and insights that can be obtained through international study, without the expense. However, a deeper understanding of farmers in southwest China on the part of the U.S. students would have required a more intensive effort by project faculty in continuing to monitor student learning through discussions and written evaluations with participants until all sharing had concluded.

Although beyond the scope of this grant project, a minimum of quarterly, mandatory discussions for all students, even those who participated in only one production and dialogue phase, is recommended. A diamond structure to promote student learning might be feasible, beginning with student-faculty conversations; widening into a broad array of filming, photography, editing work, and media-structured dialogues; and returning to student-faculty analyses of the work. In the case described here, participants did reconvene in the spring of the second year of the project to develop the project website, but with both faculty members on sabbatical leave and three student participants studying elsewhere during the fall following the project screenings, discussions were more piecemeal and more focused on modeling the project to other institutions rather than assessing the global learning outcomes.

Despite these limitations, the multimedia dialogue represents

a first step toward deeper understanding by many of those involved, from the farmers in southwest China and South Carolina and the students who immersed themselves in the work to the university faculty from China and South Carolina who attended the screenings. Students became more invested in their educational experiences and gained more nuanced understandings of problems from theoretical and practical perspectives. They developed interviewing skills and technical knowledge, worked in collaborative teams, and gained some of the benefits of off-campus study.

Meanwhile, the media produced through the project became widely accessible through websites and sharing. For example, about a year following the project's completion, Blumenfield shared *Growing Food in South Carolina* with Chinese citizens at the U.S. Embassy's Beijing-America Center in April 2016 as part of a lecture on organic farming and urban gardens in the United States. The audience loved seeing the farms and hearing directly from the farmers, learning how a technologically advanced and relatively prosperous country approaches vexing issues that affect people around the world, regardless of nationality. Those audience members, already living in a nearly post-apocalyptic environment with polluted soil, water, and air, had no hesitations about the necessity of organic farming. Their biggest question was one of trust: how can one possibly trust a person who claims to be farming organically? They composed a totally different audience than the one in southwest China. The project thus continues to foster conversations related to sustainability that affect us all.

On the U.S. side, Furman administrators, grant coordinators, and department chairs have praised the project and commended it to others as a model tied to the university's strengths in Asian studies, sustainability, and community engagement. The project was the keynote lecture at the 2016 ASIANetwork Conference to dozens of liberal arts institutions' faculty. The website has been promoted through the David E. Shi Center for Sustainability, the Duke Endowment network of four higher education institutions, and the ACS.

Perhaps in the future, a network of student-faculty teams can be drawn from elsewhere in the world and pair global learning with multimedia dialogue, thus broadening global perspectives and systems thinking, examining these areas in individual practice, and challenging us in nurturing better dialogue and solutions to the world's most pressing issues. As described here, a dialogue on food production and culture between China and the U.S. South composed a delicious place to start global learning. 

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Brandon Inabinet is associate professor of communication studies at Furman University, led the production team for the U.S. film, and was one of the investigators on the grants. At Furman, he teaches courses in argumentation, advocacy, and rhetoric. His published research spans the gamut from classical rhetoric to Southern agrarian speech and the concept of "sustainable advocacy" relevant to this project. He has served as coordinator of the Affiliate Faculty for Sustainability, serves as the president of the South Carolina Conference of the American Association of University Professors (AAUP), and has received the Janice Hocker Rushing Early Career Research Award in Communication Studies.

Tami Blumenfield is an anthropologist and assistant professor of Asian studies at Furman University and was principal investigator on the grants that funded the project. Her published research focuses on resilience in Na and Nuosu cultures of Southwest China and on cultural heritage in China. In 2016 she was a Fulbright Scholar affiliated with the Research Center for Studies of Southwest China's Borderland Ethnic Minorities at the Institute of Ethnic Group Studies and Sociology, Yunnan University.

Amanda Richey is a senior earth & environmental sciences and communication studies double major at Furman and served as one of the three independent study students who participated in the media project. She contacted farmers in South Carolina, conducted three of the interviews, and coded video clips for editing. She has published in the Young Reporters for the Environment annual competition, edited a user manual for a farm-scale biodiversity assessment tool, and conducted pond biogeochemistry research at a USDA-certified organic rotationally grazed cattle farm.

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CURQ Vignette

Enhancing Global Citizenship through Student Research Presentations

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The semester-long course Population, Society, and Environment (SOCI 215R) meets a general education elective in environmental responsibility at Stetson University, a private, predominantly undergraduate institution in central Florida. The course has no prerequisites, so it attracts students from a variety of majors. The course examines how demographic change leads to environmental change, as well as how demographic and environmental changes prompt social change. The class analyzes processes such as the health and mortality transition, fertility transition, migration, and urbanization on a global scale. Students reflect on how these processes affect the environment and on the interventions they can make in their own lives to promote sustainability.

Previous evaluations emphasized that students wanted a more high-impact, experiential learning component. The author drew on her previous experience as a study abroad professional to meet this request. For spring 2016, an optional, half-unit, spring break seminar to Shanghai was designed as a “field trip” for the class. Eight students joined this seminar, including two senior sociology majors, two junior environmental science majors, two sophomore sociology majors, a freshman environmental science major, and an MBA student. These students had taken or were enrolled in either 215R or Introduction to Sociology (101S).

As the largest city in the world’s most populous country, Shanghai highlights the relationships among demographic, environmental, and social change in sharp relief. From a practical perspective, it also offers a safe and accessible option for students who do not speak Chinese. The study abroad provider, CET, was enlisted for help in implementing ideas for the program.

The study abroad course was based on the best practices of the Association of American Colleges & Universities (AAC&U) for faculty-led programs (Donnelly-Smith 2009). It included visits by representatives from nongovernmental organizations (NGOs) addressing social problems caused by demographic change (such as a lack of schools for migrant children) and visits to an organic farm, a power company that increasingly draws from renewable sources, and a factory that manufactures electric vehicles. Consistent with the environmental theme of the course and its intent to engage students with the local environment, public transportation was used for all but one outing. Shanghai’s extensive subway system made a big impression on students, half of whom

had no previous experience with public transportation.

Although the length of the program precluded a full-length research project involving a proposal and a test of hypotheses, students did make an initial foray into applied sociological analysis, based on their own observations. Students received the syllabus, which articulated the course readings and requirements, at the beginning of the spring semester. Three weeks before departure, students also attended an orientation session on course expectations and logistics. Attendance of all learning activities in Shanghai was mandatory and allowed students to become participant observers. Students’ written work and oral presentations were based on their field notes from meetings with visitors and site visits.

During the nine-day seminar and the week immediately following, students submitted five reflection pieces on topics pertaining to the course. Reflection pieces required students to engage with the readings, to use theoretical lenses and concepts from SOCI 101S and 215R, and to include observational evidence to support their arguments. Students were asked to write one piece on morning observations at a local park—which allowed for reflection on health and aging—but they chose the topics of their other pieces. Student subjects included accessible transportation, consumerism, and the meaning of *organic*.

Nine days after their return to the United States, students met individually with the author to discuss the reflection piece that would be developed into an eight-minute research presentation. Requirements for research presentations included use of four peer-reviewed sources as well as the inclusion of ethnographic field notes and photographic evidence from Shanghai. Presentations were done in 215R as the semester-long course transitioned between units on urbanization and sustainability. Shanghai seminar students asked their peers to consider important questions such as how to develop values regarding the use of resources and how the values of people in developing countries with large populations may differ from their own. Students in 215R asked questions of the presenters.

Students quickly drew connections between the clothing made from recycled polymers, which was worn by staff at a Buddhist sustainability organization in Shanghai, and the gowns made from similar materials that would be used in Stetson’s graduation ceremony. On a deeper level, students from both the study abroad seminar and the longer class began to reconsider the meaning of sustainability and their responsibilities as global citizens. As the course progressed, students calculated their carbon footprint and articulated changes they might make to live more sustainably. As

Streitwieser writes, “transformation of experience to action is essential in the development of global citizenship” (2009, 400). By interpreting the observations made in Shanghai, students from both classes became “constructive agents of change.”

These conversations have continued beyond the walls of the 215R classroom. One student also gave her presentation at Stetson’s annual Showcase of Undergraduate Research. In fall 2016, four Shanghai seminar students volunteered to participate in a workshop on global citizenship for Stetson’s annual Values Day. These presentations allowed students to continue to reflect on global citizenship and its enhancement through study and research abroad. 

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UNDERGRADUATE RESEARCH Highlights

Williams LM, Lago BA, McArthur AG, Raphenya AR, Pray N, Saleem N, Salas S, Paulson K, Mangar RS, Liu Y, Vo AH, Shavit JA.

The Transcription Factor, Nuclear Factor, erythroid 2 (Nfe2), Is a Regulator of the Oxidative Stress Response during Danio rerio Development. *Aquatic Toxicology*. 2016; 180: 141–154. (Bates College, McMaster University, and the University of Michigan)

This study investigated the importance of a transcription factor, Nfe2, in the response to oxidative stress in zebrafish at the phenotypic and transcriptomic level during development. Animals were treated with pro-oxidants at three stages during development. Early in development, Nfe2 knockout animals suffered from hypochromia that was made more severe through exposure to pro-oxidants; this phenotype may be linked to decreased expression of *alas2*, a gene involved in heme synthesis. Across time and treatment, there were six genes that were significantly up-regulated in the knockout compared to wildtype and four genes that were significantly down-regulated. These results demonstrate that the zebrafish Nfe2 may be a regulator of both primitive erythropoiesis and the oxidative stress response during development. Larissa Williams is an assistant professor of biology at Bates College. Andrew McArthur is an associate professor in the Department of Biochemistry and Biomedical Sciences as well as Cisco Chair in Bioinformatics at McMaster University. Jordan Shavit is an assistant professor in the Department of Pediatrics and Communicable Diseases at University of Michigan. During 2015–2016 Briony Lago, a McMaster University undergraduate, worked on this project as a co-op student and summer fellow. In 2014–2015 Nicholas Pray worked on the project as part of his senior thesis and is a dental student at the University of Connecticut. During summer 2014 and the 2014–2015 academic year, Sophia Salas and Nabil Saleem worked on this project as fellows and senior thesis students. Salas is a research assistant at Brigham and Women's Hospital, and Saleem is a medical student at Tufts. Katherine Paulson and Roshni Mangar worked on the project during their 2014 summer fellowships. Paulson is a fellow at the Institute for Health Metrics and Evaluation, and Mangar is an employee at the Bar Harbor Whale Watch Company. This research was supported by NIH grants P20GM103423 and R01HL124232, MDIBL (USAMRMC W81XWH-11-1-0425), Bodi Schmidt-Nielsen Fund, McMaster Research Fund, a M.G. DeGroot Summer Fellowship, and the Canadian Foundation for Innovation. 

Raines DA, Barlow K, Manquen D, Pavinelli T, Wagner A. Evaluation of an Evidence-Based Teaching Program for New-

born Safe Sleep. *Neonatal Network: The Journal of Neonatal Nursing*. 2016; 35:6:397–400. (University at Buffalo and Sisters of Charity Hospital)

This research evaluated the effectiveness of an evidence-based teaching guideline and patient outcomes focused on newborn safe sleep. This was a descriptive study with two data collection points. A convenience sample of 48 new mothers completed both data collection points. The findings of this evaluation study demonstrate that this unit-based teaching program was effective in impacting mothers' knowledge about and practice of safe sleep for the newborn following discharge from the postpartum unit. Deborah A. Raines is an associate professor of nursing and a research mentor for the summer N.U.R.S.E. program. Donna Manquen, Theresa Pavinelli, and Ashley Wagner are registered nurses in the Mother-Baby Unit at Sisters of Charity Hospital. Khloe Barlow is a BSN student, class of 2017, in the School of Nursing at the University at Buffalo. Barlow initiated work on this research as a participant in the summer N.U.R.S.E program in 2015. 

De La Rosa-Acosta M, Jimenez-Collazo J, Maldonado-Roman M, Malave-Llamas K, Musa-Wasil JC. Bacteria as Potential Indicators of Heavy Metal Contamination in a Tropical Mangrove and the Implications on Environmental and Human Health. *Journal of Tropical Life Science*. 2015; 5:3: 110–116. (Universidad del Este, Carolina, Puerto Rico)

The study examined the sensitive nature of some bacteria to heavy metals and their potential as bioindicators. The objective of this research was to assess the bacterial community on a mangrove marsh, identify these bacteria, and correlate bacterial species with the type and concentration of the metals found on the site. Karlo Malave-Llamas is an assistant professor in the School of Science and Technology at Universidad del Este, and Juan Musa-Wasil is a professor in the School of Environmental Affairs at Universidad Metropolitana (UMET). Melanie De La Rosa-Acosta was an undergraduate student at the beginning of the project (summer 2014) sponsored by NIH-MBRS-RISE at Universidad del Este (UNE). She is pursuing her master's degree in environmental planning at AGM Online. Johannys Jimenez-Collazo was an undergraduate student at the beginning of the project (summer 2014) at UNE; she embarked on this endeavor as an independent volunteer student. She is pursuing a master's degree in environmental planning in the School of Environmental Affairs (SEA) at UMET. Marixa Maldonado-Roman was a graduate student at the beginning of the project (summer 2014) at SEA-UMET; she embarked on this endeavor as an indepen-

dent volunteer student. She graduated and is considering doctorate-level study. This research was supported by Universidad del Este Institutional Funds and a NIH-MBRS-RISE Grant. 

Bou-Abdallah F, Sprague SE, Smith BM, Giffune TR. Binding Thermodynamics of Diclofenac and Naproxen with Human and Bovine Serum Albumins: A Calorimetric and Spectroscopic Study. *The Journal of Chemical Thermodynamics*. 2016; 103: 299–309. (State University of New York at Potsdam)

Serum albumins are ubiquitous proteins able to bind a variety of exogenous and endogenous ligands including hydrophobic pharmaceuticals. Drug binding to serum albumin provides important pharmacological information and influences drug solubility, efficacy, biological distribution, and excretion. Here, the binding thermodynamics of two nonsteroidal anti-inflammatory drugs (Diclofenac and Naproxen) to bovine and human serum albumins were studied by isothermal titration calorimetry, fluorescence spectroscopy, and differential scanning calorimetry. The calorimetric and spectroscopic data presented herein provided insights into the nature of these protein-drugs interactions. Such studies might offer useful information in future drug discovery studies. Fadi Bou-Abdallah is an associate professor of chemistry at SUNY Potsdam. Sam Sprague graduated from SUNY Potsdam in 2015 and is enrolled in the 3/2 chemistry engineering program at Clarkson University, Britannia Smith is a senior at SUNY Potsdam completing her BS degree in biology, and Thomas Giffune is a triple-major graduate (biology, chemistry, and physics) from SUNY Potsdam and has been offered a position at the Combat Systems Safety Branch at Naval Surface Warfare Center, Dahlgren Division, VA. Sprague, Smith, and Giffune all worked on the project in 2015 for research credits. This work was supported by NSF (NSF MRI Award no. 0921364 to Bou-Abdallah) and by the Cottrell College Science Award (ID no. 7892) from Research Corporation (to Bou-Abdallah). 

Mishra B, Fragile PC, Johnson LC, Kluźniak W. Three-dimensional, Global, Radiative GRMHD Simulations of a Thermally Unstable Disc. *Monthly Notices of the Royal Astronomical Society*. 2016; 463:4: 3437–3448. (College of Charleston)

We present results of a set of three-dimensional, general relativistic radiation magnetohydrodynamics simulations of thin accretion discs around a nonrotating black hole to test their thermal stability. We consider two cases, one that is initially radiation-pressure dominated and expected to be thermally unstable, and another that is initially gas-pressure dominated and expected to remain stable. We find evidence for both thermal and viscous instabilities in our radiation-pressure-

dominated case. Bhupendra Mishra is a PhD student and Włodzimierz Kluźniak is a professor at the Nicolaus Copernicus Astronomical Center in Warsaw. P. Chris Fragile is a professor of physics and astronomy at the College of Charleston. Caroline Johnson was a junior physics major at the College of Charleston when she contributed to this work as part of a summer project. This research was also supported by the National Science Foundation under grant NSF AST-1211230. 

Meusel C, Grimm C, Gilbert S, Leucke G. An Agricultural Harvest Knowledge Survey to Distinguish Types of Expertise. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*. 2016; 60:1: 2048–2052. (Iowa State University)

This work describes an agricultural harvest knowledge survey that was created for user research studies that observed experienced combine operators driving a combine simulator in virtual crop fields. Based on the success of this survey as a population segmentation tool, the authors recommend three criteria for the design of future knowledge surveys in other domains: (1) use real-world scenarios, (2) ensure questions are neither too difficult nor too easy, and (3) ask the minimum number of questions to identify operator knowledge successfully. Future research aims to create a tool that can discern between system experts (with deep understanding of the system) and practice experts (who primarily have the wisdom of experience). Stephen Gilbert is an assistant professor of industrial engineering and Greg Leucke is an associate professor in mechanical engineering at Iowa State University. Chase Meusel is currently a PhD student in human computer interaction (HCI) at Iowa State University. Chase Grimm is a third-year undergraduate in industrial engineering at Iowa State University. The research was funded by John Deere. 

Volz, K, Yang E, Dudley R, Lynch E, Dropps M, Dorneich MC. An Evaluation of Cognitive Skill Degradation in Information Automation. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*. 2016; 60:1: 191–195 (Iowa State University)

The purpose of this research is to investigate long-term effects of cognitive skill degradation (CSD) through the use of automation. Measurement and analysis of the effects of Information Automation (IA) on cognitive performance is an important first step in understanding CSD, which should be considered during design of these systems. The use of an automation aid was expected to result in a high level of performance degradation over time. Participants were placed into three groups and asked to perform flight planning calculations; the results of this study show that the use of an automation aid presented the highest level of performance degradation. This work provides the foundation for design

of guidelines/recommendations for IA systems in order to prevent CSD. Michael C. Dorneich is an associate professor in industrial and manufacturing systems engineering at Iowa State. Katherine Volz is a concurrent MS student at Iowa State and worked on this research from fall 2013 to spring 2016. Euijung Yang graduated from Iowa State with her PhD and is currently employed. She worked on this project from spring 2014 to spring 2016. Rachel Dudley graduated from Iowa State with her MS and is currently employed. She worked on this project during fall 2013. Elizabeth Lynch is a senior at Iowa State and worked on this project during spring 2014. Maria Dropps graduated from Iowa State with her BS and is currently employed. She worked on this project during spring 2015. This work was funded by the Industrial and Manufacturing Systems Department's Undergraduate Research Assistant program. 

Guerra I, Schroeder SJ. Crumple: An Efficient Tool to Explore Thoroughly the RNA Folding Landscape. *Methods Mol. Biol.* 2016; 1490: 1–14. (University of Oklahoma)

This paper presents a practical user guide for Crumple, a program that computes a combinatorially complete set of non-pseudoknotted RNA structures for an input RNA sequence. The program output provides a foundation for hypothesis-driven research on viral RNA structure and function. The program is unique in its ability to incorporate experimental constraints from cryoelectron microscopy, crystallography, and in vitro evolution data. The development of Crumple has been a long-term ongoing undergraduate programming project in the Schroeder lab. A team of undergraduate programmers continues to work with the Oklahoma Supercomputing Center for Education and Research to parallelize the next-generation software for these RNA folding computations. Susan Schroeder is an associate professor in the Departments of Chemistry and Biochemistry, and Microbiology and Plant Biology. Ivan Guerra is a senior computer science major and received the Hypercube Award in the Department of Chemistry and Biochemistry in recognition of his outstanding research contributions. Guerra continues to conduct research through an internship program with Northrup Grumman and plans to graduate in spring 2017. Guerra's sophomore research project was supported by the Louis Stokes Alliance for Minority Participation in Oklahoma. An NSFCAREER award also supported this undergraduate project. 

Nika L, Gibson T, Konkus R, Karp X. Fluorescent Beads Are a Versatile Tool for Staging *Caenorhabditis elegans* in Different Life Histories. *G3*. 2016; 6:7: 1923–1933. (Central Michigan University)

Caenorhabditis elegans is a model organism, the study of which

has revealed fundamental biological principles relevant to human health. This study describes a novel method to aid in identifying different stages of *C. elegans*. Such identification is critical to their study. This new method overcomes some of the limitations of previous methods. Xantha Karp is an assistant professor of biology at Central Michigan University. Liberta Nika began this work as an undergraduate student and finished it as a master's student. Nika is currently finishing her MS and applying to PhD programs. Taylor Gibson and Rebecca Konkus were undergraduate researchers throughout the project. Gibson is now in physical therapy school, and Konkus took a job in a health-related field upon graduation. This work was supported by a combination of funding from Central Michigan University (start-up funds, and grant C62241), and from the NIH (R15 GM117568) 

Al Kazimi A, MacKenzie C. The Economic Costs of Natural Disasters, Terrorist Attacks, and Other Calamities: An Analysis of Economic Models that Quantify the Losses Caused by Disruptions. *Systems and Information Engineering Design Symposium, University of Virginia.* 2016; 1: 32–37. (Iowa State University)

Over the past decade, numerous studies have estimated the economic impacts of a variety of disruptions. This paper compiles the results from economic models in order to compare the costs of different disruptions and help decision makers prioritize among disruptions. We compare the direct and indirect economic losses from a variety of disruptions, including earthquakes, hurricanes, terrorist attacks, pandemic diseases, and port closures. Some studies model hypothetical scenarios, but other studies quantify the economic losses from historical events such as the September 11 attacks and the 2011 Japanese tsunami. This paper provides a useful benchmark to understand the consequences from disruptions and highlight areas that public officials could address in planning for future disruptions. Cameron MacKenzie is an assistant professor in industrial and manufacturing systems engineering at Iowa State University. Amro Al Kazimi is a senior in industrial and manufacturing systems engineering at Iowa State University. Funding of this project was through the IMSE department at Iowa State University. 

Kent CN, Guttilla Reed IK. Regulation of Epithelial–Mesenchymal Transition in Endometrial Cancer: Connecting PI3K, Estrogen Signaling, and MicroRNAs. *Clinical and Translational Oncology.* 2016; 18:11: 1056–1061. (University of Saint Joseph)

This review article discusses the role of epithelial-mesenchymal transition in the progression and metastasis of endometrial cancer, specifically Type I vs. Type II cancers. Metastasis

is the spread of cancer from the primary site to other organs and is responsible for the majority (90 percent) of cancer-related deaths. Current research in the field is discussed with a focus on the role of estrogen signaling and microRNA regulation. Importantly, this work proposes re-evaluating the current clinical classification system for endometrial cancer that is based on the presence or absence of the estrogen receptor alpha, since both Type I and Type II endometrial carcinomas exhibit estrogen signaling pathways. Irene Guttilla Reed is an associate professor of biology at the University of Saint Joseph. Caitlin Kent completed this work as an undergraduate senior as part of an independent research project and is pursuing doctoral-level study in medicinal chemistry at the University of Kansas. The research was supported by a USJ Provost Student Research Award and a Beta Beta Beta (National Biological Honors Society) Research Grant, both of which were awarded to Kent. 

Virgílio, J. Antropólogo militante, pesquisador e/ou sujeito de estudo? *Revista Antropologías del Sur*. 2015; 2: 3: 69–85. (Federal University of Santa Catarina; New University of Lisbon)

This article refers to reflections produced after conducting fieldwork about Portuguese student demonstrations that happened between 2012 and 2013. It suggests that a revision and reconstruction of methodological preconceptions are necessary while performing fieldwork in anthropology. It produces a theoretical review regarding research and activism in contemporary anthropology and opens a dialogue with what is observed in the field. Jefferson Virgílio, a PhD candidate at Lisbon University, conducted this research as an undergraduate at Federal University of Santa Catarina in Brazil. The research was supported by three Brazilian funds: FAPESC, CAPES, and CNPq. 