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Council on Undergraduate Research

CURPA NEWS

*Newsletter of the Council on Undergraduate Research Physics and Astronomy Division
A publication of a division of the Council on Undergraduate Research*

Fall 2017

View from the Chair

Wow, the fall semester is half over for most of us. So much has happened in CUR and our PA division I don't know where to begin, but I'll give it a shot.

Last summer we had a very enjoyable and productive Annual Business Meeting (ABM) at Northern Arizona University in Flagstaff, Arizona. Nadine Barlow was our host (thanks, Nadine!). She provides an excellent summary of our division's work at this meeting elsewhere in this issue. I think all of us would agree the high point of that meeting was an inside look at the cool physics and astronomy research going on at the NAU campus and, especially, our exclusive tours of the Lowell Observatory facilities on Mars Hill, Anderson Mesa and Happy Jack Mountain.



Fig. 1. CURPA councilors at the summer ABM in Flagstaff (that's Kristin Rabosky on the tablet, who attended vicariously!). Photo by D. McBride

A plenary session and input from Divisions were solicited on the proposed CUR governance changes at the ABM. The input received is being used to draft what should be a final version at the January E-Board meeting that will be presented at the next summer CUR meeting. Stay tuned... updates will be provided in this Newsletter.

We continued and expanded our CURPA Travel Award program this year. Two solicitations will be issued, in the fall and spring, in order to accommodate the timing of meetings throughout the year. An impressive number of applications were received for the fall 2017 solicitation. Congratulations to our newest awardees! You'll find their reports in this issue. Keep an eye on the CUR homepage for the spring announcement.

Last year we also created a Mentor Award (see the fine article by Mike Jackson in our spring issue). A solicitation for 2018 Mentor Award nominations will be on the CUR website soon, so begin thinking about colleagues who exemplify excellence in mentoring student researchers.

Again, this year we have reached out to all the physics departments in the U.S. Last year this significantly increased our overall Division's membership and several eager new Councilors joined us as a result. Please note that nominations for Councilors whose terms begin next summer are due November 6th. If you are reading this, you are probably

already a CUR member and are eligible to run for one of the open CURPA Councilor slots. Please consider nominating yourself or a colleague. Contact our Nominations Chair, Chris Fuse, at CFUSE@Rollins.edu for details.

Another initiative approved at last summer's ABM, is a "Name Our Newsletter" competition. We're still discussing details (for example, what reward should the winning suggestion get?), but it's time to put on your thinking cap! Send your suggestions to Rick Thompson at the email address given below.

CURPA is only as active as our members make it. We really want to hear how we can better serve and *involve* you in our Division's activities! What new initiatives should we undertake? We'll discuss the suggestions we receive at one of our (roughly) monthly Division teleconferences and get back to you.

As always, thanks to Rick Thompson for editing our Newsletter. Please, send him a brief report (with photos!) about your most interesting UGR-related activities, the workshops you are hosting, job listings, etc. You can reach him at rt533@cabrini.edu.

Until next time, best wishes for the approaching holiday season!



Terry Oswalt
 Chair, CUR Division of Physics and Astronomy
 Embry-Riddle Aeronautical University
Terry.Oswalt@ERAU.edu

CURPA Councilors Meet at Annual Business Meeting

Your CURPA Councilors meet three times to discuss Division business during the CUR Annual Business Meeting (ABM), held

June 29-July 1, 2017, at the Northern Arizona University campus in Flagstaff, AZ. A major topic of discussion was the proposed changes to the CUR Governance Structure to reduce the number of representatives on the Executive Board (EBoard). Currently all Divisions have a representative to the EBoard (often the Division Chair), but CUR is trying to reduce the size of the Board to become more aligned with other non-profit boards. Several models have been proposed and were discussed at the meeting. Our major concern is with the models where smaller Divisions like ours have limited representation on EBoard for up to three years in order to provide seats for outside representatives simply to enhance the expertise of the EBoard. No decision was made at the ABM, but your CURPA Councilors are making sure our concerns are heard by the CUR Governance body.

Mike Jackson is part of a task force that is developing a document on Best Practices in Undergraduate Research and presented an initial draft of this document. The goal of the document, which will be web-based and divided into short units, is to help Departments and particularly Chairs with their concerns regarding topics such as undergraduate research opportunities, student recruitment, student engagement, faculty recruitment, faculty mentoring and development, curriculum, and resources. The focus is on the questions that departments should be asking of their institutions in order to obtain administrative support of undergraduate research. One challenge of the document is that there is no one-size-fits-all solution—what works for one institution does not necessarily work for another. Much of the information currently published on best practices is geared towards R1 institutions, not the smaller PUIs that employ many CUR members. Thus it was suggested that the document provide not only some case

studies but also good links to the published data on different methodologies.

Finally, your CURPA Councilors outlined plans for our Division for the upcoming year. We will continue to work to increase our Division membership through outreach to Physics and Astronomy departments, particularly those at CUR enhanced institutions. We also discussed ways in which we could better engage graduate students and post-docs in CUR. CURPA has recently instituted a mentor award to recognize the efforts of Physics and Astronomy faculty who are effective mentors of undergraduate researchers. The CURPA Newsletter, webpage, and social media outlets will get a fresh look. And as you may have already seen, we are expanding the student travel grant program to venues beyond just NCUR.

But the ABM was not entirely work for your CURPA Councilors. Nadine Barlow set up tours of labs in the Northern Arizona University Physics and Astronomy Department for the Councilors just before the start of the ABM meeting. We visited the Mars Rover Operations and Analysis Center, Astrophysical Ices Lab, Nanotechnology Lab, Optics Lab, and the campus observatory. On Saturday afternoon/evening, following the end of the ABM, Councilors got a tour of the Lowell Observatory facilities, including the Anderson Mesa dark sky site where the National Undergraduate Research Observatory (NURO) telescope is located, the 4-m Discovery Channel Telescope facility near Happy Jack, AZ, and then back to Flagstaff to visit the original Mars Hill campus of Lowell Observatory where Pluto and the galactic redshifts indicating expansion of the universe were discovered. Overall it was a very busy but very productive three days in the mountains of Northern Arizona.

Nadine Barlow
CURPA Secretary

CUR-Goldwater Scholars Faculty Mentor Award

The Goldwater Foundation and CUR are pleased to announce the 2018 CUR - Goldwater Scholars Faculty Mentor Award. Faculty members in STEM disciplines who have five or more years of teaching and research experience past the terminal degree and have mentored 3 or more Goldwater Scholars may be nominated by their president or provost for the award. In addition to the nomination letter, the initial nomination packet includes a three-page nominee CV and a list of all Goldwater Scholars mentored by the nominee that includes each student's name, year of the Goldwater scholarship and an indication of whether the nominee was the (1) sole research mentor, (2) joint mentor or (3) supported the student in preparing his/her Goldwater application only. The nomination deadline is November 6, 2017. Nominations should be mailed or emailed to:

CUR-GS Faculty Mentor Award
ATTN: Dr. Elizabeth L. Ambos
Council on Undergraduate Research
734 15th St. NW Suite 850
Washington, DC 20005

E-mail: eambos@cur.org (with a copy to submit@cur.org)

Complete information regarding the CUR – Goldwater Scholar Faculty Mentor Award and the application process can be found at http://www.cur.org/projects_and_services/goldwater_scholars_faculty_mentor_award/

John Mateja
President
Goldwater Scholarship Foundation
goldwaterpres@vacoxmail.com

Goldwater Undergraduate Scholarships

Undergraduates who intend to pursue a research career in the natural sciences,

mathematics and engineering should be considered for nomination for a Goldwater Scholarship, an award that is considered to be among the most prestigious an undergraduate may receive in a STEM field. Sophomores who are nominated and selected for the award receive up to \$7,500 in each of their junior and senior years. Juniors who are nominated and selected for the scholarship receive up to \$7,500 in their senior year. A full set of guidelines for the 2018 competition can be found on the Barry Goldwater Scholarship and Excellence in Education Foundation's web site <https://goldwater.scholarsapply.org/> While not required, early involvement in research as an undergraduate is highly desirable.

The nomination period is now open and closes on the last Friday in January, 2018, at 5 p.m. (CST). Questions concerning the scholarship or nomination process should be directed to Dr. John Mateja, President, Goldwater Foundation at goldwaterpres@vacoxmail.com or to Lucy Decher, Executive Administrator, at goldh2o@vacoxmail.com.

John Mateja
President

Goldwater Scholarship Foundation
goldwaterpres@vacoxmail.com

Councilor Nomination Deadline

The nomination deadline for CUR Councilors to serve on the Physics and Astronomy Division is November 6, 2017. All current CUR members (including new members at the time of nomination) are eligible and encouraged to apply. Remember, membership is free if your institution is an enhanced member of CUR—all a person has to do is fill out the membership application. Please contact any colleagues you feel would make good candidates for a CUR Council

position. You can learn more about the CUR P&A Division at:

http://www.cur.org/governance/divisions/physics_astronomy/

Please contact Christopher Fuse for more information or if you are interested in being nominated.

NCUR 2018

The 2017 National Conference on Undergraduate Research (NCUR) will be held at the University of Central Oklahoma, from April 4-7, 2018. This is a major venue for undergraduate students to present their research and consists of a variety of plenary speakers as well as oral and poster presentations, visual arts displays and performances. Abstracts will be accepted from October 3 through December 5, 2017. For more information about NCUR, including a draft schedule of the conference and links to the application, please go to:

http://www.cur.org/conferences_and_events/student_events/ncur_2018/.

2018 Travel Award

The CUR Physics and Astronomy division is pleased to offer several travel awards for students presenting at the National Conference on Undergraduate Research (NCUR) or other professional venue. Applying for the travel award is easy! When your abstract is accepted by NCUR (or other professional conference), send a single email to Terry Oswalt (Terry.Oswalt@ERAU.edu) that includes the following:

1. Your name and contact information
2. Your student's name and contact information
3. Your NCUR acceptance letter
4. Your CUR membership number

Please note:

- *One award will be made per department*

- *Awards are limited to physics and astronomy submissions. Separate physics and astronomy departments from the same campus will be considered as distinct, and are each eligible.*
- *Priority is given to students of CUR P&A members.*
- *CUR P&A councilors may apply, but will receive an award only if funds are available after they have been distributed to the general P&A membership.*

Terry Oswalt
Embry-Riddle Aeronautical University
Terry.Oswalt@ERAU.edu

2018 Posters on the Hill

Do you have an engaging, personable research student who can explain his/her research to a non-technical, educated audience? If so, your student might be a great advocate for undergraduate research in Washington, DC, and should consider applying to the 2018 Posters on the Hill. This program is aimed at connecting undergraduates with their congressional representatives. Nothing more effectively demonstrates the value of undergraduate research than the words and stories of the student participants themselves.

Last year's recipients were:

- Robin Morillo, The College of Wooster, (Advisor: Dr. Niklas Manz), "A Hill on Fire: Using Matches, 3D Printing, and Code as a Forest Fire Analog,"
- Joseph Mammo, University of South Dakota, (Advisor: Dr. Jing Liu), "Cross-platform Data Manipulation and Visualization System,"
- Benjamin Whitenack, Lewis and Clark College, (Advisor: Dr. Shannon O'Leary), "Using Flickering Laser Light and an Atomic Gas to Detect Unknown Magnetic Fields."

Additionally, the following students from the Physics and Astronomy Division received an honorable mention:

- Lorena Mezini (Stony Brook University), Kristine Romich (Harold Washington College, City Colleges of Chicago), and Roman Gradford (Normandale Community College), (Advisor: Dr. Suruj Seunarine, University of Wisconsin – River Falls), "Comparison of Models of South Pole Ice for the IceCube Neutrino Observatory."

CUR has started accepting applications for the 2018 Posters on the Hill event. The submission deadline is Wednesday, November 1, 2017. Selected participants will be notified in late January/early February 2018. Interested in learning more? Please visit the CUR website at:

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

Michael Jackson
Millersville University
mjackson@millersville.edu

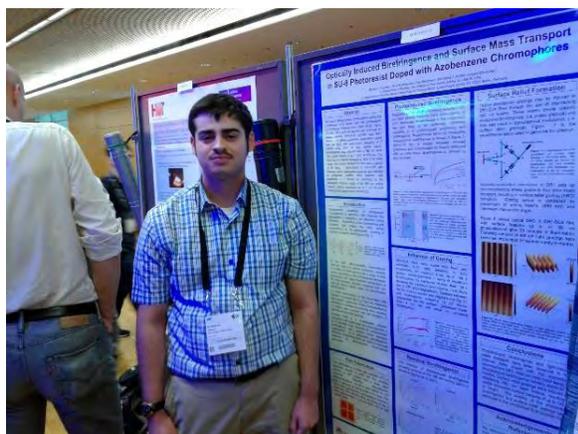
Reports from 2017 Travel Award Recipients

The following contributions are feedback from 2017 Travel Award recipients:

Ben Campos

During the week of June 26, 2017, College of New Jersey (TCNJ) physics major Benjamin Campos and his research mentor David McGee attended the European Conference on Lasers and Electro-Optics and the European Quantum Electronics Conference (CLEO/Europe-EQEC) in Munich, Germany. CLEO-EQEC is the largest gathering of optics and photonics researchers and engineers in Europe, where it is also co-located with the 2017 Laser World of

Photonics Congress. Ben presented a poster on his 3rd and 4th year research project on photopatterning of polymeric thin films. The poster, “Optically Induced Birefringence and Surface Mass Transport in SU-8 Photoresist Doped with Azobenzene Chromophores” describes Ben’s research on how doping electronic photoresist with photosensitive azobenzene molecules results in light-induced mass-transport. Ben used this phenomenon to generate topographical surface relief gratings on the surface of the polymer films by irradiating the films using a typical two-laser beam lithographic setup. The poster was very well-received, and Ben had his hands full answering questions from many interested attendees. This was Ben’s first professional conference in an international setting, and the experience was invaluable for him. Ben’s attendance at this international conference was made possible by a CURPA travel award.



Benjamin Campos with his poster

Robin Morillo

I, Robin M.P. Morillo, am a senior at The College of Wooster in Wooster, OH and I was selected to present my Senior Independent Study results, *A Hill on Fire: Using matches, 3D printing, and code as a forest fire analog* at the 21st Annual Posters on the Hill on April 26, 2017 in the Rayburn

House Office Building in Washington, D.C. This is an event put on by the Council for Undergraduate Research (CUR) every year to bring together the best and brightest students in the United States and give them a chance to present their research on a national level. I was the first ever College of Wooster Physics major to be selected by CUR and my research project was the third ever College of Wooster project to be selected by CUR. The fact that I got selected to be one of a few students to present their research at this event was an honor and led to an incredible experience.

My advisor Dr. Niklas Manz and I flew to Washington, D.C. on Tuesday morning, leaving the college around four in the morning. We left this early so that we could take advantage of CUR's offered activities to their fullest. After checking into the hotel, getting our name tags, and all of the info about where to be when, we went with a small group of students and advisors to the Folger Shakespeare Library. Here we got to learn a TON about Shakespeare. One of the most interesting things we saw was a first folio of Shakespeare's plays (printed in 1623). We also go to see some astonishing books and manuscripts in the exhibition 500 Years of Treasures from Oxford.

The exhibition items ranged from the 10th to the 17th century and had never been shown in the US before. These items included Galileo's first observation of the moon using a telescope with notes on never before seen details of the moon's surface, Newton's observations of Halley's comet, and a handwritten letter by Newton from 1681.

On Tuesday evening, we went to the 'Orientation and Advocacy Training' at the American Chemical Society. This was an event that taught us how to take our experiences and knowledge and give them to government officials in the best way. As someone who had never even done so much

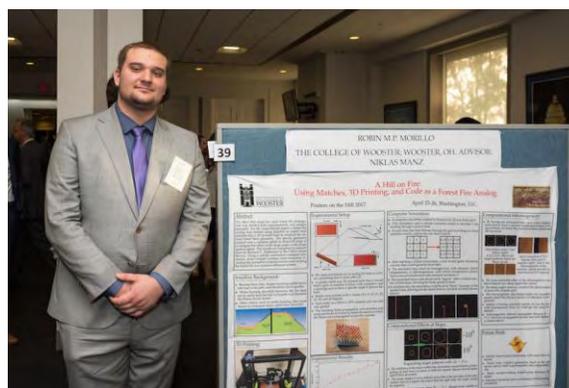
as call up their representative a year ago, this was a very enlightening event. Before and after the event, we visited one of Dr. Manz' friends who happened to be working a few floors above us. I got to see ACS behind the scenes and meet some very interesting people.

Despite many emails and calls over the past few months, we were not able to get a hold of our local Congressman, Jim Renacci, or his staff before going to D.C. Meaning that we were unable to meet face to face and talk about the importance of undergraduate research. So, instead of meeting with him, we spent the morning enjoying Capitol Hill and the Mall. In the evening, we had the poster session. I can't remember how long the whole session was because it went by so quickly. I felt like from half an hour before it started to when it officially ended I was constantly talking about my research and answering really interesting and thoughtful questions.

I had been to a few conferences before, but due to the smaller size of this one there were always one or two people looking at my poster or talking to me. I met a whole lot of people including two College of Wooster graduates, an education advisor for a senator, and someone who had worked with my best friend the previous summer. It was an absolute blast and gave me a lot of exciting ideas about the future of the research project. Our trip to Washington D.C. was supported by a Center for Undergraduate Research's Physics and Astronomy division (CURPA) student travel award and a generous gift from Wooster's 1977 physics graduate John Redfield.

As a final note: The poster session was exactly on the day that I would have taken a Thermal Physics exam in Dr. Manz' class if I hadn't been in D.C. As a result, I was going

to have to make up the test. Because Dr. Manz was coming along with me to D.C. however, I did not have to wait until I was back in Ohio. The original plan was to take the test in the hotel, but with everything that was going on, we didn't have the time. So as a result I got to take my first ever test on a plane! And, as a strange coincidence, the plane took an extra hour to get off of the runway, meaning that I didn't have to deal with any turbulence while thinking about Gibbs factors.



Robin M.P. Morillo at the 'Posters on the Hill'.

Patrick Carroll

This last summer I was fortunate enough to attend the Physics Education Research Conference and the preceding 2017 Summer AAPT meeting. At the AAPT meeting, I presented a poster, entitled "Implementing a Student Driven First-Year Mentoring Program," on the current standing of a program that another student and I began at Miami University. At the PERC, I presented a study entitled "Social

Collaboration and the Usage of Textbooks in an Introductory Physics Class," which was conducted in preparation for a more extensive application and study. At the time, I was a senior in physics at Miami University and performed research under the mentorship of Dr. Jennifer Blue. During these conferences, I was fortunate to meet many students and professionals within the teaching and physics education research communities. It also

afforded me the opportunity to get involved in discussions on veterans' issues and to share my experiences as a veteran within the physics community, which I hope to be able to continue to be an advocate for. I am currently pursuing a Master's Degree in Physics at Miami University.



Patrick Carroll at his poster

Your CURPA Councilors

Rae Anderson, University of San Diego
 Nadine Barlow, Northern Arizona University. CURPA Secretary and Chair
 CUR Fellows Committee.
 Maria Bautista, Kapi`olani Community College. Diversity and Inclusion Task Force.
 Matthew Beaky, Juniata College. CUR Finance Committee.
 Mark Biermann, Valparaiso University. Constitution and Bylaws Committee.
 Joseph Carson, College of Charleston.
 Beth Cunningham, AAPT. CURPA Mentoring program.

Chris Fuse, Rollins College.

Nominations Chair

Carol Hood, Cal State San Bernardino.

Michael Jackson, Millersville University.

CUR Posters on the Hill Committee.

Seth King, UW La Crosse

George Marcus, SUNY Genesee, Assessment.

John Mateja, Murray State University.

CUR/Barry Goldwater Scholar Faculty

Mentor Award Committee and NCUR

Oversight Committee.

Duncan McBride, formerly at the National

Science Foundation. CUR Treasurer,

CUR Finance Committee, and CUR

Investments Committee.

Sorinel Oprisan, College of Charleston. CUR

Quarterly Editors Board.

Terry Oswalt, Embry-Riddle Aeronautical

University Daytona Beach. CURPA

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Toni Sauncy, Texas Lutheran University,

Program Review, Student Programs.

Allyn Smith, Austin Peay State University.

CUR Posters on the Hill Review

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Richard Thompson, Cabrini University.

CURPA Newsletter Editor.

Francis Tuluri, Jackson State University,

Innovation and Collaboration Task Force.

Brian Utter, Bucknell University,

Assessment.

Gabriel Williams, College of Charleston

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 (Richard.Thompson@cabrini.edu). Deadline for the Winter 2018 issue is **January 19, 2018**.