

PNACP Annual Meeting  
April 20-21, 2018  
University of Washington-Bothell  
Bothell, Washington

Schedule

**Friday Morning (PNACP Board Members Only)**

**Discovery Hall, room 464**

9am-12pm Board Meeting

11:30-12:30 Board Lunch

**Friday Afternoon (Meeting)**

**North Creek Event Center (NCEC)**

12:30-1pm Registration

1pm-2pm Invited Talk: **Daniel Borrero**, Willamette University, "Subcritical Transition to Turbulence in Taylor-Couette Flow"

2:00-2:15 Contributed Talk: **Matthew Geske**, Gonzaga University, "Teaching Modeling Using Super Mario Bros"

2:15-2:30 Break

2:30-3:30 Invited Talk: **Erika Alexander Brown**, American Physical Society, "The APS Bridge Program: Changing the Face of Graduate Education"

3:30-3:45 Contributed Talk: **Abigail R. Daane**, South Seattle College, "Teaching About Racial Equity in Introductory Physics Courses"

3:45-4:00 Break

4:00-4:15 Contributed Talk: **Yuehai Yang**, Oregon Institute of Technology, "Challenges and Opportunities of Gender and Major Subject Diversities in a 10-week Long Introductory Physics Course"

4:15-5:15pm Invited Talk: **Dara Norman**, National Optical Astronomy Observatory Community Science and Data Center, "Can Big Data Lead an Inclusion Revolution?"

**Friday Evening (Banquet)**

**North Creek Event Center (NCEC)**

5:45-6:15 Social hour

6:15-7:00 Banquet

7:00-8:00 Banquet presentation: **Chanda Prescod-Weinstein**, "The Joy of Particle Cosmology"

## Saturday (Meeting)

Discovery Hall, room 162

8:30-9:30 Fostering Inclusivity Workshop led by **Mike Vignal** (Oregon State University), **Kelby T. Hahn** (Oregon State University), and **Mackenzie Lenz** (Linn-Benton Community College)

9:30-9:45 Contributed Talk: **Hillary Stephens**, Pierce College Fort Steilacoom, "Flipping Physics and Increasing Engagement"

9:45-10:00 Break

10:00-11:00 Invited Talk: **Regina Barber DeGraaff**, Western Washington University, "Finding a place for myself and others in STEM"

11:00-12:00 Panel: "Toward Equity: A discussion of the Challenges faced by STEM students from Underrepresented Populations"

12:00-1:30 Lunch

1:30-2:30 Invited Talk: **Gabriela González**, Louisiana State University, for the LIGO Scientific Collaboration and the Virgo Collaboration, "Einstein, gravitational waves, black holes and other matters"

2:30-3:30 Gerhart Lecture: **Rachel Scherr**, Seattle Pacific University, "Fixed and growth mindsets in physics graduate admissions"

3:30-3:45 Break

3:45-5:00 Business Meeting and Elections

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**Invited Talk Abstracts**

**Daniel Borrero**, Willamette University, "Subcritical Transition to Turbulence in Taylor-Couette Flow"

Turbulence is ubiquitous in naturally-occurring and man-made flows. Despite its importance in scientific and engineering applications, the transition from smooth laminar flow to disorganized turbulent flow is poorly understood. In some cases, the transition can be understood in the context of linear stability theory, which allows us to predict when the underlying laminar solution will become unstable as a parameter is varied. However, for a large class of flows (including the flow through a straight, smooth cylindrical pipe), this approach fails spectacularly, with theory predicting a stable laminar flow but experiments and simulations showing the emergence of flows with great spatiotemporal complexity. In the first part of my talk, I will discuss the experimental phenomenology of the direct or subcritical transition to turbulence in Taylor-Couette flow (i.e., the flow between independently rotating co-axial cylinders), which includes phenomena such as long-lived supertransients and finite-amplitude thresholds for transition. I will explain our emerging understanding of these phenomena using the framework of high-dimensional dynamical systems theory and the theory of phase transitions far from equilibrium. In the second part of my talk, I will discuss how table-top fluid dynamics experiments can be used in undergraduate research and advanced lab courses. Because of their relatively low cost and simplicity, as well as rich phenomenology and visual appeal, these experiments provide a low-risk avenue for undergraduates to develop their experimental physics skills and sense of self-efficacy. Developing a sense of self-efficacy and that the skills learned in their physics courses have real-world transferable applications has been shown to promote retention of students from groups traditionally underrepresented in Physics.

**Erika Alexander Brown**, American Physical Society, "The APS Bridge Program: Changing the Face of Graduate Education"

The American Physical Society Bridge Program (APS-BP) is an NSF-funded initiative to increase the number of physics PhDs awarded to underrepresented minority (URM) students. The project works to reach this goal through creation of sustainable "bridge" programs and a national network of doctoral granting institutions to mentor students as they transition from their undergraduate to graduate education. Over the last six years, APS-BP has placed over 150 URM students into supportive physics graduate programs, and maintains a high rate of retention. This presentation will describe the key objectives

and activities of the program, as well as student-supportive lessons learned from Bridge Sites.

**Dara Norman**, National Optical Astronomy Observatory Community Science and Data Center, “Can Big Data Lead an Inclusion Revolution?”

Ground-based astronomy research is evolving into an era of large surveys and big datasets. With the help of federal funding, many of these datasets are already accessible through public archives and databases. The Large Synoptic Survey Telescope, expected to begin Science Verification in 2021, will be the flagship ground-based facility into the next decade, surveying the accessible sky and delivering 200 petabytes of data over ten years. The survey is an opportunity for a research ‘Inclusion Revolution’ by providing data and data products for use by all members of the science community. However, this revolution can only be realized if 1) data products are not just accessible, but discoverable and easily useable, and 2) if the broad community of astronomers is prepared to use tools and services to take advantage of these datasets for achieving science goals. At NOAO we are actively engaged in several programs to support broad science community use of current data holdings and near-term public surveys as we prepare for the big data sets that will flow once the LSST survey begins. In this talk, I will describe these efforts and encourage participation in the use of these tools by the audience.

**Chanda Prescod-Weinstein**, University of Washington, “The Joy of Particle Cosmology”

I will give an introduction to early universe cosmology: the inflating universe and the dark matter universe. I will explain why the axion is the best dark matter candidate and why now is an interesting time for students to get involved in the world of cosmological physics.

**Regina Barber DeGraaff**, Western Washington University, “Finding a place for myself and others in STEM”

I will talk about what I have done in my career to be where I am, to create the jobs I have created for the good of banishing the scientist stereotype.

**Gabriela González**, Louisiana State University, for the LIGO Scientific Collaboration and the Virgo Collaboration, “Einstein, gravitational waves, black holes and other matters”

More than a hundred years ago, Einstein predicted that there were ripples in the fabric of space-time traveling at the speed of light: gravitational waves. On September 14 2015, the LIGO detectors in Hanford, Washington and Livingston, Louisiana in the US registered for the first time ever a loud gravitational wave signal traveling through Earth, created more than a billion years ago by the merger of two black holes. Several other gravitational waves from black holes were detected later, including one by LIGO and the Virgo detector in Europe produced by two neutron stars giving birth to a black hole, generating also electromagnetic waves detected by many telescopes. We will describe

the history and details of the observations, the gravity-bright future of the field, and highlight the diversity of the large team that made these discoveries possible.

**Rachel Scherr**, Seattle Pacific University, “Fixed and growth mindsets in physics graduate admissions”

Considering the evidence that standard physics graduate admissions practices tend to exclude women and traditionally marginalized racial and ethnic groups from the discipline, we investigate (a) the characteristics of students that physics graduate admissions committee members seek to admit to their programs and (b) the practices associated with these admissions goals. The data for this investigation are interviews with 18 faculty who chair graduate admissions committees in programs that prioritize diversity in their graduate admissions practices. We find that some express elements of an implicit theory of intelligence known as a “fixed mindset,” in which intelligence is understood as an inherent capacity or ability primarily measured by standardized test scores and grades. Some also express elements of a “growth mindset,” in which intelligence is understood in terms of acquired knowledge and effort. Overall, most faculty interviewed expressed elements of both mindsets. A fixed mindset in physics graduate admissions is consistent with research identifying physics as a “brilliance-required” field, whose members tend to believe that raw, innate talent is a primary requirement for success in the discipline. Such a mindset directly affects the participation of women and some racial or ethnic groups, who are stereotyped as lacking such high-level intellectual ability.

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Map and Parking Instructions



Map: <https://www.uwb.edu/uwbothell/media/maps/uw-bothell-campus-map.pdf>

Red circles on the map show the best area to park, and the locations of NCEC and Discovery Hall. Parking cost is 0-3 hours = \$4; 3+ hours = \$7