Building Community Through Professional Development: The LATTICE Program

Dr. Cara Margherio, University of Washington

Cara Margherio is the Assistant Director of the UW Center for Evaluation & Research for STEM Equity (CERSE). Cara manages the evaluation of several NSF- and NIH-funded projects, primarily working with national professional development programs for early-career academics from groups underrepresented in STEM. She is also currently serving as a Virtual Visiting Scholar of the ADVANCE Research and Coordination Network. Her research is grounded in critical race and feminist theories, and her research interests include community cultural wealth, counterspaces, intersectionality, and institutional change.

Dr. Coleen Carrigan, California Polytechnic State University, San Luis Obispo

Dr. Coleen Carrigan is an assistant professor of Anthropology and Science, Technology and Society (STS) at California Polytechnic State University, San Luis Obispo. Using ethnography, she investigates the historical and cultural dimensions of science, technology, engineering and mathematics (STEM), with a particular emphasis on Computer Science and Engineering, and why these high-status fields appear impervious to desegregation. Dr. Carrigan shares the findings from her research to foster welcoming environments for underrepresented groups in STEM and transform the powers of technology to advance social justice.

Dr. Joyce Yen, University of Washington

Joyce Yen, Ph.D., is the Director of the ADVANCE Center for Institutional Change at the University of Washington where she focuses on advancing women and underrepresented minority faculty in STEM fields and leading faculty professional development programs. Her diversity and faculty work has received over $6.7 million in grant funding. She holds a M.S. and Ph.D. in Industrial and Operations Engineering from the University of Michigan, Ann Arbor, and B.S. in Mathematics from the University of Nebraska-Lincoln. She was awarded the 2012 University of Washington David B. Thorud Leadership Award and the 2017 WEPAN Inclusive Culture and Equity Award.

Dr. Marie Claire Horner-Devine

Dr. Claire Horner-Devine is the co-founder and co-director of three, federally funded, national programs (BRAINS, WEBS, and LATTICE) designed to accelerate and improve the career advancement of early-career women and researchers from underrepresented groups in STEM. She is also is the founder of Counterspace Consulting and creates professional development and leadership opportunities for STEM professionals, grounded in social science research and with equity, diversity and inclusion at their core. She has published this work in Frontiers in Ecology and Evolutionary Biology, CBE – Life Sciences Education and Neuron.

Dr. Horner-Devine received her B.A from Princeton University and her Ph.D. in Biological Sciences from Stanford University and has published her work in community ecology, microbial ecology and conservation biology in journals such as Nature, Science, Proceedings of the National Academy of Sciences, and Ecology. She worked as a faculty member in the School of Aquatic and Fishery Sciences at the University of Washington for almost a decade. She also served as Director of Leadership and Diversity in the College of the Environment at UW.

Prof. Eve A. Riskin, University of Washington

Eve Riskin received her BS degree in Electrical Engineering from M.I.T. and her graduate degrees in EE from Stanford. Since 1990, she has been in the Electrical and Computer Engineering Department at the University of Washington where she is now Associate Dean of Diversity and Access in the College of Engineering, Professor of Electrical and Computer Engineering and Faculty Director of the ADVANCE Center for Institutional Change. With ADVANCE, she works on mentoring and leadership development

programs for women faculty in SEM. She was awarded a National Science Foundation Young Investigator Award, a Sloan Research Fellowship, the 2006 WEPAN University Change Agent award, the 2006 Hewlett-Packard Harriett B. Rigas Award, and the 2017 ECEDHA Diversity Award. She is a Fellow of the IEEE.

Julie Ivy, North Carolina State University

Julie Simmons Ivy is a Professor in the Edward P. Fitts Department of Industrial and Systems Engineering and Fitts Faculty Fellow in Health Systems Engineering. She previously spent several years on the faculty of the Stephen M. Ross School of Business at the University of Michigan. She received her B.S. and Ph.D. in Industrial and Operations Engineering at the University of Michigan. She also received her M.S. in Industrial and Systems Engineering with a focus on Operations Research at Georgia Tech. She is President of the Health Systems Engineering Alliance (HSEA) Board of Directors. She is an active member of the Institute of Operations Research and Management Science (INFORMS), Dr. Ivy served as the 2007 Chair (President) of the INFORMS Health Applications Society and is a past President for the INFORMS Minority Issues Forum. Her research interests are mathematical modeling of stochastic dynamic systems with emphasis on statistics and decision analysis as applied to health care, public health, and humanitarian logistics.

Dr. Christine S Grant, North Carolina State University

Dr. Christine S. Grant joined the NC State faculty in 1989 after completing her M.S. and Ph.D. (Georgia Institute of Technology) and Sc.B. (Brown University) all in Chemical Engineering (ChE). One of less than 10 African-American women full ChE professors in the country, her research interests are in interfacial phenomena and recently biomedical systems. She is the first Associate Dean of Faculty Advancement in NC State's College of Engineering. Awards/service include 2015 AAAS Mentor Award, Fellow in American Institute of Chemical Engineers Board of Directors, NSF Presidential Award for Excellence in Science, Math and Engineering Mentoring, Council for Chemical Research Diversity Award. She is the founding director of the Promoting Underrepresented Presence on Science and Engineering Faculties (PURPOSE) Institute". A certified coach, Grant consults and empowers STEM individuals at all levels in the academy towards excellence in career and professional development. Her workshops on mentoring and academic career development for NSF ADVANCE programs at Purdue, Cornell, Texas A&M, University of Toledo, UVA, Prairie View A&M, and the ADVANCE Annual PI meetings promote STEM faculty development while providing diverse role models for students. She has mentored and empowered hundreds of faculty, students and postdocs.

Hello, I am Dr. Cara Margherio and I'm here to talk to you about Launching Academics on the Tenure-Track: An Intentional Community in Engineering, or LATTICE, an NSF ADVANCE-funded collaboration designed to diversify engineering faculty at the national-level by positively impacting early-career women in academic engineering. LATTICE is a collaborative project between the University of Washington, Cal Poly San Luis Obispo, and North Carolina State University.

I serve as evaluator of LATTICE, on a team of women working to broaden participation and accelerate the success of women faculty in engineering through a program called LATTICE. Diversity and inclusion are at the core of our work together and are reflected in our LATTICE team as well as in how we do our work together. We come from a range of social identities, including personal and professional experiences with career development programs.

Launching **A**cademics on the **T**enure-**T**rack: an **I**ntentional **C**ommunity in **E**ngineering

A national symposium followed by peer mentoring circles, designed to provide community, counterspaces, and ongoing connection

Why do we do this work? These early career stages are a crucial time of transition, and an important opportunity for retention of women in engineering and computer science. For individuals who are an "only" in terms of their social identity (e.g., gender, race, sexuality, ability status, etc.), the isolation during this transitional period can be particularly acute. Research shows that a strong connection to community can counter this isolation, and that the resulting sense of belonging is important to individual success and persistence in STEM.

The LATTICE program is designed to build community and ongoing connections while providing professional development. This presentation will introduce the LATTICE program theory and design, then discuss evaluation findings, unexpected challenges, and planned modifications to continue to improve the program. I will share a bit about our model and impact to date, including how that model has evolved over time to best serve our community. Throughout this discussion, we'll engage in a few of the community-building activities we utilize within LATTICE.

Development of the Program Model

This program developed through two earlier iterations:

WEBS: women in biological sciences, with an emphasis on ecology and evolutionary biology. Five cohorts, 2007-2013

BRAINS: for individuals belonging to racial/ethnic groups underrepresented within Neuroscience and/or individuals with disabilities. Running biennially since 2012, we just recruited our fourth cohort.

One crux of our current grant is to examine what happens when we take an intervention and adapt it to a different group. When we adapted WEBS to BRAINS, we didn't explicitly study the process of adaptation.

Our program is also influenced by the peer mentoring summits for women engineering faculty of color previously run by one member of our leadership team, Dr. Christine Grant.

Program Theory

Social Cognitive Career Theory:

Career pursuits are influenced by self-efficacy, outcomes expectations, and personal goals (Brown and Lent, 1996; Byars-Winston and Fouad, 2008, Byars-Winston et al., 2010; Lent et al., 2005)

Tripartite Integration Model of Social Influence:

Importance of integration into a community, as measured by sense of belonging and identify as an academic engineer (Chemers et al., 2011; Estrada-Hollenbeck et al., 2011)

Scientific and professional skills are necessary but not sufficient to increase the persistence of women in engineering and computer science. The theory underlying our program developed as the model evolved, first through WEBS and now through BRAINS and LATTICE. Pieces of the model have been tested through the evaluation.

Our program theory is a combination of Social Cognitive Career Theory (SCCT) and the Tripartite Integration Model of Social Influence (TIMSI)
According to SCCT, career pursuits are influenced by career self-efficacy, outcomes expectations, and personal goals (Brown and Lent, 1996; Byars-Winston and Fouad, 2008, Byars-Winston et al., 2010; Lent et al., 2005). Self-efficacy is a personal judgement of one's capability to execute certain types of activities, while outcomes expectations refer to beliefs about the consequences of such activities. Self-efficacy would describe my belief that I am able to publish three papers in the next two years, while outcomes expectations would refer to my belief that this will result on getting tenure (and my personal goal, in this example, would be tenure).
From TIMSI, we draw upon the importance of integration into a community for persistence; this is measured by sense of belonging and identity as an academic engineer (Chemers et al., 2011; Estrada-Hollenbeck et al., 2011)

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To recap, LATTICE influences:

❖ Self-efficacy

❖ Outcomes Expectations

❖ Personal Goals

❖ Sense of Belonging

❖ Identity as an Academic Engineer

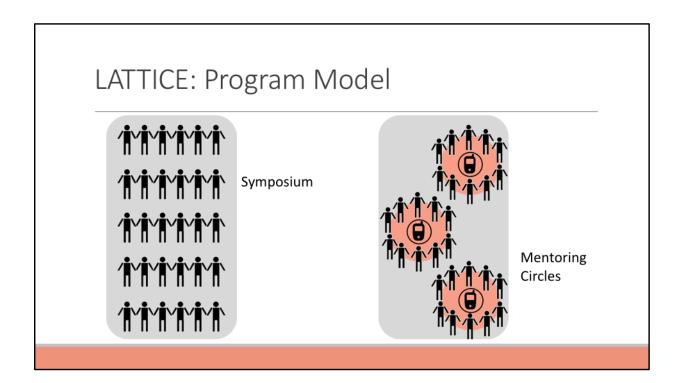How does LATTICE impact these factors?

Counterspaces

❖ Explicit conversations about how one's **experience** in engineering is **influenced by their social identities**

❖ Challenges **negative representations** of marginalized identities

Counterspaces are theorized as supportive, identity-affirming community spaces, where we engage in explicit conversations about how one's experience in engineering and computer science is influenced by social identities. These conversations serve to challenge negative representations of marginalized identities. The space also provides social support, sharing ways to deal with oppression, and reducing isolation. This is a space where we can talk about how our social identities impact our experiences in engineering and computer science.

Ongoing Connections

❖ **Ongoing opportunities** to adapt new skills into their individual contexts

❖ Opportunities for **relationships & trust** to deepen and connect across the community

This is what makes LATTICE unique - goes beyond the four days. The connection that is created at an in person event is carried through after participants return to their home institutions. So how does LATTICE create counterspaces and ongoing community? i.e., What is the program design?

The LATTICE model has two main program components:

The Symposium is a four-day retreat that includes engagement with peers, mentorship and networking from senior panelists, and professional development workshop sessions. The Mentoring Circles are virtual groups of LATTICE Symposium participants. They are launched by the LATTICE leadership team. These self-sustaining groups use a structured format that emphasizes problem solving, teaches participants how to mentor each other, and strengthens community. The LATTICE community formed at the national Symposium is extended through peer Mentoring Circles that meet online.
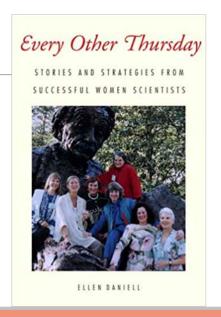
LATTICE Symposium

The symposium brings together 25-30 early-career women with 12-14 senior panelists. Each session covers a different professional development topic such as teaching, mentoring, and running a lab. In each session, four panelists present one slide each and briefly discuss their own experiences on this topic. This serves to seed the discussion for the entire group. Interactive workshop activities are incorporated into the programming, as well as an in-depth session on time management. Many of the interactive activities involve break-out groups; for example, in a session on teaching participations break by institution type, to help address differences in expectations and culture across different types of institutions.

The symposium activities and resulting community lay the foundation for deeper and ongoing support through the peer Mentoring Circles.

LATTICE: Mentoring Circles

❖8-9 Participants per virtual self-sustaining group

❖Structure is based on Every Other Thursday

Every Other Thursday
STORIES AND STRATEGIES FROM SUCCESSFUL WOMEN SCIENTISTS

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Mentoring Circles are virtual groups of LATTICE Symposium participants. Each Mentoring Circle, composed of eight to nine participants, provides a frequent and safe forum to discuss concerns, gain perspective, problem-solve, and set personal goals.

Mentoring circles are formed based entirely on individual schedules and availability. One or two members of the leadership team attend the first few mentoring circles of each group, to assist with facilitation. These self-sustaining groups use a structured format that emphasizes problem solving, teaching participants how to mentor each other and strengthening community. In this structure, each individual gets a set amount of time to present a challenge they are currently facing. The other members of the group ask questions, **but do not offer advice or relate to their own experience.** Not only might this detail the conversation, but we want participants to develop their ability to problem-solve their challenges. By asking questions, participants learn to look at their challenges from different angles and critically assess the situation. At the end of their time, the individual makes a **contract—a statement of an action that they will take within the next two weeks in regards to the challenge**.

Activity: Sounding Boards

- Write down:
  - Current challenge
  - What feedback you want
  - What you've already tried
- Split into groups of 3
- Identify a timekeeper

(~ 30-35 minutes; 5 minutes to set up, 20-24 to run activity, 5 to debrief)
The Sounding Boards Activity will introduce everyone to the structure of the mentoring circles; we do a similar activity at the symposium to introduce this structure to our participants.

(2 min) Please write down a current challenge, what feedback you'd like, and what you've already tried. It's important to share what you've already tried to help people understand the situation. Before we start the group work—a reminder that time is short when you present your challenge and so you need to be informative but succinct—you want to be sure to save time to receive feedback. **You won't be done problem solving at the end of your time, but the intent is to have some forward moment on your challenge.**

Activity: Sounding Boards

- For each person:
  - 5 minutes to present a current challenge, state what you've tried, and ask for specific feedback
  - The other members may ask questions
  - Timekeeper gives notice at 3 and 4 minute marks
  - At the end of 5 minutes, make a contract

  - Repeat until everyone has had a chance to share

Each individual gets 4 minutes where they present a challenge they are currently facing. The other two members of their group ask questions, **but do not offer advice or relate to their own experience.** At the end of 4 minutes, the individual makes a **contract—a statement of an action that they will take within the next two weeks in regards to the challenge**. (Then the second and then the third group members do the same.)

Wrap-up the activity with a brief whole group discussion, asking attendees to reflect on the experience, what worked, what didn't, etc.

LATTICE I

The first LATTICE symposium was held May 18-21, 2017 with participants who were early-career women from electrical engineering and computer science. Individuals were recruited through announcements made through professional societies, national listservs (such as WEPAN), outreach at conferences such, and personal networks. Fifty-three applications were completed, and 30 individuals were accepted. The selection process takes into account both individual need and cohort building— we first seek to identify those who appear they will benefit the most from the program, and then attempt to round out the cohort by thinking through different demographics.

Demographically, who were the participants in our first cohort? Five of the women identified as Black or African American, ten as Asian, thirteen as non-Hispanic/Latinx White, and two as Hispanic/Latinx White. Twelve were US Citizens, seven first generation degree holders, and two were individuals with disabilities. Fifteen were in tenure-track assistant professor positions, seven in postdoc positions, and eight were in other research or teaching positions (lecturer, research scientist, etc).

The second LATTICE symposium for women of color in any field of engineering will be held May 30-June 2, 2019.

LATTICE I: Impact

❖ Panelists and participants reported feeling **REJUVENATED** and **RECOMMITTED** to their work and scientific community.

❖ Participants self-reported statistically significant increases in **NETWORKING** and **SELF-EFFICACY**

❖ Many attendees anticipate the LATTICE experience will continue to **SHAPE THEIR CAREERS** for years to come.

- Evaluation data shows that the LATTICE symposium is a valuable experience for both participants and panelists, who reported feeling rejuvenated and recommitted to their work and scientific community. Participants particularly appreciated the community building and noted the informal conversations being as helpful as the formal presentations. Panelists reflected that their experience at LATTICE thus far will help them be better mentors and senior faculty members.
- The Mentoring Circles help build community, provide needed support, and allow participants to hold themselves accountable. Participants view the Mentoring Circles as a valuable source of strategies to address career issues they are facing.
- Within several months of participation, participants perceive that the LATTICE program is having a positive impact on their self-confidence and ability to pro-actively engage in career-building behaviors, such as asking for resources, seeking advice, and starting collaborations. Participants self-reported significant improvements in both self-efficacy and networking activity.

LATTICE I: Unexpected Challenges

❖ Participants arrive at LATTICE with a wide array of **perceptions of bias** and social identities

❖ These differences can **disrupt communication** and community building

- LATTICE participants came to the first symposium with a wide array of perceptions of bias, at least in part due to differences in race, ethnicity, and nationality. Individuals have different understandings of: race, ethnicity, and gender; how these identities shape their lives; and how systems of power built around these identities operate. These differences can disrupt communication and community building.
- For example, there were instances where White women shut down conversations around race—we allowed a common pattern to replicate within our program, because our model and facilitation were not prepared to address it.
- In conversations among the leadership team reflecting on these dynamics, we felt that in hindsight we should have anticipated this. We've spent a significant amount of time talking about race and our identities, and reflecting on how this impacts our cohesion as a team. We also all have long histories of doing DEI work. And yet, we weren't prepared to deal with these conflicts due to our assumptions about how people think about identities.
- In order to more fully address the intersectional identities of participants while building a cohesive community, programmatic modifications are planned for the second symposium.

LATTICE II: Planned Modifications

❖ Explicit communication with panelists prior to symposium regarding intersectionality, power, and privilege

❖ Incorporate the pedagogical tool of caucusing

We recognize a need to be more explicit with the panelists in preparing them for the symposium. The existing preparation for panelists involves pre-event emails to them, with attention to tone-setting, language, and expectations. We hold two virtual office hours to discuss expectations with them. When we have returning panelists, they are also able to peer mentor each other. In all of these communications, we remind them (1) to share their professional AND personal story and (2) to describe their stories as "this is how it is for me" and not "this is how it is". During these trainings for the panelists, we will be more explicit about issues pertaining to intersectionality and power.

The second modification will be to incorporate the pedagogical tool of caucusing, in which participants suggest the social identities they wished to caucus around (e.g., Black, Spanish-speaking, first-generation). This allows participants (and panelists) an opportunity to gather in affinity groups of self-identified salient identities, serving to enhance and support communication, **while building the capacity to understand their own identities and thereby build authentic relationships across identities.** Allows individuals to discuss how their shared social identities are impacting their career experiences without having to educate those with different identities. May increase a sense of trust and vulnerability to discuss aspects of one's experiences.

Activity: Identity Exercise

Multiple Identities Map

• Please write down the identities that are most salient to you on the inner rings

• Then work your way outward as you continue to list your identities

• For those that are comfortable, please share what is most salient for you

[~10-15 min] We're going to engage in caucusing today. But first, we're going to complete an identity exercise that will lay the groundwork for the caucusing activity. You will complete a multiple identities map, which consists of concentric circles. (Hand out map.) Please write down the identities that are most salient to you (today, at this moment, because of course identities are fluid and their salience is dynamic and contextual) on the inner rings and move outward.

After you've completed your map [5 min], please discuss your map with a partner [5 min].

Would anyone like to share with the groups what identities you listed as most salient? [5 min]

Debrief: This exercise is meant to help folks think holistically about the different identities that may be salient to yourself and to others. Today, we'll use these identities to seed the caucusing groups.

Activity: Caucusing

Caucusing question: How does your identity impact your professional experience?

Social Identity Groups:
- ❖ X...
- ❖ Y...
- ❖ Z...

[15-20 min total; ~5 minutes to set up, ~10+ to caucus] Would anyone like to suggest an identity for caucusing? (If it did not come up in the prior activity, note that these identities can be intersectional.) This may be one (or more) of the ones just mentioned, or it could be something else... [Take suggestions. Can use identities from last activity to seed list. X, Y, Z, etc. will be filled in on the slide with the identity group names.]

Please divide into separate groups around one of these social identities and discuss how your identity impacts your professional experiences.

Reflection

What questions do folks have?
How might community-building operate within your projects?
What challenges or critiques do you have of these activities?
What are other ways you have engaged in successful community building within professional programs or organizations?