

PHYSICS & ASTRONOMY NEWS



A publication of a division of the
Council on Undergraduate Research

Spring 2018

View from the Chair

Well, another academic year has come and gone. It's finally time to ease into our summer activities, especially mentoring our undergraduate researchers.

Please join me in congratulating our newest CUR Councilors: Saida Caballero-Nieves, Taviare Hawkins, Chris Hughes, Lakshmi Krishna, Hasitha Mahabaduge, and Karthik Vishwanath! Their contact information is below and short vignettes for each of them will appear in upcoming issues of this newsletter. All will officially assume their duties in June.

This issue is just a glimpse of the many activities your CUR PA Division has engaged in this year. First up, you'll find a report by PA Councilor John Mateja on the April NCUR meeting in Oklahoma. John also provides a new call for nominations for the Goldwater Foundation awards. PA Councilor Mike Jackson has been a prime mover for the CUR Posters on the Hill program for many years. He's provided a nice summary of the 2018 physics- and astronomy-related awards (thanks to those of you who volunteered to judge the applications this year!). University of San Diego student Michelle Wang and her mentor, Dr. Ryan McGorty, provide a summary of their experience at the April 2018 Optical Society's Biomedical Congress. University of Miami Ohio student Amber Williams and her mentor, Dr. Karthik Vishwanath, attended the 2018 Biophotonics Congress. Both these teams were supported by this year's CUR-PA Travel Awards. And, be sure to read PA Councilor Beth

About CUR's Physics & Astronomy Division

The P&A Division of the Council on Undergraduate Research provides networking opportunities, activities, and resources to assist Physics and Astronomy administrators, faculty members, students, practitioners, and others in advancing undergraduate research.

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Cunningham's report on the PA Diversity and Inclusion project.

As many of you know, the CUR governance structure has been under discussion since the

June 2016 Annual Business Meeting. The impetus for this discussion is a result of CUR's growth. We now have over a dozen different divisions representing almost 14,000 members at more than 700 institutions. Our current "divisional representation" governance model has resulted in a large Executive Board that has become increasingly more difficult and expensive to operate. More importantly, large organizations like CUR is now need additional expertise in areas such as fund-raising, policy-making, legal issues, legislation, etc., which are hard to find among the CUR membership, who are mostly academic faculty like you and me.

In January 2018, the Executive Board unanimously endorsed a new governance model that reduces the number of and changes the election procedure for members of the Executive Board. It also makes room for up to four appointed positions for people with special advisory expertise, but not necessarily members of CUR. These proposed changes will require amendments to the CUR constitution. The call for a vote by the CUR Council has just been issued as this Newsletter is being written. Background information and the timeline for our governance changes can be found on the CUR Communities webpage under the "General Council" tab (you can click on this [link](#), if you're reading a PDF of this Newsletter). If you received your call to vote via email, please do so ASAP!

This summer, the CUR Annual Business Meeting is June 28-30, just prior to the CUR Biennial Meeting (July 1-3). Both are in Arlington, Virginia (see the CUR website for details). Here are a few of the items already on our Division's agenda:

1. PA input on CUR governance revisions
2. Outreach to other physics & astronomy related societies

3. Incorporating undergraduate research into the curriculum
4. Advocacy Toolkit: how faculty can engage in advancing the cause of undergraduate research
5. Revisions to the Travel and Mentor Award programs
6. PA budget 2018-9 commitments
7. Update on the CUR "Improving Undergraduate STEM Education" grant program
8. CUR PA initiatives for the coming year

Additional topics and questions are most welcome—just drop me an email and it'll be on our agenda.

As I mentioned in last semester's Newsletter, we need your help to get the word out that faculty at "enhanced institutional members of CUR" are automatically individual members—they just need to activate it. There are several hundred institutional members and most physicists and astronomers have yet to claim their free membership. As the old recruiting slogan goes, "We want YOU!"

Two final notes: Did you know the PA Division has a FaceBook page? Post your CUR comments and activities [here](#)! This year we spent nearly our entire Division budget on faculty-student Travel Award requests. Would you consider donating to this worthy cause—or one of the other CUR-PA Division activities in which you are especially interested? You can find a link at the bottom right side of the cur.org home page (or, just click [here](#)).

As always, I invite you to send a report for our next newsletter on your CUR-related activities to Editor Rick Thompson at: rt533@cabrini.edu.

See you in Arlington at the ABM and Biennial CUR meetings!



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National Conference on Undergraduate Research (NCUR)

The 32nd National Conference on Undergraduate Research (NCUR) was hosted by the University of Central Oklahoma in Edmond, OK, on April 4 – 7, 2018. Over 4,000 registrants attended, representing 19 countries, including Brazil, Canada, China, Costa Rica, Czech Republic, Ethiopia, Germany, Guyana, India, Japan, Madagascar, Malaysia, Pakistan, Panama, Qatar, Taiwan, United Arab Emirates, United States of America, and Vietnam. Approximately 2000 posters, 1600 oral presentations, 36 performing arts and 33 visual art exhibits were presented.

Institutions that registered 50 or more participants included: University of Central Oklahoma – 468; Kennesaw State University – 116; University of Kentucky – 96; University of Oklahoma, Norman Campus – 67; University of Rochester – 61; Eastern Washington University – 60; University of Wisconsin – Eau Claire – 59; Iowa State University – 56; University of Alabama at Birmingham – 55; Susquehanna University – 53; University of West Florida – 50; and Georgia College and State University – 50.

Plenary addresses were presented by Ramu Damodaran, Deputy Director for Partnerships and Public Engagement from the United Nation's Department of Public

Information's Outreach Division; Kareem Abdul-Jabbar, NBA's all-time leading scorer and today a regular contributing columnist for *The Washington Post*; T.W. Shannon, the youngest Speaker of the Oklahoma House of Representatives and the first Chickasaw and first African-American to hold this post; and Claudia San Pedro, President of SONIC, America's Drive-In.

Additional highlights from NCUR 2018 included: 5 "sold-out" pre-conference workshops (496 students signed up and all slots were filled within days after registration); 17 special-interest sessions for students; 22 FAN sessions; 5 excursions; several college open houses; and 94 graduate schools.

NCUR 2019 will be hosted by the Kennesaw State University in Kennesaw, GA, about 30 miles north of Atlanta, GA. Dates for the conference are April 11 – 13, 2019. As with past NCURs, abstract submission will open in the Fall, with an abstract deadline around early December.

Congratulations to all the student presenters and their advisors who helped make NCUR 2018 a tremendous success!

Begin planning now to attend NCUR 2019 at Kennesaw State University!

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Goldwater Foundation Nomination Cycle for 2019 Opens on the First Tuesday After Labor Day

As indicated in last year's Newsletter, there is a strong correlation between the number of students nominated for Goldwater scholarships in a discipline and the number of Goldwater scholarships and Honorable Mentions that are received by students in that

discipline. The two disciplines nominating the largest numbers of students are chemistry and biology, with the greatest number of awards going to students in these disciplines. If the physics and astronomy disciplines would like to see more physics and astronomy majors recognized by Goldwater, physics and astronomy departments and faculty need to nominate more of their students.

The primary mission of the Goldwater scholarship program is to encourage and support the next generation of scientific, engineering and mathematics research leaders. Research involvement is an important indicator of a student's interest in research. Given the emphasis the physics community has placed on involving undergraduates in research, many physics and astronomy students have the credentials they need to be competitive for Goldwater scholarships.

For the past two years, Goldwater and APS have worked together to make the physics community more aware of the Goldwater scholarship and to celebrate those physics and astronomy students who have been recognized by the Goldwater Foundation. The 33 physics and astronomy students who won Goldwater Scholarships in 2018 are published in the April 9, 2018, APS NEWS (<https://www.aps.org/publications/apsnews/updates/goldwater.cfm>). APS awarded these students a free one-year membership to APS.

In a second article entitled "The Road to a Goldwater Scholarship" published in the May 2018 issue of APS NEWS, APS writer, Leah Poffenberger, interviewed three students who were named 2018 Scholars (<https://www.aps.org/publications/apsnews/201805/goldwater.cfm>). The students are from Roanoke College, Stanford University

and The University of California, Riverside. The students' accounts of their experiences in research and in applying for a Goldwater scholarship are enlightening and are stories that undergraduate physics and astronomy majors who are early in their degree programs should read.

Many of you will be mentoring physics and astronomy majors this summer. If your student is a sophomore or a junior, has a 3.0 or better GPA, is a U.S. citizen or permanent resident, and plans to pursue a research career, then your mentee is eligible for a Goldwater Scholarship and should be nominated by your institution for a Goldwater scholarship. As part of your student's summer activities, have them read the APS articles listed above and review the Goldwater application materials on the Goldwater web site (<https://goldwater.scholarsapply.org/>). If your student has questions, have them contact me. I would be happy to answer them.

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2018 Posters on the Hill

CUR's *Posters on the Hill* was held on Wednesday, April 18 in the Rayburn building, Washington DC. This year, 60 posters were selected from over 400 completed applications. The students selected to represent the Physics and Astronomy Division are:

- José Antonio Flores Velazquez, California State Polytechnic University, Pomona, (Advisor: Dr. Claude-André Faucher-Giguère), "Star Formation Rate Indicators in the FIRE Galaxy Formation Simulations,"

- Winonah Ellen Rae Ojanen, The College of St. Scholastica, (Advisor: Mr. Troy Abfalter), “Post-Starburst Galaxy Evolution Analysis: E+A Galaxies,”
- Adam J. Miller, Clemson University, (Advisor: Dr. Chad E Sosolik), “Vacuum Applications of 3D Printed Materials and Devices for Ion Beam Physics.”

Congratulations to the above students and their advisors. As one might expect, reviewers were impressed by the overall quality of the applications and the research being conducted by undergraduates. The *Posters on the Hill* event is held annually, typically during the month of April. If you are mentoring undergraduate students this summer or know someone who is, please keep this program in mind and encourage your undergraduate students to apply. More information about this program can be found at:

www.cur.org/conferences_and_events/student_events/posters_on_the_hill/

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Michelle Wang - Travel Award Report

Jing (Michelle) Wang, a sophomore physics major at the University of San Diego, attended the Optical Society’s Biomedical Congress in April 2018. Michelle, along with fellow undergraduate, Eric Gerald, presented a poster of their work developing a new microscope. She describes her project as constructing a “programmable multimodal microscope using an electrophoretic paper (ePaper) device. It is a highly-flexible and cost-effective microscopy technique.” Michelle started working on this project in her first year as an undergraduate at USD. In working on this project, Michelle describes

learning “a lot including computer programming, data organizing and critical thinking skills. I had to read and learn what scholars have previously done with multimodal microscopy and the principles behind it.”



Michelle Wang and her mentor, Dr. Ryan McGorty, are grateful for the support from the CUR Physics & Astronomy Division.

At the conference, which was held in Hollywood, FL, Michelle networked with a number of others working in optics. She writes that “there were a lot of very accomplished scholars, professors and graduate students presenting their research, and by communicating with them I have learned so much about their projects and career paths. By presenting my research, I have received much useful and inspirational feedback from other scholars. Many thanks to CUR for this travel grant because this experience at the OSA conference was amazing!” Michelle will be continuing with research over the summer.

Physics & Astronomy Diversity and Inclusion Projects

A number of diversity and inclusion projects have been launched by the physics and astronomy professional societies. This article provides a short summary of a few of these efforts.

1. 2018 Global Survey of Mathematical, Computing, and Natural Scientists.

You and your colleagues are invited to participate in the 2018 Global Survey of Mathematical, Computing, and Natural Scientists

(<https://statisticalresearchcenter.aip.org/cgi-bin/global18.pl>). The survey is available in seven languages (English, French, Russian, Spanish, Arabic, Chinese, and Japanese). Simply choose your language on the first page of the survey.

The survey is part of an interdisciplinary collaboration of eleven partners, supported by the International Council for Science (ICSU), which aims to better understand the problems mathematical, computing, and natural science academics and practitioners are facing around the world. The partners are:

1. International Mathematical Union (IMU)
2. International Union of Pure and Applied Chemistry (IUPAC)
3. International Union for Pure and Applied Physics (IUPAP)
4. International Council for Industrial and Applied Mathematics (ICIAM)
5. International Astronomical Union (IAU)
6. United National Educational, Scientific and Cultural Organization (UNESCO)
7. International Union of Biological Sciences (IUBS)

8. Gender in Science, Innovation, Technology and Engineering (GenderInSITE)
9. International Union of History and Philosophy of Science and Technology (IUHPST)
10. Organization for Women in Science for the Developing World (OWSD)
11. Association for Computing Machinery (ACM)

One of the specific tasks for the project is to collect data across the world to inform policy makers from all countries, especially developing countries, about reducing the gap between men and women in mathematical, computing, and natural sciences.

The data are being collected by the Statistical Research Center of the American Institute of Physics (<https://www.aip.org/statistics>). Responses to this survey are voluntary, and individual information will be held in strict confidence. The goal is to obtain thousands of respondents from every corner of the world!

ICSU and the eleven partners will also need your help to find more respondents (men and women), to answer this survey. Please forward information about the survey to anyone (both men and women) who has studied or worked in mathematics, computing, natural sciences, or the history and philosophy of science and technology.

The cover letters in all seven languages of the survey are available at: <https://icsugendergapinscience.org/2018-global-survey-of-mathematical-computing-and-natural-scientists/>.

It is only by hearing from as many people as possible that we can understand the worldwide situation for people in these fields. The survey will be open through October 2018.

2. The AIP National Task Force to Elevate African American Representation in Undergraduate Physics & Astronomy (TEAM-UP)

The number of physics and astronomy bachelor's degrees awarded in the US is at an all-time high. Yet, the proportion of these degrees earned by African Americans remains appallingly low. A smaller proportion of physics and astronomy bachelor's degrees are awarded to African Americans today than was the case two decades ago.

The AIP TEAM-UP Task Force is investigating the reasons for the persistent underrepresentation of African American undergraduate students in physics and astronomy, and will produce a report of its findings with evidence-based recommendations for increasing the number of African American students obtaining physics and astronomy bachelor's degrees.

The Task Force will conduct its work over a two-year period and undertake the following:

- The Survey of African American physics & astronomy students aimed at understanding their experiences is open through early June.
- Site Visits to varied institutions to learn first hand from students, faculty and administrators about the climates, challenges, and opportunities for increased diversity and inclusion within the physics and astronomy fields. (Spring 2018, Fall 2018, Spring 2019)
- Develop evidence-based recommendations and work with pilot schools to implement them (Fall 2019)
- Release Task Force Report to disseminate recommendations broadly in the physics community (Spring 2020)

The Task Force members include physics faculty members, post doctoral fellows, and education researchers. More information about the Task Force is available at <https://www.aip.org/diversity-initiatives/team-up-task-force>. Support for this project provided by the American Institute of Physics and Research Corporation for Science Advancement.

3. Gender Bias in Physics: An International Forum

Gender bias in physics means that many talented physicists end up leaving the field. To maintain the integrity and strength of the physics discipline, we need to ensure that all physicists feel welcome. The Gender Bias in Physics Forum is a space where women and people who are gender and sexual minorities can share experiences of gender and sexuality bias in physics, find resources, and report responses to bias. The Forum is available at <https://genderbias.compadre.org>.

Women and people who are gender and sexual minorities are welcome to register to join the Forum. Once your registration is approved, you can submit your experiences to the database, engage in conversations, and explore resources to reduce bias.

The database and discussions on the Forum are for registered users only. Resources on reducing gender bias are publicly accessible. The Gender Bias in Physics forum was developed as part of the 6th IUPAP International Conference on Women in Physics. The website was created by the US delegation with support from the American Association of Physics Teachers, Bruce Mason, and Rylai Davis. Funding was provided by the National Science Foundation Grant #1661340.

4. eAlliances: Uniting Isolated Women Physicists and Astronomers

Everyone needs mentors, but how do you find other women physicists who understand your experience-- as the only Hispanic in the department, the only PER researcher, the only full-time physicist at your TYC, the only one who brings a newborn in a sling to department meetings? Join eAlliances, an NSF-sponsored faculty development project for women physics and astronomy faculty, and become part of a peer-mentoring alliance with other women who share many of your same experiences.

Why me?

- Connect with other women physicists and astronomers
- Get and give advice and affirmation
- Gather a variety of insights to help you address professional issues
- Address work-life balance issues
- Receive encouragement and support in achieving your goals

This is professional development for your career stage: whether you are teaching your first or hundredth section of intro physics, mentoring your first or hundredth research associate, or leading your first or hundredth committee meeting. Someone else has a similar experience and can share insights, frustrations, and successes. To join, register at eAlliances.aapt.org. Hosted by the American Association of Physics Teachers and supported by NSF ADVANCE-PLAN D (HRD-1500529).

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Opportunities

(If you have a job opening or program that you would like to advertise here, please send the information to us for inclusion in the next newsletter)

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* Term begins at June 2018 Business Meeting

** Re-elected to new term

Term ends at June 2018 Business Meeting

CURPA News Deadline

CURPA News comes out three times per year and we welcome your contributions! Please send your submissions, comments, achievements, opportunities, etc. to Rick Thompson (rt533@cabrini.edu). Deadline for the Fall 2018 issue is ***September 15, 2018***.