

## A Framework for Mentoring Students Attending Their First Professional Conference

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### Abstract

Scientific conferences build professional skills and identity in undergraduate students and provide opportunities for developing professional social skills, a sense of belonging to their field, and an understanding of potential career options. However, undergraduate student attendance at professional conferences is low. When undergraduate students do attend, they often express anxiety associated with speaking with professionals, networking, or with the conference environment. To address these concerns, instructors from several institutions collaborated to develop an undergraduate course with the objective of training students to attend their first professional conference and then traveled with them to experience a conference. The course framework involved meetings with students and course assignments before, during, and after the conference. Assessment results indicated that student outcomes included a greater sense of belonging to their profession, social benefits, gains in confidence, career confirmation, and an improved understanding of the pathways to pursuing a career in this field (i.e., importance of undergraduate research, gaining experience during college, etc.). Our results suggest that formal preparation for attendance at a national scientific meeting maximizes the potential for students to benefit from their experience and reduces the anxiety many students express about attending a professional conference.

### Core Ideas

- Undergraduate students benefit by attending conferences and interacting with professionals.
- Active mentoring and support before, during, and after a conference increases student confidence.
- Students gained a sense of belonging, social benefits, and career confirmation through the course.
- Developing professional relationships likely leads to increased retention of professionals.
- This mentoring course focused on students in natural resource and environmental sciences, but the course structure is easily transferrable to other disciplines.

Scientific conferences provide many professional, academic, and social opportunities for students. Academic (i.e., workshops, contributed paper topics) and professional (i.e., resume review sessions, career panel discussions) opportunities may vary between different conferences or subsequent years of the same conference, but a common element of all conferences is social opportunities. Social interactions experienced during professional conferences can enhance students' involvement in their field, lead to long-term retention of professionals by developing new relationships and strengthening existing relationships, improve students' motivation, and increase their sense of self-efficacy (Jones et al., 2011), which is the belief of students in their ability to successfully perform a behavior (Bandura, 1997). Professional socialization has shown to increase self-efficacy support in students attending conferences (Helm and Bailey, 2013), and increases in self-efficacy and confidence have been identified as important factors in persistence of students in science, technology, engineering, and math (STEM) fields (Graham et al., 2013). Furthermore, interactions with peers who share similar interests and aspirations as well as the formation of social networks likely strengthen a student's professional identity as a future professional in their field (Hunter et al., 2007), also leading to retention or persistence of these early career professionals.

Although undergraduate students may benefit from the opportunity to develop professional relationships, many undergraduate students, especially those not involved in research, do not attend these conferences. Many undergraduate students express anxiety associated with socializing professionally and with their unfamiliarity with the professional culture. Mabrouk (2009) found less than half of undergraduate students attending the American Chemical Society meetings participated in organized social activities. To overcome this anxiety and to maximize students' experiences at a conference, additional mentoring and support would be beneficial as they prepare for and participate in a conference (Mabrouk 2009). A structured approach to guiding a student through their first conference

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**Abbreviations:** PU, Purdue University; STEM, science, technology, engineering, and math; TWS, The Wildlife Society; UNCW, University of North Carolina Wilmington; WVU, West Virginia University.

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is similar in concept to the structured undergraduate research programs that mentor and lead students through their first research experience. Importantly, these research programs report significant gains in personal and professional outcomes for participating undergraduate students related to networking and socializing (Lopatto, 2004; Hunter et al., 2007; Russell et al., 2007; Adedokun et al., 2012).

To encourage students to attend a conference, provide support throughout the event to reduce anxiety, and optimize the students' experiences, instructors at three institutions collaborated to develop and offer a course that prepared students for their first professional conference. The course provided students with an opportunity to attend a national conference with continued support and structure throughout the conference experience. The overall course objectives were to (1) provide students with an opportunity to attend a national meeting; (2) provide consistent mentoring and support before, during, and after the conference to formalize the experience; and (3) support students during the development and re-evaluation of their career goals.

## **MATERIALS AND METHODS**

### **Course Overview**

We developed this course primarily for undergraduate students at all levels in their academic program; however, graduate students have enrolled in the course to maximize their experience at professional conferences as well. The course had an enrollment ranging from 10 to 14 students at each of the three universities and was offered in wildlife ecology and environmental sciences programs, although the course could easily be adopted by any academic program. At each university, the course had a primary instructor or team of instructors and in most cases, a graduate student who served as both a teaching assistant and as an additional mentor to the students enrolled in the course. For our courses, enrolled students attended The Wildlife Society's (TWS) annual meetings in Pittsburgh, PA, in 2014 and Raleigh, NC, in 2016 for the conference experience.

We divided the course structure into three main modules: pre-conference, during conference, and post-conference. During the pre-conference portion of the course, students met with the course instructors and graduate student mentors three to six times for group discussion and completed a series of course assignments. During the conference, students met with the instructors and graduate mentors daily to debrief and discuss their accomplishments. In 2014, students also met with guest speakers during the daily meeting to discuss the variety of pathways to a professional career. In 2016, students from the three participating universities met both with their course instructors and mentors and then with instructors from a different institution. After the conference, students and instructors met one or two additional times to debrief about the overall experience and students completed a final assignment.

Attending a conference can be expensive because of travel costs and conference registration. The total cost of attending the conference was included within the syllabi and discussed during the first course meeting with the students. All students understood they would be responsible for covering the cost if they enrolled in the course. Instructors

also worked with the students and student organizations to write grants and raise funds to reduce the cost for the students. For the 2014 Purdue University (PU) course, all of the students' costs were covered by grants and support raised by the students and instructors. During the 2016 course at PU, West Virginia University (WVU), and University of North Carolina Wilmington (UNCW), students were responsible for approximately 50% of the overall cost of attending the conference. We minimized travel and housing costs by carpooling to the conference and students sharing hotel rooms.

### **Pre-Conference Course Activities**

During the three to six pre-conference course meetings, students completed a series of six to nine assignments (Table 1), depending on the course instructor and institution. The goal of these assignments was to prepare students to maximize their experience at the conference by reviewing the conference schedule, investigating the potential people attending the conference, and building professional skills. Another goal associated with these assignments was to familiarize students with the conference format and structure and prepare them for socializing professionally in an attempt to reduce anxiety. The initial assignment was an intentions essay to encourage the students to begin thinking about what they hoped to gain by enrolling in the course and attending the conference, how attending the conference may benefit their education and career, what they thought might be the biggest challenges in attending the conference, and what skills they hoped to gain during the course.

In addition to the course assignments, students met with the instructors three to four times in a seminar-style course format to review the assignment expectations, discuss the students' work, answer questions, and provide mentoring and support before the conference. During these conversations, instructors addressed questions and provided information regarding career-specific professional social behavior including professional attire, how to approach people, and how to politely leave a conversation. Instructors also addressed conference language and structure including the differences between a plenary, symposium, and a workshop and moving between sessions to attend presentations in different rooms. We discussed safety and other considerations for visiting a larger city including traveling in groups, finding inexpensive meals, and navigating traffic. Students had the opportunity to interact with faculty from other institutions at the conference and could begin considering opportunities for future graduate programs as a part of this course. Therefore, we discussed differences between undergraduate and graduate programs, differences in thesis and non-thesis programs, and differences between masters and doctoral programs; how to contact a potential advisor and select an advisor; and how to apply to graduate school; and funding for graduate programs.

Students also were required to identify professionals attending the conference they were interested in meeting, email these people, and set up an in-person meeting. Anxiety related to socializing with strangers and professionals within their field is high for most students, so the instructor at WVU organized a mock social event, complete with snacks and beverages, that involved the Associate Dean of Academic Affairs for the college among other faculty, staff, graduate students, and administrators.

Table 1. A description of the major pre-conference assignments that were incorporated into the courses at Purdue University (PU), the University of North Carolina Wilmington (UNCW), and West Virginia University (WVU) that trained students to attend a professional conference. For each assignment, the expected student outcomes are identified as well as the institution that implemented the assignment.

Assignment	Student tasks	Expected student outcomes	Institution that implemented assignment
Intentions essay	Students wrote a 2–3 page essay summarizing their intentions for enrolling in the course and describing their desired outcomes for participating in a professional conference.	Students formalized their interests and desired outcomes for the course.	PU, UNCW, WVU
Personal conference schedule	Students used the conference app when available to develop a schedule of events they planned to attend while at the conference. Students also identified the highest priority presentations to attend.	Students spent less time at the conference searching through the schedule and arrived with a plan to optimize their attendance.	PU, UNCW
Critical evaluation of abstracts	Students selected three conference abstracts to demonstrate the range of organization of information within an abstract.	After reviewing abstracts, students gained an improved understanding of content and structure of an abstract.	PU, WVU
Create/revise a current resume	Students created or revised their resume with the intention that they could share this with potential employers or graduate advisors, or to have it critiqued at the resume help booth.	Students completed the course with a current professional resume that has been reviewed by instructors, and possibly by the resume help booth, and was ready for use when applying for future jobs.	PU, WVU
Develop questions for meeting with professionals	Students were expected to meet with others at the conference and in preparation, they developed a series of questions that they could use during those meetings.	Students arrived at the conference with questions to use during meetings with other attendees that were developed and reviewed in class.	PU, UNCW, WVU
Negotiate missed class while attending the conference	Course instructors wrote and distributed a letter for students' course instructors to describe the importance of the course and why students would be absent during the conference. Students were responsible for sharing this with their instructors, identifying the missed work, and had each instructor sign the form.	Students would minimize the impact of their absences in courses while they attended the conference and gained a clear understanding of their instructors' expectations for making up missed work and class meetings.	PU, UNCW, WVU
Identify professionals or agencies to meet during the conference	Students began the assignment with a paragraph outlining their future career interests and then created a list of three people they planned to meet at the conference with a description of who they are and why each person was selected. Students were tasked with contacting these people to potentially set up an informal meeting during the conference. The UNCW course assignment required students to develop and present a PowerPoint presentation about a person or agency likely represented at the conference.	Students would arrive at the conference with planned meetings with potential employers, graduate advisors, or other professionals who could provide career or academic advice.	PU, UNCW, WVU
Review of primary literature	After identifying people to meet, students read research papers co-authored by these people and summarized the literature.	Students would meet with professionals at the meeting with an understanding of their past research and/or management involvement.	PU, UNCW
Networking night (mock social)	Students participated in a social, organized by the instructor, that included food, beverages, and a variety of people to meet and practice networking before the conference.	Students would build confidence in navigating a professional networking event similar to the ones planned for the conference.	WVU

This event provided students with the opportunity to practice initiating a conversation with someone they did not know in a setting similar to what they would experience at the conference.

### During Conference Course Activities

During the conference, we assigned students a series of 10 tasks to encourage social interactions and participation in the conference (Table 2). Each task was worth a relatively small amount of points (~1–2% of the overall course grade per question), so if a student was too overwhelmed to complete a task, it would not have a significant negative impact on their course grade. To build comradery among the students and for accountability, students were required to have a witness from the course sign their assignment sheet to vouch for the completion of the task. Finally, students were required to report a brief summary of the event during an evening debriefing session at the meeting.

Each day during the conference students met with the instructors in a meeting room secured before the conference for approximately 1.5 hours to debrief on the day's activities, have questions answered related to presentations or conversation from their day, and to hear about their classmates' experiences. During the first 45 minutes, the students engaged in conversation and discussion about the day. In 2014, we invited three guest speakers identified by

the students during their pre-conference assignments. Guests visited with the group in a conversational forum, described their career pathway to their current professional position, and answered students' questions. In 2016, individual institutions met separately during the first 45 minutes for the debriefing and then mixed institutional groups during the second half of the meeting for additional discussion about their day.

### Post-Course Activities

Following the conference, students met an additional one to two times to discuss the overall experience of both participating in the course and attending the conference. Following these meetings, students wrote and submitted a 2- to 3-page reflection essay summarizing their experience. Essays addressed such questions as whether attending the conference and participating in the course were worthwhile; whether the experience was different from what they expected and what were the biggest surprises; what advice would they provide to students attending a future meeting; did the experience confirm their career goals; what was their biggest challenge and their biggest reward; and if there was anything the instructors could do to improve the student experience in the course or at the conference.

Table 2. Students were provided with a task sheet with assignments to complete during the conference. Different instructors used a combination of these (not all instructors used all of the tasks listed below). When they completed each task, students were required to write a brief description of the event, record the time and date of the event, and have a witness (another student from the course) sign verifying completion.

Task	Description of event	Time/date	Signature of witness
Meet another undergrad member from a different institution			
Meet a grad student from a difference institution			
Meet a nonacademic professional			
Meet a professor from another institution			
Ask a question of someone at a general research poster			
Ask a question of a student at a research in progress poster			
Ask a question at the end of a talk			
Meet alumni at the alumni social			
Attend another activity (vendors, panel discussion, plenary session, non-Purdue social, etc.)			
Attend a working group meeting			
Meet a TWS Council Member†			
Meet an Executive Board Member			
Attend the Quiz Bowl			
Speak with a vendor about their products			

† TWS, The Wildlife Society.

## Assessment

Instructors administered a voluntary pre- and post-conference survey to evaluate students' confidence in their abilities to complete a variety of achievements or behaviors related to attending a conference using a 7-point Likert scale. This analysis allowed us to quantify changes in self-efficacy that would suggest students could envision themselves moving forward in a science career and participating in future conferences. We used matched pre- and post-conference survey pairs with a paired, two-tailed *t* test in SPSS (v. 24, IBM, Armonk, NY) to evaluate differences in students' confidence. We also evaluated the reflection essays and identified and documented major themes that emerged regarding students' perceived outcomes from attending the conference. The PU Institutional Review Board (IRB) approved all student assessments and covered students at all three institutions (Purdue University IRB no. 1508016424).

## RESULTS AND DISCUSSION

### Student Assessment Results from Pre- and Post-Conference Survey

Results from the pre- and post-conference assessment in 2016 suggested that the experience had a significant impact on students' confidence regarding professional socialization. Students reported a positive change in their confidence toward all surveyed tasks or behaviors with the only nonsignificant change related to their confidence developing and completing independent research (Table 3, Fig. 1).

### Student Feedback

In their first course assignment (the intentions essay), all students enrolled in the 2016 course at PU noted that one of their main reasons to enroll in the course was to develop professional networking and social skills. However, ~50% of the PU and 78% of the UNCW students also recognized that speaking with professionals and building the confidence to approach people was going to be one of their greatest challenges. Nearly 33% of the students in 2016 noted that they hoped to strengthen connections with peers, graduate students, and faculty at their home institution. Other common reasons to enroll were to learn how to attend a

conference, develop career connections, explore their career options, investigate graduate school opportunities, meet with specific people or organizations, and learn more about their favorite species, region, or research focus. Several students (<15%) seemed overwhelmed by the idea of attending a large conference and expressed concerns about scheduling their time and time management, navigating the conference, the number of people that would be present, and the amount of information they would process over a short amount of time.

In all iterations of the course, students reported in their reflection essays that attending the conference was an overall positive experience. In fact, 43% of the UNCW students specifically stated the course met or exceeded their expectations. Many of the benefits they reported involved building confidence and developing a sense of belonging in the profession, which is similar to the survey results (Table 3). More than 75% of students reported that the experience confirmed their career choice and their decision to attend graduate school, although at both WVU and UNCW, one student realized that wildlife conservation might not be the right career choice. Additionally, students who had not been considering graduate school reported a new interest in research and pursuing a graduate degree and gained a better understanding of the process for pursuing graduate school. Again, similar to the results from the survey (Table 3), students gained confidence interacting with professionals while often reporting that the initial thought of this was "scary." Despite this concern, students were surprised at how friendly, supportive, and positive the professionals and other students were during these interactions. Students also noted that they enjoyed hearing about new technology, research, and opportunities that were available to young professionals and felt energized observing the passion people expressed toward their careers.

Although negative comments and feedback were rare, a few students (~20%) acknowledged that they felt overwhelmed and tired during the conference. Others noted that it was often difficult to initiate conversations at socials because professionals also were busy socializing with old friends and colleagues, and students were unable to step into the conversations and ask them questions about their

Table 3. Results from a paired, two-tailed *t* test analyzing undergraduate students' confidence in completing tasks related to conference attendance or professional developing before and after attending a professional conference, The Wildlife Society's annual conference in Raleigh, NC, in 2016. The sample size was 26 for all questions, except networking with professionals (*n* = 25). All changes in students' confidence were positive.

Survey question	Test statistic	<i>p</i> value	Cohen's <i>d</i>
Developing and completing independent research	1.266	0.210	0.242
Presenting research findings in either poster or oral presentation format	5.047	<0.001	0.880
Starting conversations with professionals	5.196	<0.001	1.137
Speaking about current challenges facing wildlife populations	4.2	<0.001	0.839
Networking with undergraduates from other universities	5.091	<0.001	1.155
Networking with professionals	4.359	<0.001	1.047
Acquiring a graduate or professional position after graduation	2.519	0.019	0.636



research or career. One student was disappointed in the low diversity in the plenary speakers. Finally, many commented it was difficult to budget time to various opportunities.

In 2014, 100% of PU students found the course beneficial to maximizing their conference experience; in 2016, 91% of the students at PU and 100% of the WVU and UNCW students thought the class was beneficial. Students commented that the course forced them to talk to people and participate in the conference. They noted that if they had not enrolled, they likely would have been less engaged and missed opportunities. This requirement also helped them gain social confidence and networking skills. The assignment to develop a personal itinerary (Table 1) was often cited as the most useful pre-conference assignment because it prepared them to immediately participate in conference activities. Some appreciated the opportunity

to evaluate and discuss abstracts whereas others found the requirement to read papers before meeting with professionals increased their confidence during the meeting and provided topics for discussion.

Social benefits were an outcome students commonly acknowledged. Students noted that course participation and conference attendance allowed them to develop new friendships and strengthen existing relationships with other students and the course instructors from their institutions. Students reported that the presence of their professors and instructors at the conference made them feel more comfortable in the professional setting, knowing that they had them as resources and for support. Students often commented on the anxiety and fear before attending the conference, but that the course helped reduce these feelings and made them feel better prepared to maximize

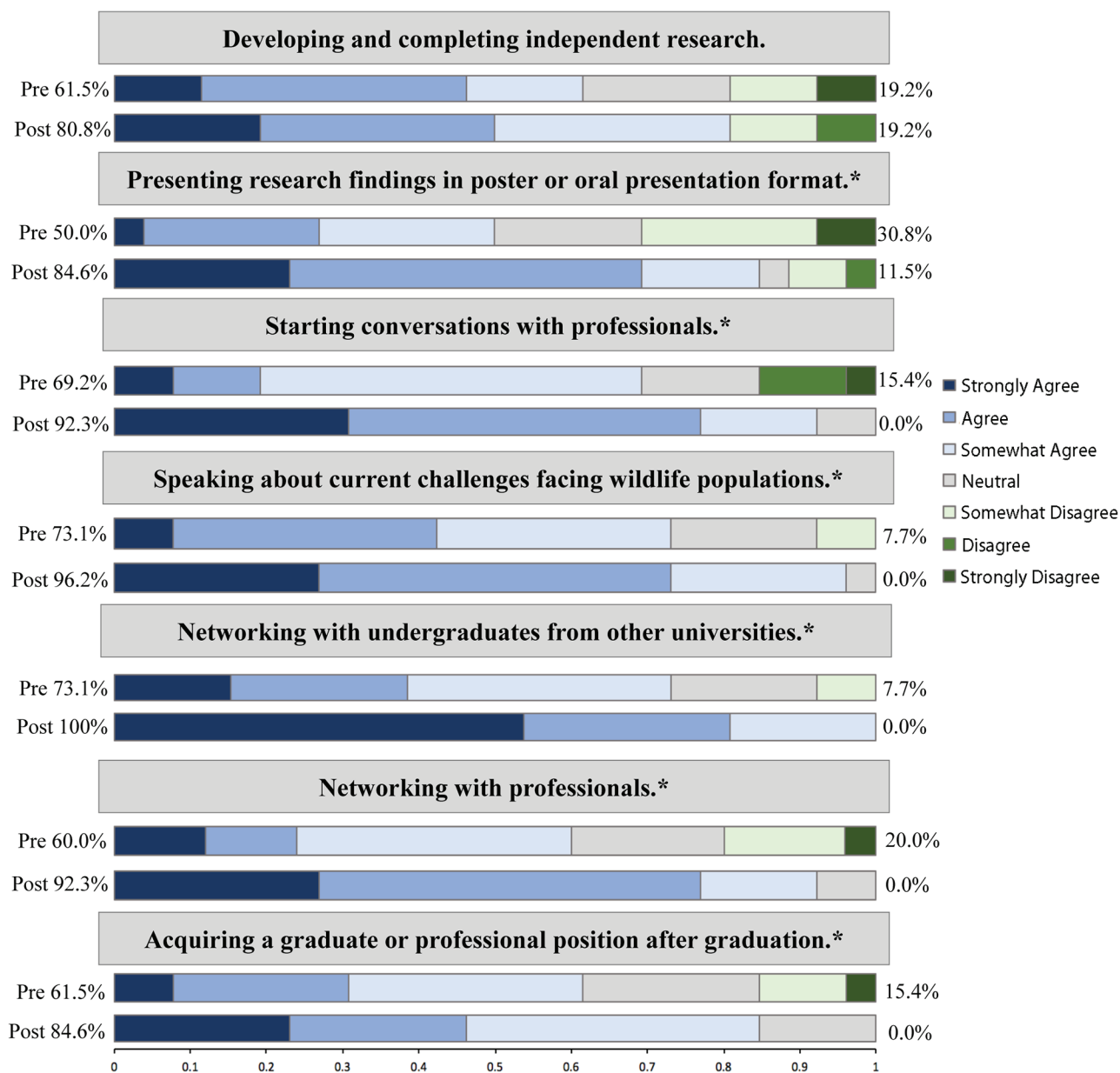


Fig. 1. Results from a pre-conference (upper bar for each question) and post-conference (lower bar) survey question for students enrolled in a course to prepare them to attend their first professional conference. The sum percentage of all levels of agreement and disagreement are listed to the left and right of each bar, respectively. A total of 26 students enrolled in three sections of the course offered at Purdue University, University of North Carolina Wilmington, and West Virginia University in 2016. The survey used a 7-point Likert scale to assess students' confidence in accomplishing a variety of tasks related to attending a professional conference. \*Indicates significance ( $\alpha = 0.05$ ).

their experiences. Students who had attended a conference before enrolling in the course noted that they gained much more from the overall experience than from their first conference experience. Finally, many noted that they appreciated the 10 assignments during the conference (Table 2) because it required them to do things they likely would not have done, including approaching and meeting people, without this requirement.

Students provided some suggestions for future iterations of this course in their reflection essays. Most agreed that the pre-conference assignments were helpful. Students also suggested that instructors encourage students to attend sessions with a classmate or require everyone to attend plenary or keynote sessions to facilitate discussions during the class meetings. The 2014 students were very positive about the daily meetings at the conference and seemed to benefit from the guest speakers. The 2016 PU students were less positive about the daily meetings but did note they benefited from the discussions because it allowed them to learn about topics they missed, boosted their confidence, and provided an opportunity to compare undergraduate programs from different universities. The 2016 PU students also complained about the witness requirement for the conference tasks, citing this as a barrier to completing assignments. The UNCW and WVU students did not express concerns regarding the witness requirement, indicating that cohorts may respond differently to this task based on the cohesiveness of their group. The 2016 students also requested more interactions among the university groups.

### **Instructor Feedback and Observations**

The conference preparation and training course was a rewarding experience for the instructors and allowed them to introduce students to their professional society, colleagues, and professional culture. Overall, the instructors and graduate teaching assistants agreed with the students' feedback that it was a positive experience. The instructors observed that the structure of the course was beneficial in allowing students to gain an understanding of the experience and ask questions before they traveled to a large city and were immersed in a conference with >1,800 attendees.

The meetings with students during the conference also were critical in that they provided a safe place for students to discuss both their positive and negative experiences during the day and receive feedback and support. Students also used those meetings to ask questions related to presentations they saw, most often questions related to statistical analysis, and many reported that they heard a talk during the day that incorporated methods they had recently learned in a course. Instructors observed that students' expectations for the conference to be "scary, intimidating, or overwhelming" did not, in most cases, meet reality. Once students forced themselves to network, those expectations were quickly replaced (albeit with a few rare negative experiences). Instructors also observed an increasing level of confidence expressed by the students as the conference progressed, with students asking more questions and providing increasingly critical evaluations of presentations, likely because of the support system provided by the course and the daily feedback during the course meetings. Two PU students presented their undergraduate research in a poster session and appeared to greatly benefit from peer support during this experience.

Future course iterations will maintain similar structure and assignments because of the documented student outcomes.

Instructors will continue to pair the on-campus course with the mentored conference experience. Without the course structure and support, our personal conclusion, based on observations and having attended many conferences with students before this course, is that students in this course benefited to a greater extent in terms of maximizing their professional social interactions than if they had attended the conference without participating in the course.

## **CONCLUSIONS**

Overall, the course outlined here was successful in providing students with a supported and mentored professional experience and in training them to attend their first conference. The course structure appeared to significantly influence the students' experiences and led to four major outcomes for our students including developing a sense of belonging, understanding professional social behaviors, gaining confidence in themselves, and confirming their career plans. Nearly all students and all instructors reported positive experiences and all students who participated reported that the course helped maximize their experience at the conference. The students found the assignments and pre-conference course meetings helpful in preparing them for the conference and reported that the daily meetings during the conference provided important feedback. Although this iteration of the course focused on students in natural resource and environmental sciences, the course structure is easily transferrable to other disciplines.

There is clearly a need to provide more opportunities for undergraduate students to engage with their professional community and to develop and practice professional social skills (Hunter et al., 2007; Kneale et al., 2016). Attending professional conferences is one way to train young professionals while allowing them to explore opportunities available to them in their future career and build stronger relationships with their peers, faculty, and staff from their home institution. While undergraduate research experiences provide students with similar benefits, those experiences are restricted to a relatively small proportion of the undergraduate student population. Courses like this can provide a larger number of students with a transformative social and personal career experience, increase student participation in undergraduate research opportunities, and improve retention in our professions.

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