

Conference Proceedings: Research as a Learning Connection Across the Digital Divide: A Panel Discussion of Perspectives on Faculty-Student Collaborative Research

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ABSTRACT

These conference proceedings summarize a panel discussion of faculty and students from the American Public University System (APUS) discussing the who, what, where, when, why, and how of faculty-student research collaboration. The panel participants represented four research projects and reflected on their experiences, which fell into the following themes: how students are involved in research, the benefits of faculty-student collaboration, and how students can get involved. In the future, similar projects could be supported under the umbrella of a center of excellence, such as the proposed Center for Research in Earth & Environmental Sustainability and Technology (CREST), which seeks to engage students in science research to explore Earth and Environmental Sciences, Sustainability, Climate Resilience, and related topics.

Keywords: Collaboration, Environmental Science, Faculty-Student, Online, Post-secondary Education, Research

Actas de la conferencia: La investigación como conexión de aprendizaje a través de la brecha digital: una mesa redonda sobre perspectivas en la investigación colaborativa entre profesores y estudiantes

RESUMEN

Estas actas de conferencia resumen una mesa redonda de profesores y estudiantes del Sistema Universitario Público Americano

(APUS) que debatió sobre el quién, qué, dónde, cuándo, por qué y cómo de la colaboración en investigación entre profesores y estudiantes. Los participantes del panel representaron cuatro proyectos de investigación y reflexionaron sobre sus experiencias, las cuales se centraron en los siguientes temas: cómo participan los estudiantes en la investigación, los beneficios de la colaboración entre profesores y estudiantes y cómo pueden participar los estudiantes. En el futuro, se podrían apoyar proyectos similares en el marco de un centro de excelencia, como el propuesto Centro de Investigación en Sostenibilidad y Tecnología de la Tierra y el Medio Ambiente (CREST), que busca involucrar a los estudiantes en la investigación científica para explorar las Ciencias de la Tierra y el Medio Ambiente, la Sostenibilidad, la Resiliencia Climática y temas relacionados.

Palabras clave: Colaboración, Ciencias Ambientales, Profesorado-Estudiante, En línea, Educación Postsecundaria, Investigación

会议记录：以研究为学习纽带，跨越数字鸿沟：师生合作研究视角小组讨论

摘要

本次会议记录总结了美国公立大学系统 (APUS) 的教师和学生就师生科研合作的“谁、什么、哪里、何时、为什么以及如何”等主题进行的小组讨论。小组成员代表了四个研究项目，并分享了他们的经验，这些经验可归纳为以下几个主题：学生如何参与科研、师生合作的益处以及学生如何参与其中。未来，类似的科研项目可以在卓越中心的支持下开展，例如拟建的地球与环境可持续发展与技术研究中心 (CREST)。该中心旨在鼓励学生参与科学研究，探索地球与环境科学、可持续发展、气候适应力及相关领域。

关键词：合作，环境科学，师生合作，在线，高等教育，研究

Research and the professional collaboration and experiences it brings can be important aspects of scholarly engagement for students in higher education. While not all students will develop interests in and pursue careers in scientific research, providing collaborative research opportunities throughout the college experience offers numerous benefits. Although the research experience will vary by project and educational level, from undergrad-

uate to graduate and doctoral students, having the opportunity to take part in the processes involved in scientific research is invaluable.

Today, higher education offers many formats for class delivery, from traditional face-to-face brick-and-mortar institutions to fully remote, online, and asynchronous degree programs. There are also hybrid educational pathways that combine in-person and remote learning in countless configurations. In recent years, online enrollments have continued to expand, despite overall decreasing trends in higher education enrollments (Bright & Vogler, 2024). The most recent data from the Integrated Postsecondary Education Data System (IPEDS) (2023) from the U.S. Department of Education, National Center for Education Statistics, show that 23% of all undergraduate students and 39% of all graduate students were enrolled in exclusively distance education, and fewer than half of students were not enrolled in any distance education. Another important shift is an increase in adult or non-traditional learners. IPEDS (2023) reports that nearly 33% of the over 19 million students enrolled in postsecondary institutions were aged 25 or older. These non-traditional learners may benefit from alternative research pathways offered in cooperation with asynchronous remote learning opportunities, since these projects expand the possibilities for fully remote learners to get involved.

When students engage in higher education through an asynchronous, fully remote, online learning platform,

scholarly research opportunities may seem more challenging to support. However, as this model of higher education expands, more faculty are finding ways to carry out traditional research with remote and asynchronous partners. Such opportunities, though not well known across the online learning environment, do occur in specific departments and programs. In the Department of Space Studies at American Public University System (APUS), Zeilinhofer and Miller (2024) provide examples of such projects, including the Exoplanet Research Group and the APUS Analog Research Group (AARG), which have had to address challenges such as remote communication through novel pathways, connecting in an asynchronous environment and across time zones, and meeting the needs of students at varying degree levels.

CREST as a Hub for Faculty-Student Engagement and Idea Generation

Building on the research group model presented by Zeilinhofer and Miller (2024), faculty across disciplines have come together to establish the Center for Research in Earth & Environmental Sustainability and Technology (CREST) at APUS. Universities may develop centers to apply focus to a disciplinary area or across disciplines, often utilizing an umbrella theme. There are many reasons and benefits for doing so. CREST was proposed with the intent to bring together faculty and students, engaging and encouraging both to explore and expand science research

in related areas of interest, to include Earth and Environmental Sciences, Sustainability, and Climate Resilience. A center such as CREST will provide a hub for connections and opportunities to drive future-focused thinking and sustainable solutions with a mind towards environmental stewardship.

As part of the Space Education & Strategic Applications (SESA) 2025 Conference, the developing Center for Research in Earth & Environmental Sustainability and Technology (CREST) at APUS gathered a mix of faculty and alumni to elucidate faculty-student research collaboration through existing projects, new opportunities, and future ideas. Existing research was showcased in fields related to environmental and natural sciences, health sciences, political science, international development, and Earth sciences. Projects covered included:

- Water Testing and Awareness Project (WaterTAP): Student-driven Community Science Drinking Water Quality, Kelly Reiss (APUS) and Daniela Messina (APUS), Co-Principal Investigators (Co-PIs)
- Effect of Increasing Dietary Protein on the Gut Microbiome, Lauri Byerley (APUS), Karyn Gallivan (APUS), Kristin Ondrak (APUS), and Denise Danos (Louisiana State University Health Sciences Center), Co-PIs)
- COVID-19 Pandemic on Indigenous Communities in North and Central America, Michelle

Watts (APUS), PI, Kristin Drexler (APUS), Anthony Caole (APUS), Bridget Kimsey (APUS)

- APUS Analog Research Group (AARG) & Supernova Search Program, faculty lead Kristen Miller (APUS).

How Students are Involved in Research: What Roles do They Play?

Dr. Lauri Byerley, Co-PI for the project, “The Effect of Increasing Dietary Protein on the Gut Microbiome,” discussed the various roles students have undertaken in her research through the years to include being participants and taking active author roles in the writing process. Dr. Kelly Reiss and Dr. Daniela Messina, CO-PIs for “WaterTAP (Water Testing and Awareness Project): Student-driven Community Science Drinking Water Quality,” had students involved in running tests, reporting data, and data analysis. Dr. Kristin Drexler added that students in the project led by Dr. Michelle Watts, “COVID-19 Pandemic on Indigenous Communities in North and Central America,” were involved in the research preparation, question writing, field work, data analysis, and publication of the data. Dr. Kristen Miller discussed that for the “APUS Analog Research Group (AARG)” project’s mission, students are assigned to roles such as planning and communication. Additionally, students had opportunities to explore research development and project management. Having this

diversity of roles permitted students to join in person, directly running the experiments in the simulated space environment, or serve as remote support.

Benefits of Faculty-Student Collaborative Research

Participation in research allows students to learn from peers and faculty through increased skills and knowledge, mentoring, direct observation, and community building and networking. An important point, however, is that faculty also benefit from these faculty-student collaborative opportunities.

Increased Skills and Knowledge

Some of the skills developed through collaborative research include leveraging software and other applications, developing a better understanding of research methods, and learning to convert qualitative data into quantifiable metrics. To add to this, Mr. Anthony Caole, who was a student researcher on the “COVID-19 Pandemic on Indigenous Communities in North and Central America” project, made the point that using certain applications not only increased student skills but also helped to “bridge the gaps to allow students to participate alongside their faculty,” who are subject matter experts (SMEs). Dr. Miller noted additional benefits, such as fostering student leadership and ownership in the research projects in which they participate.

Mentoring

Bringing together various skill levels

from novice undergraduate students to professionals and SMEs results in the growth of new skills and knowledge. Ms. Bridget Kimsey, a former graduate student, now alum, who worked on the project, “COVID-19 Pandemic on Indigenous Communities in North and Central America,” shared that being mentored throughout the project’s life-cycle was a “game changer” and a “turning point,” which not only shaped her as a student researcher, but has carried through to her current role as PI of her own project. In a similar way, Dr. Miller, faculty lead on AARG, explained her team’s working model, where students are encouraged and supported through the various stages of their own projects, noting their “team-based support.”

Direct Observation

Observing faculty mentors enables students to experience live role models through shadowing faculty and professional experts as they work through project design, organization, planning, surveying interviewees, problem-solving, project management, data collection, analysis, results dissemination, and professional writing. Mr. Caole emphasized this point. He underscored the importance of personally observing Dr. Watts and Dr. Drexler in the field, noting their methods of conducting interviews and of expanding their network of potential interviewees.

Community Building and Networking

Students in both in-person and virtual learning spaces can feel isolated, detached from others with similar in-

terests and from the profession they are studying. This may impact their motivation, persistence, retention, and ultimately, their academic success. Dr. Miller commented that participating in research allows for community building, especially important in an online environment. As a doctoral student, Mr. Caole shared that being involved in faculty-student collaborative research was key to his persisting and surviving in his degree pursuit. Beyond practical skills, participating in the research also provided “motivation and inspiration.”

The networking aspect is also important to mention. Student researchers had the opportunity to make both professional and scholarly connections. Students were able to partner with professionals as peers. Dr. Miller noted that, consequently, they developed a more authentic understanding of the profession that extended beyond the theoretical knowledge gained in class alone.

How to Get Involved

When enrolled in an online degree program, students may be unaware of available research opportunities. Finding pathways to connect with faculty may seem overwhelming or intimidating, but both parties benefit from shared faculty-student research experiences. There are a variety of mechanisms for students to get involved, which vary across projects and faculty leads, but some pathways for involvement include in-class communication, e-mail, attending conferences, participating in university

student organizations, and joining professional societies.

Discussed were the mechanisms students and faculty should consider in fostering collaborative research, along with shared experiences in getting involved. Dr. Drexler suggested that students speak with their professors in class about collaborative research prospects. Dr. Byerley noted that she frequently uses email to reach out to students. Dr. Reiss and Dr. Messina used flyers and announcements in classes to recruit student volunteers, and AARG frequently used flyers to announce project openings.

Connections through student organizations and professional societies provide important pathways for finding faculty-student research opportunities. Dr. Drexler noted that making announcements in student chapters and organizations was exceptionally effective in organizations such as Women in Science, Technology, Engineering, and Math (STEM), the Association for Women in Science (AWIS), and the Society for Advancement of Chicanos/Hispanics & Native Americans in Science (SACNAS). Ms. Kimsey shared that Dr. Watts and Dr. Drexler were key in encouraging her involvement, leading her to further explore some of the existing student organizations. Participating in student organizations may also promote conference attendance and staying up to date in the disciplinary field, which provides ways to discover involvement opportunities, since networking occurs in these professional spaces.

Conclusion

As a proposed hub for academic excellence, CREST seeks to engage students in science research to explore Earth and Environmental Sciences, Sustainability, Climate Resilience, and related topics. These efforts will foster innovation, environmental stewardship, and sustainable solutions for the future. Such centers cultivate interdisciplinary collaboration, support students in academic learning through applied research, promote faculty-student and student-student mentorship, enhance the quality and visibility of scholarly work, and develop discipline-specific resources. These efforts not only benefit faculty but also strongly develop independence and confidence in student researchers, leading them to create their own future research questions, projects, and practice. Additionally, research collaborations can help students “survive and thrive” in their degree pursuits, promoting student retention and fostering supportive academic, research, and professional communities.

Students can play many roles in faculty-student research projects, from

more narrow roles as participants in a single part of the project (e.g., the data collection process) to being more broadly involved in some or all of the research process (e.g., crafting research questions, developing methods, participating in field work, processing laboratory data, conducting data analysis, publishing findings). The panel discussed some of the many benefits of faculty-student collaborative research, including increased skills and knowledge, mentoring, direct observation, and community building and networking. For as many roles as students play in research, there are as many avenues for students to find ways to get involved, from receiving electronic communications of opportunities to participating in student organizations and professional societies.

Taken collectively, this panel presented support for faculty-student research by highlighting details of four collaborative projects. In the future, these projects could be supported by a center like CREST as a hub for innovation and opportunity that would collate existing projects, provide new opportunities, and generate future ideas.

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