4th Biennial Network Gender & STEM Conference

Reimagining Who Does STEM and Why Through Research, Education, and Action

Conference Program
July 31st – August 2, 2018
University of Oregon
Eugene, OR USA

NETWORK
GENDER & STEM
educational and
occupational pathways
and participation

UOTeach
DEPARTMENT OF EDUCATION STUDIES

VhTo
NATIONAL
EXPERT ORGANISATION
ON GIRLS/WOMEN AND
SCIENCE/TECHNOLOGY

UNIVERSITY OF OREGON | **College of Education**

TABLE OF CONTENTS

Welcome from the Gender & STEM conference organization team

Welcome to our 4th biennial Network Gender & STEM conference! This conference aims to present empirical research and instructional practice, exploring how STEM (Science, Technology, Engineering, Mathematics) educators, practitioners, and students form STEM identities, how those identities are formed or constrained by existing structures, and the ways that instruction and educational policy can broaden conceptions of who can and could do STEM research and practice. Complementary perspectives will address how such pathways can be facilitated at various points along students' and young adults' educational and occupational development. Keynote presentations are from Professors Helen Watt, Kimberly Scott, Kathryn Scantlebury, and Alice Pawley.

The aim of our international conference is to gain deeper insight into the various, closely connected aspects of career choices and professional careers of girls/women and boys/men in the broad field of STEM (Science, Technology, Engineering, and Mathematics) and connected specialisms. There is an urgent need to integrate complementary perspectives addressing the question of how pathways into STEM can be facilitated at various points along students' and young adults' educational and occupational development. Additionally, it is important to move beyond results, which highlight only single aspects. By drawing together international researchers from diverse disciplinary perspectives, alongside policymakers and practitioners, an important aim of this conference is to stimulate new research and findings to reshape future inquiry, by formulating advances in future research, policy and actions concerning the promotion of girls and women (and boys and men) in STEM fields through connecting theoretical, methodological, and empirical issues.

There is large surplus value to interrelate relevant research results to gain a coherent interdisciplinary account concerning gender and STEM from childhood to labor market. The inclusion of cutting-edge research from diverse disciplines where there is relevant scientific and scholarly expertise, their integration with each other, and also with inputs from STEM professionals, policy-makers and educators, will collectively break new ground and stimulate new lines of study on issues that have been largely unexplored concerning the persistent issue of gender and STEM participation, to understand the state of the knowledge and chart directions for future research.

Conference Host:
Dr. Jenefer Husman, University of Oregon, Eugene, OR, USA
Co-Organizers:
Professor Helen Watt, The University of Sydney, Australia
Ms. Noortje Jansen, VHTO
Associate Professor Jill Baxter, University of Oregon
Assistant Professor Holly M. Matusovich, Virginia Tech
Associate Professor Joanna Goode, University of Oregon
Assistant Professor Jennifer Ruef, University of Oregon
Assistant Professor Sarah Stapleton, University of Oregon
Ms. Lisa Fortin, University of Oregon

The fifth biennial conference is planned for July 30 - August 1, 2020 @ The University of Sydney, Australia.

Save the date! Further details will be announced as they become available at the Network website: www.genderandSTEM.com

Keynote Speakers

Jacquelynne S. Eccles

Distinguished Professor and Network Patron Jacquelynne S. Eccles has asked the Conference Committee to extend her regret that she will be unable to deliver her scheduled Keynote and join us for the conference due to a family bereavement.

We have expressed our condolences and have cards for colleagues and friends attending the conference to express their sympathies, please check at the registration desk.

Professor Helen Watt, co-Founder of the Network, is honored to accept Professor Eccles' request to present a keynote address to begin our conference.

Helen M.G. Watt
Gendered Career Decisions
Tuesday, July 31
10:30 am – 11:30 am

Helen M. G. Watt is Professor of Educational Psychology at the University of Sydney, and Australian Research Council Future Fellow 2017–2021. She previously served at Monash University, and the Universities of Michigan, Western Sydney, Sydney, and Macquarie. Her longitudinal programs have implications for supporting career development of beginning teachers (www.fitchoice.org), and redressing gender imbalances in STEM fields (www.stepsstudy.org). Helen is currently Associate Editor for AERA Open and on several editorial boards. She edited books including Global perspectives on teacher motivation (CUP 2017); Teacher motivation (Routledge 2014); Gender and occupational outcomes (APA 2008) and co-founded Network Gender & STEM: www.genderandSTEM.com

Kimberly A. Scott
Misappropriating Narratives and Other Issues with Broadening STEM Participation for Women of Color
Wednesday, August 1, 11:00 am – 12:00 pm
Redwood Auditorium

Kimberly A. Scott is a professor of women and gender studies in the School of Social Transformation at Arizona State University (ASU) and the founding executive director of ASU's Center for Gender Equity in Science and Technology. Founded by Professor Scott, the center is a one-of-a-kind research unit focused on exploring, identifying, and creating innovative scholarship about underrepresented women and girls in STEM. Having written and successfully won nearly $10 million in grant funding to support research about and programs for women and girls of color in STEM, Scott was named in 2014 as a White House Champion of Change for STEM Access. Since 2018, Scott has been a member of the NSF STEM Education Advisory Panel created to encourage U.S. scientific and technological innovations in education and assembled in consultation with the U.S. Department of Education, NASA, and NOAA. Scott earned her BA from Smith College in art history and French literature, an MS from Long Island University in curriculum and instruction/elementary education and her EdD from Rutgers University in social and philosophical foundations of education and completed the high potentials leadership program at Harvard Business School.

Alice Pawley
Shift the Default: Ruling Relations and Broadening Participation in Engineering Education
Wednesday, August 1, 2:45 pm – 3:45 pm
Redwood Auditorium

Alice Pawley is an Associate Professor in the School of Engineering Education and an affiliate faculty member in the Gender, Women's and Sexuality Studies Program and the Division of Environmental and Ecological Engineering at Purdue University. Prof. Pawley's goal through her work at Purdue is to help people, including the engineering education profession, develop a vision of engineering education as more inclusive, engaged, and socially just. She runs the Feminist Research in Engineering Education (FREE, formerly RIFE, group), whose diverse projects and group members are described at feministengineering.org. She received a CAREER award in 2010 and a PECASE award in 2012 for her project researching the stories of undergraduate engineering women and men of color and white women. She has received ASEE-ERM's best paper award for her CAREER research, and the Denice Denton Emerging Leader award from the Anita Borg Institute, both in 2013. She was co-PI of Purdue's ADVANCE program from 2008-2014, focusing on the underrepresentation of women in STEM faculty positions. She helped found, fund, and grow the PEER Collaborative, a peer mentoring group of early career and recently tenured faculty and research staff primarily evaluated based on their engineering education research productivity. She can be contacted by email at apawley@purdue.edu.

Kathryn Scantlebury
Pursing Entanglements: Implications of (New) Material Feminism
for STEM Education
Thursday, August 2, 9:00 am – 10:00 am
Redwood Auditorium

Kathryn Scantlebury is a professor in the Department of Chemistry and Biochemistry at the University of Delaware and Director of Secondary Education in the College of Arts and Sciences and a visiting research professor at the Center for Gender Research at Uppsala University in Sweden. She taught high school chemistry, science and mathematics in Australia before completing her doctorate at Purdue University. Her research interests focus on gender issues in various aspects of science education, including urban education, preservice teacher education, teachers' professional development, and academic career paths in academe. Scantlebury is currently a co-editor for *Gender and Education* and a lead editor for *Cultural Studies of Science Education.* Her recent publications include two edited books, "*Material practice and materiality: A re-introduction into science education*" and *"Turning feminist theory into practice: Enacting material change in education.* She served as the Research Director for the *National Science Teachers Association* (2011-2014), is a Fellow of the *American Association for the Advancement of Science* and is the 2017 Recipient the American Education Research Association's *Distinguished Contributions to Gender Equity in Education Research Award* and *Research on Women and Education SIG's Willystine Goodsell Award*.

Conference Agenda

Tuesday, 31 July	Wednesday, 1 August	Thursday, 2 August
8:00 am Registration Opens	9:00 am – 10:40 am Concurrent Sessions	9:00 am – 10:00 am Keynote Speaker Kathryn Scantlebury 'Pursing Entanglements: Implications of (New) Material Feminism for STEM Education'
Morning Coffee 9:30 am – 10:00 am	*Morning Coffee 10:40 am – 11:00 am*	*Morning Coffee 10:00 am – 10:30 am*
10:00 am – 10:30 am Welcome and Notices	11:00 am – 12 pm Keynote Speaker Kimberly Scott 'Misappropriating Narratives and Other Issues with Broadening STEM Participation for Women of Color'	10:30 am – 11:50 am Concurrent Sessions
10:30 am – 11:30 am Keynote Speaker Helen M.G. Watt 'Gendered Career Decisions'		
Lunch 11:30 am – 12:30 pm	*Lunch 12:00 pm – 1:00 pm*	*Lunch 11:50 am – 1:00 pm*
12:45 pm – 2:15 pm Distinguished Symposium: 'The Social Contexts of Girls' and Women's Developing Sense of Belonging in STEM' Leaper, Simpkins, Riegle-Crumb, Diekman, and Master	1:00 pm – 2:30 pm Concurrent Sessions	1:00 pm – 2:20 pm Concurrent Sessions
2:30 pm – 3:50 pm Concurrent Sessions	2:45 pm – 3:45 pm Keynote Speaker Alice Pawley 'Shift the Default: Ruling Relations and Broadening Participation in Engineering Education	
Afternoon Tea 3:50 pm – 4:20 pm	*Afternoon Tea 3:45 pm – 4:15 pm*	*Afternoon Tea 2:20 pm – 2:50 pm*
4:20 pm – 5:30 pm Poster Session	4:15 pm – 5:15 pm Concurrent Sessions	3:00 pm - 4:30 pm Student Poster Award Reflections: Eccles, Scott, Pawley, Scantlebury and Borko Conference close and 2020 information
5:30 pm – 6:30 pm Reception	6:00 pm Depart for Gala Dinner at Sweet Cheeks Winery	

8:00 am – 10:00 am
Registration
Ballroom Lobby

9:30 am – 10:00 am
Morning Coffee
Ballroom Lobby/Terrace

10:00 am – 10:30 am
Conference Welcome and Notices
Redwood Auditorium

10:30 am – 11:30 am
Keynote Speaker Helen M.G. Watt
Gendered Career Decisions
Redwood Auditorium

11:30 am – 12:30 pm
Lunch on your own

12:45 pm – 2:15 pm
Invited Symposium
Redwood Auditorium

The social contexts of girls' and women's developing sense of belonging in STEM

Researchers are increasingly documenting the multiple factors contribute to women's underrepresentation in particular STEM fields such as computer science, engineering, or physics. As highlighted in our session, scientific studies point to subtle and blatant ways that that many girls' and women's sense of STEM belonging is gradually undermined from childhood into adulthood. These include gendered messages that students may experience from their parents (Simpkins) as well as from teachers and peers in STEM classrooms (Riegle-Crumb). Also, girls and women may stereotype particular STEM fields as incompatible with other goals that they consider important, such as helping others (Diekman). However, interventions aimed at counteracting stereotypes may help boost girls' and women's STEM interest and belonging (Masters). We consider the significance and implications of this work (Leaper).

Campbell Leaper
Chair and Discussant
Campbell Leaper is Professor and Department Chair of Psychology at the University of California, Santa Cruz. For over 30 years, he has been investigating gender and sexism during childhood, adolescence, and adulthood. Many of his studies have examined how gender biases and discrimination are related to girls' and women's motivation and success in STEM. Other research interests include the study of peer relations as contexts for the development of gender (and other) identities; gender ideologies and close relationships; language and social interaction; and representations of gender in the media. He has also published several meta-analyses documenting moderators of average gender differences in behavior. Professor Leaper organizes and co-chairs the biennial Gender Development Research Conference (gender.ucsc.edu), which is held in San Francisco during the fall of even years.

Sandra Simpkins
The role of parents' beliefs and behaviors in adolescents' motivational beliefs in math and science
Professor Sandra Simpkins, Ph.D. in psychology, is a faculty member of the University of California, Irvine School of Education. Through her research, Professor Simpkins examines how youth development unfolds over time and how the contexts in which youth are embedded influence their development. Generally, her work has focused on how families, friendships, and social position factors (such as, ethnicity and culture) shape adolescents' organized after-school activities, pursuit of STEM, and motivation.

Catherine Riegle-Crumb
Examining the social contexts of STEM classrooms: Teachers, peers and, and gendered messages
Catherine Riegle-Crumb is Associate Professor of STEM Education and Sociology, Associate Director of Research, Center for STEM Education, and Faculty Research Associate at the Population Research Center, at the University of Texas at Austin. Her research interests center upon inequality in educational experiences and achievement, with a focus on gender and racial/ethnic inequality in STEM domains. As a sociologist of education, she is interested in the role of social contexts, including peer groups, classrooms, and communities, in shaping educational disparities. Dr. Riegle-Crumb's has received funding from several agencies and foundations, including NSF. Her research expertise includes quantitative analyses of large datasets. She brings an interdisciplinary approach to her research, and publishes in journals in education, sociology, and psychology, including AERJ, Journal of Research in Adolescence, Science Education, and Sociology of Education.

Amanda Diekman

A cue to culture: Communal affordances can signal belonging in STEM

Amanda Diekman is Professor of Psychology at Miami University. She received her B.A. from Kenyon College and her Ph.D. from Northwestern University. She is a social psychologist who investigates how stereotypes stem from and reinforce the social structure, with an emphasis on change and stability in gender roles. Her work, funded by the National Science Foundation, explores the impact of stereotypes that STEM fields do not afford opportunities to connect or help others. She is a Fellow of the Association for Psychological Science, the Society for Personality and Social Psychology, and the Society of Experimental Social Psychology.

Allison Master

Counteracting stereotypes to boost girls' interest and belonging in STEM

Allison Master is a research scientist at the Institute for Learning & Brain Sciences at the University of Washington. She earned a B. A. from Yale University and a Ph.D. in developmental psychology from Stanford University, and completed a postdoctoral fellowship at the University of Washington. She has received awards and funding from the National Science Foundation, American Psychological Foundation, Society for Research in Child Development, and Society for Personality and Social Psychology. Her research interests include social-psychological processes that affect motivation and identity from early childhood through adulthood, and how stereotypes affect students' sense of belonging and interest in STEM.

2:30 pm - 3:50 pm
Themed Paper Sessions

Paper Session 1.1: Attraction and Recruitment to STEM
Chair: Shirley Yu
Location: Redwood Auditorium

1.1.1   The role of ability beliefs and agentic vs. communal career goals in adolescents' first educational choice. What explains the degree of gender-balance?
Una Tellhed, Martin Bäckström & Fredrik Björklund

1.1.2   Imperfect progress: Graduating Black women in STEM in Florida community colleges
Sophia Rahming

1.1.3   Sexism in the wild: Gender dynamics and women's belonging in geoscience fieldwork
Julie R. Posselt & Anne-Marie Nuñez

1.1.4   Leaving the pond – choosing the ocean: Effects of school context on career choices
        Luise von Keyserling, Michael Becker, Malte Jansen, & Kai Maaz

Workshop Session 1.2: Addressing gender and gender biases with STEM students from kindergarten to college
Workshop Organizer: Rebecca Bigler
Location: Cedar/Spruce

Paper Session 1.3: Teacher and Class Influences
Chair: Jennifer Ruef
Location: Swindells

1.3.1   The Impact of Community College Math Remediation using a Regression Discontinuity Analysis: Assessing Student Enrollment, Degree Completion and STEM Major Intent
        Rosalía C. Zárate

1.3.2   Women in gateway, college mathematics courses: Understanding gender differences in math attitudes and persistence
        Brooke Midkiff & Judith Meece

1.3.3   Gender-related values and STEM trajectories: The role of altruism in STEM career choice
        Chris Wegemer & Jacquelynne Eccles

1.3.4   Teacher and student gender and mathematics self-beliefs for New Zealand middle school students
        Penelope Watson & Christine Rubie-Davies

3:50 pm – 4:20 pm
Afternoon Tea
Gumwood/Ballroom Terrace

4:20 pm – 5:30 pm
Poster Session
Gumwood
Schedule:
To ensure all participants have time to evaluate the posters, we've divided the time in half.
4:20 pm – 4:55 pm   Faculty Posters 1-9
4:55 pm – 5:20 pm   Student Posters 10-18

Faculty Posters
1. Child(less): Mixed Method Insight into the Early-Career Mindsets of Women in STEM
        Sarah E. Thoman, Amber K. Stephens, Rachael D. Robnett, PhD

2. Gender Differences in Attitudes towards, Performance, and Self-efficacy in 4 STEM Fields
    Sylvia Beyer
3. How Parents' Science Talk Differs by Child Gender in a Book Reading Task
    Tess A. Haifley, Jennifer Jipson, Claudia L. Castañeda, and Maureen Callanan
4. Mentoring as an intervention strategy for young women at risk of leaving a STEM teaching pathway
    Deborah Tully
5. Paving the Path for Latinx Students' STEM Career Aspirations: The Association of STEM Career Choice with Familial Interest in Science
    Kristel C. Dupaya
6. Who, what and when? Understanding STEMM Aspirations of Adolescent Hispanic Youth
    Nayssan Safavian, Anna-Lena Dicke, Yannan Gao, Jacquelynne S. Eccles, Stuart Karabenick
8. The Gender Gap in Science in India: Do the Causes Lie Within?
    Prajval Shastri, Anitha Kurup & Aparna Markose
9. Women's Positioning in an Advanced Undergraduate Mathematics Course
    Ann Y. Kim & Jeffrey Pair

Student Posters
10. "The Flies Chose Me": Mixed-Method Insight into Successful Women in STEM
    Sarah E. Thoman, Tori DiBona, James Abelar, Rachael D. Robnett, PhD
11. Teacher Instructional Practices and Young Female Students' Participation in Community Science
    Nancy Campos, Dimple Manasalaxmi Ravuri, Jiwon Lee, Jennifer J. Long, Sara Ludovise
12. Aspirations of Australian secondary students for careers requiring high level mathematics
    Felicia Jaremus, Jennifer Gore, Leanne Fray, Adam Lloyd, Elena Prieto
13. Trajectories of science and math motivation among Latino/a adolescents
    Ta-yang Hsieh, Yangyang Liu, Sandra D. Simpkins
15. Culturally-Relevant Growth Messages Unexpectedly Undermine Women's Help-Seeking
    Giselle Laiduc, Rebecca Covarrubias
17. Understanding the Motivation of Underrepresented Female Ph.D. Students to Enroll and Persist in STEM-Related Fields
    Lauren Witherspoon
18. Shrink the Gap: Environmental and Individual Strategies Enhancing Female's Belongingness in STEM
Mengfan Zhai, Zige Zhao, Bobbie Bermudez Bonilla, Dr. Jenefer Husman

5:30 pm – 6:30 pm
Reception
Ballroom Lobby/Terrace

9:00 am - 10:40 am
Themed Paper Sessions

Paper Session 2.1: STEM Teachers: Motivation & Support
Chair: Juliet Baxter
Location: Redwood Auditorium

2.1.1   Gendered motivations for STEM, teaching, and STEM teaching
        Helen M. G. Watt, Paul W. Richardson & Suzanne Rice

2.1.2   Teachers' achievement goals and motivational beliefs: Similar or different across gender and
        teaching domain?
        Ruth Butler

2.1.3   Contributing to sustainability by becoming a teacher: Implications for recruitment processes and
        teaching programs
        Pia Spangenberger

2.1.4   Preparing teachers for inclusive computer science classrooms
        Joanna Goode

2.1.5   An integrative model of teachers' motivational self-beliefs: Relations with teacher and student
        outcomes
        Harsha Perera

Paper Session 2.2: STEM Beliefs and College Context
Chair: Holly Matusovich
Location: Swindells

2.2.1   Entering STEM in later life: Examining the motivations of adult women studying computing
        Clem Herman, Helen Donelan, Helen Jefferis & Janet Hughes

2.2.2   Engineering and…: Women negotiating their future in the present
        Kate Youmans & Idalis Villanueva

2.2.3   Engineering graduate students: Future time perspectives and gender
        Marissa Tsugawa-Nieves, Heather Perkins, Matthew Bahnson, Cheryl Cass, & Adam Kirn

2.2.4   Understanding the motivation of underrepresented female PhD students to enroll and persist in STEM-related fields
Lauren Witherspoon

2.2.5   "I'm a computer scientist!": Virtual reality experience reduces stereotype threat and increases STEM motivation among undergraduate women via the Proteus effect
Christine R. Starr, Katie A. Green, & Barrett R. Anderson

Paper Session 2.3: Intersectionality and Agency in STEM
Chair: Stephany RunningHawk Johnson
Location: Cedar

2.3.1   Decolonizing Indigenous research: The Northern Paiute history project at UO
Jennifer O'Neal

2.3.2   Why Indigenous traditional ecological knowledge is important for STEM
Michelle M. Jacob, Joana Jansen, Stephany RunningHawk Johnson, & Hobie Blackhorn

2.3.3   Chicana feminisms to decolonize STEM
Jean Aguilar-Valdez

2.3.4   Germination of a STEM interest: A social-design study of interest and agency across a networked STEM club
Deena L. Gould & Priyanka Parekh

2.3.5   Black women in white coats: Science identity construction in Afro-Caribbean women
Sophia Rahming

10:40 am – 11:00 am
Morning Coffee
Gumwood/Ballroom Terrace

11:00 am – 12:00 pm
Keynote Speaker Kimberly A. Scott
Misappropriating Narratives and Other Issues with Broadening STEM Participation for Women of Color
Redwood Auditorium

12:00 pm – 1:00 pm
Lunch on Your Own

1:00 pm - 2:30 pm
Themed Paper Sessions

Paper Session 2.4: Women's Motivation and Participation in STEM Higher Education: Identifying Key Challenges and Corresponding Interventions
Chair: Amy Roberson Hayes
Location: Redwood Auditorium

2.4.1   One size does not fit all: Gender and ethnic variation in math anxiety and stereotype threat
         Jennifer E. John & Rachael D. Robnett

2.4.2   Gender differences in perceptions of work-ethic and ability in college STEM classes
         Amy Roberson Hayes, Kristin Hixson, & Stephanie Masters

2.4.3   Links between mentoring and STEM self-efficacy: A mixed-methods analysis of undergraduates and their research mentors
         Rachael D. Robnett, Paul A. Nelson, Eileen L. Zurbiggen, Faye J. Crosby, & Martin M. Chemers

2.4.4   Closing the gender gap in STEM: A meta-analysis of what works (and what does not)
         Emily F. Coyle & Lynn S. Liben

2.4.5   Discussant & Interaction
         Lynn S. Liben

Paper Session 2.5: STEM Motivation & Identity
Chair: Helen M. G. Watt
Location: Swindells

2.5.1   Promoting equity by gender into the classroom at the Institute of Technology in Linköping, Sweden
         Vivian Vimarlund

2.5.2   The influence of gender and ethnicity on students' endorsement of science identity
         Paulette Vincent-Ruz & Christian D. Schunn

2.5.3   The perspectives of Western Australian Year 10 girls and boys on advanced maths course selection for senior secondary studies
         Jane Kirkham, Elaine Chapman, & Helen Wildy

2.5.4   Measuring mathematical identity shifts
         Jennifer Ruef, Shannon Sweeney, Chris Willingham, & Eva Thanheiser

2.5.5   Discrimination hurts and support helps undergraduate students' STEM motivation
         Christy Starr & Campbell Leaper

Paper Session 2.6: Teacher and Class Influences
Chair: Brandy Todd
Location: Cedar

2.6.1   Gender differences in parent and teacher support for science among Latino youth
Ting-Lan Ma & Sandra Simpkins

2.6.2   Can mixed assessment methods make biology classes more equitable?
Sehoya Cotner & Cissy Ballen

2.6.3   Latinx Community College Students' STEM Pathways - Everything but Linear
Rosalía Chávez Zárate

2.6.4   Pattern-centered approach to high school math motivation
Ta-yang Hsieh & Sandra D. Simpkins

2.6.5   Not material: The importance of hands-on learning among Black women and men engineering students
Sophia Rahming & Lara Perez-Felkner

2:45 pm – 3:45 pm
Keynote Speaker Alice Pawley
Shift the Default: Ruling Relations and Broadening Participation in Engineering Education
Redwood Auditorium

3:45 pm – 4:15 pm
Afternoon Tea
Gumwood/Ballroom Terrace

4:15 pm - 5:15 pm
Themed Paper Sessions

Paper Session 2.7: University Chemistry Education
Chair: Kathryn Scantlebury
Location: Swindells

2.7.1   Self-regulated learning in college chemistry: Roles of belonging and instructional context
Shirley L. Yu, Stephen Pearson, Yeo-eun Kim, Matthew Stoltzfus & Ted Clark

2.7.2   Why organic chemistry may be a roadblock course for females

Ara C. Austin, Ian R. Gould & Nicholas Hammond

2.7.3   Measuring learning gains and examining implications for student success in STEM: A gender story in post-secondary first year chemistry
Kathleen Scalise, Angelica Stacy & Michelle Douskey

Paper Session 2.8: Gendered Achievement and Attitudes
Chair: Silke Luttenberger
Location: Redwood Auditorium

2.8.1   International differences in STEM potential and attitudes: TIMSS and PISA 2015
Anniek van den Hurk, Annemarie van Langen & Martina Meelissen

2.8.2   Do STEM males always outperform non-STEM females when performing visuospatial tasks?
Juan C. Castro-Alonso, Mona Wong, Paul Ayres & Fred Paas

2.8.3   To buy or not to buy: A study in gender-based marketing of STEM toys
Brandon Aigner, Chris Bolognese & Bailey Braaten

5:45 pm
For Gala Dinner attendees: Meet at the lower level of the EMU outside of The "O" desk/Townshend's Tea for a 6:00 pm departure.

9:00 am – 10:00 am
Keynote Speaker Kathryn Scantlebury
Pursing Entanglements: Implications of (New) Material Feminism
for STEM Education
Redwood Auditorium

10:00 am – 10:30 am
Morning Coffee
Gumwood/Ballroom Terrace

10:30 am – 11:50 am
Themed Paper Sessions

Paper Session 3.1: Stereotypes and Barriers
Chair: Gale Sinatra
Location: Redwood Auditorium

3.1.1   "As bad as it sounds, they are the nerds": Girls' perceptions of who participates in STEM
Felicia Jaremus, Jennifer Gore, Leanne Fray, Adam Lloyd, Elena Prieto

3.1.2   Barriers for gender-untypical career aspirations: Differences between boys and girls in untypical domains
Silke Luttenberger & Manuela Paechter

3.1.3   When bias education backfires: Antecedents and outcomes of social identity threat after learning about implicit gender bias in STEM
Audrey Aday, Simon Lolliot, & Toni Schmader

3.1.4   Not brilliant enough for STEM: Self-concepts and goals moderate the relationship between STEM stereotypes and motivation
Christy Starr & Campbell Leaper

Paper Session 3.2: Computer Science & Information Technology
Chair: Marissa Tsugawa-Nieves
Location: Swindells

3.2.1   Game-based learning for supporting self-confidence and motivation of female students for ICT
Bernhard Ertl

3.2.2   So, you want to learn computer science? Are you a girl, a boy, underrepresented, a future worker, a robot maker, or a chipset baker? Analysis of four corporate computer science education sites: Code.org, Apple, Google, and Microsoft
Makseem Skorodinsky

3.2.3   Online Professional Development for Computer Science Teachers: Addressing Barriers to Broadening Participation in Computing
Kirsten Peterson, Joyce Malyn-Smith & Joanna Goode

3.2.4   "Trust yourself: You have the IT-Factor!" Career coaching for female computer scientists
Silvia Förtsch

11:50 am – 1:00 pm
Lunch On Your Own

Themed Paper Sessions
1:00 pm - 2:20 pm

Paper Session 3.3: Attraction and Recruitment to STEM
Chair: Shawn Lampkins
Location: Cedar

3.3.1   Establishing a school based STEM culture for young women through a university partnership program: An Australian case-study
Judy Anderson

3.3.2   Reimagining STEM recruitment in the UK – an evaluation of the People Like Me initiative
Wendy Sadler, Clem Herman, & Jane Kendall-Nicholas

3.3.3   Interventions in education to prevent STEM pipeline leakage
Anniek van den Hurk, Annemarie van Langen, & Martina Meelissen

3.3.4   Who goes where and does it matter? Exploring the experiences of successful URM women in STEM at different types of colleges
Deborah Tully

Paper Session 3.4: From the Inside and Out: Evidence for Ecological Influences on Girls and Women in STEM
Chair: Jennifer E. John and Sarah E. Thoman
Location: Swindells

3.4.1   How do ability beliefs and collegiate experiences affect computer science achievement among undergraduate women and men?
Lara Perez-Felkner, Barbara Schneider, Carolina Milesi, & Kevin Brown

3.4.2   The role of attitudinal factors on the gendered nature of Pre-Med STEM course attrition
Paulette Vincent-Ruz, Eben Witherspoon, & Christian D. Schunn

3.4.3   Are adolescents concerned about sexism in STEM fields? A mixed-methods analysis
Rachael D. Robnett & Jennifer E. John

3.4.4   In the workforce and on the homefront: Gender roles in work and life
Alexandra I. Zelin & Sarah E. Thoman

Paper Session 3.5: From Toys to Test Tubes: Perspectives on the Development of Female STEM Identity from Kindergarten through Graduate School
Chair: Ann Kim
Location: Redwood

3.5.1   Sparking young girls' STEM interest: Gender effects of STEM curricula for kindergarten and 4th grade
Gale M. Sinatra, Sandra Kaplan, Eugenia Mora-Flores, Susan McKibben, Ananya Matewos, Julie A. Marsh, & Morgan S. Polikoff

3.5.2   Gendered experiences in an elementary school makerspace program
Vanessa Vongkulluksn, Ananya Matawos, & Gale M. Sinatra

3.5.3   Do I have what it takes? Ability uncertainty predicts women's academic self-efficacy and vocational identity in STEM
Audrey E. Aday & Viviane Seyranian

2:20 pm – 2:50 pm
Afternoon Tea

3:00 pm – 4:30 pm
Student Poster Award, Reflections, 2020 Information, and Conference Close

Tuesday, July 31ˢᵗ

4:20 pm – 5:30 pm

Location: Gumwood

Schedule:

To ensure all participants have time to evaluate the posters, we've divided the time in half.

4:20 pm – 4:55 pm   Faculty Posters 1-9

4:55 pm – 5:20 pm   Student Posters 10-18

Poster 1. Child(less): Mixed Method Insight into the Early-Career Mindsets of Women in STEM
Sarah E. Thoman, Amber K. Stephens, Rachael D. Robnett

Abstract

Women are underrepresented in science, technology, engineering and math (STEM) fields in the U.S., and improving gender inclusivity in STEM is a national priority. One approach to addressing this issue is understanding how early-career women in STEM perceive and anticipate ameliorating work-life conflict. To evaluate and describe STEM women's work-life experiences, a mixed-methods design investigated current work-life conflict, anticipated work-life conflict and concern, and STEM identity. Responses from undergraduate and graduate women in STEM at a large, diverse, research intensive university in the Southwest U.S. revealed two overarching mindsets: challenge and opportunity. A challenge mindset was associated with higher levels of work-life conflict and plans to forego or delay children. An opportunity mindset was associated with higher levels of STEM identity and plans to balance work and family. Results further psychological insight into the experiences of women in STEM, have implications for STEM retention, and help inform work-life interventions.

Bios

Sarah E. Thoman, University of Nevada, Las Vegas, thoman@unlv.nevada.edu
Ms. Thoman is a doctoral student in psychology working with the Social Development Research Lab at the University of Nevada, Las Vegas (UNLV). Her research interests focus on the influence of gender on career-related experiences, decisions, and trajectories. She is especially intrigued by gender inequality in gender atypical professions (e.g., women in STEM fields, men as stay at home fathers). Prior to joining the Psychology department at UNLV, Ms. Thoman worked as an analyst and consultant in the private sector investigating employee and consumer behavior. She holds degrees from The University of Texas at Austin and Teachers College, Columbia University.

Amber K. Stephens, University of Nevada, Las Vegas, akory@unlv.nevada.edu
Ms. Stephens is a master's student in the communications studies department at the University of Nevada, Las Vegas (UNLV). She received her BA in Psychology with a Minor in Sociology from UNLV. Her research interests focus on the influence of romantic relationships on the way we view ourselves, others, and the world around us, particularly in underrepresented or marginalized groups (LGBTQ, Polyamorous). Additionally, she is interested in exploring gender and work-life balance issues involving sex workers.

Rachael D. Robnett, University of Nevada, Las Vegas, rachael.robnett@unlv.edu
Rachael Robnett, Ph.D., is a developmental psychologist at the University of Nevada, Las Vegas. Her research focuses on educational equity in STEM fields during adolescence and emerging adulthood. Specific areas of emphasis include peer influences on academic aspirations, intersectionality, identity, and self-efficacy. Representative publications are as follows: Robnett, R.D., John, J.E., Underwood, C.R., & Thoman, S.E. (2018). Sexism and gender stereotyping. To appear in S. Hupp and J. Jewell (Eds.), The Encyclopedia of Child and Adolescent Development. Robnett, R.D., & Thoman, S.E. (2017). STEM success expectancies and achievement among women in STEM majors. Journal of Applied Developmental Psychology, 52, 91-100.

Poster 2. Gender Differences in Attitudes towards, Performance, and Self-efficacy in 4 STEM Fields
Sylvia Beyer

Abstract
The aim of this study was to understand female underrepresentation in STEM using Eccles' expectancy x value framework. Undergraduates' (159 females, 90 males) high school and college experiences in STEM subjects, STEM knowledge, self-efficacy, and values were assessed. Math was the subject most often ranked as the favorite and best subject in high school by males and females alike. No gender differences in favorite high school subject or best high school subject emerged for any STEM fields. Males and females alike deemed ability to be more important than effort for success, especially for math. These findings suggest that in high school math and other STEM fields are not unpopular and the absence of gender differences in high school STEM subjects was noteworthy. Nevertheless, females had lower self-efficacy for biology and chemistry in college despite an absence of gender differences in STEM knowledge, which could adversely affect selection of STEM majors.

Bio
Sylvia Beyer, University of Wisconsin-Parkside, beyer@uwp.edu
I received a Vordiplom in Psychology (equivalent to a Bachelor's degree) from the Universität Tübingen in 1985 and a Ph.D. in Psychology from the University of Oregon in 1991. I am a full professor of Psychology at the University of Wisconsin-Parkside where I was awarded both the teaching and research awards. In 2000, I was the principal investigator of a $423,000 research grant from the NSF to study the underrepresentation of women in Computer Science. I have published extensively on women and STEM in Psychology and Computer Science journals. I am also the mother of three teenage sons.

Poster 3. How Parents' Science Talk Differs by Child Gender in a Book Reading Task
Tess A. Haifley, Jennifer Jipson, Claudia L. Castañeda, and Maureen Callanan

Abstract
Women's participation in the science, technology, engineering and math (STEM) workforce varies by occupation with significantly lower participation in the physical sciences for women (National Science Foundation, 2017). To understand where these gender disparities may originate, we examined early parent-child conversations about science during a shared book-reading task. We coded 67 videos of parent-child dyads for parent talk including science explanation and science facts, describing evidence, personal connections, and fantasy. Post hoc tests revealed that parents talked more about science explanations and science facts with boys than with girls (d = .52). Similarly, parents described evidence more when reading

with boys than with girls (d = .86). Our findings suggest that parents might discriminate by child gender in the ways they talk, with boys receiving more science and describing talk than girls. Differential talk parents use might contribute to differences in boys' and girls' interests and engagement with science.

Bios

Tess A. Haifley, University of California, Santa Cruz, thaifley@ucsc.edu
Tess Haifley is a Developmental Psychology Ph.D. graduate student working with Dr. Campbell Leaper at the University of California, Santa Cruz. Her research interests include gender differences in parent-child interactions that involve opportunities to talk about examine, and interact with science. Tess is particularly interested in informal contexts where science might be discussed with young children, such as in the home or museums. Tess is part of a current project with Drs. Maureen Callanan and Jennifer Jipson investigating parent-child interactions while book reading.

Jennifer L Jipson, California Polytechnic State University, San Luis Obispo, jjipson@calpoly.edu
Children at the preschool age are naturally motivated to understand the world around them. In my research program, I explore young children's developing understandings within the domains of science, health, and technology. In addition to examining what children of different ages know about specific topics, I investigate how everyday interactions in informal settings (e.g., museums, zoos, virtual environments, preschools, parent-child conversations) contribute to children's learning. Finally, I am interested in exploring the extent to which these early experiences impact later engagement with, and proficiency in, scientific, technological and health-related activities.

Claudia L. Castañeda, University of California, Santa Cruz, clcastan@ucsc.edu
Claudia L. Castañeda is a Developmental Psychology Graduate student at the University of California, Santa Cruz. Claudia's research examines children's development and engagement in science during everyday activities with their families. A main goal of her work is to investigate how children, including those from Indigenous and Indigenous-heritage communities of México and the Americas, begin to make sense of environmental issues and practices. In her work, she uses an interdisciplinary approach to create a more inclusive theoretical framework that allows for a better understanding about how and what children with different cultural values and experiences learn in family and community contexts.

Maureen A. Callanan, University of California, Santa Cruz, callanan@ucsc.edu
Maureen Callanan is Professor of Psychology at the University of California, Santa Cruz. Her research focuses on young children's developing understanding of the natural world in the context of family conversations. Taking a sociocultural approach, she investigates language and cognitive development in young children, with particular attention to diversity across families and communities, as well as gender diversity. Callanan has a long-standing research partnership with Children's Discovery Museum of San Jose, where she has been PI or co-PI on several NSF-funded projects investigating children's and families' informal learning about science.

Poster 4. Mentoring as an intervention strategy for young women at risk of leaving a STEM teaching pathway
Deborah Tully

Abstract
In Australia, mathematics teachers are in short supply. A lack of collegial support and perceptions of isolation are often amongst the main contributing factors for those leaving a teaching pathway. Using the theoretical lenses of social capital and social presence, this study follows the journey of two female mathematics teachers (one pre-service, one in-service) who engaged through a mentoring relationship established though a university partnership program. Multiple interviews with both participants were conducted over a one-year period. The significance of this mentoring relationship, as it relates to retention in the profession, was assessed through employing the five cycles of Wenger, Trayner and deLaat's (2011) conceptual framework of "value creation" for communities of practice. Results indicate that in-service teachers feel valued through contributing to the learning experience of pre-service teachers, while pre-service teachers benefited from the encouragement and care offered from a non-supervising teacher with whom transparency was valued.

Bio
Deborah A. Tully, University of Sydney, deborah.tully@sydney.edu.au
Deborah is currently the Vonwiller Post-Doctoral Research Fellow at the University of Sydney working with the STEM Teacher Enrichment Academy. She recently completed her PhD in Education focusing on minority women in STEM higher education in the United States. Prior to commencing her PhD studies, Deborah was an engineer who later trained to become a high school mathematics teacher. She holds a Master Degree in Mathematics Teaching from Harvard University and a Bachelor's degree in Engineering and Operations Research from the University of Massachusetts/Amherst (magna cum laude). Her research interests include gender and STEM, quantitative methodologies and mathematics teacher education.

Poster 5. Paving the Path for Latinx Students' STEM Career Aspirations: The Association of STEM Career Choice with Familial Interest in Science
Kristel C. Dupaya

Abstract
Family can be a starting point for the development of a student's STEM identity, and can be utilized as a resource to promote STEM interest in underrepresented minorities. This study aims to find (1) if there is an association between students' STEM career aspirations and family manifestations of interest in science, and (2) how students' gender or endorsement of familism beliefs moderates this association. Running multiple regressions using questionnaire data from 93 Latinx high schoolers, the association of family interest in science alone was found to be insignificant. When including interactions, the main effect of gender became significant when looking at older siblings' interest (p=.045). However, when looking at parent interest, only the parent interest main effect became significant (p=.031). These findings are important for helping promote STEM in underrepresented populations and for starting the search for alternate ways to help young Latina women embrace STEM as a career option.

Bios

Kristel C. Dupaya, University of California, Irvine, kdupaya@uci.edu
Kristel Dupaya earned her B.A. in Psychology and Chemistry at Wellesley College. She worked closely with the Wellesley Centers for Women on projects focusing on STEM education research and gender equity. After earning her degree, she worked as a research assistant at the University of Chicago on projects focused on improving spatial learning and math proficiency. At the UCI Education Graduate program, she is currently interested in exploring the mechanisms behind students' pursuit of and persistence in STEM education. In particular she is looking at the ways women and underrepresented minority students' relationships impact their motivation to persist in STEM.

Poster 6. Who, what and when? Understanding STEMM Aspirations of Adolescent Hispanic Youth
Nayssan Safavian, Anna-Lena Dicke, Yannan Gao, Jacquelynne S. Eccles, Stuart Karabenick

Abstract
Statistics around the underrepresentation of Hispanics and women in STEMM have focused on attainment of advanced degrees—neglecting the STEMM-related workforce outside these margins. Using an expanded STEMM framework, we examine Hispanic youths' STEMM aspirations by gender, across grades, and predictors of aspirations. 7,835 adolescent Hispanic youths' (52% female, 71% low-income, 49% English learners) occupational aspirations and motivations were surveyed. Aspirations were aggregated into STEMM and STEMM-support categories. Hispanic youth aspire to STEMM (33-44%). STEMM aspirations matched gendered expectations: Females aspired to Healthcare (both practitioner and support) occupations, whereas males aspired to Architecture and Engineering, Computer and Mathematics, and Technician occupations. The likelihood of STEMM and STEMM-support aspirations increased with higher math expectancy-value beliefs. Findings imply that Hispanic youths' STEMM aspirations differentiate by gender and with maturity and experience. Divergent choices could reflect gender-specific cultural norms and changes in perceptions of affordances over time.

Bios

Nayssan Safavian, University of California, Irvine, nayssan.safavian@uci.edu
Dr. Safavian is an Associate Project Scientist within the School of Education at the University of California, Irvine. Her research applies an achievement motivation lens to study factors that optimize opportunities in mathematics and science in underrepresented communities. Currently she is a co-PI on a Institute of Education Sciences-funded a study examining undergraduates perceptions of science relevance with a focus on students who are underrepresented in science—first-generation, underrepresented minorities, and female students. She also manages a National Science Foundation study where she is exploring longitudinal associations between Hispanic youths' motivations in adolescence and post-secondary STEM-aspirations and career attainment.

Anna-Lena Dicke, University of California, Irvine, adicke@uci.edu
Dr. Anna-Lena Dicke is an Associate Project Scientist at the University of California, Irvine. Her research interests focus on understanding the driving factors and benefits of students' interest, motivation, and engagement. Currently, her work investigates the underlying motivational mechanisms that determine students' educational pathways. She is interested in how features of the school environment that students experience on an everyday basis influence not only their academic success but also their educational, career, and life choices in the short- and long-term.

Yannan Gao, University of California, Irvine, yannang@uci.edu
Yanna Gao is a doctoral student in the School of Education with a specialization in Learning, Teaching, Cognition, and Development. Her research interests focus on the motivational processes underlying influential choices during adolescence. Yannan is particularly interested in understanding how adolescents make decisions in academic and career settings and whether or not cultural background and family socioeconomic status influence these decisions.

Jacquelynne Eccles, University of California, Irvine, jseccles@uci.edu
Jacquelynne S. Eccles is the Distinguished Professor of Education at the University of California, Irvine. Over the past 30 years, Professor Eccles has conducted research on a wide variety of topics including gender-role socialization, teacher expectancies, classroom influences on student motivation, and social development in the family and school context. One of the leading developmental scientists of her generation, she has made seminal contributions to the study of achievement-related decisions and development. Most notably, her expectancy-value theory of motivation and her concept of stage-environment have served as perhaps the most dominant models of achievement during the school years, contributing to extensive research and reform efforts to improve the nature of secondary school transitions.

Stuart Karabenick, University of Michigan, skaraben@umich.edu
Dr. Stuart Alan Karabenick is a Research Professor in the School of Education in the Combined Program in Education and Psychology and Adjunct Professor in the Department of Psychology at the University of Michigan, as well a Professor Emeritus of psychology at Eastern Michigan University. His research interests focus on student and teacher motivation and self-regulated learning. Research projects in progress include a longitudinal study of Hispanic students' aspirations and continued participation in the science, technology, engineering and math (STEM) pipeline. His interests include studies of Middle-Eastern students' experiences in U.S. middle school classrooms, and interventions designed to improve the motivation and learning of students.

Poster 8. The Gender Gap in Science in India: Do the Causes Lie Within?
Prajval Shastri, Anitha Kurup & Aparna Markose

Abstract
The conceptual framework is that the gender gap at various levels in the Indian science profession in general and in physics in particular reflects not only social processes in the environment it is embedded in but also prejudicial processes within the praxis. The gap can therefore be mitigated by interventions whose remit is confined to institutional boundaries. The aim is to evaluate whether current interventions to address the gap are based on existing evidence. Several common explanations for the gap are considered in the light of this evidence from statistics of the gender fraction in multiple arenas at multiple levels, upwards of the secondary-level. It is found that many current interventions are inconsistent with pointers from the evidence. Ways forward that institutions should prioritise to address the gap are then considered, keeping in mind that gender parity of numbers is a necessary but not sufficient condition for gender equality.

Bios
Prajval Shastri, Indian Institute of Astrophysics, prajval.shastri@gmail.com
I am an astrophysicist and Professor at the Indian Institute of Astrophysics. I research accreting giant black holes. Understanding and mitigating gender inequity in science has been my additional passion. I am currently Chair of the new Gender in Physics Working Group of the Indian Physics Association (the

professional society of Indian physicists), which is a consequence of a successful proposal that I led. I am member, Working Group5 on Women in Physics, IUPAP and Working Group for Gender Equity, Astronomical Society of India, was Country Team Leader at the International Conferences of Women in Physics 2011 and 2014. I guest-edited two Indian science publications with an all-women authorship in 2017 (Resonance & Physics News). I seek to address the gender gap in the physics profession (stark at higher echelons) and seek collaboration with social scientists, and professionals in other disciplines, countries and cultures, to finesse effective ways forward.

Anitha Kurup, National Institute of Advanced Studies, bkanitha@gmail.com
Anitha Kurup is a Professor, School of Social Sciences and Anchor of the Education Programme. She is also leading the National Gifted Education Program in India anchored at NIAS. Her research interests span the broad disciplines of education and gender studies. Her expertise in the area of gender covers a wide spectrum, from examining conceptual and methodological strands of gender relations to political participation and decentralised governance. She is a Member, Governing Board of ISEC, Bangalore, and Member, Academic Council, Christ University.

Aparna Markose, Pondicherry University, aparnamarkose@gmail.com
Aparna Markose has a Masters in Physics. After gaining research experience as an intern in astrophysics and as a lecturer in physics she is enrolled in a Masters Programme in Environmental Science in Pondicherry University.

Poster 9. Women's Positioning in an Advanced Undergraduate Mathematics Course
Ann Y. Kim & Jeffrey Pair

In this study examined how female students positions themselves in an advanced undergraduate mathematics class. In this unique, proof-based course, instructors sought to create a community of practice modeled after the professional mathematics community; students were responsible for negotiating the criteria for a valid mathematical argument and assessing their peers' mathematical contributions. We coded transcripts from whole class discussions, focusing on the female students. Using positioning theory, we categorized the different positions women took up into four profiles. One we labelled, "tell me what to do to get an A." These women contributed to class discussions through asking how student work would be graded. The second were those who had limited understanding of the nature of mathematics, as only computational. The third were those who only engaged when called upon. Lastly, there were women who made authentic contributions to their mathematics community. Implication discussions welcome during poster session.

Bios
Ann Y. Kim, California State University, Long Beach, Ann.Kim2@csulb.edu
Ann Y. Kim is an assistant professor of human development at California State University, Long Beach. Broadly, her research interests are in the area of identity development among adolescents and young adults. When she was a postdoctoral scholar in educational psychology at the University of Southern California she developed a focus on academic contexts such as STEM classrooms and the intersectional influences of race-ethnicity and gender. She teaches courses in adolescent development and emerging adulthood and research methods in human development.

Jeffrey Pair, California State University, Long Beach, Jeffrey.Pair@csulb.edu
Jeffrey Pair is an assistant professor of mathematics education in the Department of Mathematics and Statistics at California State University, Long Beach. He teaches mathematics courses designed for future teachers. During his dissertation study regarding the teaching and learning of the nature of mathematics, he realized that our mathematical ideas are tied to our personal identity. He is interested in learning more about identity. More broadly his research interests are related to the teaching and learning of mathematical proof and the nature of mathematics.

Poster 10. "The Flies Chose Me": Mixed-Method Insight into Successful Women in STEM
Sarah E. Thoman, Tori DiBona, James Abelar, Rachael D. Robnett

Abstract
Women are underrepresented in science, technology, engineering and math (STEM) fields in the U.S. Improving gender inclusivity in STEM is a national priority and may be addressed by understanding what characterizes women's success in STEM. To investigate STEM success, a longitudinal mixed-method design assessed the psychological constructs of STEM identity, career identity status, career commitment, and resilience in the experiences of successful women in STEM. Women were engaged in two project-based STEM programs at a large, diverse, research intensive university in the Southwest U.S. Associations between resilience and career commitment and differences in resilience experiences with respect to career identity status emerged. Results provide initial insight into women's STEM success to help inform STEM educational and career development theories, programs, and interventions.

Bios
Sarah E. Thoman, University of Nevada, Las Vegas, thoman@unlv.nevada.edu
Ms. Thoman is a doctoral student in psychology working with the Social Development Research Lab at the University of Nevada, Las Vegas (UNLV). Her research interests focus on the influence of gender on career-related experiences, decisions, and trajectories. She is especially intrigued by gender inequality in gender atypical professions (e.g., women in STEM fields, men as stay at home fathers). Prior to joining the Psychology department at UNLV, Ms. Thoman worked as an analyst and consultant in the private sector investigating employee and consumer behavior. She holds degrees from The University of Texas at Austin and Teachers College, Columbia University.

Tori DiBona, University of Nevada, Las Vegas, dibona@unlv.nevada.edu
Ms. DiBona graduated from the University of Nevada, Las Vegas with a B.A. in Psychology and a minor in Family Studies in May 2017. She plans on attending a Marriage and Family Therapy graduate program with a focus on Human Sexuality. She is interested in identifying the degree to which an individual's outlook is altered by the perceptions held by those around him or her. Ms. DiBona is particularly fascinated by the potential influences of stereotypes on physical and mental performance as well as how stereotypes influence the overall quality of relationships.

James Abelar, University of Nevada, Las Vegas, abelar@unlv.nevada.edu
Mr. Abelar is pursuing a B.A. in Psychology and a B.S. in Public Health at the University of Nevada, Las Vegas (anticipated graduation: December 2017). After completing his degrees, he plans to pursue a Master's degree in Social Work and a Master's degree in Public Health. Mr. Abelar's research interests involve gender and racial bias. More specifically, he is interested in how these biases impact health and what interventions can be done to reduce the burden on at-risk populations.

Rachael D. Robnett, University of Nevada, Las Vegas, rachael.robnett@unlv.edu
Rachael Robnett, Ph.D., is a developmental psychologist at the University of Nevada, Las Vegas. Her research focuses on educational equity in STEM fields during adolescence and emerging adulthood. Specific areas of emphasis include peer influences on academic aspirations, intersectionality, identity, and self-efficacy. Representative publications are as follows: Robnett, R.D., John, J.E., Underwood, C.R., & Thoman, S.E. (2018). Sexism and gender stereotyping. To appear in S. Hupp and J. Jewell (Eds.), The Encyclopedia of Child and Adolescent Development. Robnett, R.D., & Thoman, S.E. (2017). STEM success expectancies and achievement among women in STEM majors. Journal of Applied Developmental Psychology, 52, 91-100.

Poster 11. Teacher Instructional Practices and Young Female Students' Participation in Community Science
Nancy Campos, Dimple Manasalaxmi Ravuri, Jiwon Lee, Jennifer J. Long, Sara Ludovise

Abstract
This project aims to understand how to better support young female students, largely from Latina and low-income family backgrounds, to enhance their learning outcomes and motivation to pursue STEM-related careers. Grounded in sociocultural and cognitive perspectives on learning, we explore the impact of an innovative learning experiences provided through a citizen science program on these students' participation and self-perception. Participants were 194 fifth-grade students (96 females) in California. Data include: (a) pre and post assessments, (b) lesson videos, (c) interviews with 18 focus female students. We quantitatively analyzed pre and post assessments and qualitatively analyzed teacher lesson videos and students interviews. The analyses reveal some noticeable relationship between particular teaching practices and female students' enhanced learning outcomes as well as their motivation to pursue a STEM-related career. During the presentation, we will share a set of effective practices discussing how and why they may support female students' learning and motivation.

Bios
Nancy Campos, University of California, Irvine, camposn1@uci.edu
Nancy Campos is an undergraduate student at UC Irvine triple majoring in Educational Sciences; Psychology & Social Behavior; and Criminology, Law and Society. She is currently serving for the second year as a student coordinator for the Early Academic Outreach Program (EAOP) through the Center for Educational Partnerships. Nancy is also currently a research assistant for Project CRYSTAL. Her interest lies in student motivation, access to higher education, and sociocultural learning. She has experience researching student involvement in student support programs and factors that influence their retention, perception of said programs, and motivations.

Dimple Manasalaxmi Ravuri, University of California, Irvine, dravuri@uci.edu
Dimple Ravuri is an undergraduate student studying Biological Sciences at UC Irvine. She will be enrolling in the CalTeach teaching credential program to teach science at the secondary level. Her areas of interest also include curriculum design and education reform. She is currently a research assistant for Project CRYSTAL. She has done work with Central Valley Robotics, a program dedicated to spreading the values of STEM and creating after-school FIRST® robotics programs in the Central Valley of California.

Jiwon Lee, University of California, Irvine, jiwonl3@uci.edu
Jiwon Lee is a PhD student at UC Irvine - School of Education. She received her M.Ed. in Learning and Teaching from Harvard Graduate School of Education. While at Harvard, she has been involved in several research projects related to teachers' mathematical quality of instruction as a trained Mathematical Quality of Instruction rater. She has research experience in mathematics and science teaching and learning and has been involved in tutoring and mentoring youth in mathematics in Oakland and Irvine. She is currently a graduate student researcher for Project CRYSTAL.

Jennifer J. Long, Center for Environmental Biology, University of California, Irvine, jjlong@uci.edu
Jennifer J. Long is the Education & Outreach Coordinator for the Center for Environmental Biology in the University of California, Irvine's School of Biological Sciences, where she manages county-wide partnerships dedicated to linking academic research with ecosystem management of our natural resources and to educating the next generation of environmental biologists and stewards. Jennifer received her Ph.D. in Education with a specialization in Learning, Cognition, and Development from University of California, Irvine in 2015. Her research centers on science learning in informal environments, including partnerships that link informal and formal learning spaces.

Sara Ludovise, Crystal Cove Conservancy, sara@crystalcove.org
Sara brings more than 12 years of professional experience in design, development, and implementation of informal science education programming to her position of Director of Education at Crystal Cove Conservancy, the nonprofit partner of Crystal Cove State Park. Sara holds a BA in Archaeology from Tufts University and is currently pursuing her Master of Education in free-choice learning and science education from Oregon State University.

Poster 12. Aspirations of Australian secondary students for careers requiring high level mathematics
Felicia Jaremus, Jennifer Gore, Leanne Fray, Adam Lloyd, Elena Prieto

Abstract
Secondary mathematics has long been identified as a 'critical-filter' to mathematically intensive tertiary fields, including many in STEM. However, many western nations continue to face low female participation in upper secondary mathematics, particularly at higher levels. This paper draws on more than 5,500 surveys completed by secondary students in Australian government schools to explore the aspirations of girls for careers requiring a degree with assumed knowledge of upper secondary calculus-based mathematics. Our analyses revealed that girls were significantly less likely than boys to aspire to such a career. Additionally, girls' aspirations within these careers were highly concentrated in life and animal sciences. Boys' aspirations were spread across a broader range of STEM-related careers. We argue that given such limited interest shown by girls in most fields requiring high level mathematics we can expect little future change to the gendered composition of upper secondary mathematics and tertiary STEM without significant intervention.

Bios
Felicia Jaremus, The University of Newcastle, felicia.jaremus@newcastle.edu.au
Felicia Jaremus is a Ph.D. candidate and research assistant in the Teachers and Teaching Research Centre at the University of Newcastle. With an interest in equity, mathematics education and STEM, her Ph.D. investigates the participation of female secondary students in high level mathematics.

Jennifer Gore, The University of Newcastle, jenny.gore@newcastle.edu.au
Jenny Gore is a Laureate Professor in the School of Education and Director of the Teachers and Teaching Research Centre at the University of Newcastle. In addition to a program of research on student aspirations, she is currently leading a research agenda focused on improving student outcomes and supporting teacher professional development through an innovative approach called Quality Teaching Rounds.

Leanne Fray, The University of Newcastle, Leanne.fray@newcastle.edu.au
Leanne Fray is a postdoctoral fellow at the University of Newcastle in the Teachers and Teaching Research Centre. She has extensive experience in qualitative research and has previously worked on research projects across such disciplines as health, education, and social science. Her research interests include improving student access and participation in higher education.

Adam Lloyd, The University of Newcastle, adam.lloyd@newcastle.edu.au
Adam Lloyd is a postdoctoral fellow in the Teachers and Teaching Research Centre at the University of Newcastle with a diverse background in engineering, mathematics education, and research on child lifestyle behaviours. With a particular interest in STEM, his current research focuses on Quality Teaching, student aspirations in the middle years of schooling, and improving equity in education.

Elena Prieto, The University of Newcastle, elena.prieto@newcastle.edu.au
Dr. Elena Prieto is a senior lecturer in Mathematics Education at the University of Newcastle. She holds a Bachelor degree in Mathematics and a Ph.D. in Theoretical Computer Science. From 2005, she has worked extensively in STEM education and is engaged in several projects focused on computer programming for the learning of mathematics, and equity of access to higher education.

Poster 13. Trajectories of science and math motivation among Latino/a adolescents
Ta-yang Hsieh, Yangyang Liu, Sandra D. Simpkins

Abstract
Latinas are underrepresented in physical science and math, whereas Latinos are underrepresented in social and biological sciences. Using the Expectancy-Value framework, we examined 103 Latinx adolescents' (40% female) motivational trajectories in math, physics, chemistry, and biology from 9th to 11th grade. HLM results showed declines in math and physics self-concept (β=-.10, -.18) and utility (β=-.17, -.20), aligning with previous findings. In contrast, youth's interest in all subjects and chemistry beliefs remained stable. No gender differences were found in initial status or change in motivation for all subjects, but perceived science support predicted changes in physics motivational beliefs. Pathway into STEM is often a gendered topic; yet our results suggests adolescents' math/science trajectory are more different within than between gender (gender similarity). Our study also expands the literature by showing results differed within science domains, focusing on Latinx adolescents, and incorporating perceived support as a contextual factor.

Bios
Ta-yang Hsieh, University of California-Irvine, tayangh@uci.edu
Diane (Ta-yang) Hsieh is a second-year Ph.D student in the School of Education at UC Irvine (UCI). Diane is interested in the social and cultural factors of academic motivation, such as family practices, after-school activities, and cultural stereotypes. Diane aims to use quantitative methods to examine the relationship

between academic motivation and the intersections of identities. Before UCI, Diane got Bachelors in Psychology and Human Development & Family Studies from the University of Wisconsin-Madison.

Yangyang Liu, University of California-Irvine, yangyal@uci.edu
Yangyang Liu is a third-year Ph.D student in the School of Education at UC Irvine. Yangyang's research looks at how organized activities promote positive youth development. Yangyang is also interested in motivational development in youth and how contextual factors such as family play a role in motivation development.

Sandra D. Simpkins, University of California-Irvine, simpkins@uci.edu
Sandra Simpkins, Ph.D. in psychology, is a professor in the University of California, Irvine School of Education. Through her research, Prof. Simpkins examines how youth development unfolds over time and how the contexts in which youth are embedded influence their development. Generally, her work has focused on how families, friendships, and social position factors (such as, gender, ethnicity and culture) shape adolescents' organized after-school activities and motivation.

Poster 15. Culturally-Relevant Growth Messages Unexpectedly Undermine Women's Help-Seeking
Giselle Laiduc, Rebecca Covarrubias

Abstract
Two studies examined the impact of culture-matching, growth messages on students' participation in peer tutoring (Study 1) and perceptions of peer interactions (Study 2). In Study 1, 433 undergraduates from an introductory biology course received 1 of 3 email invitations to peer tutoring that included factual information (control), growth messages, or culture-matching growth messages emphasizing effort and collaboration. Sign-ups, session attendance, and grades were collected. Moderated-mediation analyses showed no impact on men's sign-ups. For women, growth messages increased sign-ups compared to control, leading to greater attendance and higher grades. Unexpectedly, culture-matching growth messages decreased sign-ups for women, suggesting peer tutoring may not be collaborative. To explore this, in Study 2, 429 students from the course completed survey measures about peer interactions. Chi-square analyses revealed more women perceive peer interactions as competitive than men. Programs should implement growth messages to recruit more women and to improve collaboration in peer learning.

Bios
Giselle A. Laiduc, University of California, Santa Cruz, glaiduc@ucsc.edu
Giselle is a second-year PhD student who develops cultural interventions to increase the retention of underrepresented students (e.g., students of color, women) in STEM. She is particularly interested in how the competitive nature of STEM fields relates to students' experiences and how message framing can impact students' behavior and performance.

Rebecca Covarrubias, University of California, Santa Cruz, rebeccac@ucsc.edu
Rebecca is an Assistant Professor at UC Santa Cruz. She examines how delegitimizing learning contexts undermine educational, social, and mental health outcomes for marginalized students, and how culturally-grounded interventions can reverse these effects. With her research team in the Culture and Achievement Collaborative, Rebecca continues to develop strategies for improving the daily experiences of diverse students through teaching, mentoring, service and research.

Poster 16. The Impact of Postsecondary Remediation using a Regression Discontinuity Analysis: Assessing Student Persistence, Student Outcomes and Major Intent
Rosalía Chávez Zárate

Abstract
Community college (CC) and remediation are significant elements in many students' academic pathways, including students interested in STEM degrees. This study examines the impact of math remediation on students' academic outcomes. This study observes students who began their CC journey in two colleges in California during the 2010-2013 academic years who were followed through fall of 2016. Regression discontinuity analysis is used to estimate the causal effects of being assigned to upper-level math remediation on seven outcomes: students' passing their first courses, first, third, sixth and ninth quarter enrollment, degree completion/transfer, and STEM major persistence. Preliminary results show that remediation does not have a significant impact on enrollment whether it is enrolling for 1, 3, 6, or 9 quarters. The results imply that remediation neither encourages nor discourages students from enrolling in their CC courses. Results expand our knowledge on remediation and STEM intent and inform laws on remedial education.

Bio
Rosalía C. Zárate, Stanford Graduate School of Education, rzarate12@gmail.com
Rosalía Zárate is earning her PhD from the Stanford Graduate School of Education and her Masters of Science in Statistics from Stanford. She earned her Bachelor's of Science degree in Mathematical Sciences from the University of California, Santa Barbara. Her interests include: academic resilience, recruitment and retention of underrepresented students in STEM (Science, Technology, Engineering, Mathematics), STEM career pathways/transition to higher education, education policy and evaluation, and gender/racial mathematics achievement gaps. She aspires to provide effective qualitative and quantitative research that provides better understanding of new approaches in assisting marginalized students in STEM particularly at the postsecondary level.

Poster 17. Understanding the Motivation of Underrepresented Female Ph.D. Students to Enroll and Persist in STEM-Related Fields
Lauren Witherspoon

Abstract
Although 51 percent of STEM graduates are women, they do not pursue or persist in STEM-related work fields in commensurate numbers with their male counterparts (NSF, 2014). There is a growing concern that fewer women of color – African Americans, Hispanics and Native American – are entering and leaving the STEM academic fields. The proposed study will use a sequential explanatory mixed methods research design to examine the motivational and behavioral factors that underlie-underrepresented female Ph.D. students' decisions to enroll and persist in STEM-related fields. Quantitative data will be collected using the Motivated Student Learning Questionnaire (MSLQ). Qualitative data will be collected through focus groups. The self-regulated learning framework that examines motivation/affect, behavior, and contextual factors is used to inform the investigation. Findings from the study may help identify additional supports that universities/states can implement to increase the number of women of color in the STEM- related fields.

Bio
Lauren Michelle Witherspoon, University of Oregon, lwither6@uoregon.edu
Lauren Witherspoon is expected to graduate Spring 2018 with her D.Ed. She is currently an academic advisor at the University of Oregon and prior a Program Coordinator and Research Assistant with the Division of Equity of Inclusion. Lauren holds an MBA and BS degree. Early in her career she was a high school math teacher and coach who started a pre-collegiate tutoring business and an organization named Scholars; which focused on building social capital and pre-collegiate skills, in hopes to increase student success post-secondary. Post graduation she wants to work in higher education administration around equity and inclusion in academic affairs.

Poster 18. Shrink the Gap: Environmental and Individual Strategies Enhancing Female's Belongingness in STEM
Mengfan Zhai, Zige Zhao, Bobbie Bermudez Bonilla, Jenefer Husman

Abstract
In 2013, the gender gap in STEM was nearly the same as it was in the 1960s (Hill et al., 2010). In this poster we argue social belongingness– a basic human emotional and psychological need for perceiving acceptance in some social group or setting (Baumeister & Leary, 1995) - is essential to understanding persistent gender disparities. As part of our literature review, we conducted a systematic online review of the research on Social Belongingness Theory and women in STEM. The findings were then categorized into environmental and individual factors that influence female participation in STEM. We not only found that social belongingness affects women's persistence and interest in STEM, but also that lower belongingness among women is due to: generally feeling unwelcomed; lack of early exposure to STEM experiences and lack of female representation. In conclusion, our poster evaluates data-based solutions and suggestions on improving belongingness of women in STEM.

Bios
Mengfan Zhai, University of Oregon, mengfanz@uoregon.edu
Mengfan is a junior majoring in Education Foundations with particular interests in educational psychology and the comparison of Chinese and the U.S.'s education. Mengfan was born and raised in Henan Province, the central-north of China. With previous experience of being a teaching assistant in both Chinese middle school and Eugene local elementary schools, Mengfan would like to pursue her interest of educational psychology for graduate school, specifically the topic of motivation and cognitive development.

Zige Zhao, University of Oregon, zigez@uoregon.edu
Zige is a senior in the Education Foundations program. She is interested in educational motivation and cross-culture education between Asian and North American education system. She recently joined Dr. Jenefer Husman's human research lab and worked on social belongingness and female student's interest and persistence in STEM majors. She is currently completing a summer internship in Japan with local kindergarten hoping to gain a deeper understanding of cross-culture education. Zige was born and raised in China and came to the United States for higher education. Her current interests are focused on Asian women feminist approaches in the education system.

Bobbie Bermudez, University of Oregon, bxb@uoregon.edu
Bobbie Bermudez is a doctoral student in the Critical and Socio-Cultural Studies in Education program (CSSE) at the University of Oregon. Bobbie was born and raised in Tegucigalpa, Honduras. Her studies took her to London (B.A in Communications) and New York (M.S in Publishing). She has a strong emotional connection to studies in Spanish / English bilingual education. Having attended and later taught at a bilingual school, her current research interests in the intersectionality of English/Spanish bilingual education, Hispanophobia and immigration.

***Jenefer Husman*, University of Oregon, jhusman@uoregon.edu**
Dr. Jenefer Husman is an Associate Professor in the Department of Education Studies at the University of Oregon. As an educational psychologist, Dr. Husman's research focuses on how students imagine their futures and how their futures influence learning in the present. She argues that thoughts about our futures can be transformative; changes in who we want to become can change what we do and who we are now. Jenefer has created educational programs providing access and support for under-served student in STEM fields, especially engineering.

Student Poster Award

Following a Network Gender & STEM tradition, we will acknowledge the import work of our student members. At the close of the conference, we will announce the Student Poster award. Two faculty, Drs. Holly Matusovich and Sarah Stapleton, have agreed to provide us with recommendations for this award.

Paper Session 1.1: Attraction and Recruitment to STEM
Chair: Shirley Yu

1.1.1 The role of ability beliefs and agentic vs. communal career goals in adolescents' first educational choice. What explains the degree of gender-balance?
Una Tellhed, Martin Bäckström & Fredrik Björklund

Abstract

Drawing on social cognitive career theory, we tested for explanations of gender differences in educational interest and choice, in a sample of 2500 randomly selected Swedish school pupils. The results are published in Sex Roles (Tellhed, Bäckström, & Björklund, 2017) and Journal of Vocational Behavior (Tellhed, Bäckström, & Björklund, 2018). Although Sweden is one of the most gender equal countries in the world, we demonstrate that young women still doubt their high-tech ability and their potential to succeed in STEM-occupations. This was the main explanation of both gender differences in interest and in the subsequent choice of STEM programs. Women's self-doubts contrast evidence of gender similarity in competence (Hyde, 2014), but in a related study we show that stereotype threat confuses performance assessments (Tellhed & Adolfsson, 2017). Women's lower expectations of social belongingness in STEM, and higher communal goals also contributed to explain the gender-skewness in interest and choice.

Bios

Una Tellhed, Lund University, una.tellhed@psy.lu.se
Una Tellhed is a Senior Lecturer at the Department of Psychology at Lund University in Sweden. Her dissertation from 2008 regarded gender-related stereotype threat. She is currently the leader of a research group in Lund who specializes in testing social psychological explanations of the horizontal gender segregation in the labor market, which includes the gender-skewed STEM-sector. As a side project she is also involved in research which tests psychological and physiological health effects of yoga.

Martin Bäckström, Lund University, martin.backstrom@psy.lu.se
Martin Bäckström is a professor in the Department of Psychology at Lund University.

Fredrik Björklund, Lund University, fredrik.bjorklund@psy.lu.se
Fredrik Björklund is Professor of Psychology at the Department of Psychology, Lund University. His research concerns social psychological issues such as stereotyping and prejudice, and personality measurement.

1.1.2 Imperfect progress: Graduating Black women in STEM in Florida community colleges
Sophia Rahming

Abstract

Starobin and Lanaan (2010) argue that community colleges are an essential component in providing STEM education to students. Few studies have focused on Black women's outcomes in STEM at community colleges (Ong, Wright & Espinosa, 2011). This paper seeks to fill a void about Black women's graduation rates in STEM fields at Florida College System institutions. Using nationally representative IPEDS STEM 2001

and 2009 datasets and the 2004-2009 Beginning Postsecondary Students Longitudinal Study, I generated descriptive statistics and used logistic regression to explore the soundness of the proposed theoretical framework of intersectionality. Results evidenced that despite a national focus on STEM diversification (NSF, 2006 – 2009) community colleges in Florida, on average, did not improve in the ability to graduate Black women. I suggest that if we are to achieve equity and parity, an intensive local and regional policy focus on barriers to Black women's success in STEM is crucial.

Bio
Sophia Glenyse Rahming, Florida State University, sgr14@my.fsu.edu
Sophia Rahming is a doctoral candidate in the Higher Education program, in the College of Education, where she has received FSU's Legacy Fellowship and other major graduate awards. She serves as the Parliamentarian for the National Black Graduate Student Association. She has served as a research assistant for the Center for Postsecondary Success on multiple mixed method studies, currently focusing on black women and men in engineering. Her research interests include science identity construction in international women of color; migration experiences of international women of color; gender in education and development; and technology issues in education in small and developing nations.

1.1.3 Sexism in the Wild: Gender Dynamics and Women's Belonging in Geoscience Fieldwork
Julie R. Posselt, Anne-Marie Nuñez

Abstract
The experiential and social dynamics of field activity deepen conceptual learning (Stokes & Boyle, 2009; Whitmeyer, Mogk, & Pyle, 2009) and positively affect geoscientists' productivity (McGuire et al., 2012). As a rite of passage and a degree requirement, fieldwork is central to geosciences' disciplinary culture (e.g., Fuller, 2006; Lock, 1998). Yet, among STEM environments with low rates of participation from women and high rates of sexual harassment and assault, geoscience fieldwork has begun to gain attention. Almost 80% of women in a recent survey had experienced sexual harassment in academic fieldwork settings and almost a quarter were victims of sexual assault (Clancy et al., 2014). Another survey found that 66% had experienced sexual harassment at a field site, with 38% reporting harassment had "stymied their careers" or "caus[ed] them to question their abilities and their future in the discipline" (Meyers et al., 2014). Geology fieldwork is part of disciplinary histories of military activity and westward exploration, which may be associated with toxic masculinities (Banet-Wieser & Miltner, 2016) that lead members to turn a blind eye to harassment and even assault. This paper reports a comparative ethnographic case study of field culture in the geosciences. We use theories of social boundaries and social identity to examine how gender norms in field-based geoscience learning environments shape women's belonging. Consistent with Kim, Sinatra, and Seyranian's (forthcoming) work on STEM identity among young women, we aim to "understand how the STEM environment is informing female students' efforts to identify and strive to become a part of the STEM community" (11). It follows participant-observation of two field-based courses in summer 2017, one for undergraduates and one for graduate students. The data include 264 hours of participant-observation and 34 interviews with students and faculty. We find typical spatial, temporal, and social identity boundaries that define the learning environment are broken down in the field, inspiring students to think differently about themselves in science. However, this same erosion of boundaries can also provoke discouragement and marginalization. Field activity is replete with informal encounters – often under difficult conditions—in which professional boundaries are more likely to be crossed. Other threats to STEM identity development are subtle. Inherited norms about a "good" field experience may intersect problematically with women's

involvement and sense of belonging. The paper closes by assessing implications for future research on gender in the field as well as the design of more inclusive field experiences.

Bios

Julie R. Posselt, University of Southern California, posselt@usc.edu
Julie R. Posselt is Assistant Professor in the University of Southern California's Rossier School of Education. Her current scholarship, funded by the National Science Foundation, examines how faculty practices and disciplinary norms may reproduce or mitigate institutionalized gender and racial inequalities in graduate education and STEM. Posselt is author of the book, Inside Graduate Admissions: Merit, Diversity, and Faculty Gatekeeping (Harvard, 2016), a comparative ethnography of faculty decision making in doctoral admissions. She was a 2015 National Academy of Education/Spencer Foundation postdoctoral fellow and received the 2017 Early Career Award from the Association for the Study of Higher Education.

Anne-Marie Nuñez, The Ohio State University, nunez.80@osu.edu
Anne-Marie Nuñez, an associate professor of Educational Studies at The Ohio State University, employs sociological approaches to explore how diverse higher education institutional types, linkages between K-12 and postsecondary education systems, and scientific disciplinary cultures structure equitable postsecondary educational opportunities for historically underserved groups in education. Two of her current projects involve NSF grants to develop more inclusive organizational cultures in the geosciences, particularly through experiential learning. For her contributions to educational research on underrepresented groups, she received the 2011 Association for the Study of Higher Education (ASHE) Council on Ethnic Participation Mildred Garcia Exemplary Scholarship award.

1.1.4   Leaving the pond – choosing the ocean: Effects of school context on career choices
Luise von Keyserling, Michael Becker, Malte Jansen, & Kai Maaz

Abstract

Math self-concept (MSC) is a central predictor of students' aspirations and career choices in the STEM area. Girls tend to have a lower MSC than boys. Furthermore, self-evaluation of abilities is biased by the achievement level of the reference group (Big-fish-little-pond-effect - BFLPE). While the BFLPE has often been replicated within the school context, little is known about its consequences after graduation. Therefore, we investigated whether the BFLPE affects STEM aspirations and college major choices and if effects differ between girls and boys using a subsample (N=2117) of the German longitudinal study. Measurements took place in grade 12 and two years after graduation. Results show that MSC and individual math-achievement are positive predictors for STEM aspirations and college major choice. For girls, effects of individual achievement were mediated by MSC. Moreover, negative effects of school-average achievement on both outcome variables for both girls and boys were mediated by MSC.

Bios

Luise von Keyserlingk, Leibniz Institute for Educational Research and Educational Information (DIPF), keyserlingk@dipf.de
Luise von Keyserlingk studied psychology with a focus on educational psychology at the Technical University Dresden in Germany as well as at Universidad de La Serena in Chile and graduated in 2015. Since 2016 she has been working on her doctoral thesis at the Leibniz Institute for Educational Research and Educational Information (DIPF) in Berlin, investigating effects of the learning environment on academic self-concept and

on career choices. She focuses on longitudinal data and presented her work on several scientific conferences.

Michael Becker, Doctor of Philosophy, becker@dipf.de
Michael Becker was a doctoral student of psychology at the Max-Planck Institute for Human Development at the Center for Educational Science and Education Systems in Germany. From 2008-2010 he was an academic staff member at the same institute. From 2010-2013 he was an academic staff member at the University of Potsdam, and since 2013 he has been an academic staff member at the Leibniz Institute for Educational Research and Educational Information (DIPF). In his scientific work he focuses on cognitive and psycho-social development in childhood, adolescence, and early adulthood as well as on quantitative methods in social research, particularly on causal analytical approaches.

Malte Jansen, Institute for Educational Quality Improvement (IQB), Berlin, Malte.Jansen@IQB.HU-Berlin.de
Malte Jansen was a doctoral student in psychology at the Humboldt University of Berlin and graduated in 2014. From 2014 to 2016 he was an academic staff member at the Leibniz Institute for Educational Research and Educational Information (DIPF), and since 01/2017 he has been the scientific head of the Research Data Centre (FDZ) at the Institute for Educational Quality Improvement (IQB) in Berlin. In his scientific work he focuses on academic self-concept, gender differences in motivational constructs, and educational trajectories of students with migration background.

Kai Maaz, Leibniz Institute for Educational Research and Educational Information (DIPF), maaz@dipf.de
Kai Maaz was a doctoral student in educational science at the Max-Planck Institute for Human Development at the Center for Educational Science and Education Systems from 2002-2005. From 2005-2009 he was an academic staff member at the same institute. From 2010-2013 he was Professor for Quantitative Methods in Educational Science at the University of Potsdam. Since 2013 he has been Director of the Department for Educational Governance at the Leibniz Institute for Educational Research and Educational Information (DIPF) and Professor for Social Science focusing on educational systems and society at the Goethe University Frankfurt a.M. in Germany.

Workshop Session 1.2: Addressing gender and gender biases with STEM students from kindergarten to college

Rebecca Bigler

Workshop Overview
The gender imbalance within STEM fields and the continuing presence of gender discrimination in STEM fields affect girls' and women's willingness to train for and work in STEM fields. Some research suggests that addressing these topics directly is an important component of programs that effectively improve the climate in STEM for girls and women. Based on our experiences with schools and intervention programming (Hayes & Bigler, 2013, 2015; Hayes, Pahlke, & Bigler, 2011; Lamb, Bigler, Liben, & Green, 2009; Pahlke, Bigler, & Green, 2010; Weisgram & Bigler, 2006a, 2006b, 2007), we believe that STEM students (male and female) need to: 1) be aware of, 2) understand the causes of, 3) be prepared to cope with, and 4) work to diminish the gender imbalance in their fields. They need to know these same things about gender discrimination.

The proposed workshop will present lessons concerning the gender imbalance in STEM and gender discrimination for use with science students in elementary, middle, and high school, as well as college

classrooms. That is, the lessons explicitly address why gender imbalances in STEM exists, how such imbalances affect workplaces, why such imbalances are problematic, and what to do in order to minimize both the imbalance and their negative consequences. The workshop should be useful for teachers and students in STEM fields. The workshop will provide brief reviews of the scientific evidence on which the lesson content is based and outline areas in which further research is needed, making the workshop of interest to researchers interested in the factors that promote women's participation in STEM fields. The workshop will also include ample time for questions and discussion with attendees.

Bio

Rebecca Bigler, University of Texas at Austin, rebeccabigler28@gmail.com
Dr. Rebecca Bigler studies the effects of school contexts on children's and adults' gender attitudes, and the reciprocal effects of children's and adults' gender attitudes on their schooling. She has developed and tested school-based intervention aimed at reducing youth's gender stereotyping, gender prejudices, and gender-based bullying. Dr. Bigler's work has been commended for its use of careful experimental designs (e.g., inclusion of pre- and post-tests and appropriate control groups) and rigorous, multi-measure assessments of treatment efficacy. Among other findings, Dr. Bigler's research suggests that explicitly addressing gender issues is an important component of effective intervention.

Paper Session 1.3: Teacher and Class Influences
Chair: Jennifer Ruef

1.3.1   The Impact of Community College Math Remediation using a Regression Discontinuity Analysis: Assessing Student Enrollment, Degree Completion and STEM Major Intent
Rosalía C. Zárate

Abstract

Community college (CC) and remediation are significant elements in many students' academic pathways, including students interested in STEM degrees. This study examines the impact of math remediation on students' academic outcomes. This study observes students who began their CC journey in two colleges in California during the 2010-2013 academic years who were followed through fall of 2016. Regression discontinuity analysis is used to estimate the causal effects of being assigned to upper-level math remediation on seven outcomes: students' passing their 1st courses, first, third, 6th and ninth quarter enrollment, degree completion/transfer, and STEM major persistence. Preliminary results show that remediation does not have a significant impact on enrollment whether it is enrolling for 1, 3, 6, or 9 quarters. The results imply that remediation neither encourages nor discourages students from enrolling in their CC courses. Results expand our knowledge on remediation and STEM intent and inform laws on remedial education.

Bio

Rosalía C. Zárate, Stanford Graduate School of Education, rzarate12@gmail.com
Rosalía Zárate is earning her PhD from the Stanford Graduate School of Education and her Masters of Science in Statistics from Stanford. She earned her Bachelor's of Science degree in Mathematical Sciences from the University of California, Santa Barbara. Her interests include: academic resilience, recruitment and retention of underrepresented students in STEM (Science, Technology, Engineering, Mathematics), STEM

career pathways/transition to higher education, education policy and evaluation, and gender/racial mathematics achievement gaps. She aspires to provide effective qualitative and quantitative research that provides better understanding of new approaches in assisting marginalized students in STEM particularly at the postsecondary level.

1.3.2 Women in gateway, college mathematics courses: Understanding gender differences in math attitudes and persistence
Brooke Midkiff & Judith Meece

Abstract

Women's representation in college mathematics remains lower than men. This study draws on Astin's (1984) theory of student engagement in order to explore gender differences in experiences in gateway mathematics courses, sites of sorting among undergraduate students in choosing a STEM major. Primary data was collected from a research-university. The sample includes 950 students over 3 semesters. Group differences between women and men along attitudinal and outcome dimensions were examined. Structural equation modeling was used to study the role of math attitudes in mediating the relationship between gender and student outcomes. Findings suggest that women students have less interest in math courses and take fewer mathematics courses in college than men. This research is significant because it shows gender differences in engagement in gateway mathematics courses, offering insight into ways to better address the needs of women students and to further support them in pursuing STEM majors.

Bios

Brooke Midkiff, University of North Carolina at Chapel Hill, bmidkiff@email.unc.edu
Brooke Midkiff is a quantitative research methodologist with expertise in econometric and psychometric modeling for education research. She studies and develops psychological scales for use in education research, and applies and studies comparative econometric methods, with an emphasis on historically marginalized populations. Her methodological skills include randomized control trials, quasi-experiments, psychometrics, econometrics, and survey development and analysis. She studies the measurement of psychosocial and study skill factors, along with active learning for college teaching and institutional change.

Judith Meece, University of North Carolina at Chapel Hill, meece@email.unc.edu
Dr. Judith Meece is Professor of Educational Psychology and Investigator on the Finish Line Project at UNC-CH. She has studied gender differences in motivation and achievement for over 30 years, and she contributed to the development of the original Eccles et al. (1983) model of academic choice, which has is widely used to study gender differences in STEM-related fields. Dr. Meece's gender research has focused on middle school students and rural high school students. She is currently extending this research to the STEM enrollment and persistence of historically underrepresented college students, including first-generation, female, rural, and non-white minority students.

1.3.3   Gender-related values and STEM trajectories: The role of altruism in STEM career choice
Christopher Wegemer & Jadquelynne S. Eccles

Abstract
Female representation in STEM remains uneven. Expectancy-value theory provides a framework for understanding complexities of STEM career choices. Values partially predict achievement-related behaviors and have been associated with STEM gender differences. This study aims to understand how gender-related values in adolescence may influence STEM trajectories by answering: Does altruism mediate the relationship between gender and STEM career choices? The Maryland Adolescent Development in Context Study tracked 1,482 adolescents from 7th grade to age 26. STEM outcomes were examined across career aspirations, college majors, and employment. Altruism was measured as general self-schema and occupational values. Logistic regressions and path analyses found that both gender and altruism predicted towards life sciences and away from physical sciences. Altruism mediated the relationship between gender and STEM choice. Investigating the function of a specific gender-typed value adds nuance to explanations of gender discrepancies between STEM fields and may inform interventions targeting value-oriented perceptions of youth.

Bios
Christopher Wegemer, University of California, Irvine, cwegemer@uci.edu
Chris received the following degrees: B.S. in Applied Physics from Providence College, B.S. in Electrical Engineering from Columbia University, and M.A. in Global and International Studies from UC Santa Barbara. His thesis focused on the role of universities and student-activism in the anti-sweatshop movement. Chris has worked as a teacher, consultant, program coordinator, and a live-in "dorm parent." His academic engagement with the discipline of Education grew from his enjoyment of teaching high school STEM classes and his passion for working with youth in afterschool programs. Chris hopes his scholarly work will increase equity of STEM outcomes for underrepresented groups.

Jacquelynne Eccles, University of California, Irvine, jseccles@uci.edu
Jacquelynne S. Eccles is the Distinguished Professor of Education at the University of California, Irvine. Over the past 30 years, Professor Eccles has conducted research on a wide variety of topics including gender-role socialization, teacher expectancies, classroom influences on student motivation, and social development in the family and school context. One of the leading developmental scientists of her generation, she has made seminal contributions to the study of achievement-related decisions and development. Most notably, her expectancy-value theory of motivation and her concept of stage-environment have served as perhaps the most dominant models of achievement during the school years, contributing to extensive research and reform efforts to improve the nature of secondary school transitions.

1.3.4   Teacher and student gender and mathematics self-beliefs for New Zealand middle school students
Penelope Watson & Christine Rubie-Davies

Abstract
Students' self-beliefs can shape their self-concept. Further, student self-beliefs can be influenced by teachers' own beliefs and expectations for their students. Yet, the relationship between teacher and student gender, mathematics self-efficacy and self-concept, and student mathematics achievement outcomes has been little explored. New Zealand middle school students (N = 2234) and their teachers (N =72) from 3

urban schools ranging in ethnicity and socioeconomic status, were surveyed at the beginning and end of one school year regarding their beliefs about and expectations of mathematics achievement, and student mathematics achievement was measured. Boys' mathematics self-efficacy exceeded that of girls' with statistical significance by the year's end. Further, although in the classes of male teachers, girls' mathematics achievement exceeded that of boys' at the beginning of the year, boys outscored their female peers at the year's end. Implications for associations between mathematics self-beliefs, mathematics self-concept, and teacher and student gender were revealed.

Bios
Penelope Watson, The University of Auckland, p.watson@auckland.ac.nz
After a 30 year career as a secondary school teacher Penelope completed a PhD in educational psychology at The University of Auckland, New Zealand, where she is currently a lecturer in the Faculty of Education and Social Work. Her research interests are embedded in the social psychology of the classroom. They include the relationship between gender stereotypes, gender identity, student scholastic choices, and gender stereotype threat. As well, she explores the relationship between gendered teacher expectations and student outcomes, particularly those with implications for students in mathematics-related fields.

Christine M. Rubie-Davies, The University of Auckland, c.rubie@auckland.ac.nz
A Professor of Education, Faculty of Education and Social Work, University of Auckland, New Zealand, Christine's primary research interests are teacher expectations and beliefs that moderate expectancy effects. She primarily focuses on teacher expectation effects for disadvantaged groups. Christine has published six books and numerous articles and chapters in prestigious presses, has won national and international awards for research, teaching and service, and is a Fellow of the Association for Psychological Science.

Paper Session 2.1: STEM Teachers: Motivation & Support
Chair: Juliet Baxter

2.1.1   Gendered motivations for STEM, teaching, and STEM teaching
Helen M. G. Watt, Paul W. Richardson & Suzanne Rice

Abstract
Motivations to teach STEM are important in Australia and elsewhere experiencing critical shortages of qualified STEM teachers. Teaching motivations have been studied mostly among preservice or practising teachers. Few studies have explored motivations among youth not yet self-selected into teaching – essential to identify deterrents, not only attractors to teach. This is also a gendered question, since teaching is a feminised career, yet STEM is masculinised. Teaching- and STEM-related abilities and interests likely differ and may even be in tension. Among final-year Australian high-school students from 5 Queensland schools, we contrast distinguishing motivations for 5 career intention groups (CIGs): 36 STEM secondary teaching aspirants (STEM-teach), 71 non-STEM secondary teaching aspirants (non-STEM sec-teach), 60 non-secondary teaching aspirants (non-sec teach), 110 non-teaching STEM aspirants (non-teach STEM) and 256 non-teaching non-STEM aspirants (non-teach non-STEM) measured by the Motivations for Career Choice scale (MCC; Watt & Richardson, 2006). Further, we compared attractiveness of a range of potential teaching and STEM policy levers by CIG and gender groups (no significant interactions occurred) using MANOVAs.

Most students were in the non-teach non-STEM CIG; chi square revealed relatively more girls in non-sec teach, and more boys in non-teach STEM. Motivations differed by CIG and gender. Motivations were similar for aspiring STEM teachers and other teaching aspirants; distinguishing motivations for non-teach STEM versus aspiring teachers were work with youth (lower) and expertise (higher). Promising levers to attract those with STEM interests (predominantly boys) to teach, and with teaching interests (predominantly girls) to STEM were educed. Theoretical and policy implications will be discussed. Funding acknowledgment: ARC LP160100094

Bios
Helen M. G. Watt, The University of Sydney, helen.watt@sydney.edu.au
Helen M. G. Watt is Professor of Educational Psychology at the University of Sydney, and Australian Research Council Future Fellow 2017–2021. She previously served at Monash University, and the Universities of Michigan, Western Sydney, Sydney, and Macquarie. Her longitudinal programs have implications for supporting career development of beginning teachers (www.fitchoice.org), and redressing gender imbalances in STEM fields (www.stepsstudy.org). Helen is currently Associate Editor for AERA Open and on several editorial boards. She edited books including Global perspectives on teacher motivation (CUP 2017); Teacher motivation (Routledge 2014); Gender and occupational outcomes (APA 2008) and co-founded Network Gender & STEM: www.genderandSTEM.com

Paul W. Richardson, Monash University, paul.richardson@monash.edu
Paul W. Richardson is Professor and Associate Dean Research, previously Associate Dean Teaching, Faculty of Education, Monash University. He has worked at the University of Sydney, Gippsland Institute of Advanced Education, and University of Michigan. He is engaged in a longitudinal study of teachers' career choice motivations, self-efficacy, and career trajectories for different types of beginning and mid-career teachers (www.fitchoice.org), attracting substantial research funding from three sequential Australian Research Council grants (2006-2016). He has begun theorizing the career motivations of early career university academics. He has edited books including Teacher motivation (Routledge 2014) and Global perspectives on teacher motivation (CUP 2017).

Suzanne Rice, The University of Melbourne, s.rice@unimelb.edu.au
Suzanne Rice is an Associate Professor at the Centre for Vocational and Educational Policy (CVEP) in the Melbourne Graduate School of Education at the University of Melbourne. Her research interests include high-stakes testing, clinical models of teacher education, and teacher and student pathways. She has published book chapters, reports to governments and articles in prestigious journals such as Journal of Education Policy, Educational Review and Teachers and Teaching.

2.1.2   Teachers' achievement goals and motivational beliefs: Similar or different across gender and teaching domain?
Ruth Butler

Abstract
Motivations for learning and motivational beliefs still tend to differ on average among men and women in keeping with societal expectations regarding gendered roles and abilities in STEM versus non-STEM domains. Is this the case also for teaching, a feminised occupation? Two samples of secondary school teachers in Israel (490 participants, 417 females, 188 teachers of STEM) completed measures of

achievement goals for teaching (GOT: Butler, 2007, 2012), intrinsic motivation, beliefs about ability, and burnout. Overall, responses were very similar across gender and teaching domain. However, in keeping with research on student motivation for "feminine" academic subjects, women in both samples displayed higher levels of intrinsic motivation, teaching efficacy, and incremental beliefs about teaching ability than did men; women also reported more emotional exhaustion. In keeping with the literature on gender differences in self-serving attributional biases, men were more likely than women to attribute setbacks to students and to depersonalize students. The only significant effects for teaching domain showed that STEM teachers scored higher on performance goals and on entity beliefs about intelligence, a pattern that has been linked to less rather than more positive consequences for student engagement and outcomes. More research is needed, but these preliminary findings of patterns of marked similarity together with small but theoretically coherent differences are suggestive. Focusing on the conference themes, I shall discuss possible implications for the ways male and female and STEM and non-STEM teachers engage with their profession and how these may in turn contribute to gender differences in students' STEM motivation.

Bio
Ruth Butler, Hebrew University of Jerusalem, ruth.butler@mail.huji.ac.il
Ruth Butler is Meyerhoff Professor and former Dean at the Seymour Fox School of Education, Hebrew University of Jerusalem. She works at the interface of developmental, educational, and social psychology to study how students from early childhood through college construct motivational goals and beliefs within socio-cultural and educational contexts and how goals and beliefs influence self-evaluation, learning strategies and outcomes. Over the last decade she has extended her approach to study teacher motivation and to develop a framework for conceptualizing gendered patterns of motivation and achievement. She has served as consultant to the Israel Ministry of Education and the Max Plank Institute for Human Development, and has been a visiting scholar at Stanford, UC. Berkeley, and Columbia.

2.1.3   Contributing to sustainability by becoming a teacher: Implications for recruitment processes and teaching programs
Pia Spangenberger

Abstract
How can contributing to sustainability professionally influence the decision to become a VET teacher? Within a quantitative study, an intervention with young adults right before graduating from German secondary school will be conducted. Text based information of a technical VET teacher program will be manipulated by highlighting the contribution to sustainability, for instance the recycling of construction components. The questionnaire contains items on situational interest (Krapp, 2005), on ecological values (Wiseman, Wilson & Bogner, 2012), on Holland´s typology of personality (Holland, 1997), and items of the Social-Utility-Value dimension of the FIT-Choice scale (Watt/Richardson, 2007). In the paper 1st results of the study will be presented. It will be discussed, if conceptions of VET teaching recruitment and curricula should change to a) reduce the lack of VET teachers, b) bring more women into technical VET classrooms, and c) integrate sustainability as a core part of STEM teacher identities (e.g. Cech, 2015).

Bio
Pia Spangenberger, Technische Universität Berlin, pia.spangenberger@tu-berlin.de
Pia Spangenberger was awarded a Diploma in Economics from the University of Cologne in 2007. Upon completing her degree, she relocated to New York where she worked for the German American Chamber of

Commerce. 2010 she was hired by the Science Shop Bonn. In 2016 she finished her doctoral thesis at the Technische Universität Berlin about the influence of sustainability on the motivation of women to choose a technical profession. Currently she leads two research projects at TU Berlin. The project "MitEffekt" aims at evaluating a serious game providing feedback to female adolescents regarding their vocational competencies in renewable energy technologies. The project "Social Utility Values and Teaching as a Career" analyses the question, if there is relationship between the contribution to sustainability as a VET teacher and the choice for teaching as a career.

2.1.4   Preparing teachers for inclusive computer science classrooms
Joanna Goode

Abstract
With the recent national movement to bring "CS for All" to students and schools across racially and socioeconomically diverse communities, issues of access and inclusion in this historically homogenous field have been at the heart of efforts to infuse school curriculum with computer science. While a large emphasis of these efforts have been on preparing teachers to teach computing to girls and culturally diverse students, there has been little empirical data to guide these reform programs. This paper will inform these efforts by drawing from a pair of qualitative studies: observations of nine classroom computer science teachers in practice over the course of a year enacting pedagogy, and observations of two sessions of teachers in a week-long professional development setting talking explicitly about gender, race, and their own computing classrooms. Together, these studies help inform a model of teacher preparation that is based on principles of access, inclusion, and culturally responsive computing pedagogy.

Bio
Joanna Goode, University of Oregon, goodej@uoregon.edu
Dr. Joanna Goode is an Associate Professor of Education Studies at the University of Oregon whose scholarship focuses on teacher education and inclusive computer science education. Her NSF-sponsored research examines how large-scale reforms in computer science education can provide innovative opportunities for learning while simultaneously introducing new challenges to equity and inclusion in computing classrooms. Dr. Goode led the development of the equity-focused Exploring Computer Science high school curriculum and professional development program. Dr. Goode has authored multiple journal articles, chapters, and is co-author the book, Stuck in the Shallow End: Education, Race, and Computing (MIT Press, 2008/2017).

2.1.5   An Integrative model of teacher's motivational self-beliefs: Relations with teacher and student outcomes
Harsha Perera

Abstract
Research investigating the effects of teachers' self-efficacy beliefs has been centrally concerned with teacher-related outcomes (e.g., job satisfaction, teacher engagement); however, few studies have simultaneously investigated teacher-and-student-outcomes of teachers' efficacy beliefs in integrative models. The present research was conducted to investigate the relations of teachers' self-efficacy for teaching math with not only students' academic (i.e., math achievement) and non-academic (i.e.,

perceptions of engaged teaching) outcomes but also teachers' job satisfaction. We also examined whether math teachers' gender was related to their efficacy beliefs, extent of engaged teaching, and job satisfaction. In addition, traditional student-related motivational predictors of achievement were investigated (e.g., math self-concept, interest), and gender effects on the motivational and achievement constructs were examined. Based on data from over 400 teachers and almost 6000 4th grade students, constituting part of the TIMSS 2015 Australian data, results revealed significant positive associations of teachers' self-efficacy beliefs with the class averages of students' perceptions of engaged math teaching and math achievement as well as job satisfaction. Moreover, the class-average of engaged teaching was shown to be positively associated with the class-average of math achievement. Although there were no gender differences in teachers' self-efficacy or job satisfaction, the class-average of student perceptions of engaged teaching was significantly higher for female teachers. At the individual student level, results showed a significant, positive association of math self-concept, and significant, negative association of math interest, with math achievement. Although there were no gender differences in math achievement, females reported significantly lower math self-concept and interest, but perceived their math teachers as more engaging in teaching math lessons.

Bio

Harsha N. Perera, University of Nevada, Las Vegas, harsha.perera@unlv.edu
Harsha N. Perera is an Assistant Professor of Educational Psychology with the Department of Educational Psychology and Higher Education, College of Education, University of Nevada Las Vegas. His research centers on the social-cognitive-based motivational processes through which young people choose, engage with, and achieve in educational and career pathways. He is also interested in teachers' motivation and engagement. On a methodological level, he is interested in advanced latent variable models. Dr. Perera has published research in a number of top tier journals, including Contemporary Educational Psychology, British Journal of Educational Psychology, Learning and Individual Differences, Journal of Vocational Behavior, Teaching and Teacher Education, inter alia. In addition, he serves on the editorial boards of the Journal of Educational Psychology, Journal of Vocational Behavior, School Psychology Quarterly, Frontiers in Psychology, Journal of Career Assessment, and the Australian Journal of Career Development. Dr. Perera is also the recipient of a number of prestigious awards recognizing his research excellence, including (a) the Australian Association for Research in Education (AARE) Ray Debus Award for the most outstanding doctoral dissertation in education across Australia, (b) the UTS Chancellor's List Award for outstanding doctoral research, and (c) the American Educational Research Association (AERA) Division E Outstanding Dissertation Award.

Paper Session 2.2: STEM Beliefs and College Context
Chair: Holly Matusovich

2.2.1   Entering STEM in later life: Examining the motivations of adult women studying computing
Clem Herman, Helen Donelan, Helen Jefferis & Janet Hughes

Abstract

The number of female students qualifying in IT/ computing degrees in the UK has fallen by 10% over the past 5 years (BCS 2016). While most research focuses on young women entering the IT sector, this study examines mature women students at a distance education university in the UK. Our data showed a much lower proportion of women enrolling on the single honours Computing & IT degree programme (12%) compared to the joint honours or open degree programmes (25%) and we wanted to examine their

motivation for choosing these different pathways. We found no gender difference in actual attainment or progression once enrolled, but our study showed that women were more likely to have reservations about confidence in their ability to study IT, suggesting that participation in computing, even among women who are already working, continues to be influenced by gendered perceptions and behaviours.

Bios

Clem Herman, The Open University, clem.herman@open.ac.uk
Dr Clem Herman is Director of eSTEeM, the Open University's Centre for STEM Pedagogy and chair of the university's STEM Gender Equality Group. Throughout her career Clem has led on a range of projects to support the participation and progression of women in STEM, and her research on the impact of career breaks and women returners to STEM has been widely published. Her current ESRC funded research project, is a comparative study of Gender, Skilled Migration and IT in India and the UK. She is also the founder and Editor-in-Chief of the International Journal of Gender Science and Technology.

Helen Donelan, The Open University, helen.donelan@open.ac.uk
Helen Donelan is a Senior Lecturer at the Open University in the UK. She has a background in wireless communications engineering and she currently teaches in the area of communications and information technologies. Her current research interests are in: technologies for teaching, learning and online communication and collaboration; and gender and STEM. She is an associate editor of the Journal of Gender, Science and Technology.

Janet Hughes, The Open University in Scotland, janet.hughes@open.ac.uk
Janet Hughes completed her PhD at the University of Dundee and has taught computing at all levels (secondary school, teacher training, undergraduate and postgraduate) for over thirty years. Previously Janet held various posts in the University of Dundee, including Dean of the School of Computing and Head of Learning and Teaching in the College of Art, Science and Engineering. She was awarded a Personal Chair by the University of Dundee in 2014 and joined the Open University in 2016. Janet is a member of the BCS, contributing to BCS professional accreditation assessor teams, and was co-chair of Dundee's successful School of Computing Athena SWAN bronze award self-assessment team.

Helen Jefferis, The Open University, h.jefferis@open.ac.uk
Helen Jefferis is an Associate Lecturer in the School of Computing and Communications at the Open University. She teaches on a range of computing courses, and is a consultant to the Gendered Motivations and Choices project, funded by eSTEeM, the Open University's Centre for STEM Pedagogy.

2.2.2   Engineering and… : Women negotiating their future in the present
Kate Youmans & Idalis Villanueva

Abstract

Despite nationwide efforts to change the perception of engineering, the percentages of women in the field has remained relatively stagnant at approximately 20%. Initiatives by the National Academy of Engineering have aimed to change the public perception of engineering and introduce globally relevant challenges for the future (National Academy of Engineering, 2008, 2016). These programs reflect the Engineering Professional Identity (EPI) of the 21st century engineer who is trained to be a social servant with skills to meet humanistic needs (Villanueva & Nadelson, 2017). However, it seems that many engineering curricula

and careers have remained in alignment with the historically traditional perspectives of engineering. This work investigates the imagined futures of early year undergraduate women in engineering within the context of the EPI and the initiatives of the National Academy of Engineering.

As part of an engineering college-wide initiative, a group of 36 freshmen women engineering students enrolled in a one-credit elective course aimed to support their exploration of future engineering careers. The purpose of this qualitative study was to explore these entry-level undergraduates' career goals and perceptions of skills in engineering. An open-ended questionnaire was sent to the participants at the beginning and the end of the course and students were asked to describe their career goals and perceptions of professional skills and engineering challenges. A priori coding based on the historic foci of the EPI Framework (Villanueva and Nadelson, 2017) and the Change the Conversation and Grand Challenges of Engineering Initiatives of the National Academy of Engineering (National Academy of Engineering, 2008, 2016) was conducted on the data sources. Early findings suggest that entry-level undergraduate women in engineering align their professional goals and skills with the professional identity of the 21st century engineer social servant; (Villanueva and Nadelson, 2017). Further, these goals and skills align with the initiatives of the National Academy of Engineering.

Bios
Kate Youmans, Utah State University, youmans@usu.edu
Kate Youmans is pursuing her PhD in Engineering Education at Utah State University, focusing on empathy as a tool to increase diversity in engineering. With fourteen years of involvement as an engineering educator and diversity advocate, Kate is passionate about breaking down barriers and transforming engineering into a more inclusive field. She brings a broad perspective drawing from her background as a medical device engineer, experience leading diversity and outreach initiatives for MIT's College of Engineering and from the establishment of STEM programs in Computer Science, Design Thinking and Robotics at a K-12 charter school.

Idalis Villanueva, Utah State University
Dr. Villanueva is an Assistant Professor in the Engineering Education Department and an Adjunct Professor in the Bioengineering Department in Utah State University. Her multiple roles as an engineer, engineering educator, engineering educational researcher, and professional development mentor for underrepresented populations has aided her in the design and integration of educational and physiological technologies to research 'best practices' for student professional development and training. In addition, she is developing methodologies around hidden curriculum, academic emotions, physiology, and engineering makerspaces. She is a 2017 NSF CAREER awardee for her work on hidden curriculum in engineering.

2.2.3   Engineering graduate students: Future time perspectives and gender
Marissa Tsugawa-Nieves, Heather Perkins, Matthew Bahnson, Cheryl Cass, & Adam Kirn

Abstract
The purpose of this quantitative study was to explore engineering graduate students' (EGS') perceptions of the future in relation to their gender identities (e.g., agender, female). Few studies in graduate engineering education have empirically investigated engineering graduate students' affective traits, such as motivation and identity. We addressed the following research question: What effect does gender identity have on perceptions of the future? We disseminated a future-oriented motivation survey to EGS at western and

southeastern land-grant institutions (34% female, 58% male, 4% cisgender, 4% other). To determine if the factor structure held from a previous exploratory factor analysis, we conducted confirmatory factor analysis. We conducted one-way, nonparametric analysis of variance tests on each factor and no differences ($p > 0.05$) were found between gender on perceptions of the future. The lack of differences imply that EGS do not perceive the future differently which may result from the graduate culture.

Bios

Marissa A. Tsugawa-Nieves, University of Nevada, Reno, tsugawam@nevada.unr.edu
Marissa Tsugawa-Nieves is a graduate research assistant studying at the University of Nevada, Reno in the PRiDE Research Group. She is currently working towards a Ph.D. in Engineering Education. She expects to graduate May of 2019. Her research interests include student development of identity and motivation in graduate engineering environments. She is also interested in the professional development of engineering graduate students.

Heather Perkins, North Carolina State University, hlperki2@ncsu.edu
Heather Perkins is a graduate student studying at North Carolina State University in the Applied Social and Community Psychology program. She entered the program in the fall of 2014, after completing her Bachelor of Science in Psychology from the University of Cincinnati. She has participated in various research projects examining the role of engineering identity on graduate student success, how to counter scientist stereotypes in the classroom, and how to measure science identity and interest. Her primary research interest is identity and identity processes, as applied to STEM education and online communities.

Matthew Bahnson, North Carolina State University, mrbahnso@ncsu.edu
Matthew Bahnson is a doctoral student at North Carolina State University in Applied Social and Community Psychology. Matthew holds an M.A. in Social Sciences from University of Chicago and a B.A. in Psychology/Human Sexuality from University of Northern Iowa. He currently works on a research project in the College of Engineering about engineering identity and its connection to recruitment and retention in engineering graduate programs. His research interests include engineering identity, diversity, bias, stereotypes, and STEM education.

Cheryl Cass, North Carolina State University, cheryl_cass@ncsu.edu
Cheryl Cass is a teaching assistant professor in the Department of Materials Science and Engineering at North Carolina State University where she has served as the Director of Undergraduate Programs since 2011. Her research focuses on the intersection of science and engineering identity in post-secondary and graduate level programs.

Adam Kim, University of Nevada, Reno, akim@unr.edu
Adam Kim is an Assistant Professor of Engineering Education at University of Nevada, Reno. His research focuses on the interactions between engineering cultures, student motivation, and their learning experiences. His projects involve the study of student perceptions, beliefs and attitudes towards becoming engineers, their problem solving processes, and cultural fit. His education includes a B.S. in Biomedical Engineering from Rose-Hulman Institute of Technology, a M.S. in Bioengineering and Ph.D. in Engineering and Science Education from Clemson University.

2.2.4 Understanding the Motivation of Underrepresented Female Ph.D. Students to Enroll and Persist in STEM-Related Fields

Lauren Witherspoon

Abstract

Although 51 percent of STEM graduates are women, they do not pursue or persist in STEM-related work fields in commensurate numbers with their male counterparts (NSF, 2014). There is a growing concern that fewer women of color – African Americans, Hispanics and Native American – are entering and leaving the STEM academic fields. The proposed study will use a sequential explanatory mixed methods research design to examine the motivational and behavioral factors that underlie-underrepresented female Ph.D. students' decisions to enroll and persist in STEM-related fields. Quantitative data will be collected using the Motivated Student Learning Questionnaire (MSLQ). Qualitative data will be collected through focus groups. The self-regulated learning framework that examines motivation/affect, behavior, and contextual factors is used to inform the investigation. Findings from the study may help identify additional supports that universities/states can implement to increase the number of women of color in the STEM- related fields.

Bio

Lauren Michelle Witherspoon, University of Oregon, lwither6@uoregon.edu
Lauren Witherspoon is expected to graduate Spring 2018 with her D.Ed. She is currently an academic advisor at the University of Oregon and prior a Program Coordinator and Research Assistant with the Division of Equity of Inclusion. Lauren holds an MBA and BS degree. Early in her career she was a high school math teacher and coach who started a pre-collegiate tutoring business and an organization named Scholars; which focused on building social capital and pre-collegiate skills, in hopes to increase student success post-secondary. Post graduation she wants to work in higher education administration around equity and inclusion in academic affairs.

2.2.5 "I'm a computer scientist!": Virtual reality experience reduces stereotype threat and increases STEM motivation among undergraduate women via the Proteus effect

Christine R. Starr, Katie A.Green, & Barrett R. Anderson

Abstract

College women are less likely to choose math, physical science, engineering, and computer science (MPECS) majors. Prior studies have found that playing as an avatar in a virtual space can encourage participants to retain aspects of the person they were pretending to be (known as the Proteus effect). Using an expectancy-value framework, the current study explored virtual reality as a potential space for a targeted intervention to decrease stereotype threat and increase MPECS motivation. Participants were 82 undergraduate women in California (45% Asian) who were randomly assigned to play as an avatar either highly successful in MPECS or highly successful in humanities. Women assigned to the MPECS condition reported significantly lower anticipated stereotype threat, and significantly higher MPECS value beliefs and course motivation, however, this relationship was moderated by avatar identification. This study was the 1st to explore VR and the Proteus effect in relation to academic motivation and self-concepts.

Bios

Christine R. Starr, University of California, Santa Cruz, cestarr@ucsc.edu
Christy Starr is a PhD candidate at the University of California, Santa Cruz. Christy's program of research explores stereotypes, STEM motivation, and sexual objectification among girls and women. Her advisor is Prof. Campbell Leaper.

Katie Ann Green, California State University Monterrey Bay, katgreen@ucsc.edu
Katie Green is a recent graduate of The University of California, Santa Cruz's Digital Arts and New Media program. She is a game developer who specializes in visuals, exploring the use and meaning of perspective and embodiment in digital games.

Barrett R. Anderson, University of California, Santa Cruz, barander@ucsc.edu
Barrett Anderson is a graduate student in the Computational Media department at University of California, Santa Cruz. His work explores various ways that games can serve learning and the social good, and how game systems convey meaning and values.

Paper Session 2.3: Intersectionality and Agency in STEM
Stephany RunningHawk Johnson

2.3.1   Decolonizing Indigenous research: The Northern Paiute history project at UO
Jennifer O'Neal

Abstract
This presentation will highlight the multi-year Northern Paiute History Project embodying a formal collaboration between the University of Oregon Robert D. Clark Honors College and the Northern Paiute communities of the Confederated Tribes of Warm Springs and the Burns Paiute Tribe. Anchored by the annual research colloquium, "Decolonizing Research: The Northern Paiute History Project," accompanying field research trip to the Warm Springs Reservation and sustained engagement between undergraduates and tribal elders and community member course partners, this initiative positions students to perform original research and create new knowledge with and for the tribal communities. The course espouses the values of community-based, inter-cultural, decolonizing, multidisciplinary research, and authentic discourse among Native and non-Native students, historians, and scholars. The presentation will critically examine practices, protocols, and philosophies of instruction, pedagogy, research, scholarship, historiography, and the creation and dissemination of knowledge within this learning environment.

Bio
Jennifer O'Neal, University of Oregon, joneal@uoregon.edu
Jennifer R. O'Neal (The Confederated Tribes of Grand Ronde) is the University Historian and Archivist at the University of Oregon, and affiliated teaching faculty with the Robert D. Clark Honors College, History Department, and Native Studies program. She specializes in American West and Native American history, with an emphasis on decolonizing methodologies and social movements. Her research and teaching are dedicated to Indigenous research methodologies, Indigenous knowledges, cultural placed-based pedagogy, and collaborative research models with tribal communities. She holds a Masters in History from Utah State University and a Masters in Library and Information Science from the University of Arizona.

2.3.2 Why Indigenous traditional ecological knowledge is important for STEM

Michelle M. Jacob, Joana Jansen, Stephany RunningHawk Johnson, & Hobie Blackhorn

Abstract

In our paper, we discuss the benefits of applying an Indigenous traditional ecological knowledge (TEK) framework to STEM fields. We draw from our shared experiences building an Indigenous TEK Initiative at the University of Oregon, and we utilize an Indigenous decolonizing methodological approach (Smith, 2012; Wilson, 2001) to examine three examples of TEK projects from across the Western U.S. For example, Tribal Elders are deeply engaged in STEM education and research. Elder Virginia Beavert (Yakama), ties her lived knowledge and teachings in discussing effects of increased irrigation and weather changes (Beavert, 2017). In our paper, we share examples of TEK contributions to STEM and conclude that TEK makes the following impacts in STEM fields: 1) shifts the narrative of who "belongs"; 2) (re)situates Tribal Elders as experts; 3) reclaims Indigenous cultural and language knowledge as inherently important.   Beavert, V. (2017). The gift of knowledge Ttnúwit Átawish Nch'inch'imamí : reflections on Sahaptin ways (J. Underriner Ed.). Seattle: Seattle : University of Washington Press. Smith, L. T. (2012). Decolonizing Methodologies: Research and Indigenous Peoples (2nd ed.). London: Zed Books. Wilson, S. (2001). What is indigenous research methodology? Canadian Journal of Native Education, 25(2), 175-179.

Bios

Michelle M. Jacob, University of Oregon, mjacob@uoregon.edu
Michelle M. Jacob, PhD, (Yakama Nation) is Professor of Indigenous Studies and Director of the Sapsik'ʷałá (Teacher) Education Program in the Department of Education Studies at the University of Oregon (UO). Her research interests include: Indigenous research methodologies, traditional ecological knowledge, health, Native feminisms, and decolonization. Michelle leads the Indigenous Traditional Ecological Knowledge Initiative at UO. She has two books, Yakama Rising: Indigenous Cultural Revitalization, Activism, and Healing, and Indian Pilgrims: Indigenous Journeys of Activism and Healing with Saint Kateri Tekakwitha, both published by the University of Arizona Press, and numerous referred journal articles and book chapters.

Joana Jansen, University of Oregon, jjansen@uoregon.edu
Joana Jansen is Associate Director of the Northwest Indian Language Institute at the University of Oregon and Senior Research Associate of the Sapsik'ʷałá (Teacher) Education Program in the College of Education. She works with speakers and learners of Indigenous languages to support language documentation, description, and teaching goals, pedagogical grammar development, and language curriculum and materials development, particularly place-based curriculum. Research interests include language teacher education, collaborative research models for mutually beneficial work involving academic institutions and Tribal communities, and linguistic description, analysis and revitalization of the Ichishkíin/Sahaptin language.

Stephany RunningHawk Johnson, University of Oregon, stephany@uoregon.edu
Stephany RunningHawk Johnson is pursuing a PhD in Critical and SocioCultural Studies at the University of Oregon. She is a descendant of the Oglala Sioux; her grandfather was enrolled on Pine Ridge Reservation. Stephany earned a B.S. in Natural Resources from Oregon State University 2003, an MEd from UO 2008 as part of the Sapsik'ʷałá program, taught secondary math and science from 2008-2013, and was a Professional Advisor at OSU from 2013-2016. Research interests include indigenous students attending university in

science fields, how the philosophy behind science education creates access or barriers, Traditional Ecological Knowledge, and indigenous feminisms.

Hobie Blackhorn, University of Oregon, hobieb@uoregon.edu
Hobie Blackhorn (Northern Cheyenne) is a Doctoral Candidate at the University of Oregon's College of Education, in Secondary Special Education and Transition. His interests include the importance of Family and Community involvement in culturally relevant planning with transitioned aged Native American youth.

2.3.3   Chicana feminisms to decolonize STEM
Jean Aguilar-Valdez

Abstract

Decolonization involves undoing colonialist epistemologies that frame dominant peoples, genders, and cultures as more legitimate, and entitled to be an authority over others. This presentation uses ethnographic research, stories, poetry, and dialogue in non-traditional formats to drive conversation and understanding of STEM that is broader than the narrow Eurocentric conceptions that claim singular possession of what counts as STEM. In doing so, Chicana feminist theories from Gloria Anzaldúa, Maria Lugones, Sofia Villenas, and feminist science theories from Sandra Harding and Linda Tuhiwai Smith inspire conceptualizations of STEM that are uncoupled from white supremacist, patriarchal claims to exclusivity to the meanings and validity of the practices of STEM, in an act of reclamation of STEM into the hands and hearts of the women and indigenous cultures that have long held them aloft, before they were appropriated as the sole dominion of the white male in the lab coat.

Bio

Jean R. Aguilar-Valdez, Portland State University, aguil@pdx.edu
As a Latina, scientist, and science educator, I am personally familiar with the inequity that exists for women of color in the science and science education worlds. I'm a community-engaged scholar-activist that works at the intersection of Chican@ feminist theories and science education, to push against colonizing, narrow conceptions of science and science education, and advocate for socially just, decolonizing understandings and praxis regarding the teaching and learning of science.

2.3.4   Germination of a STEM interest: A social-design study of interest and agency across a networked STEM club
Deena L. Gould & Priyanka Parekh

Abstract

In this presentation, we report the diversity of interests and forms of agency that developed in an after-school STEM club. We designed the club to position middle grade-students, from non-dominant groups, with access to resources and non-hierarchical mentoring that was supportive of the development of their STEM interests. Building on the theory of agency and identity in cultural worlds (Holland, Lachicotte, Skinner, Cain, 2001), and using longitudinal ethnographic and discourse data, we discuss our findings from a social-design case-study of students, aged 11 through 14. We report 1. How youth narrated and enacted their STEM agency and interests over time and across spaces. 2. The knowledge, skills, and resources youth brought to the system from their cultural and social backgrounds. 3. How interests and agency emerged, diffused, and

changed synergistically. 4. Structural factors that enabled and constrained how interests and agency emerged and grew as processes in a complex system

Bios

Deena L. Gould, Arizona State University, deena.gould@asu.edu
Deena Gould is a doctoral candidate at Arizona State University. Her research focuses on the design and study of expansive learning opportunities for youth and communities spanning across formal, informal, face-to-face, and digital spaces. Taking an ecological perspective, she studies how youth navigate boundary crossings in complex STEM ecosystems. She has presented her work at meetings of the American Educational Research Association, National Association of Research in Science Teaching, and National Association of Multicultural Education. Her work has also been published in research journals such as Journal of Science Education and Technology and practitioner journals such as Science Scope.

Priyanka Parekh, Arizona State University, pnparekh@asu.edu
Priyanka Parekh is a doctoral candidate at Mary Lou Fulton Teachers College, Arizona State University. She researches science learning in elementary age children and informal science learning environments. An avid STEM and tinkering enthusiast, she adopts a sociocultural and ecological framework to explore how skills and knowledge are nurtured in children over time and space. She collaborates with public libraries and teachers to design and implement hands-on STEM learning opportunities. Priyanka has presented her work at conferences such as the meetings of the American Educational Research Association and Digital Media and Learning.

2.3.5 Black Women in White Coats: Science Identity Construction in Afro-Caribbean Women
Sophia Rahming

Abstract

Forty-three percent of all international students enroll in science, technology, engineering and mathematics (STEM) programs ("SEVIS by the Numbers," 2017) in the U.S. In 2014, the region that sent the highest proportion of female students (44%) to study STEM in the U.S. was the Caribbean ("SEVIS by the Numbers," 2015). According to Carlone and Johnson (2007), minority women in the U.S must construct science identities to persist in STEM. Afro-Caribbean women were not among the study's participants and tend not to be featured in research on STEM diversity and participation. Afro-Caribbean women, have constructed personal and collective identities (Eccles, 2007) crucial to science identity construction outside of the U.S. in unique sociocultural contexts where Black is dominant and British-styled instruction remains intact. Using grounded theory, this paper proposes a model of science identity construction that attends to the intersectionality of Afro-Caribbean women's experiences as an example of counter-narrative in STEM.

Bio

Sophia Glenyse Rahming, Florida State University, sgr14@my.fsu.edu
Sophia Rahming is a doctoral candidate in the Higher Education program, in the College of Education, where she has received FSU's Legacy Fellowship and other major graduate awards. She serves as the Parliamentarian for the National Black Graduate Student Association. She has served as a research assistant for the Center for Postsecondary Success on multiple mixed method studies, currently focusing on black women and men in engineering. Her research interests include science identity construction in international

women of color; migration experiences of international women of color; gender in education and development; and technology issues in education in small and developing nations.

Paper Session 2.4: Women's Motivation and Participation in STEM Higher Education: Identifying Key Challenges and Corresponding Interventions
Chair: Amy Roberson Hayes; Discussant: Lynn S. Liben

2.4.1   One Size Does Not Fit All: Gender and Ethnic Variation in Math Anxiety and Stereotype Threat
Jennifer E. John and Rachael D. Robnett

Abstract

A wide body of research demonstrates that math anxiety and stereotype threat can negatively impact math performance and, relatedly, STEM career aspirations. Relative to men, women are more susceptible to both math anxiety and stereotype threat. Accordingly, these constructs likely contribute to the gender gap in STEM fields. The current research is designed to address two gaps in the math anxiety and stereotype threat literatures. First, little research simultaneously considers participants' ethnicity and gender when assessing the implications of math anxiety and stereotype threat. This is particularly the case in math anxiety research, which only rarely tests for ethnic variation. Second, although performance decrements associated with math anxiety and stereotype threat are thought to be caused by the same underlying cognitive mechanism (i.e., working memory deficits), research has yet to examine whether they dually influence math performance. We took a step toward filling these gaps through a study that was conducted with 227 ethnically diverse undergraduates (53% women). Participants completed a survey that included a measure of math anxiety, a stereotype threat manipulation, a math task, and several open-ended questions. Consistent with prior research, results showed that women reported higher math anxiety than did men (p = .002). This finding aligns with a gender difference that emerged in open-ended data; specifically, women were significantly more likely than men to report feeling anxious during the math task (e.g., "I was very anxious, and I began to panic"; p < .001). Follow-up analyses illustrated that Latina women reported higher levels of math anxiety than did European American women (p = .05). In contrast, Latino men and European American men did not significantly differ in their levels of math anxiety. Additional analyses indicate that math anxiety interacts with stereotype threat to negatively impact women's math performance. Specifically, math anxiety was negatively correlated with math performance when stereotype threat was induced (p = .04). When threat was not induced, this correlation was nonsignificant. Collectively, findings indicate that mean levels of math anxiety vary at the intersection of ethnicity and gender, such that Latinas reported particularly high levels of math anxiety relative to other participants. Findings also shed light on how contextual influences (stereotype threat) combine with trait influences (math anxiety) to negatively impact women's math performance. Specifically, challenges associated with stereotype threat may be accentuated in women who have high math anxiety. Discussion will center on recommendations for intervention and outreach.

Bios

Jennifer E. John, University of Nevada, Las Vegas, johnj4@unlv.nevada.edu
Jennifer John (MSW, Boston University, 2013) is a graduate student in the Social Development Research Lab at the University of Nevada, Las Vegas. Her research interests broadly include gender and racial stereotypes with a focus on intersectionality. She is currently studying how academic stereotypes manifest throughout the educational pipeline to influence future college and career decisions for underserved and underrepresented groups.

Rachael D. Robnett, University of Nevada, Las Vegas, rachael.robnett@unlv.edu
Dr. Robnett is an assistant professor of psychology at the University of Nevada, Las Vegas. She received her doctorate in developmental psychology from UC Santa Cruz in 2013, under the supervision of Dr. Campbell Leaper. Her research focuses on educational equity in STEM fields during adolescence and emerging adulthood. Specific areas of emphasis include peer influences on academic aspirations, intersectionality, identity, and self-efficacy.

2.4.2   Gender Differences in Perceptions of Work-Ethic and Ability in College STEM Classes
Amy Roberson Hayes, Kristin Hixson, and Stephanie Masters

Abstract
Research points to personal beliefs (e.g., self-efficacy, perceived ability) and structural factors (e.g., discrimination) as explanations for the "leaky pipeline" phenomena, wherein the number of women in STEM fields decreases throughout the ranks (Alper & Gibbons, 1993; Ceci, et al., 2009). Recent research has shown female students consistently under-rate their performance and ability in STEM classes relative to their male peers, and the converse is true for male students (Grunspan et al., 2016). The purpose of this study was to examine college students' experiences in STEM courses to determine which factors have a significant impact on students' a) perceived ability and b) participation in these classes. Participants included 197 U.S. undergraduate students (133 female, 59 male, 5 gender variant/non-binary). Students completed a 30-minute online survey which asked them to rate their experiences in their most recent college science and mathematics classes. Results showed significant gender differences in students' self-reported work-ethic in science classes ($p < .01$) and math classes ($p < .01$), with female students rating their work significantly higher than did the male students in both cases. This finding was compelling considering there were no gender differences in student's reported grades across either type of class, nor was there a significant gender difference in the actual number of hours students reported studying for these classes per week. Additionally, women reported significantly higher levels of participation in math and science classes than did men ($ps < .01$).   Multiple regression analyses were conducted to determine which factors predict students' perceived ability in their college STEM classes. For female students, self-reported work ethic was the most significant predictor of perceptions of math and science ability. Among male students, only GPA was a significant predictor of science and math ability. Peer and instructor support were not predictors of ability in either model. Additional regression models examined predictors of STEM class participation. Among women, both the gender composition of their math and science classes and peer support significantly predicted how often they participated in class (only GPA and perceived ability predicted men's participation). These results demonstrate that, among similarly achieving college women and men, there are differentiated sets of factors that predict how capable they perceive themselves to be in their STEM classes relative to their peers, and that, even when they receive the same grades in STEM classes, women perceive themselves to be working harder and participating more than do male students.

Bios
Amy Roberson Hayes, University of Texas at Tyler, ahayes@uttyler.edu
Dr. Hayes is an assistant professor of psychology at the University of Texas at Tyler. She received her Ph.D. in Developmental Psychology from the University of Texas at Austin in 2014, where she worked with Dr. Rebecca Bigler. She studies the gender-differentiated pathways of occupational values, interests, and

achievement throughout the lifespan. Her recent work has focused on the effects of seeing and learning about gender-segregated occupations on children's occupational interests, the effects of gender-typed toys on children's spatial play, and the factors that affect self-efficacy among college women in STEM classes.

Kristin Hixson, University of Texas at Tyler, khixson@uttyler.edu
Kristin Hixson is a graduate student at the University of Texas at Tyler working with Dr. Amy Hayes. She will receive her M.S. in Clinical Psychology from UT Tyler December of 2017. She studies intersectionality of factors including race, educational attainment, socioeconomic status, gender and sexuality and their impacts on self-efficacy in the classroom. Particularly, she is interested in the relation between these factors and their impact on persistence in STEM fields. Her recent work examines gender, level of peer/parental support, and ambivalent sexism as a predicting factor of self-efficacy and perceived academic performance in the classroom.

Stephanie Masters, University of Texas at Tyler, smasters@patriots.uttyler.edu
Stephanie Masters is a graduate student at the University of Texas at Tyler working with Dr. Amy Hayes. She received her B.A. in psychology at the University of Texas at Tyler in 2015. She studies the gender-differentiated pathways of occupational values, interests, and achievement. She has conducted empirical studies on self-efficacy among young women in STEM classes, as well as children's perceptions of gender-segregated occupations and activities. She is also interested in the impact of various social factors on minorities in STEM classes. Recently, she conducted an exploratory study examining sexualization of STEM toys.

2.4.3   Links Between Mentoring and STEM Self-Efficacy: A Mixed-Methods Analysis of Undergraduates and their Research Mentors

Rachael D. Robnett, Paul A. Nelson, Eileen L. Zurbiggen, Faye J. Crosby, & Martin M. Chemers

Abstract
The U.S. is currently struggling to populate its science workforce. This problem is compounded by the lack of diversity that characterizes many science fields. Accordingly, researchers and educators have partnered to offer educational interventions that target women and members of underrepresented ethnic groups. These interventions often feature an intensive period of mentored research involvement. For some undergraduates, these research apprenticeships yield positive outcomes; other undergraduates, however, benefit very little.   The current study seeks to better understand this variation in student outcomes by focusing on the relationship between students and their STEM mentors. Specifically, we tested for longitudinal associations between two forms of mentoring (i.e., socioemotional and instrumental) and undergraduates' STEM self-efficacy. To contextualize and corroborate self-report data from our undergraduate participants, we collected open-ended data from participants' research mentors. Specifically, mentors discussed the strategies they used to bolster their students' STEM self-efficacy.   Analyses focus on data provided by 486 undergraduates and their faculty mentors. Participants were recruited from a research-intensive outreach program that serves students who are underrepresented in science fields. Accordingly, our undergraduate sample was primarily composed of women (66%) and members of ethnic groups that are historically underrepresented in science (76%). Students and their mentors participated through an online survey. Students participated at two time-points that spanned an academic year. Mentors participated at one time-point. We utilized a blend of quantitative and qualitative methods to analyze the data. Quantitative findings revealed ethnic and gender variation in the amount of mentoring that

participants reported receiving (p-values < .05). Also, higher levels of instrumental mentoring at the study's outset predicted heightened STEM self-efficacy one year later (p < .01). Qualitative findings replicate and expand upon the aforementioned quantitative patterns. Although mentors reported using substantial amounts of instrumental and socioemotional mentoring, they also reported using strategies that were not captured in our closed-ended measures. For instance, a subset of mentors emphasized the importance of "holistic" mentoring that takes into accounts all facets of a student's background. Collectively, findings indicate that research mentoring has positive, long-term implications for undergraduates' STEM self-efficacy. However, not all mentoring relationships have the same impact; mentoring relationships that feature high levels of instrumental mentoring (i.e., task-focused mentoring) appear to be particularly beneficial. Additional implications pertain to qualitative data from participants' mentors, which revealed novel forms of mentoring that have not been captured in prior quantitative work.

Bios
Rachael D. Robnett, University of Nevada, Las Vegas, rachael.robnett@unlv.edu
Dr. Robnett is an assistant professor of psychology at the University of Nevada, Las Vegas. She received her doctorate in developmental psychology from UC Santa Cruz in 2013, under the supervision of Dr. Campbell Leaper. Her research focuses on educational equity in STEM fields during adolescence and emerging adulthood. Specific areas of emphasis include peer influences on academic aspirations, intersectionality, identity, and self-efficacy.

Paul Nelson, University of Nevada, Las Vegas, paul.nelson@unlv.edu
Dr. Nelson is an assistant professor-in-residence at the University of Nevada, Las Vegas. His research focuses on the analysis of narratives and conversations to examine how people dynamically use friends and family to cope with daily hassles. Dr. Nelson's prior professional experiences include program evaluation of education-focused grants and management of children's transitions from state custody back home with their families.

Eileen Zurbriggen, University of Nevada, Las Vegas, zurbrigg@ucsc.edu
Dr. Zurbriggen is a professor of psychology at the University of California, Santa Cruz. Her research draws together methods and theories from a variety of sources, including social and personality psychology, feminist studies, political psychology, communications and media studies, and applied statistics.

Faye Crosby, University of California, Santa Cruz, fjcrosby@ucsc.edu
Dr. Crosby is a provost and professor of psychology at the University of California, Santa Cruz. She is interested in the relation between objective (i.e., consensual) and subjective reality; she has looked at individual attitudes in the context of social change and stability.

Martin Chemers, University of California, Santa Cruz, mchemers@ucsc.edu
Dr. Chemers is a professor emeritus of psychology at the University of California, Santa Cruz. His research focuses on leadership and team and organizational effectiveness. Much of his work has addressed how cultural and personality characteristics of leaders and followers affect the intrapersonal and interpersonal processes that give rise to highly motivated and effective teams.

2.4.4　Closing the gender gap in STEM: A meta-analysis of what works (and what does not)
Emily F. Coyle and Lynn S. LIben

Abstract

Women and girls are underrepresented in multiple areas of science, technology, engineering and math (STEM; Liben & Coyle, 2014). Myriad attempts have been made to ameliorate this disparity. They vary with respect to target age group; setting (e.g., school, extracurricular); duration; and gender composition of intervention participants. Little is known, however, about which qualities of interventions successfully reduce the gender gap in STEM, and which are ineffective or even counterproductive. We will report data from an ongoing meta-analysis conducted to identify the impact of various qualities of such interventions. This meta-analysis examines interventions reported between 1975 and 2017. "Intervention" was broadly construed to mean any activity (e.g., training, curriculum) manipulated to try to change a STEM-relevant outcome. We included only interventions that included a pretest control, a control group, or some comparison group. We searched article abstracts indexed in a range of social and physical science databases using a single Boolean term. To mitigate potential file-drawer problems, we posted notices on listserves, emailed researchers to solicit data and to identify others with relevant data, announced the project at the July 2014 meeting of this conference, and included dissertation and thesis indexes in our search. Searching for interventions between 1975 and 2014 resulted in 2703 unique returns, of which 535 met our inclusion criteria, and 116 reported usable data. Data from 2015-2017 are currently being added to our analysis. Intervention outcomes were coded by category: motivation (e.g., aspirations, self-efficacy), achievement (e.g., knowledge and skills, academic performance), and participation (e.g., STEM involvement). Potential moderators include participant age, dosage, setting, year of publication, and intervention content. Analysis to date finds that most intervention assessments (n=59 studies) examined achievement outcomes (grades, test scores, or other STEM performance). Motivation-related assessments were about half as common (n=34). Only 2 studies assessed actual STEM participation. STEM-skill interventions showed the strongest effects (g=.27, p<.001, small-medium effect size). Motivation for STEM showed a small, significant effect (g=.17, p=.005). Most other intervention approaches showed no or trivial effects. Moderator analysis and analysis of interventions from 2015-2017 are on-going.   Our findings highlight the diversity of intervention approaches addressing the STEM gender gap, as well as the need for consistent, rigorous assessment of such interventions. While interventions targeting motivation and STEM skills were effective, few interventions assessed participation. Participation may well be the key to determining if STEM interventions have the necessary impact on the STEM gender gap.

Bios

Emily F. Coyle, Saint Martin's University, ECoyle@stmartin.edu
Dr. Coyle is an assistant professor of psychology at Saint Martin's University in Lacey, WA. She received her doctorate in developmental psychology from the Pennsylvania State University in 2015, under the supervision of Dr. Lynn Liben. Her research interests are in social cognitive development and its impact on aspiration and achievement, particularly in the context of informal settings (e.g., play) and for girls in STEM domains. Some of her recent work examines the subtle ways that girls disengage in STEM contexts, and the differential impact of gendered marketing on children's mechanical learning.

Lynn S. Liben, The Pennsylvania State University, liben@psu.edu
Dr. Liben is Evan Pugh University Professor at The Pennsylvania State University where she is also Professor of Psychology; Human Development; and Education. Her work focuses on identifying and explaining

developmental, individual, and gender differences in spatial skills and how these skills link to STEM learning in both formal and informal educational settings. A second research focus is on the development of gender and racial stereotypes, including ways in which such stereotypes may affect children's educational and occupational choices.

Paper Session 2.5: STEM Motivation & Identity
Chair: Helen M. G. Watt

2.5.1   Promoting equity by gender into the classroom at the Institute of Technology in Linköping, Sweden
Vivian Vimarlund

Abstract
The Institute of Technology at Linköping University has taken several steps forward to promote equity by gender, and implemented a web-based course to support course assistants in their professional role. The course provides knowledge and examples about situations that perpetuate gender bias and that create negative effects on students. This study aims to capture effects of the web-based course in course assistants' behavior at the moment to interact with students in class-rooms.   Data was sampled from 105 reflections written by course assistants that followed and pass the course during 2015-2017. The results shown that course assistants turned from passive into active agents that reflect on their role as teachers applying methodologies that create a welcome climate that avoided gender- related differences. The findings can have a significant impact on the methods used for solving interactions between teachers and students in general independent their social background or gender.

Bio
Vivian Vimarlund, Linköping University, vivian.vimarlund@liu.se
Vivian Vimarlund is professor in Informatics at the department of computer and information science, institute of technology, Linköping University. In parallel to this, she is the gender lecturer at the institute of technology and works with the integration of gender issues in education and research.

2.5.2   The influence of gender and ethnicity on students' endorsement of science identity
Paulette Vincent-Ruz & Christian D. Schunn

Abstract
Students that endorse a science identity are more likely to participate in optional science experiences and in turn choose STEM careers. In this study, we analyzed different identity profiles of students and how they affect they out of school choices. We recruited over 1,800 ethnically diverse students in 6th, 7th, and 9th grade in the United States. Students completed a survey asking about their topical identities. We conducted a latent profile analyses to understand which topical identities students endorsed. We found that students primarily endorsed science identities together with other unrelated identities like sports and art. Unlike sports and art, which occurred as isolated identities, science was never alone. In addition, the identity profiles were strongly gendered in intersectional ways. Where girls were not only less likely to endorse a

science identity but also where the intersection of gender and race placed and important role on which identities were endorsed.

Bios

Paulette Vincent-Ruz, Learning Research and Development Center, pvincentruz@pitt.edu
Paulette Vincent-Ruz is a 4th-year doctoral student in the Learning Sciences and Policy (LSAP) program at the University of Pittsburgh. She graduated college with a degree on Chemical Engineering and conducted research in Organic Chemistry. Her research focuses on using an intersectional and motivational framework to understand the interplay of people's attitudes, skills and experiences in science and how they predict STEM pathways. Understanding how these factors interact together is key to better understand the institutional barriers that create underrepresentation in STEM fields. The intersectional focus puts people's identities and backgrounds at the center of the analysis to understand their role in mechanisms.

Christian D. Schunn, University of Pittsburgh, schunn@pitt.edu
Christian Schunn is Co-Director of the Institute for Learning, Senior Scientist at the Learning Research and Development Center and Professor of Psychology, Learning Sciences and Policy, and Intelligent Systems at the University of Pittsburgh. He directs a number of research and design projects in science, mathematics, and engineering education. This work includes studying expert engineering and science teams, building innovative technology-supported STEM curricula, and studying factors that influence student and teacher learning and engagement. He is a Fellow of AAAS, ISDDE, APA, and APS.

2.5.3 The perspectives of Western Australian Year 10 girls and boys on advanced maths course selection for senior secondary studies
Laura Jane Kirkham, Elaine Chapman, & Helen Wildy

Abstract
In Australia, girls and boys with similar proficiency in maths have been found to make different decisions about advanced maths courses for senior secondary studies, with girls underrepresented in these courses in comparison to boys. The aim of this research is to explore the influence of intrinsic and extrinsic factors that contribute to the differential choices made by Western Australian Year 10 girls and boys. Findings will be based on a qualitative study conducted by means of eight focus group interviews to generate a range of factors that students consider in deciding whether to undertake advanced maths. The perspectives of girls and boys who have, and who have not, selected advanced maths will be compared to throw light on how they make decisions that contribute towards consequential life choices about education and careers. The results will inform recommendations to schools for facilitating STEM pathways for school-age girls in Western Australia.

Bios

Laura Jane Kirkham, University of Western Australia, jane.kirkham@research.uwa.edu.au
Jane Kirkham is a PhD candidate at the University of Western Australia researching girls' and boys' choices about maths courses. She works as psychologist for the Association of Independent Schools based in regional Western Australia. She is also an experienced teacher with expertise in mainstream, gifted and special education. Originally from the UK, Jane has worked in British, South African and Australian schools and universities. She is passionate about students being encouraged to optimise their potential, whoever

they are, wherever they live and whatever their personal circumstances. She has a son and a daughter who both plan to become engineers.

Elaine Chapman, University of Western Australia, Elaine.Chapman@uwa.edu.au
Dr. Elaine Chapman is the Deputy Dean Research, Graduate School of Education, The University of Western Australia. Dr. Chapman has been conducting research on motivation and mathematics education for over 20 years, and she has supervised numerous doctoral projects within these areas.
Helen Wildy, University of Western Australia, Graduate School of Education, helen.wildy@uwa.edu.au
Professor Helen Wildy BA, BEd, Grad Dip Ed Amin, MEd, PhD, FACEL has been Dean and Head of School, Graduate School of Education, The University of Western Australia since 2009. Her experiences as a student of a small rural primary school in Western Australia underpin her commitment to education, particularly the leadership of small schools, and later as a secondary Mathematics teacher underpin her passion for the Mathematics development of students, particularly girls.

Helen Wildy, University of Western Australia, helen.wildy@uwa.edu.au
Professor Helen Wildy BA, BEd, Grad Dip Ed Amin, MEd, PhD, FACEL has been Dean and Head of School, Graduate School of Education, The University of Western Australia since 2009. Her experiences as a student of a small rural primary school in Western Australia underpin her commitment to education, particularly the leadership of small schools, and later as a secondary Mathematics teacher underpin her passion for the Mathematics development of students, particularly girls.

2.5.4   Measuring mathematical identity shifts
Jennifer Ruef, Shannon Sweeny, Chris Willingham, & Eva Thanheiser

Abstract
Our research seeks to identify aspects of mathematical identities. Many students see mathematics as abstract, difficult, and not-for-them. For decades, mathematics education communities have worked to shift mathematics instruction to position all learners as "math people." Like Wenger (1998), we frame identity as a "nexus of multimembership" in different lived contexts. Our work elicits and organizes the ways teachers define and relate to mathematics, and how and whether they see themselves as "math people."   Our instruments measure and analyze mathematical identities: drawing protocols, narratives, and a survey of beliefs, which also provide data sources (Ruef, in preparation). Early results indicate sources of mathematics anxiety, and shifts in preservice teachers' identities and beliefs. Because of pervasive and perverse fears of mathematics, often disproportionately represented in elementary teachers, this work has powerful implications for helping people heal from past math trauma, improve relationship with mathematics, and help their own students in related ways (Stoehr, 2015).

Bios
Jennifer L. Ruef, University of Oregon, jruef@uoregon.edu
Jennifer Ruef has been a mathematics educator for 30 years and a mathematics teacher educator for 16 years. She is motivated by questions about who is invited to see themselves as "good at math," and who is not invited but decides they are good at math anyway. She is currently co-developing a suite of instruments designed to measure shifts in "math identities," the ways people see themselves as "good at math.".

Shannon P Sweeny, Northern Arizona University, Shannon.Sweeny@nau.edu
Dr. Shannon P. Sweeny is an Assistant Professor in the Department of Teaching and Learning at Northern Arizona University (NAU). Before earning her Ph.D at Michigan State University in 2013, she spent eight years working in public school settings as a classroom teacher (both elementary and middle school), K-6 mathematics specialist and middle school mathematics and science peer coach. Dr. Sweeny currently teaches undergraduate and graduate-level elementary mathematics methods courses and supervises prospective elementary teachers in their practicum placements. Dr. Sweeny's research focuses on prospective and early-career elementary teachers' beliefs and views about mathematics teaching and learning.

Chris Willingham, James Madison University, willinjc@jmu.edu
Chris Willingham is an assistant professor in the Department of Mathematics and Statistics at James Madison University and holds a Ph.D. in mathematics and science education from the University of Middle Tennessee. His research focuses on interactions among teachers' beliefs and mindset regarding mathematics and the teaching and learning of mathematics and their mathematical knowledge for teaching. He has considered the operationalization of these constructs in a variety of settings including professional development programs, K-12 mathematics classrooms, and preservice mathematics and science education courses.

Eva Thanheiser, Portland State University, evat@pdx.edu
Dr. Eva Thanheiser is an Associate Professor in the Department of Mathematics at Portland State University. Dr. Thanheiser currently teaches undergraduate mathematics content courses for prospective elementary and middle school teachers as well as graduate courses in mathematics education. Dr. Thanheiser's foci of interest are teacher content knowledge for teaching, teacher beliefs about teaching and learning, teacher motivation to learn, and most recently cultural responsiveness.

2.5.5   Discrimination hurts and support helps undergraduate students' STEM motivation
Christy Starr & Campbell Leaper

Abstract
College women's experiences with discrimination may undermine their persistence in STEM majors. We surveyed undergraduate biology students (n = 786 women, n = 399 men) about their experiences with sexual harassment as well as gender bias toward women in STEM perpetrated by instructors/teaching assistants or classmates. Our outcome measures were based on the expectancy-value model of achievement. Women's experiences with gender bias in STEM from classmates predicted expectancy beliefs (negative), perceived costs (positive), value (negative), and STEM career aspirations (negative). Women's experienced sexual harassment from faculty/graduate students was negatively related to STEM value and career aspirations. Few associations between gender discrimination and STEM motivation were seen among the men. In addition, STEM motivation was positively related to perceived support for STEM among friends (especially among women) and family (especially among men). Our regression analyses revealed the independent contributions of sexual harassment, gender-biased behaviors about women in STEM, and STEM support independently predicted STEM motivation in women.

Bios
Christy Starr, University of California, Santa Cruz, cestarr@ucsc.edu

Christy Starr is a doctoral student in graduate program in developmental psychology at the University of California, Santa Cruz. She attained her bachelor's degree at Knox College. Mx. Starr's research focuses on STEM motivation and achievement among girls/women and other underrepresented students; sexual objectification; stereotyping, prejudice, and discrimination.

Campbell Leaper, University of Santa Cruz, cam@ucsc.edu
Campbell Leaper is Professor and Department Chair of Psychology at the University of California, Santa Cruz. His research examines the developmental and social psychology of gender and sexism. This includes studies of gender biases and discrimination in relation to girls' and women's motivation and success in STEM. Other research interests include the study of peer relations as contexts for the development of gender (and other) identities; gender ideologies and close relationships; language and social interaction; and representations of gender in the media. Professor Leaper organizes and co-chairs the biennial Gender Development Research Conference (gender.ucsc.edu).

Paper Session 2.6: Teacher and Class Influences
Chair: Brandy Todd

2.6.1   Gender differences in parent and teacher support for science among Latino youth
Ting-Lan Ma & Sandra Simpkins

Abstract
Ecological system theory denotes that parental and teacher support interact together as the mesosystem factors that shapes youth development, yet little is known about mesosystem adult support for Latino youth adolescents pursuing in science. The current study examined the growth rate of the change and gender differences in teacher's and Latino parents' science support for science Latino adolescents from 9th to 11th grade, and to what extent does gender predict such rate. Self-Adolescent-reported science engagement, gender, science grade, teacher's support, and parental support in science were collected longitudinally from 104 Latino adolescents (60% female) across 9th-11th grades. The growth curve models showed that teacher's and parents' support for science increased over the years, although in favor of boys, and were positively correlated with each other. Latino adolescents' science class engagement positively predicted teacher science support more often strongly than parent supports'—more so than for parents'—support for science. The results indicated that, although teachers and parents gradually increased their support for science, such increases did not move fairly across both genders. Alternatively, a ceiling effect could play a role in the results.

Bios
Ting-Lan Ma, Edgewood College, tma@edgewood.edu
Professor Ting-Lan Ma, Ph.D. in Educational Psychology is a faculty member of Edgewood College and a current visiting scholar of the University of California, Irvine School of Education. Her research interests focus on multiple ecological system influences on adolescent psycho-social development including culture, parenting practices, and peer relation. Her most recent research focuses on defending in school bullying across childhood and adolescence, adolescent development in cross-cultural setting, socio-emotional factors predicting traditional and cyber-bullying, and organized activities among ethnicity minority youth.

Sandra Simpkins, University of California, Irvine, simpkins@uci.edu
Professor Sandra Simpkins, Ph.D. in psychology, is a faculty member of the University of California, Irvine School of Education. Through her research, Prof. Simpkins examines how youth development unfolds over time and how the contexts in which youth are embedded influence their development. Generally, her work has focused on how families, friendships, and social position factors (such as, gender, ethnicity and culture) shape adolescents' organized after-school activities and motivation.

2.6.2   Can mixed assessment methods make biology classes more equitable?
Sehoya Cotner & Cissy Ballen

Abstract

Among the factors proposed to explain the attrition of women in science is the lower performance of women in introductory courses. We hypothesized that mixed methods of assessment would benefit women. Specifically, we analyzed gender-based performance trends in nine large (N > 1000 students) introductory biology courses. Females underperformed on exams compared to their male counterparts, a difference that does not exist with other methods of assessment. Next, we analyzed three case studies of courses that shifted grading schemes to either de-emphasize or emphasize exams as a proportion of total course grade. We found that the shift away from an exam emphasis benefits female students, closing gaps in overall performance. We conclude by challenging the student deficit model, and suggest a course deficit model as explanatory of these performance gaps, whereby the microclimate of the classroom can either raise or lower barriers to success for underrepresented groups in STEM.

Bios

Sehoya Cotner, University of Minnesota, sehoys@umn.edu
Sehoya Cotner is an Associate Professor in the Department of Biology Teaching and Learning at the University of Minnesota. She is interested in identifying barriers to equity in STEM education, and testing interventions to minimize these barriers in situ. Sehoya is PI of Equity and Diversity in Undergraduate STEM (EDU-STEM), a National Science Foundation-supported research coordination network in undergraduate biology education (RCN-UBE).

Cissy Ballen, University of Minnesota, balle027@umn.edu
Cissy Ballen is a Post-doctoral Associate in the Department of Biology Teaching and Learning at the University of Minnesota. She is interested in identifying barriers to equity in STEM education, and testing interventions to minimize these barriers in situ. Cissy is Co-PI of Equity and Diversity in Undergraduate STEM (EDU-STEM), a National Science Foundation-supported research coordination network in undergraduate biology education (RCN-UBE).

2.6.3   Latinx Community College Students' STEM Pathways - Everything but Linear
Rosalía Chávez Zárate

Abstract

This study consists of 24 semi-structured interviews of Latinx students that are between their 6th-9th quarter at community colleges (CCs), CalifasBay1 and CalifasBay2 that began with an initial interest in a STEM degree, either on the remedial or college-level track. The purpose of this study is to better understand

the experiences of Latinx CC students and how different internal and external factors impact their major choice and academic decisions. This study may reveal what Latinx students need to be successful in STEM, what CCs can do to assist them, and what factors are impacting Latinx students that switch from STEM to non-STEM fields. By combining the status-attainment theory framework and community cultural wealth conceptual framework this study will show how students connect different academic and personal interests with their degree and career goals and the type of knowledge students bring from their culture and their upbringing to their academics.

Bio

Rosalía C. Zárate, Stanford Graduate School of Education, rzarate12@gmail.com
Rosalía Zárate is earning her PhD from the Stanford Graduate School of Education and her Masters of Science in Statistics from Stanford. She earned her Bachelor's of Science degree in Mathematical Sciences from the University of California, Santa Barbara. Her interests include: academic resilience, recruitment and retention of underrepresented students in STEM (Science, Technology, Engineering, Mathematics), STEM career pathways/transition to higher education, education policy and evaluation, and gender/racial mathematics achievement gaps. She aspires to provide effective qualitative and quantitative research that provides better understanding of new approaches in assisting marginalized students in STEM particularly at the postsecondary level.

2.6.4   Pattern-centered approach to high school math motivation

Ta-yang Hsieh & Sandra D. Simpkins

Abstract
Math motivational beliefs are crucial in promoting STEM outcome and enrollment; most studies, however, largely isolated each motivational belief while holding others constant when in reality they hardly function in isolation. Examining math self-concept, interest, self-efficacy, and utility (Expectancy-Value framework), the current study expands the math motivation literature by utilizing pattern-centered approach, and identified 6 prevalent profiles of motivational beliefs. Sample (N=15606; 50% female) are 9th graders from the nationally representative High School Longitudinal Study. Females were underrepresented in overall high motivation and low interest profiles, which are associated with above average math achievement; while overrepresented in low self-concept and overall low motivation profiles, which are associated with below average achievements. Female overrepresentation in the low self-concept profile is driven by students at the intersection of marginalized ethnicity (Hispanic or Black) and income level. There was no gender difference in the change in profile membership from 9th to 11th grade.

Bios
Ta-yang Hsieh, University of California-Irvine School of Education, tayangh@uci.edu
Diane (Ta-yang) Hsieh is a second-year Ph.D student in the School of Education at UC Irvine (UCI). Diane is interested in the social and cultural factors of academic motivation, such as family practices, after-school activities, and cultural stereotypes. Diane aims to use quantitative methods to examine the relationship between academic motivation and the intersections of identities. Before UCI, Diane got Bachelors in Psychology and Human Development & Family Studies from the University of Wisconsin-Madison.

Sandra D Simpkins, University of California, Irvine, simpkins@uci.edu
Professor Sandra Simpkins, Ph.D. in psychology, is a faculty member of the University of California, Irvine School of Education. Through her research, Prof. Simpkins examines how youth development unfolds over time and how the contexts in which youth are embedded influence their development. Generally, her work has focused on how families, friendships, and social position factors (such as, gender, ethnicity and culture) shape adolescents' organized after-school activities and motivation.

2.6.5   Not material: The importance of hands-on learning among Black women and men engineering students
Sophia Rahming & Lara Perez-Felkner

Abstract
We examine black undergraduate engineering students' experiences with embodied cognition (Wilson, 2002), while enrolled in a university summer research fellowship in a historically black college/university in the Southeastern U.S. While the curriculum focused on abstract engineering topics (i.e., robotics, materials development), findings from two rounds of individual interviews with participants identified hands-on learning as a vital component, a finding supported by prior work on its importance of STEM interest development and future career choice (Nersessian, 1989; Haury & Rillero, 1994). Indeed, thematic coding analysis found that students who participated in hands-on projects were metacognitvely aware of the pivotal connection between hands-on experience and motivation for conceptualizing abstract topics. Students reported the need to see tangible outcomes of their research. Conversely, students – women in particular - deprived of hands-on experiences described frustrated awareness that their learning was impeded and reported decreased motivation. We conclude with implications for faculty, institutions, and scholars.

Bios
Sophia Rahming, Florida State University, sgr14@my.fsu.edu
Sophia Rahming is a doctoral candidate in the Higher Education program, in the College of Education, where she has received FSU's Legacy Fellowship and other major graduate awards. She serves as the Parliamentarian for the National Black Graduate Student Association. She has served as a research assistant for the Center for Postsecondary Success on multiple mixed method studies, currently focusing on black women and men in engineering. Her research interests include science identity construction in international women of color; migration experiences of international women of color; gender in education and development; and technology issues in education in small and developing nations.

Lara Perez-Felkner, Florida State University, lperezfelkner@fsu.edu
Lara Perez-Felkner is an Assistant Professor of Higher Education and Sociology in the Higher Education Program in the College of Education at Florida State University. Her research uses developmental and sociological perspectives to examine how young people's experience of their social contexts influence their college and career outcomes. In particular, she investigates racial-ethnic, gender, and socioeconomic disparities in post-secondary educational attainment and entry to STEM fields. She employs secondary analysis of large-scale national longitudinal datasets as well as original and often mixed-methods research. She is currently leading an evaluation of student success interventions in engineering at a historically black college.

Paper Session 2.7: University Chemistry Education
Chair: Kathryn Scantlebury

2.7.1   Self-regulated learning in college chemistry: Roles of belonging and instructional context

Shirley L. Yu, Stephen Pearson, Yeo-eun Kim, Matthew Stoltzfus & Ted Clark

Abstract

According to self-regulated learning (SRL) theory, metacognition, cognition, motivation, and behavior are important factors impacting academic outcomes (Pintrich, 2004). We examined whether gender moderated the mediating role of SRL in explaining the relations between personal and learning context (sense of STEM belonging, instructor support, course organization, academic press) variables (Time 1) to course performance and intentions to persist in STEM (Time 2). Undergraduate students (N = 679; 60% female) enrolled in general chemistry at a large university completed two online self-report surveys consisting of established measures toward the beginning and end of the Autumn 2017 semester. Moderated mediation analyses will be conducted using the PROCESS macro with 5000 bootstrap samples (Hayes, 2013). The significance of the results will be discussed in terms of instructional context factors that faculty can employ to support students' use of SRL and subsequent achievement and retention.

Bios

Shirley L. Yu, The Ohio State University, yu.1349@osu.edu
Shirley L. Yu is an Associate Professor of Educational Psychology in the Department of Educational Studies at The Ohio State University. She earned her B.A. in Psychology from the University of California, Los Angeles and her M.A. in Psychology and Ph.D. in Education and Psychology at the University of Michigan. Her research is focused on motivation and self-regulated learning in STEM, with a particular interest in women and ethnic minority students. She serves on the editorial board for the Journal of Experimental Education.

Stephen Pearson, The Ohio State University, pearson.246@osu.edu
Stephen Pearson is a graduate research assistant and graduate teaching assistant at The Ohio State University in the Department of Chemistry and Biochemistry. He is currently pursuing a Ph.D. in biophysics and obtained a B.S in biochemistry and a B.S. in chemistry from Kutztown University. His research interests include science education, self-regulated learning, teaching methods, and teacher education and professional development.

Yio-eun Kim, The Ohio State University, kim.6105@osu.edu
Yeo-eun Kim is a doctoral student in Educational Psychology in the Department of Educational Studies at The Ohio State University. She earned her B.A. from Seoul National University of Education and her M.A. from Seoul National University. Her research interests center upon students' motivational processes and self-regulated learning, especially how they relate to personal and social factors. She is the student member of the Research Advisory Board for the Office of Research in the College of Education and Human Ecology at OSU, and she is a recipient of the Hathaway Education Scholarship.

Matthew Stoltzfus, The Ohio State University, mstoltzf@chemistry.ohio-state.edu
Matthew Stoltzfus is a Senior Lecturer in the Department of Chemistry and Biochemistry at The Ohio State University. He earned a B.S. from Millersville University and a Ph.D. from The Ohio State University. He is a co-author of the "Chemistry: The Central Science" textbook, was a recipient of The Ohio State University

Provost's Award for Distinguished Teaching by a Lecturer, and is recognized as an Apple Distinguished Educator.

Ted Clark, The Ohio State University, tclark@chemistry.ohio-state.edu
Ted Clark is an Associated Professor in the Department of Chemistry and Biochemistry at The Ohio State University. He earned a B.A. from the University of Detroit and a Ph.D. from the University of Michigan. Following a post-doctoral research position at OSU, he has been an instructor and chemical education researcher in the department. He currently teaches large-enrollment General Chemistry courses that incorporate active learning strategies and that support chemical education research projects on student learning. He was named the Ohio-Project Kaleidoscope (OH-PKAL) STEM Educator of the Year for 2017.

2.7.2 Why organic chemistry may be a roadblock course for females
Ara C. Austin, Ian R. Gould & Nicholas Hammond

Abstract
General organic chemistry is regarded as a "roadblock" course for college students, especially in underrepresented populations. The goal of this study was to better understand possible causes for this roadblock. Performance data collected from two academic institutions across seven years showed that females consistently earned fewer points and lower grades compared to males. Socio-cognitive theory was used to guide an examination of these differences. Gender differences in spatial ability were previously proposed as an important cognitive factor in college science courses, but an analysis of problem types showed that it was not the cause of the effects observed. Instead, motivation data collected using a survey instrument adapted specifically for these courses suggested that differences in self-efficacy, above all of the other affective factors studied, was responsible for the observed gender effects. These results suggest that more attention be paid to affective factors in critical college-level science courses.

Bios
Ara C. Austin, Arizona State University, ara.austin@asu.edu
Dr. Austin oversees the online program for the School of Molecular Sciences at Arizona State University. She also received her Ph.D. in chemistry education at ASU, and her research has explored various factors that contribute to student performance in college-level science courses. Her research interests are primarily focused on motivation, self-regulation, and capital of college students in STEM. She has authored several academic publications on these topics, and her current role at ASU is to help online students achieve success in STEM fields.

Ian R Gould, Arizona State University, igould@asu.edu
Ian Gould is President's Professor in the School of Molecular Sciences at Arizona State University. His current research interests are in organic geochemistry and geochemically inspired green organic chemistry. His education research programs focus on studies designed to understand student performance in organic chemistry courses, and on the development of an intelligent online tutoring system for organic chemistry. He has over 130 research publications and an H-index of 45.

Nicholas Hammond, University of Rochester, nicholas.hammond@rochester.edu
Nicholas B. Hammond is an Assistant Director for the College Workshop Program in the Center for Excellence in Teaching & Learning at the University of Rochester. His work focuses on making peer-led team

learning environments equitably accessible for all students. Previously, Nic was a Postdoctoral Faculty Fellow in the Department of Chemistry at Boston University, where he was instrumental in bringing the Learning Assistant model to BU. He did his bachelor's in biochemistry at the University of Mississippi before getting his doctorate in chemistry at the University of Rochester.

2.7.3 Measuring learning gains and examining implications for student success in STEM: A gender story in post-secondary first year chemistry

Kathleen Scalise, Angelica Stacy & Michelle Douskey

Abstract

This paper focuses on learning gains in the area of higher education STEM through new approaches to the formative assessment feedback cycle. Learning gains were examined for stratified randomized comparison and two treatment groups of 943 students organized into 41 laboratory sections in first-year post-secondary chemistry at a single university. Treatment groups received either (i) support for conceptual understanding through a larger percentage of conceptual questions in online homework or (ii) the same mix of conceptual questions with differentiated answer feedback. The comparison group received the usual online homework and feedback for the course. Results showed no statistically significant difference among groups at pretest, yet both treatment groups showed statistically significant gains in learning outcomes beyond the original comparison group. Findings to be discussed here include (i) a significant gender effect identified, and (ii) overall, students in the treatment condition showed a 43% reduction in STEM 'at risk' identification.

Bios

Kathleen Scalise, University of Oregon, kscalise@uoregon.edu
Kathleen Scalise's main research areas are in science, technology, engineering and mathematics education (STEM). Most recently, she completed a visiting research scientist appointment with Columbia University's Department of Neuroscience and has been working on science literacy with the U.S. National Assessment of Educational Progress (NAEP) through ETS. She has served internationally with OECD and IEA, and on the U.S. National Research Council (NRC) committee for the National Academy of Sciences report on the Next Generation Science Standards. She holds K-12 teaching credentials in physical sciences and life sciences, a bachelor's degree in biochemistry, and the Ph.D. from UC Berkeley (2004).

Angelica Stacy, University of California, Berkeley, astacy@berkeley.edu
Professor of Chemistry at UC Berkeley, Angelica Stacy investigates Solid State, Physical and Inorganic Chemistry. Her research group synthesizes materials with interesting physical properties that can be applied to emerging technologies and elucidate their behavior. Dr. Stacy has published extensively and earned numerous awards and tributes for her work, including the NSF Faculty Award for Women Scientists and Engineers; Lawrence Berkeley Laboratory Technology Transfer Certification of Merit; President's Chair for Teaching, University of California; Francis P. Garvan-John M. Olin Medal, American Chemical Society; Catalyst Award, Chemical Manufacturers Association; and The Donald Sterling Noyce Prize for Excellence in Undergraduate Teaching.

Michelle Douskey, University of California, Berkeley, douskey@berkeley.edu
Lecturer of Chemistry at UC Berkeley since 2001, Michelle Douskey earned the Ph.D. in Chemistry at the University of Minnesota-Twin Cities in 1999 and completed her postdoctoral research in Chemical Engineering at the University of Minnesota-Twin Cities & Rohm and Haas. She teaches courses in general chemistry, quantitative analysis, and professional preparation for graduate students in supervised teaching

for chemistry. She has participated extensively in educational research in STEM, including developing scaffolded and free-inquiry problem solving activities.

Paper Session 2.8: Gendered Achievement and Attitudes
Chair: Silke Luttenberger

2.8.1   International differences in STEM potential and attitudes: TIMSS and PISA 2015
Anniek van den Hurk, Annemarie van Langen & Martina Meelissen

Abstract
TIMSS and PISA measure trends in mathematics and science achievement and attitude among students at the age of 10 and 15 from 30-60 countries. In this paper, we present data from TIMSS2015 and PISA2015 to compare international (gender) differences in STEM attitude and achievement. The analyses focus on the high-achievers (upper 20%) in a selection of 5 to 10 western countries including The Netherlands. We concentrate on the relation between gender, (high) achievement and self-confidence in STEM. Important research questions are: Does this relation vary among countries and age groups? How does the socioeconomic status (SES) of the students affect this relation? Does gender and self-confidence of the high-achieving students in those countries affect their future educational and occupational plans in STEM? The results of our analyses will shed more light on international gender differences in STEM achievement, attitude and choice, using large and reliable databases. (146 words)

Bios
Anniek van den Hurk, Twente University, a.i.vandenhurk@utwente.nl
Anniek van den Hurk (1989) is a junior researcher at the University of Twente, department of Research Methodology, Measurement and Data Analysis. She focusses in her research on STEM participation and STEM persistence in secondary and tertiary education. She is interested in the gender gap in STEM and differences in STEM participation between western countries. Anniek specializes in analyzing international large-scale assessment data to analyze these phenomena.

Annemarie van Langen, KBA Nijmegen, a.v.langen@kbanijmegen.nl
Dr. Annemarie van Langen (1962) is a senior researcher at KBA Nijmegen. She specializes in the international participation of students in STEM education in secondary and tertiary education. Her thesis in 2005 ('Unequal participation in mathematics and science education') was the starting point for several research projects in secondary and tertiary education on this topic. Annemarie has also been investigating the national and international differences in school attainment and education careers of boys and girls. Her other project work is linked to school effectiveness school and educational opportunities for ethnic minorities and other disadvantaged groups.

Martina Meelissen, Twente University, m.r.m.meelissen@utwente.nl
Dr. Martina Meelissen is as senior researcher at the University of Twente, department of Research Methodology, Measurement and Data Analysis, faculty of Behavioural, Management and Social Sciences. Her thesis in 2005 on gender differences and ICT shows a longtime interest in gender & STEM-related issues. Martina is also National Project Manager of PISA and National Research Coordinator of TIMSS for the Netherlands.

2.8.2 Do STEM males always outperform non-STEM females when performing visuospatial tasks?

Juan C. Castro-Alonso, Mona Wong, Paul Ayres & Fred Paas

Abstract

Visuospatial processing is fundamental in STEM areas. As males may outperform females in visuospatial tasks, this could disadvantage STEM females. But is this observed in every visuospatial task? We adapted four visuospatial tests to determine if they were differently affected by gender and study discipline. 160 undergraduate students, 80 per gender, were recruited (50% STEM). We developed two versions of a mental rotation test, a spatial processing test, and a visual processing instrument. ANOVA showed significant Performance x Gender and Performance x Discipline interactions. Follow-up comparisons showed that the mental rotations and the spatial processing tests favored males and STEM undergraduates. The visual processing test did not show these effects. By developing new computer versions of visuospatial tests, we have shown that they can be influenced by gender and study discipline. Hence, it is important to not only develop new instruments but match tests with research goals and individual characteristics.

Bios

Juan C. Castro-Alonso, CIAE, Universidad de Chile, jccastro@ciae.uchile.cl
Juan C. Castro-Alonso is Biochemist, Master in Communication and Education, and PhD in Education. He is a researcher in the STEM Group of the Center for Advanced Research in Education (CIAE), Universidad de Chile. His interests are STEM and biology education, gender differences, educational psychology, multimedia learning, and visuospatial abilities. He is investigating how learners' characteristics can affect their performance on a recently developed battery of adaptable computer visuospatial tests.

Mona Wong, The University of Hong Kong, wpsmona@hku.hk
Mona Wong was granted a PhD from the University of New South Wales, Australia, were she investigated gender effects in multimedia learning about manipulative tasks. She is a researcher in the Faculty of Education, The University of Hong Kong. Her research areas include cognitive load theory, embodied cognition, gender effects, and multimedia learning.

Paul Ayres, University of New South Wales, p.ayres@unsw.edu.au
Paul Ayres is Emeritus Professor of the University of New South Wales, Australia. He has an outstanding career in educational psychology, as a member of the group who pioneered cognitive load theory. His highly cited research has been conducted on many of the key areas of cognitive load theory, such as split-attention, isolating elements, the goal-free effect, the expertise reversal effect, and the transient information effect of instructional animations and videos.

Fred Paas, Erasmus University Rotterdam, paas@essb.eur.nl
Fred Paas is Professor at Erasmus University Rotterdam, The Netherlands. He is the world's most productive researcher in educational psychology, approaching 200 articles published in leading international journals. His diverse research interests include cognitive load theory, embodied cognition, instructional design, multimedia learning, assessment and measurement in education, and the transient information effect in instructional dynamic pictures.

2.8.3   To buy or not to buy: A study in gender-based marketing of STEM toys

Brandon Aigner, Chris Bolognese & Bailey Braaten

Abstract

This paper reviews the existing literature pertaining to the intersectionality of gender, STEM disciplines, and children's toys. The aim of the paper is motivated by the underrepresentation of females in STEM careers coupled with the current popularity of STEM toys. Through initial analysis of 84 toys found at three stores, results show that toys marketed as STEM toys can still perpetuate the same gender roles and stereotypes that such toys are trying to disrupt. Emerging from a conceptual framework of feminist theory on gender performativity (Butler, 1999), the study introduces a flowchart test to help consumers critically evaluate the effectiveness of a toy based both on its ability to disrupt socially constructed gender norms as well as provide children with cognitively engaging play. This new evaluative framework contributes to existing research on educational toys, toys and gender roles, and STEM toys.

Bios

Brandon T. Aigner, The Ohio State University, aigner.5@osu.edu
Brandon Aigner is a former middle school science, engineering, and math teacher and current 2ndyear doctoral student at The Ohio State University. His studies in Teaching and Learning have an emphasis in STEM Education and the best methods of integrating the four components of STEM. He currently serves as a preservice teacher supervisor and methods instructor at OSU. His research interests involve teacher preparation, the integration of preservice teachers' multiple preparatory experiences in coherent and beneficial ways leading toward licensure, and gender differences within the STEM fields.

Chris Bolognese, The Ohio State University, bolognesec@columbusacademy.org
Chris Bolognese is the K - 12 mathematics department chair at The Columbus Academy. Chris is in his 12th year teaching upper school mathematics and computer science. He is actively involved in state and national mathematics teacher organizations. Chris is a second year masters in mathematics student at Texas A & M University. Chris is also in his third year as a doctoral student at The Ohio State University with research interests in the intersection of computational thinking and mathematical problem solving, inservice teacher professional development through mathematics teachers' circles, and building tasks in dynamic mathematics technological environments.

Bailey Braaten, The Ohio State University, braaten.7@buckeyemail.osu.edu
Bailey Braaten is a former mechanical engineer and former high school mathematics teacher. She is a 3rdyear doctoral student at the Ohio State University, studying teaching and learning with an emphasis on STEM education. Bailey's research interests focus on gender and identity performance in middle school and high school mathematics classes and how this may influence students' choices to pursue STEM careers. Bailey is passionate about creating a school to STEM career pipeline that is inclusive of and allows for women and people of color to thrive in STEM fields.

Paper Session 3.1: Stereotypes and Barriers
Chair: Gale Sinatra

3.1.1   "As bad as it sounds, they are the nerds": Girls' perceptions of who participates in STEM

Feleicia Martine Jaremus, Jennifer Gore, Leanne Fray, Adam Lloyd & Elena Prieto

Abstract

Whilst women have made progress in entering the STEM fields of health and biological sciences they remain underrepresented in physics, mathematics engineering and technolo gy. In this paper, we draw on theoretical perspectives on gender as a 'performance' to provide new insights into girls' perceptions about who works in these different STEM fields. Through thematic analyses of semi-structured interviews with female secondary students (n=38), teachers (n=10), and parents (n=4) we found that strongly gendered occupational stereotypes persist. Biology was viewed as the "more humanitarian", "more interesting", and "easier" science. Physics, mathematics, engineering and technology were viewed with little interest and as only for those with "complex" brains. These findings indicate that without significant efforts to broaden perspectives on who works in the STEM fields perceived to be more 'complex' we can expect little change to the underrepresentation of females in physics, mathematics, engineering and technology.

Bios

Felicia Martine Jaremus, The University of Newcastle, felicia.jaremus@newcastle.edu.au
Felicia Jaremus is a Ph.D. candidate and research assistant in the Teachers and Teaching Research Centre at the University of Newcastle. Her research interests centre on equity in access to higher education, mathematics education and STEM. Her Ph.D. investigates the participation of female secondary students in high level mathematics.

Jennifer Gore, The University of Newcastle, jenny.gore@newcastle.edu
Jenny Gore is a Laureate Professor in the School of Education and Director of the Teachers and Teaching Research Centre at the University of Newcastle. In addition to a program of research on student aspirations, she is currently leading a research agenda focused on improving student outcomes and supporting teacher professional development through an innovative approach called Quality Teaching Rounds.

Leanne Fray, The University of Newcastle, leanne.fray@newcastle.edu.au
Leanne Fray is a postdoctoral fellow at the University of Newcastle in the Teachers and Teaching Research Centre. She has extensive experience in qualitative research and has previously worked on research projects across such disciplines as health, education, and social science. Her research interests include improving student access and participation in higher education.

Adam Lloyd, The University of Newcastle, adam.lloyd@newcastle.edu.au
Adam Lloyd is a postdoctoral fellow in the Teachers and Teaching Research Centre at the University of Newcastle with a diverse background in engineering, mathematics education, and research on child lifestyle behaviours. With a particular interest in STEM, his current research focuses on Quality Teaching, student aspirations in the middle years of schooling, and improving equity in education.

Elena Prieto, The University of Newcastle, elena.prieto@newcastle.edu.au
Dr Elena Prieto is a senior lecturer in Mathematics Education at the University of Newcastle. She holds a Bachelor degree in Mathematics and a Ph.D. in Theoretical Computer Science. From 2005, she has worked extensively in STEM education and is engaged in

3.1.2 Barriers for gender-untypical career aspirations: Differences between boys and girls in untypical domains

Silke Luttenberger & Manuela Paechter

Abstract
Gender-untypical choice behavior is still rare, with females deciding less frequently for apprenticeships in technical (or STEM) and males in social domains and retail trade. Individual (e.g., self-efficacy, interest) and contextual factors (e.g., family, school) may be perceived as barriers or support for entering gender-untypical professions. The study investigates differences between females and males with gender-typical and gender-untypical career wishes. Altogether, 530 students in Austria from lower secondary schools preparing mainly for an apprenticeship (mean age 14.64) took part in a survey on career wishes, career goals, and experiences of barriers in the apprenticeship-finding process. Generally, adolescents with gender-untypical career wishes experienced contextual barriers. Females with gender-untypical career wishes did not report individual barriers but missed social support and career role models. In comparison, boys with gender-untypical career wishes experienced individual barriers (e.g. insecurities in interests). Boys, however, experienced more support from the family and reported of male role models.

Bios
Silke Luttenberger, University of Teacher Education Styria/Federal Centre for Professionalization in Education Research, silke.luttenberger@phst.at
Silke Luttenberger is a professor for Educational Psychology in Primary Education at the University of Teacher Education Styria (Austria) and deputy head of the Federal Centre for Professionalization in Education Research (Austria). She graduated and finished her Ph.D. at the University of Graz (Educational Psychology). Her research interests are the development of vocational interests and career decisions with a focus on gender differences in STEM domains. She investigates topics such as gender differences with regard to individual behaviors and attitudes, and social domains (e.g. family or school related factors), and gender-sensitive didactics.

Manuela Paechter, University of Graz, manuela.paechter@uni-graz.at
Manuela Paechter is a professor of Educational Psychology (Institute of Psychology) at the University of Graz (Austria). She graduated at the University of Hull (UK) with an M.Sc. and at the Technical University of Darmstadt with a Diploma in Psychology and finished her Ph.D. at the Technical University of Braunschweig (Germany). In her research she investigates topics such as gender differences in STEM with regard to individual stereotypic behaviors and attitudes (e.g., career choices) but also contextual and instruction factors that facilitate stereotypes; she also investigates the role of anxiety, self-concept, and goal orientations in learning and instruction.

3.1.3   When bias education backfires: Antecedents and outcomes of social identity threat after learning about implicit gender bias in STEM

Audrey Aday, Simon Lolliot, & Toni Schmader

Abstract

Social identity threat (the threat of being devalued on the basis of one's social identity; Steele, Spencer, & Aronson, 2002) has often been examined as contributing to the longstanding gender gap in STEM. Two studies examined whether learning about implicit gender bias would lead women to avoid working collaboratively with a male partner due to increased concerns of social identity threat. In Study 1, 229 undergraduates watched an educational video about implicit gender bias in STEM. In Study 2, 225 undergraduates (only women) read a faux news article describing gender bias in STEM as either pervasive or decreasing. Both studies found that gender (S1) and condition (S2) predicted avoidance of cross-gender contact. Mediational analyses revealed these effects were explained by social identity threat (S1 and S2) and intergroup anxiety (S1). These findings highlight possible costs of bias education programs.

Bios

Audrey E. Aday, The University of British Columbia, aday@psych.ubc.ca
Audrey Aday is a graduate student in the Department of Psychology at The University of British Columbia. She received a BA in psychology from California State Polytechnic University, Pomona in 2016. Her research examines the effects of stereotyping and prejudice with a particular focus on women's experiences in the Science, Technology, Engineering, and Mathematics (STEM) fields. She is interested in understanding how gender biases shape social interactions between men and women in highly collaborative settings, and in developing interventions tailored to educate men and women about gender bias while fostering intergroup trust and cooperation.

Simon Lolliot, The University of British Columbia, slolliot@psych.ubc.ca
Simon Lolliot is an instructor in the Department of Psychology at The University of British Columbia. He completed his PhD in Experimental Psychology as a Rhodes Scholar at the University of Oxford in 2014. His research interests include diversity, intergroup contact, belongingness, and how these relate to success (pedagogical and otherwise) at University, as well as scholarship of teaching and learning and educational leadership. He is also interested in prejudice, attitude generalization, reconciliation, and ingroup identity.

Toni Schmader, The University of British Columbia, tschmader@psych.ubc.ca
Toni Schmader is a Canada Research Chair in Social Psychology at the University of British Columbia, and is the Director of the Social Identity Laboratory. Dr. Schmader has 15 years of experience and over 50 publications examining how stereotypes and bias constrain people's performance and self-views. She has given frequent public lectures on the topic of implicit gender bias including talks to the National Academies of Science in the United States, as part of Harvard's Women in Work Series, and at the International Gender Summit. She was the recipient of a Killam Research Prize in 2013.

3.1.4 Not brilliant enough for STEM: Self-concepts and goals moderate the relationship between STEM stereotypes and motivation

Christy Starr & Campbell Leaper

Abstract
Prior studies have found that people tend to stereotype those in STEM fields as geniuses who are isolated and socially awkward. Holding these stereotypes may demotivate people who see these stereotypes as in conflict with their own self concepts and goals; e.g., they do not believe they are geniuses or wish to be popular. Due to gender roles these stereotypes may affect women more than men. Using expectancy-value framework, the current study investigated self-concepts and goals as a moderator between stereotypes and STEM expectancy and value beliefs. Participants were 155 high schoolers (58% girls) who filled out a survey about their future goals, self-concepts, STEM stereotypes, and STEM expectancy and value beliefs. We found that self-concepts and goals significantly moderated the relationship between STEM stereotypes and value beliefs, in the expected direction. Results point to the need to reduce stereotypes about people in STEM, which may disproportionately affect women and girls.

Bios
Christy R. Starr, University of California, Santa Cruz, cestarr@ucsc.edu
Christy Starr is a doctoral student in graduate program in developmental psychology at the University of California, Santa Cruz. She attained her bachelor's degree at Knox College. Mx. Starr's research focuses on STEM motivation and achievement among girls/women and other underrepresented students, as well as sexual objectification; stereotyping, prejudice, and discrimination.

Campbell Leaper, University of Santa Cruz, cam@ucsc.edu
Campbell Leaper is Professor and Department Chair of Psychology at the University of California, Santa Cruz. His research examines the developmental and social psychology of gender and sexism. This includes studies of gender biases and discrimination in relation to girls' and women's motivation and success in STEM. Other research interests include the study of peer relations as contexts for the development of gender (and other) identities; gender ideologies and close relationships; language and social interaction; and representations of gender in the media. Professor Leaper organizes and co-chairs the biennial Gender Development Research Conference (gender.ucsc.edu).

Paper Session 3.2: Computer Science & Information Technology
Chair: Marissa Tsugawa-Nieves

3.2.1 Game-based learning for supporting self-confidence and motivation of female students for ICT
Bernhard Ertl

Abstract
There's a large gender gap in Information and Communication Technologies (ICT). Studies report a lower self-concept of females which is influenced by stereotypes rather than by objective achievement or individual aptitudes. This has consequences with regard to motivation for ICT and for later career choice. Austria is one of the countries with the highest gender differences in PISA science and mathematics scores as well as with respect to the self-concept in this field. The project Mit-Mut aimed at supporting female

pupils' motivation and self-concept in ICT by a game-based learning approach. Students worked in a social enterprise network role play game for about six weeks. This contribution provides insights into processes and outcomes of the game by a quantitative and a qualitative study. Results show that during the game the female pupils developed some sense of mastery in ICT and also a more differentiated perspective on females in ICT professions.

Bio

Bernhard Ertl, Universität der Bundeswehr München, duk@ertl.org
Bernhard Ertl is professor for learning and teaching with media at Universität der Bundeswehr München. Before that, he was professor for educational technology at Donau-Universität Krems. His research focuses on gender equality issues in the field STEM, particularly on concepts for gender mainstreaming in STEM didactics and gender specific facilitation methods. Examples for these are the EU-funded project PREDIL dedicated at PRomoting Equality in DIgital Literacy or Mit-Mut, a project that aimed at developing a computer game for facilitating female pupils' interest and self-concept in the fields of information and communication technologies and entrepreneurship.

3.2.2   So, you want to learn computer science? Are you a girl, a boy, underrepresented, a future worker, a robot maker, or a chipset baker? Analysis of four corporate computer science education sites: Code.org, Apple, Google, and Microsoft

Makseem Skorodinsky

Abstract

Initiatives such as Hour of Code and CS for All, have been gaining momentum, and computer science curriculum is making increasing appearances in K-12 classrooms. Historically, technology industry elites have expressed that Computer Science curriculum for K-12 is not making it into classrooms quickly enough. The four sites analyzed in this paper are corporate efforts aimed at expediting the introduction of computer science in the K-12 classrooms. Are these corporate efforts purely altruistic? What ideology regarding technology and its role in society do they promote? In their attempts to address underrepresentation in the field of computer technology, do they address historical reasons for gaps in access, agency, contribution or simply present technology as neutral, a-historic, and inherently good? How are these corporate efforts aiming to inspire participation in the field and for whose benefit? The analytic methodology employed in "reading" these efforts is as follows: race, gender, and queer theory.

Bio

Makseem Angel Skorodinsky, University of Oregon, makseem@uoregon.edu
Max is a 1st year PhD student in UO's Critical and Sociocultural Studies of Education. He currently teaches Computer Science at an alternative public high school in Eugene, OR. He is committed to activism in democratizing the field of Computer Science education and access to the subject. Max created a computer science program at Ophelia's Place, a local organization focused on supporting girls. He has taught Computer Science at Eugene's Coder Dojo, and a variety of venues focused on supporting low income and at-risk youth.

3.2.3   Online Professional Development for Computer Science Teachers: Addressing Barriers to Broadening Participation in Computing

Kirsten Peterson, Joyce Malyn-Smith & Joanna Goode

Abstract

In order to address the continued low number of students interested in computer science (CS) and the underrepresentation of women and minorities in these fields, it is critical to provide teachers with high quality, accessible professional development that requires them to go beyond learning only content and instead reflect on how their own pedagogical practices shape learning opportunities for students. This paper reports on Online Professional Development for ECS Teachers, a project aimed at broadening participation in CS education through an online learning community model of professional development that challenges teachers to examine their belief systems and collectively transform the culture of CS classrooms to one that is inclusive of all learners. Preliminary findings indicate that teachers need additional targeted content knowledge, and find great value in an intuitive online facilitated learning community where they can share instructional resources and collaborate on lesson planning strategies.

Bios

Kirsten Peterson, Education Development Center (EDC), kpeterson@edc.org
Kirsten Peterson is an instructional designer with extensive expertise in developing and supporting online professional learning communities and managing, scaling, and sustaining online learning programs. She is currently co-PI for the NSF CS10k project Online Professional Development for Exploring Computer Science (ECS) where she and her colleagues are designing, implementing and researching capacity-building online professional development learning experiences for ECS teachers. Nationwide, Peterson has led production teams in providing custom online development and consulting services for K-12, higher education, non-profit and other organizations with an educational mission.

Joyce Malyn-Smith, Education Development Center (EDC), Education Development Center (EDC) , jmsmith@edc.org
Joyce Malyn-Smith is a nationally-recognized thought leader in the field of workforce development, specializing in effective strategies to promote STEM career readiness and success. She has extensive expertise in facilitating the efforts of business and industry leaders to identify major tasks, skills, knowledge, and abilities needed by workers in emerging fields and significantly changed occupations. Malyn-Smith is the Principal Investigator (PI) of several initiatives that focus on fostering key workforce competencies. She is leading a national computational thinking forum and an initiative to design online learning experiences to prepare high school teachers to implement the Exploring Computer Science curriculum.

Joanna Goode, University of Oregon, goodej@uoregon.edu
Joanna Goode's research examines issues of access and equity for underrepresented students of color and females in computer science education. For the past several years, she has studied the institutional and psychological reasons preventing many underrepresented youth from entering the computer science pipeline in high school. As a former urban high school mathematics and computer science teacher, Goode considers the relationship between teacher development and opportunities to learn for students. She continues to serve as the director of a program aimed at preparing and supporting the efforts of LAUSD computer science educators in diversifying the high school computing pipeline.

3.2.4   "Trust yourself: You have the IT-Factor!" Career coaching for female computer scientists
Silvia Förtsch

Abstract
Theoretical framework: Female computer scientists show a lower self-efficacy compared to male colleagues. As a result, a coaching program that supports them after a re-entry into professional life, in a new orientation or with regard to leadership aspirations has been developed. Aims and objectives: Coaching strengthens computer scientists in their motivational resources and enables them to take advantage of professional opportunities. Sample: The pilot project included 15 female professionals. Methodology: The coaching started with a validated professional personality test. Individual career plans were developed in coaching sessions, including a clear definition of the objective and implementation strategy. Results: The following aspects were mentioned as supporting career-advancing by the participants: company culture, personal mentor, family-friendly environments, home office, flexible working hours and forms of child care. The lack of professional appreciation of self-confidence, role models, and gender-typical attributions demotivate and hinder women to aspire leading positions. Scientific and applied significance: Due to the high demand for coaching, the concept was expanded for students.

Bio
Silvia Maria Förtsch, University of Bamberg, silvia.foertsch@uni-bamberg.de
Silvia Förtsch studied educational sciences (B. Sc.) at the University of Hagen and empirical educational research (M. Sc.) at the University of Bamberg. She worked as assistant of the Women in Computer Science Equal Opportunities Officer and organized a mentoring program for female students of computer science. From 2012-2015, she was a research associate at the project "Alumnae Tracking". Since 2015 she works as a PhD candidate in the project "Career Coaching in STEM". Her research interests include longitudinal research on educational and professional pathways, career aspirations, life course research, and gender studies.

Paper Session 3.3: Attraction and Recruitment to STEM
Shawn Lampkins

3.3.1   Establishing a school based STEM culture for young women through a university partnership program: an Australian case-study
Judy Anderson

Abstract
Established in 2014, and the first of its kind in Australia, the STEM Teacher Enrichment Academy offered through the University of Sydney brings together teams of science, mathematics, and technology teachers from selected high schools for a five-day residential program to support and enhance teachers' pedagogical and content knowledge in the development of interdisciplinary units and projects in STEM. Through increasing teacher capacity, the main aim of the Academy is to improve student interest and engagement in STEM, particularly for those underrepresented in STEM. Using a case-study approach, and framed upon theories of motivation, this paper focuses on the development of STEM programs at three all-girls high schools in Sydney (one catholic, one independent, one public) that are partners with the Academy. This

paper discusses the unique challenges at each school in shifting and establishing a STEM culture centered upon growth and success for young women in STEM.

Bio
Judy Anderson, University of Sydney, judy.anderson@sydney.edu.au
Judy is Associate Professor in mathematics education, Director of the STEM Teacher Enrichment Academy, and a member of the University Academic Board. She has also worked as a Senior Curriculum Officer responsible for the development of the mathematics syllabuses for NSW schools. Judy is the President of the Australian Curriculum Studies Association, a past President of the Australian Association of Mathematics Teachers and of the Mathematical Association of NSW. Her research interests include students' motivation and engagement in mathematics as well as teachers' inquiry-based learning. More recently, Judy has been exploring approaches to STEM education in schools and conducting research into STEM education leadership.

3.3.2   Reimagining STEM recruitment in the UK – an evaluation of the People Like Me initiative
Wendy Sadler, Clem Herman, & Jane Kendall-Nicholas

Abstract
The UK has seen a plethora of initiatives to try and bring more girls and women into STEM, yet the figures for enrolment into higher education and employment in STEM subjects remains consistently low, especially in technology and engineering subjects. This presentation will discuss the impact of a recent high-profile national project that engages girls and their parents. Workshops run in school and through industry used a methodology that focuses on attributes and identities, thus challenging prevailing stereotypes about 'who does STEM'. Using data from interviews and questionnaires with participants and stakeholders, we examine the impact of the 'People Like Me' intervention on girls, parents, teachers and potential employers, and discuss how an intervention such as this might change the landscape of who does STEM in the future.

Bios
Wendy Sadler, Science Made Simple, wendy@sciencemadesimple.co.uk
Wendy is the founding Director of science made simple and a lecturer in Science Communication and Engagement at Cardiff University. Wendy is passionate about inspiring the next generation of scientists, engineers and communicators, and making STEM subjects accessible to more diverse audiences.Wendy is a fellow of the RSA, University of Wales Trinity St. David, and the ERA Foundation and was formerly a member of the Science Advisory Council for Wales. She was the Chair and co-author of the Task and Finish report on STEM engagement in Wales and was part of the group behind the 'Talented Women for a Successful Wales' report for the Welsh Government.

Clem Herman, The Open University, clem.herman@open.ac.uk
Dr. Clem Herman is Director of eSTEeM, the Open University's Centre for STEM Pedagogy and chair of the university's STEM Gender Equality Group. Throughout her career Clem has led on a range of projects to support the participation and progression of women in STEM, and her research on the impact of career breaks and women returners to STEM has been widely published. Her current ESRC funded research project, is a comparative study of Gender, Skilled Migration and IT in India and the UK. She is also the founder and Editor-in-Chief of the International Journal of Gender Science and Technology.

Jane Kendall-Nicholas, The Open University, j.m.kendall-nicholas@open.ac.uk
Jane Kendall-Nicholas obtained a PhD in fatigue crack growth at the University of Cambridge and subsequently worked in materials research. She trained as a secondary school science teacher, and has taught in schools and other educational settings, specialising in physics. She is currently an Associate Lecturer at the Open University in the Science Faculty, tutoring 1st and 2ndlevel modules, and has an MA in Online and Distance Education.

3.3.3 Interventions in education to prevent STEM pipeline leakage
Anniek van den Hurk, Annemarie van Langen, & Martina Meelissen

Abstract
Worldwide, the leaking STEM pipeline discussion has resulted in the development of many programs aimed at enhancing STEM interest and persistence in STEM education. Although many of these programs have been evaluated, it is unclear which interventions are particularly effective according to academic standards. This paper reports on the results of a systematic international review to find successful interventions evaluated according to high academic standards and with an evidence-based research design. Initially over 500 studies were found, but the quality analyses show that only a small percentage is designed in such a way that it is likely that the effects are caused by the intervention. As a result, our review results in the description of just a few potentially effective interventions. This shows that there is still a large need for evidence-based research meeting academic standards regarding the effectiveness of programs to prevent the STEM pipeline from leaking. (148 words)

Bios
Anniek van den Hurk, University Twente, The Netherlands, a.i.vandenhurk@utwente.nl
Anniek van den Hurk (1989) is a junior researcher at the University of Twente, department of Research Methodology, Measurement and Data Analysis. She focusses in her research on STEM participation and STEM persistence in secondary and tertiary education. She is interested in the gender gap in STEM and differences in STEM participation between western countries. Anniek specializes in analyzing international large-scale assessment data to analyze these phenomena. (67 words)

Annemarie van Langen, KBA Nijmegen, a.v.langen@kbanijmegen.nl
Dr. Annemarie van Langen (1962) is a senior researcher at KBA Nijmegen. She specializes in the international participation of students in STEM education in secondary and tertiary education. Her thesis in 2005 ('Unequal participation in mathematics and science education') was the starting point for several research projects in secondary and tertiary education on this topic. Annemarie has also been investigating the national and international differences in school attainment and education careers of boys and girls. Her other project work is linked to school effectiveness school and educational opportunities for ethnic minorities and other disadvantaged groups.

Martina Meelissen, University Twente, m.r.m.meelissen@utwente.nl
Dr. Martina Meelissen is as senior researcher at the University of Twente, department of Research Methodology, Measurement and Data Analysis, faculty of Behavioural, Management and Social Sciences. Her thesis in 2005 on gender differences and ICT shows a longtime interest in gender & STEM-related issues. Martina is also National Project Manager of PISA and National Research Coordinator of TIMSS for the

Netherlands.

3.3.4   Who goes where and does it matter? Exploring the experiences of successful URM women in STEM at different types of colleges
Deborah Tully

Abstract
In the United States underrepresented racial minority women represent more than 20% of the population, yet earn less than 10% of STEM degrees. This imbalance poses major equity issues as our country seeks to secure a diverse and well-trained STEM workforce. Through focusing on retention issues specific to URM women in higher education STEM programs, this study aims to explore how the organizational setting and social practices experienced at different types of colleges may influence persistence to degree completion for URM women in STEM. This mixed-methods study (n=447) was carried out at five colleges (two coeducational, two women's, one HBCU). Drawing on theories of identity, cultural and social capital, and a college impact model, this study offers a comparative analysis of the unique contributions that these colleges may offer towards persistence. Further results highlight how science identity for URM women may be shaped through the college experience.

Bio
Deborah A. Tully, University of Sydney, deborah.tully@sydney.edu.au
Deborah is currently the Vonwiller Post-Doctoral Research Fellow at the University of Sydney working with the STEM Teacher Enrichment Academy. She recently completed her PhD in Education focusing on minority women in STEM higher education in the United States. Prior to commencing her PhD studies, Deborah was an engineer who later trained to become a high school mathematics teacher. She holds a Master Degree in Mathematics Teaching from Harvard University and a Bachelor's degree in Engineering and Operations Research from the University of Massachusetts/Amherst (magna cum laude). Her research interests include gender and STEM, quantitative methodologies and mathematics teacher education.

Paper Session 3.4: From the Inside Out: Evidence for Ecologoical Influences on Girls and Women in STEM
Chairs: Jennifer E. John and Sarah E. Thoman

3.4.1   How Do Ability Beliefs and Collegiate Experiences Affect Computer Science Achievement among Undergraduate Women and Men?
Lara Perez-Felkner, Barbara Schneider, Carolina Milesi, Kevin Brown

Abstract
Using an in-depth case study of two research institutions and comparison data from national cohorts, we evaluate the degree to which computer science undergraduate women and men vary in beliefs about their ability as well as informal and formal involvement in the major. This analysis is useful for two reasons. First, there is insufficient depth of information currently available about the role of ability beliefs among students in gateway courses and their association with related experiences and decisions made by students in college. Second, we bridge small-n and large-scale studies of postsecondary STEM students by validating our information across national studies of STEM postsecondary students while identifying specific patterns at

the institutional level for students involved in STEM extracurricular programs as well as those who are not. Computer science is of current particular interest because it appears to be particularly malleable in its enrollments over the past half-century, is of considerable importance because of increasing economic growth in this sector, and computing professions have comparably small gender wage gaps while having among the smallest shares of women, in particular women of color. It is therefore especially important to understand the experiences of computer science undergraduate students and how they vary by gender. Extant research indicates many students and faculty in computer science view strong gender differences among the talents, self-beliefs, and involvement of male and female undergraduate students (e.g., Margolis & Fisher, 2002). We report on a study of 165 computer science students at two Midwestern research institutions, completing two rounds (fall, spring) of intensive Experience Sampling Method (ESM) surveys. We find surprisingly few differences among women and men in our sample, perhaps in part because scientifically-talented girls often exit the scientific pipeline in secondary school (see e.g., Perez-Felkner, McDonald, Schneider, & Grogan, 2012, etc.). We explain our findings in light of related studies of STEM and CS women in national studies of secondary and postsecondary school students as well as potential explanations specific to highly competitive research institutions. Implications for further research and computer science initiatives and departments are discussed.

Bios
Lara Perez-Felkner, Florida State University, lperezfelkner@fsu.edu
Lara Perez-Felkner is an Assistant Professor of Higher Education and Sociology in the Higher Education Program in the College of Education at Florida State University. Her research uses developmental and sociological perspectives to examine how young people's experience of their social contexts influence their college and career outcomes. In particular, she investigates racial-ethnic, gender, and socioeconomic disparities in post-secondary educational attainment and entry to STEM fields. She employs secondary analysis of large-scale national longitudinal datasets as well as original and often mixed-methods research. She is currently leading an evaluation of student success interventions in engineering at a historically black college.

Dr Barbara Schneider, Michigan State University, bschneid@msu.edu
Barbara Schneider is the John A. Hannah Chair and University Distinguished Professor in the College of Education and Department of Sociology at Michigan State University. Her research focuses on how the social contexts of schools and families influence the academic and social well-being of adolescents as they move into adulthood. Schneider has also played a significant role in the development of research methods for the real- time measurement of learning experiences. Professor Schneider has published 15 books and more than 100 articles and reports on family, social contexts of schooling and sociology of knowledge.

Carolina Milesi, Michigan State University, Milesi-Carolina@norc.org
Carolina Milesi is a Senior Research Scientist in the Education and Child Development Department at NORC. Her areas of research expertise include socioeconomic disparities in education and health from early childhood to adulthood, access to and persistence in post-secondary education, and gender disparities in science, technology, engineering, and mathematics (STEM) education. She is currently the Project Director of a National Science Foundation-funded study of gender differences in college students' persistence in computer science and computer engineering, based on a data collected via the Experience Sampling Method using smartphone technology.

Kevin L. Brown, NORC Academic Research Center, brown-kevin@norc.org

Kevin L. Brown is a Deputy Director of NORC's Academic Research Center. Dr. Brown also served as Director of NORC's Center for Advancing Research & Communication (ARC) in STEM, is the evaluator of the center supporting NSF's cyberlearning (CFLT) program, and is an expert advisor to the center that supports NSF's program on informal science education (AISL). He currently directs a subcontract for the evaluation of NSF's sustainability initiative (SEES) and was PI on an NSF INCLUDES workshop grant.

3.4.2 The role of attitudinal factors on the gendered nature of Pre-Med STEM course attrition
Paulette Vincent-Ruz, Eben Witherspoon, Christian D. Schunn

Abstract
Women show much higher interest in medical careers at the end of high school, but this overrepresentation disappears by the end of the undergraduate degree. Little is known about what combination of factors in pre-med course experiences might contribute to this substantial decline. From transcript analyses of thousands of students across multiple cohorts, much of the attrition by gender was attributable to two pre-med science course sequences (Organic Chemistry and Introductory Physics), primarily within students receiving As or Bs in the first course of the sequence. We then administered surveys and used different mediation analysis to test which motivation variables explained the differential enrollment in subsequent science courses of students. In particular, we surveyed 520 students in Organic Chemistry 1, and focus on the 335 students receiving A and B grades in this course. The measures included three attitudinal variables (chemistry fascination, chemistry competency beliefs and science identity) as possible mediators between gender and enrolling in Organic Chemistry 2. Mirroring the large dataset, this sample also showed significantly lower odds of women continuing to Organic Chemistry 2, $\chi 2(1) = 5.80$, $p = .02$. Mediation analyses revealed that the primary mediator of this relationship was chemistry competency beliefs (see Figure 1). Mediation through chemistry fascination was not significant, while mediation through science identity was a smaller effect and in the wrong direction (i.e., predicted greater female enrollment in Organic 2). Only competency beliefs are included in the model, the relationship between gender and enrollment is shown to be partially mediated (i.e. the gender difference is no longer significant), $\chi 2(2) = 23.23$, $p = .10$. Maintaining a high ratio of women from early high school interest into medical careers is integral to the goals of improving innovation in the medical field, and improving equity within the medical profession and society more broadly. This study supports the hypothesis that women are not leaving the pre-med track because of actual academic underperformance in their STEM courses, but rather by perceived abilities. By identifying courses in which these gaps are most problematic, and ruling out absolute and relative academic performance explanations, this study provides a critical foundation for interventions that can more directly target these motivational factors that appear to be instrumental in producing large gender gap during college.

Bios
Paulette Vincent-Ruz, University of Pittsburgh, pvincentruz@pitt.edu
Paulette Vincent-Ruz is a fourth-year doctoral student in the Learning Sciences and Policy (LSAP) program at the University of Pittsburgh. She graduated college with a degree on Chemical Engineering and conducted research in Organic Chemistry. Her research focuses on using an intersectional and motivational framework to understand the interplay of people's attitudes, skills and experiences in science and how they predict STEM pathways. Understanding how these factors interact together is key to better understand the institutional barriers that create underrepresentation in STEM fields. The intersectional focus puts people's identities and backgrounds at the center of the analysis to understand their role in mechanisms.

Eben Witherspoon, University of Pittsburgh, eben.witherspoon@pitt.edu
Eben Witherspoon is a third-year doctoral student in the Learning Sciences and Policy (LSAP) program at the University of Pittsburgh. His research examines the combination of motivational and academic factors that influence STEM retention in career pathways for undergraduate students. He is also interested in how teacher instructional goals influence the transfer of programming knowledge in informal and formal robotics learning environments. Prior to joining LSAP, Eben taught mathematics, coached soccer, and mentored a FIRST Robotics team at a high school in Detroit.

Christian D. Schunn, University of Pittsburgh, schunn@pitt.edu
Christian Schunn is Co-Director of the Institute for Learning, Senior Scientist at the Learning Research and Development Center and Professor of Psychology, Learning Sciences and Policy, and Intelligent Systems at the University of Pittsburgh. He directs a number of research and design projects in science, mathematics, and engineering education. This work includes studying expert engineering and science teams, building innovative technology-supported STEM curricula, and studying factors that influence student and teacher learning and engagement. He is a Fellow of AAAS, ISDDE, APA, and APS.

3.4.3   Are Adolescents Concerned About Sexism in STEM Fields? A Mixed-Methods Analysis
Rachael D. Robnett and Jennifer E. John

Abstract
Experimental evidence demonstrates that sexism has yet to be eradicated from fields related to science, technology, engineering, and math (STEM; Moss-Racusin et al., 2012). Experiencing sexism can have negative implications for girls and women who aspire toward STEM careers. For instance, among adolescent girls, experiencing sexism is associated with lessened STEM self-efficacy (Brown & Leaper, 2010).   Less is known, however, about whether adolescents perceive sexism in STEM as a serious problem. Understanding adolescents' reasoning about sexism in STEM is important for two reasons. First, because they are early in their career trajectories, adolescents are positioned to make changes to STEM fields. Second, adolescence is typically when young people begin to seriously consider potential occupational pathways (Erikson, 1968). Thus, for adolescent girls, and perhaps boys as well, awareness of sexism in STEM may have implications for their academic and career outcomes in STEM.   The current research takes a mixed-methods approach to understanding adolescents' reasoning about sexism in STEM. We collected closed- and open-ended survey data from an ethnically diverse sample of 629 adolescents (48% girls; Mage = 16.09). We used latent profile analysis (LPA) to classify adolescents into groups according to their beliefs about sexism in STEM. Of note, one of these groups was composed of 196 participants (31% of the sample) who perceived sexism in STEM as a fairly common and very serious problem. That is, they were more concerned about sexism than were other participants. Follow-up analyses indicated that this "high-concern" group was predominantly composed of girls; also, high-concern participants were significantly higher in STEM value and feminist identity compared to the rest of the sample (p-values < .01). Qualitative data provided deeper insight why adolescents in the "high concern" group were worried about sexism in STEM. For instance, participants in this group were significantly more likely than other participants to perceive sexism in STEM as morally wrong and as a potential impediment to scientific innovation (p-values < .01).   Collectively, findings indicate that concern about sexism in STEM is highest among girls who value STEM and have feminist ideals. Discussion centers on two contrasting implications. On the one hand, the high-concern girls may be at-risk for leaving the STEM pipeline due to their concern about sexism in STEM. On the other hand, however,

perhaps the high-concern girls, by virtue of their STEM value and feminist identity, will enter the STEM pipeline and become strong advocates for gender equality.

Bios

Rachael D Robnett, University of Nevada, Las Vegas, rachael.robnett@unlv.edu
Rachael Robnett, Ph.D., is a developmental psychologist at the University of Nevada, Las Vegas. Her research focuses on educational equity in STEM fields during adolescence and emerging adulthood. Specific areas of emphasis include peer influences on academic aspirations, intersectionality, identity, and self-efficacy. Representative publications are as follows: Robnett, R.D., John, J.E., Underwood, C.R., & Thoman, S.E. (2018). Sexism and gender stereotyping. To appear in S. Hupp and J. Jewell (Eds.), The Encyclopedia of Child and Adolescent Development. Robnett, R.D., & Thoman, S.E. (2017). STEM success expectancies and achievement among women in STEM majors. Journal of Applied Developmental Psychology, 52, 91-100.

Jennifer E. John, University of Nevada, Las Vegas, johnj4@unlv.nevada.edu
Jennifer E. John (MSW, Boston University, 2013) is a graduate student in the Social Development Research Lab at the University of Nevada, Las Vegas. Her research interests broadly include gender and racial stereotypes with a focus on intersectionality. She is currently studying how academic stereotypes manifest throughout the educational pipeline to influence future college and career decisions for underserved and underrepresented groups.

3.4.4 In the Workforce and on the Homefront: Gender Roles in Work and Life
Alexandra I. Zelin, Sarah E. Thoman

Abstract
Science, technology, engineering, and math (STEM) fields represent male-dominated professions where women may encounter gender role expectations that impact their job and relationship satisfaction. Women who violate gender role norms at work often suffer backlash; they are seen as competent and qualified, but lacking in social skills. It is not clear whether gender roles influence STEM women's psychological outcomes at work and home. The current study investigates the influence of gender roles on job satisfaction and romantic relationship satisfaction among early-career women in the workforce. The study included a snowball sample of STEM women (n=30) employed full-time in math-intensive STEM fields. All women were between the ages of 22-30 (M = 26.7, SD = 2.4), and had been in a monogamous, heterosexual romantic relationship for an average of 4.3 years (SD=2.66). Several of the women's male romantic partners (n=7, 23.3%) also participated; many (n=6, 85.7%) also worked full-time in a math-intensive STEM field. All participants provided insight into women's work and home communality and agency. Women also reported their job satisfaction and relationship satisfaction. Note that additional measures, not the focus of this study, were also included. Preliminary findings indicated women's romantic relationship satisfaction was significantly predicted by work communality and job satisfaction (R^2 = .31, $F_{(2, 27)}$ = 6.05, p =.01) with work communality as a significant predictor (β = .52, p =.03) and job satisfaction as a marginally significant predictor (β = .46, p =.07). Additionally, women indicated significantly higher mean levels of communal behavior (t (29) = -3.67, p<.01) at home compared to work. Women's communal behavior at home was significantly correlated with their male partner's perception of such behavior (r= .80, p= .03). However, women's mean levels of agentic behavior at home was significantly higher than their male partner's perceptions of such behavior (t (6) = -2.59, p=.04). Together, results suggest that women in STEM are motivated to act communally at work and at home to further both job and relationship satisfaction. Additionally, while women's communal behavior at home was associated with their partner's perceptions of

their behavior, women's agentic behavior at home significantly differed from men's perception of such behavior. This suggests that regardless of the nature of math-intensive STEM fields, women in such fields may align their behavior to prescribed gender roles, which is associated with desirable outcomes (e.g., satisfaction) at work and home.

Bios
Alexandra I. Zelin, University of Tennessee, Chattanooga, alexandra-zelin@utc.edu
Alexandra I. Zelin, Ph.D., is an Assistant Professor in the Department of Psychology at The University of Tennessee at Chattanooga. Her training is within the field of Industrial-Organizational Psychology, where she incorporates gender research, including sexism and prescribed and actual behaviors of women, into the areas of selection, performance management, and organizational culture. She is active in the field of preventing sexual assault through bystander behavior and critical consciousness raising and is working to incorporate more trainings against sexual harassment and sexual violence within the workplace.

Sarah E. Thoman, University of Nevada, Las Vegas, thoman@unlv.nevada.edu
Ms. Thoman is a doctoral student in psychology working with the Social Development Research Lab at the University of Nevada, Las Vegas (UNLV). Her research interests focus on the influence of gender on career-related experiences, decisions, and trajectories. She is especially intrigued by gender inequality in gender atypical professions (e.g., women in STEM fields, men as stay at home fathers). Prior to joining the Psychology department at UNLV, Ms. Thoman worked as an analyst and consultant in the private sector investigating employee and consumer behavior. She holds degrees from The University of Texas at Austin and Teachers College, Columbia University.

Paper Session 3.5: From Toys to Test Tubes: Perspectives on the Development of Female
Chair: Ann Kim

3.5.1: Sparking Young Girls' STEM Interest: Gender effects of STEM curricula for kindergarten and 4th grade
Gale M. Sinatra, Sandra Kaplan, Eugenia Mora-Flores, Susan McKibben, Ananya Matewos, Julie A. Marsh, Morgan S. Polikoff

Abstract
Interest in STEM generally declines through the primary and secondary grades (Wigfield, Eccles, Yoon, Harold, Arbreton, Freedman-Doan, & Blumenfeld, 1997). Heddy and Sinatra (2017), sustained girls' interest in STEM over the course of a year-long intervention in middle school. One way to promote interest is to target younger students who have not yet lost interest in STEM content. Speedometry is a Common Core State Standards (CCSS) and Next Generation Science Standards (NGSS) aligned, 2-week elementary curriculum, which targets concepts such as potential and kinetic energy. Of particular concern was whether the curriculum would be equally effective for both girls and boys. In a large-scale study (Authors, 2017), demonstrating a positive impact of Speedometry on 4th graders' knowledge, interest, and emotion, there were no significant gender differences. In a qualitative analysis of interviews, teachers who enacted the curriculum reported that the unit promoted student engagement and interest in science and mathematics with no gender differences, even though a few teachers had expressed concern about gender differences

prior to teaching the unit. Inspired by these positive results, we developed and piloted a version of Speedometry for kindergarteners that focused on the concepts of push and pull. This version of Speedometry is also aligned to CCSS and NGSS standards, as well as English Language Development and California Gifted standards. We recruited twelve classrooms—nine Kindergarten (K) classes and three Pre-K classes —in two schools serving substantially different populations, both demographically and economically. Researchers assessed students' science content knowledge using a picture-matching activity administered one-on-one prior to and after the class completed the lessons. Paired t-tests revealed significant growth in performance for both Pre-K students (t = 4.75, p < .001) and K students (t = 8.21, p < .001). These findings suggest the curriculum positively affected student performance and understanding of the concepts of push and pull. Without the benefit of a control group (that did not receive the intervention), however, we cannot definitively attribute the improvement to Speedometry. Using names as an indicator, we saw no significant gender differences. Despite these limitations, the preliminary findings at kindergarten suggest that future research on the impact of Speedometry for science learning for very young girls is warranted.

Bios
Gale M. Sinatra, University of Southern California, gsinatra@usc.edu
Gale M. Sinatra is the Associate Dean for Research and Professor of Psychology and Education at the Rossier School of Education at the University of Southern California. She is the past Editor of the APA Division 15 journal, Educational Psychologist and she is currently the President Elect of Division 15. She is a Fellow of APA, AERA, and the Society for Text and Discourse. She heads the Motivated Change Research Lab, the mission of which is understanding the cognitive, motivational, and emotional processes that lead to attitude change, conceptual change, and successful STEM learning.

Sandra Kaplan, University of Southern California, skaplan@usc.edu
Sandra Kaplan is a professor in the USC Rossier School of Education, where she teaches methods courses for the school's Master of Arts in Teaching (MAT) program. Her research interests include gifted education, and she is a consultant for several state departments and school districts nationwide on the topics of education for gifted students, differentiated curriculum in depth and complexity, and thematic interdisciplinarity.

Eugenia Mora-Flores, University of Southern California, moraflor@rossier.usc.edu
Eugenia Mora-Flores is a professor in the USC Rossier School of Education. She teaches courses on language acquisition, Latino culture, and literacy development. She began her work in education almost 25 years ago as a first grade, dual-language teacher and went on to teach a range of grade levels and instructional contexts. Her research interests include effective practices in developing the language and literacy skills of English Leaners in grades Pre-K-12. She has written 9 books in the area of literacy and academic language development (ALD) for English learners, and has also published articles and chapters on literacy and language across the curriculum and gifted education for ELs. She was named, MAT Professor of the Year (2016), a title awarded by the students of USC.

Susan McKibben, University of Southern California, smckibbe@rossier.usc.edu
Susan McKibben is a research administrator in the USC Rossier School of Education, where she has managed research teams investigating STEM learning, mathematics instruction, and the relationship between social-emotional learning and achievement in mathematics. She earned her Ph.D. in Education at UCLA.

Ananya Mukhopadhyay Matewos, Temple University, a.mukhop@gmail.com
Ananya Matewos is a Postdoctoral Fellow at Temple University where she conducts research on the development and testing of instructional strategies and materials that facilitate critical thinking about scientific topics. She has served as the qualitative researcher on teams investigating STEM learning across a variety of contexts. She earned her PhD in Urban Education Policy from USC.
Julie A. Marsh, University of Southern California, julie.marsh@usc.edu
Julie A. Marsh is an Associate Professor of Education Policy at the Rossier School of Education at the University of Southern California and Faculty Director of Policy Analysis for California Education. Her research focuses on accountability and instructional policy, including math and science curricular reforms, and their effects on practice.

Morgan S. Polikoff, University of Southern California, morgan.polikoff@gmail.com
Dr. Morgan Polikoff is an Associate Professor of Education at Rossier. His areas of expertise include K-12 education policy; Common Core standards; assessment policy; alignment among instruction, standards and assessments; and the measurement of classroom instruction. Dr. Polikoff uses quantitative methods to study the design, implementation, and effects of standards, assessment, and accountability policies. Recent work has investigated teachers' instructional responses to content standards and critiqued the design of school and teacher accountability systems. Ongoing work focuses on the implementation of Common Core standards and the influence of curriculum materials and assessments on implementation. He is an Associate Editor of American Educational Research Journal and on the editorial boards for AERA Open and Educational Administration Quarterly. His research is currently supported by the National Science Foundation, the WT Grant Foundation, and the Institute of Education Sciences, among other sources.

3.5.2   Gendered Experiences in an Elementary School Makerspace Program
Vanessa Vongkulluksn, Ananya Matawos, Gale M. Sinatra

Abstract
Design-based makerspace has been highlighted as a medium that stimulates students' engagement in STEM. However, girls' makerspace experiences may be qualitatively different than boys', leading to differences in engagement. This study examined the differences in self-efficacy, academic emotions, and interest trajectories between students who worked on electronic vs. non-electronic projects in a makerspace program. Social cognitive career theory (SCCT) used in this study describes factors that influence students' choices to pursue STEM learning opportunities. SCCT suggests that self-efficacy and emotional reactions are antecedents of students' interest and active choice to participate in STEM-related tasks.   One hundred students (3rd-6th grade) participated in a makerspace program. Students were asked to identify a real-world problem, then create a product to solve it. Projects either involved electronics and technology in their designs or did not. From our field observations, we noticed that students who worked on electronic projects were primarily male (91% male). Students took self-efficacy surveys at three points in the semester. Academic emotions and interest surveys were given at the mid-point and the end of the semester. Qualitative data include observation notes, two focus groups (n=9), and students' weekly blogs. Quantitative data were analyzed using hierarchical growth modeling of students' self-efficacy, academic emotions, and interest trajectories, with observations nested within students. Growth trajectories were examined for differences between students who worked on electronic vs. non-electronic projects. We derived qualitative codes from SCCT to conduct initial deductive coding of student data, combined with inductive open coding of students' makerspace experiences. Students who worked on an electronic project experienced a lower

decline in self-efficacy throughout the semester. And although they experienced lower levels of positive emotions (excitement, surprise, and curiosity) towards the mid-point of the semester, they had lower declines on these indices and ended the semester with positive emotion levels higher than the non-electronic group. Rates of increase of negative emotions (boredom, confusion, and frustration) were comparable for both student groups. In terms of interest, students who worked on a non-electronic project had higher interest at the mid-point of the semester, but experienced more marked decline in interest by the end of the semester. Because female students primarily worked on non-electronic projects, their makerspace experiences were distinct from those of their male peers, leading to different motivational and engagement patterns. These distinctive experiences have implications for female students' development of STEM interest and identity.

Bios

Vanessa Vongkulluksn, The Ohio State University, vongkulluksn.1@osu.edu
Vanessa Vongkulluksn is a postdoctoral scholar in the Research Laboratory for Digital Learning at the Ohio State University. She earned a Ph.D. in Education from the University of Southern California in 2016, with a concentration in Educational Psychology and Quantitative Methods. She has focused her research on examining factors that impact learning and motivation in technology-integrated contexts. Her additional research interests include examining the learning experiences of traditionally disadvantaged students such as low-income and ethnic minority students in technology-rich learning environments, and how these experiences lead to the development of digital literacy skills and STEM interest.

Ananya Mukhopadhyay Matewos, Temple University, a.mukhop@gmail.com
Ananya Matewos is a Postdoctoral Fellow at Temple University where she conducts research on the development and testing of instructional strategies and materials that facilitate critical thinking about scientific topics. She has served as the qualitative researcher on teams investigating STEM learning across a variety of contexts. She earned her PhD in Urban Education Policy from USC.

Gale M. Sinatra, Temple University, gsinatra@usc.edu
Gale M. Sinatra is the Associate Dean for Research and Professor of Psychology and Education at the Rossier School of Education at the University of Southern California. She is the past Editor of the APA Division 15 journal, Educational Psychologist and she is currently the President Elect of Division 15. She is a Fellow of APA, AERA, and the Society for Text and Discourse. She heads the Motivated Change Research Lab, the mission of which is understanding the cognitive, motivational, and emotional processes that lead to attitude change, conceptual change, and successful STEM learning.

3.5.3   Do I have what it takes? Ability uncertainty predicts women's academic self-efficacy and vocational identity in STEM

Audrey E. Aday, Viviane Seyranian

Abstract
Two studies sought to examine ability uncertainty, or uncertainty regarding one's skill as an able competent domain (Lewis & Hodges, 2015), as a novel predictor of women's outcomes in STEM. These studies investigated whether social belonging and ability uncertainty play a role in women's undergraduate experience (Study 1) and whether these variables predict academic self-efficacy, vocational identity, and GPA among women in STEM (Study 2). Study 1 finds that women in engineering had lower social belonging

and higher ability uncertainty than women in the social sciences. Study 2 demonstrates that higher ability uncertainty among women in engineering and sciences is associated with lower academic self-efficacy and lower vocational identity. Overall, our findings suggest that ability uncertainty may be a unique and important part of women's experience in STEM.

Bios

Audrey E. Aday, The University of British Columbia, aday@psych.ubc.ca
Audrey Aday is a graduate student at The University of British Columbia. She received a BA in psychology from California State Polytechnic University, Pomona in 2016. Her research examines the effects of stereotyping and prejudice with a particular focus on women's experiences in the Science, Technology, Engineering, and Mathematics (STEM) fields. She is interested in understanding how gender biases shape social interactions between men and women in highly collaborative settings, and in developing interventions tailored to educate men and women about gender bias while fostering intergroup trust and cooperation.

Viviane Seyranian, California State Polytechnic University, Pomona, vseyranian@cpp.edu
Viviane Seyranian is an assistant professor of social psychology at California State Polytechnic University, Pomona. Her research applies insights from the social psychological literature to address major social issues. One line of her research studies the experiences of underrepresented groups and women in STEM and tests social psychological interventions to improve their outcomes. Dr. Seyranian earned her Ph.D. and M.A. in basic and applied social psychology from Claremont Graduate University and her B.A. cum laude in psychology and government from Claremont McKenna College. She completed her postdoctoral training in educational psychology at the University of Southern California.

Information

Wireless Access

Visitors can register themselves for 7-day access to UO's wireless network:

- On your computer or mobile device, select the UO Guest wireless network.
- Select Create an account.
- Provide the requested information, then check the box indicating you accept the terms and conditions (UO's Acceptable Use Policy), and click Register.
- Click Send password via email and/or Send password via text message. (Note: The system may not acknowledge the button click, but it is sending you the message.)
- Once you've received a message containing your password, click Log in.
- Enter your assigned username and password. You should then be connected to the UO Guest wireless network.

Eduroam is also available on campus.

Smoke and Tobacco Free Campus

The UO is a smoke and tobacco free campus, meaning use of those products is not allowed indoors or outdoors anywhere on campus. The closest smoking area to the Erb Memorial Union Building (where the conference is being held) would a few blocks away on the corner of 13th and Kincaid Streets.

Lunch Dining Options

The EMU has numerous options for lunch.
Level 1 Dining Options
Chipotle Mexican Grill: Tacos, burritos, and rice bowls.
Joe's Burgers on Wheels: Cascade Natural beef hamburgers, dogs, fries, and hand-spun milkshakes
Panda Express: Chinese food
Starbucks: Coffee, tea, pastries and sandwiches
Subway: Made-to-order subs, deli sandwiches, breakfast sandwiches, and salads

Ground Level Dining Options
Fresh Corner Market: Mediterranean bowls, daily soups, sandwiches, fruit, and snacks.
Townshend's Tea Company: Purveyor of top quality loose leaf tea.
Falling Sky Pizzeria and Public House: Pizza, salads, custom sodas and beer.

There are additional restaurants a short distance away on 13th St. Just ask at the registration desk if you want directions!

Onsite Information

Registration Check-In opens at 8:00 am on Tuesday, July 31 and is located in the ballroom lobby area on Level 2 of the Erb Memorial Union (EMU).

The EMU is located at 1395 University St., Eugene, OR 97403-1232
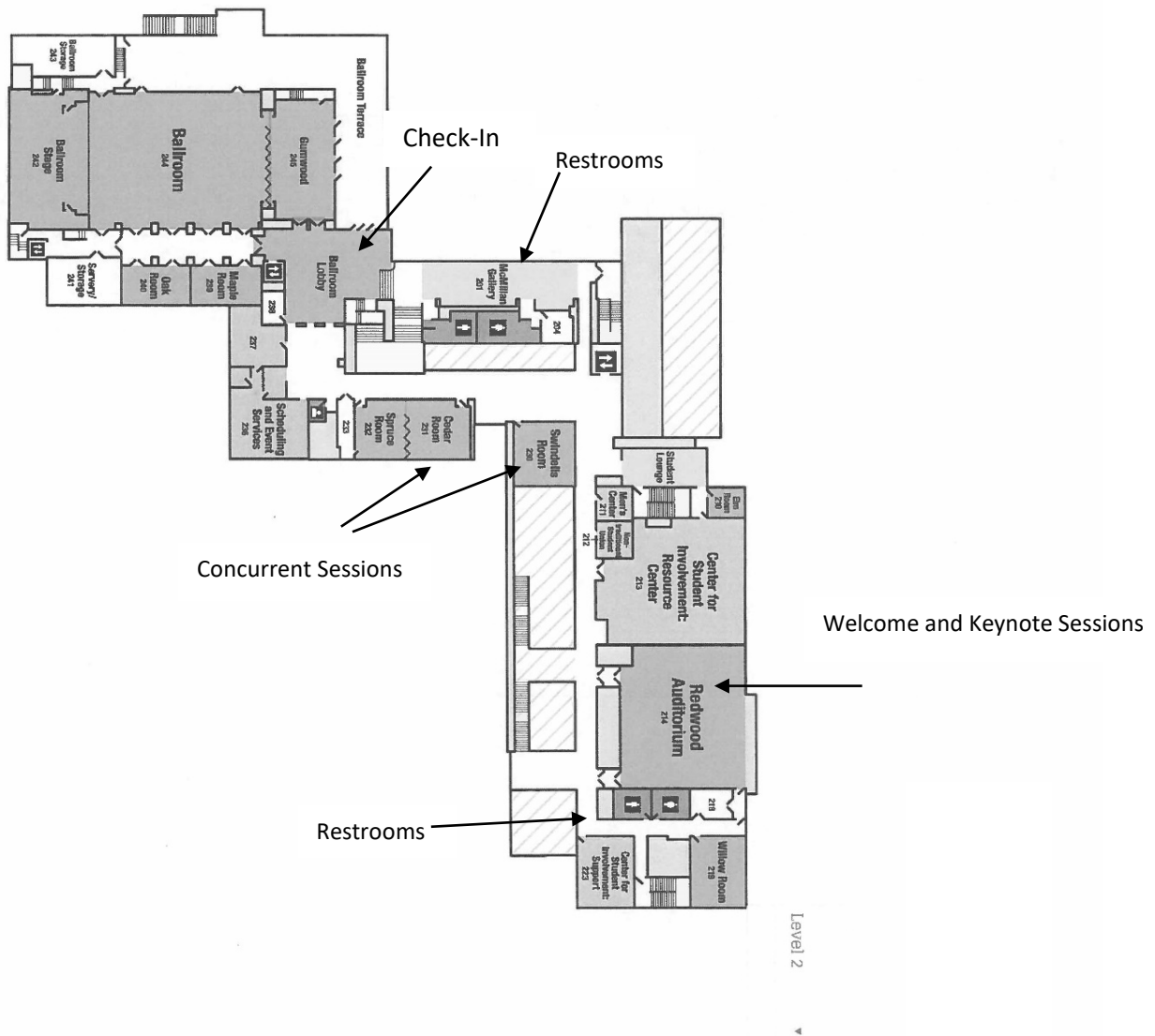
About VHTO

VHTO, the Dutch national expert organization on girls/women and science/technology, aims to increase the participation of women and girls in Science, Technology, Engineering and Mathematics (STEM). VHTO is the co-founder of the Network Gender & STEM.

Since the early 1980s, VHTO has been building up knowledge about the participation of girls and women in the world of STEM, and experience in deploying this knowledge in areas such as education. With our projects and methodology, we aim to break (implicit) stereotypes concerning gender & STEM, increase the growth mindset and self-confidence of girls and young women regarding STEM subjects. VHTO has developed several successful programs to bring together female students/recent graduates and female professionals (role models) in STEM across the whole education spectrum, from primary to higher Education, and from the vocational to the university level.

VHTO currently has a range of activities aimed at increasing the numbers of women in the STEM sector including:

- Organizing training and workshops for teachers and career counsellors to reduce gender bias, in- crease gender awareness, and provide them with the necessary tools and knowledge to advise and Inform girts about a study or career in STEM fields.
- Advising school managers and deans (in primary, secondary and higher education) on implementing gender policy and screening teaching material for gender bias ('gender scans').
- Organizing Girls day every year, at which girls (aged 10-15) visit technical /engineering companies and STEM research institutes. This gives girls a first-hand experience of what It's like to work in STEM. n 2016, more than 10.000 girts participated in Girls day.
- Organizing activities to get girls in touch with female STEM professionals, such as "speed-date sessions" in secondary schools, in which small groups of girls talk with rote models. To this end, VHTO has built a large database in which nearly 2000 female professionals in STEM are registered (www.spiegelbeeld.net). h 2015, more than 35.000 girls were reached with VHTO's dissemination activities.
- Developing an online database with videos and stories of (mainly) female role-models working in STEM, called "DIt Doek" ("This is what Ido", www.ditdoeik.nl). These "portraits" of women working in STEM give a realistic image of what it is like to work in STEM and the wide variety of STEM jobs.

www.vhto.nl
www. face.book.com/VHTOamsterdam/
twitter.com/VHTOamsterdam

Conference Notes

Conference Notes