THE FUTURES OF STS IN ENGINEERING AND POLYTECHNIC UNIVERSITIES

September 24, 2021

MISSOURI S&T

Center for Science, Technology, and Society

The Futures of STS in Engineering and Polytechnic Universities

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What does the future of STS look like at engineering and polytechnic universities? In such STEM-focused environments, where STS scholars often operate independently and without a central STS department or program, how can STS researchers maximize their impact on the education of undergraduate and graduate students, as well as on the original research conducted by (and often financially supported by) colleagues in engineering departments? How can STS researchers become indispensable to engineering and scientific research endeavors without being perceived as simply support personnel? Assembling convergent research teams to tackle important social and scientific challenges is an acknowledged best practice, so how should STS researchers embrace convergent research endeavors in order to add value and lead inquiries into areas of new and developing knowledge?

Please register for each panel individually.
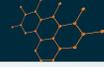
*ALL TIMES IN CENTRAL US

CONFERENCE SCHEDULE

8:00-9:15 am
Register Here

OPENING REMARKS AND BREAKFAST SPEAKER

Welcome from Missouri S&T

Dr. Amy Bix, Iowa State University

Now More Than Ever: STS as Essential for Twenty-First Century Perspective

The opening years of the twenty-first century have already raised awareness of vital issues embedded in science and technology's place in our world. Climate crises, hyperconnectedness, privacy, global health challenges and more all demand serious attention, alongside broader questions of economic and social justice. More than ever, STS work can offer vital perspective in dialogue with other scholars and the public. This talk offers opening analysis to begin this conversation.

9:30-10:30 am
Register Here

PANEL 1: BIG IDEAS ABOUT THE FUTURES OF STS IN ENGINEERING ENVIRONMENTS
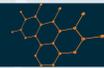
Dr. Juan Lucena, Colorado School of Mines

"What is Engineering for?" Transforming engineering education spaces through STS

This talk will outline a journey through engineering education spaces where I have deployed STS conceptual and methodological tools to try to transform how students understand their relationship with engineering by critically engaging the question (and the assumptions behind it), what is engineering for? The talk will include critical interventions in key concepts that have shaped engineering education in the last three decades, including diversity, globalization, engineering cultures, community development, and social justice.

Dr. Jennifer Singh, Georgia Tech

Engaging STS through an Undergraduate Minor and Graduate Certificate

The Ivan Allen College of Liberal Arts at Georgia Tech recently developed an undergraduate minor in STS and a graduate STS Certificate. These STS opportunities allow students from across the institute who major in engineering, computer science, etc. to engage with STS principles and analytics in relation to their own research. These STS courses are taught by interdisciplinary faculty – ranging from history, sociology, and philosophy to literature, digital media, and interactive computing.

Dr. Amy Bix, Iowa State University

STS, Engineering, and "Innovation"

Iowa State University, like a number of other institutions of higher education, has explicitly embraced "innovation" as a priority for student development. This semester's opening of ISU's "Student Innovation Center" offers intriguing potential for STS education, offering practical advantages and intellectual opportunity. At the same time, this direction calls for critical examination of the rhetoric, assumptions, and limits of an "innovation"-driven mindset, with analysis from the perspectives of both STS and the history of technology and science.

PANEL 2: STRATEGIES FOR INDIVIDUALS/SMALL GROUPS OF STS RESEARCHERS IN ENGINEERING ENVIRONMENTS
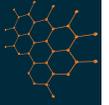
Dr. Samantha Muka, Stevens Institute of Technology

Widening our Definitions for Scientific Communities

Historians and sociologists have traditionally focused on telling the stories of academic science and large, formal laboratories. Little attention has been paid to small or non-traditional communities with different knowledge systems. Those embedded at small engineering schools are well situated to work with engineering groups and non-traditional science communities. Using my own work on aquarium tank design, this talk will highlight the opportunities available to STS researchers to work with expansive definitions of science and engineering.

Dr. Steven Walton, Michigan Tech

Navigating the Shoals of Disciplinary with an Interdisciplinary Field

Because STS is by its very nature interdisciplinary, and actively seeks to be, curricular initiatives that could broadly promote the field in an integrated fashion often run afoul of departmental and college divisions (not to mention general education structures put in place by states or accreditors). University-wide educational initiatives, however, hold the promise of the integration of STS methods and insights, although without the force of those same departmental/collegiate/GenEd mandates. One promising avenue may be for engineering and polytechnic universities to integrate STS in a campus-wide, supra-disciplinary, programmatic fashion—that is, working toward outcomes at a "branding" rather than at a curricular level.

LUNCH SPEAKER
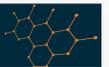
Dr. Emily York, James Madison University

Critical Participation and STS Strategery in STEM Spaces: A Gardening Approach

Imagine STS thriving in every STEM space, as a norm of how science and technology are done. In fact, imagine these aren't "STEM" spaces, *per se*; they are places of critical inquiry, collaboration, and transdisciplinary knowledge production, where disciplinary humility and reflexivity undergird sociotechnical world-making. Perhaps we can grow these spaces, planting STS seeds, coaxing our little ecosystems into providing enough water and light, and patiently tending the seeds that take root. In this talk, I reflect on how critical participation and "STS strategery" have guided me toward an experimental gardening approach to cultivating and imagining the future of STS.

PANEL 3: STRATEGIES FOR COMMUNITIES/COHORTS/CENTERS FOCUSED ON STS IN ENGINEERING ENVIRONMENTS

Dr. Emma Frow, Arizona State University

On being a chameleon: STS in an engineering world

I will reflect on a decade of studying and working alongside biological engineers and synthetic biologists in the US and Europe – as part of research centers, scientific grants, training programs, and through standalone STS projects. My collaborations with scientists and engineers have often started from top-down initiatives to involve social scientists in engineering endeavors, and in practice have required continuous negotiation of different roles within each project.

Dr. Olivia Burgess, South Dakota School of Mines

Collaboration Across the Two Cultures

These remarks will draw on my experiences in developing and teaching in interdisciplinary programs that integrate writing, ethics, and engineering design. I will share my insights from a three-year partnership with a faculty member from the Colorado School of Mines Engineering, Design, & Society Department, including the rewards, benefits, and challenges of collaborative teaching. My talk will offer advice and suggestions on how non-engineering faculty at STEM institutions can create meaningful collaborations across disciplines to enhance undergraduate education and challenge the perception of STS/humanities faculty as "support personnel."
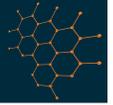
Dr. Emily York, James Madison University

"Gardening in STEM Spaces"

I will build upon my earlier remarks and discuss how the "gardening" approach to STS has been working among cohorts and communities at James Madison University.

2:15-3:15 pm Register Here

PANEL 4: STRATEGIES FOR DISSEMINATING INFORMATION AND INCREASING IMPACT IN ENGINEERING ENVIRONMENTS

Dr. Raquel Velho, Rensselaer Polytechnic Institute

A Jar of Tampons — Centering STS as the hearth of a community

The Design, Innovation, and Society (DIS) program at Rensselaer Polytechnic Institute is its School of Humanities, Arts, and Social Science's second largest undergraduate major, with about 120 students. Around 90% of these students are Engineering dual majors, and many have stated that DIS kept them from dropping out of the Institute. I will discuss what this STS-informed design program is, and how its central theme of social responsibility has created a home within RPI for Engineering students.

Dr. Coleen Carrigan, California Polytechnic State University

Strategies for Disseminating Action-Oriented Knowledge to Broaden Impacts in Science and Engineering

Qualitative studies are important because they can help illuminate the experiences of minoritized members of scientific workplaces, and offer intersectional insights into complex phenomena, the contexts in which they occur, and their consequences. However, epistemic bias against qualitative research stymies collaborative efforts for transformative change in technoscience by designating some methods as rigorous and "real" and, by implication, others as "soft" and "unreal." I discuss my experience using a combination of action-oriented ethnography and the case study method to effectively engage scientists and engineers in conversations about diversity, equity and inclusion.

Dr. Caitlin Donahue Wylie, University of Virginia

Studying Engineers or Studying Engineering

There seem to be two models of doing STS in an engineering school: studying engineers or studying engineering. The first applies STS methods and theories to study engineers' culture, while the second applies STS methods and theories to try to inform and improve engineering research or practice. I discuss my experiences in each of these approaches and invite discussion of a potential third way in which the construction of knowledge in STS and engineering is truly integrative.

3:15-4:00 pm Register Here

BREAKOUT NETWORKING
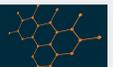
PRESENTERS

Amy Sue Bix is Professor of History at Iowa State University. Her 2013 book *Girls Coming to Tech: A History of American Engineering Education for Women* won the 2015 Margaret Rossiter Prize from the History of Science Society, as well as 2015's IEEE-USA Award for Distinguished Literary Contributions, and 2014's Betty Vetter Award for Research from WEPAN (the Women in Engineering ProActive Network). Bix has written widely on many topics in the history of science, technology, and medicine, including *Inventing Ourselves Out of Jobs?: America's Debate over Technological Unemployment, 1929-1981* (2000). Her book in progress is *Recruiting Engineer Jane and Astrophysicist Amy: American STEM Advocacy for Girls, 1965-2015.*

Olivia Burgess is Assistant Professor in the Humanities Department at the South Dakota School of Mines & Technology, where she teaches general education curriculum for STEM students and courses for STS majors. Before joining SD School of Mines & Technology, she taught at the Colorado School of Mines, where she was involved in developing and collaboratively teaching first-year interdisciplinary courses integrating writing and ethics with engineering design. She also directed Nature & Human Values, a first-year program that links writing, ethics, and topics in science and technology.

Coleen Carrigan, is an Associate Professor of Anthropology and Science, Technology and Society (STS) at California Polytechnic State University, San Luis Obispo. She shares the findings from her ethnographic research to foster welcoming environments for underrepresented groups in technoscience and strengthen alliances between liberal arts scholars, engineers and scientists to enhance civic engagement and combat social injustice.

PRESENTERS

Emma Frow is an Assistant Professor at Arizona State University, with a joint appointment in the School for the Future of Innovation in Society (SFIS) and the School of Biological & Health Systems Engineering (SBHSE).

Juan Lucena is Professor and Director of Humanitarian Engineering (HE) at the Colorado School of Mines. Juan obtained a Ph.D. in STS from Virginia Tech and two engineering degrees from Rensselaer. His books include *Defending the Nation: U.S. Policymaking to Create Scientists and Engineers from Sputnik to the 'War Against Terrorism'* (2005), *Engineering and Sustainable Community Development* (with Jen Schneider and Jon Leydens, 2010), *Engineering Education for Social Justice: Critical Explorations and Opportunities* (2013), and *Engineering Justice: Transforming Engineering Education and Practice* (with Jon Leydens, 2017).

Samantha Muka is an Assistant Professor of STS in the College of Arts and Letters at Stevens Institute of Technology in Hoboken, New Jersey. Her forthcoming book, *Inland Oceans*, examines the history of aquarium craft and modeling.

PRESENTERS

Jennifer Singh is Associate Professor of Sociology in the School of History and Sociology at Georgia Tech. Dr. Singh's research focuses on epistemologies of autism, including genetics, which she investigates in her book *Multiple Autisms: Spectrums of Advocacy and Genomics Science.* She teaches STS courses and is on the Steering Committee of the STS Graduate Certificate.

Raquel Velho, Assistant Professor at Rensselaer Polytechnic Institute's Department of Science & Technology Studies, received her PhD from University College London, UK, and her research interests span from infrastructure studies, to disability studies, to design.

Steven A. Walton, is an Associate Professor of History at Michigan Tech University, and formerly an assistant professor of STS at Penn State University (2002-2012). His background is in mechanical engineering followed by a PhD in history and philosophy of science and technology (Toronto). His own work and affiliations bridge chronological periods from the Middle Ages through the 19th century and he works variously within fields of industrial heritage and archaeology (the graduate program in his current department) and on histories of military technology, scientific instruments, and technological users.

PRESENTERS

Caitlin Wylie is an Assistant Professor of Science, Technology, and Society in the University of Virginia's School of Engineering and Applied Science.

Emily York is an Assistant Professor in the School of Integrated Sciences at James Madison University. She has a Ph.D. in Communication and Science Studies from UC-San Diego. She is an Associate Editor of *Engineering Studies* and a Co-PI on a National Science Foundation grant to host the "STS as a Critical Pedagogy" workshop at JMU in the summer of 2020.

Missouri S&T

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