Initial Findings from APS CUWiP

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APS CUWiP

- January 17 - 19, 2014
- 8 Sites
- 1214 Applicants
- 1064 Participants
APS CUWiP – Prior Evaluation

• Previous evaluations of the conferences showed that participants…
  – Felt satisfied with the conference (91-95%),
  – Were positively influenced in confidence to succeed in graduate school (86%),
  – Appreciated networking opportunities,
  – Improved understanding of career opportunities in physics (90-93%)
APS CUWiP – Goals

• Enhancing communication
• Creating networks
• Facilitate mentoring
• Learn networking skills
• Amplifying awareness
• Generating student ambassadors
• Impact confidence & motivation
• Build knowledge about physics careers
APS CUWiP – External Evaluation

• **Evaluation goals:** How are conferences…
  – influencing participants,
  – how organizer goals are being met,
  – provide feedback to NOC on design/implementation, and
  – investigate mechanisms for shifts attitude, affect, knowledge and outcome expectations.
APS CUWiP – Evaluation Methods

• Theory building
  – Focus group interview with former participants
  – Informal discussion with NOC & APS Staff

• Survey development and testing
  – ~30 Questions, Repeated measures (pre/post)
  – Pilot testing with students & review with NOC

• Analysis
APS CUWiP – Theory Building

What are the things that might change as result of participating in CUWiP?


• Self-efficacy (Lent 1984, Sawtelle 2012, Zimmerman 1992)

• Outcome expectation (Diekman 2010, Diekman 2011, Morgan 2001)

• Interest / Motivation (Hazari 2010)

APS CUWiP – Theory Building

• Focus Group Interview with 4 CUWiP participants.
  – Experiences with CUWiP
  – Impacts of CUWiP
  – Elements of CUWiP that they found meaningful

• Unanticipated results –
  – Imposter Syndrome
  – Need to increase emphasis on minority women.
APS CUWiP – Pre Survey

• 30 questions for pre survey
  – Physics Identity, Self-efficacy, Outcome expectation, Interest, Motivation, Sense of community, Imposter Syndrome, Knowledge of careers
  – Network - Provided list of site specific participants, “Who do you know?”
  – Administered electronically through APS, follow up to CUWiP Application
  – Response Rate = 79% (963 responses)
APS CUWiP – Post Survey

• 28 Base questions for post survey
  – 12 Questions repeated from pre survey
  – 4 Additional questions on conference activities
  – Response Rate = 59% (628 Responses)

• 609 Female, 15 Male
7. To what extent do you believe your successes are due to...

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APS CUWiP – Analysis

- Pre and Post Response files merged and matched
  - 510 matched pre and post responses
  - 114 matched items
  - Repeated measures t-tests used to compare mean scores, significance level $p = 0.01$
  - Presenting only significant results
APS CUWiP – Results

• Interest in a career in physics
  – Professor \( \downarrow 0.28 \)
  – Research / Lab Scientist \( \downarrow 0.21 \)
  – Engineer \( \downarrow 0.28 \)
  – High School Teacher \( \downarrow 0.19 \)

• Interest in physics
  – Personal interest physics course content \( \downarrow 0.09 \)
  – Personal interest physics outside course \( \downarrow 0.08 \)
  – Interest in things other than physics \( \uparrow 0.07 \)
APR CUWIP – Results

• Imposter Syndrome – To what extent do you believe your successes are due to…

  – Your ability                     No Change
  – Your hard work                   No Change
  – Good luck                        ↑ 0.32
  – Others perceptions of you        ↑ 0.16
APS CUWiP – Results

• Outcome Expectations – To what extent do you believe you can accomplish the following:
  – Working with people (women) \( \uparrow 0.18 \) (\( \uparrow 0.48 \))
  – Having job opportunities/security \( \uparrow 0.23 \)
  – Helping people (women) \( \uparrow 0.34 \) (\( \uparrow 0.43 \))
  – Developing new knowledge & skill \( \uparrow 0.19 \)
  – Being good at your job \( \uparrow 0.13 \)
  – Having children \( \uparrow 0.30 \)
  – Being respected by colleagues \( \uparrow 0.13 \)
APS CUWiP – Results

• Sense of community – to what extent do you:
  – Feel valued & respected ➔ 0.13
  – Feel you can share your thoughts/ideas ➔ 0.21
  – Feel you can be heard ➔ 0.14
  – See yourself as a physicist No Change
  – Feel like you are a part of the community No Change
APS CUWiP – Results

• Self Efficacy – to what extent do you:
  – Have confidence you will succeed in physics ➡️ 0.12
  – Relate to your classmates in physics ➡️ 0.21

• Have you received advice from
  – Female physics students outside your program ➡️ 0.68
  – Others female faculty postdocs or grad. students ➡️ 0.17
APS CUWiP – Results

• Awareness of job opportunities
  – To someone with a bachelor’s degree 0.54
  – To someone with a masters’s degree 0.44
  – To someone with a doctoral degree 0.45
  – In sectors other than academia 0.69

• Knowledge of what physicists do in…
  – academia 0.54
  – industry 0.44
  – research labs 0.45
APS CUWiP – Results

• Knowledge of…
  – Undergrad research opportunities \( \uparrow 0.36 \)
  – How to apply for research opportunities \( \uparrow 0.74 \)
  – How to identify and apply for industry jobs \( \uparrow 0.90 \)
  – Different graduate programs available \( \uparrow 0.84 \)
  – Multiple research areas you could pursue \( \uparrow 0.83 \)
  – Graduate application process \( \uparrow 0.92 \)

• Feel…
  – Interested in applying for graduate school \( \downarrow 0.15 \)
  – Confident in applying for graduate school \( \uparrow 0.19 \)
APS CUWiP – Results

• Knowledge of…
  – Challenges faced by women in physics 0.36
  – Strategies for dealing with work/life balance 0.74
  – Strategies for dealing with feelings of inadequacy 0.68
  – Strategies for dealing with bias 0.63
  – Strategies for accomplishing your goals 0.37
  – Physics resources available online 0.57
  – Research findings on gender issues in science 0.81
  – Current work of white women physicists 1.08
  – Current work of non-white women physicists 0.78
APS CUWiP – Synthesis

• Consistent and strongly positive understanding of physics careers & how to pursue career
• Challenges in areas of motivation, identity development, self-efficacy
• Growth in community & development of mentors
APS CUWiP – Future Evaluation

• Break results by conference & conference activity, utilize regression modeling to link conference activity to shifts

• Network Analysis identifying the growth of community structure and linking to specific conference activities

• Survey refinement and administration
APS CUWiP – Recommendations / Questions

• Distance between speakers and students – too great?
  – Inspirational speakers tend to be highly successful, are students relating to the speakers?

• Balance emphasis on awareness of challenges women face with opportunities that a career in physics provides.