



# CURPA NEWS



*Newsletter of the Council on Undergraduate Research Physics and Astronomy Division*

*Winter 2015*

## ***Message from the Chair***

Happy New Year and welcome to the winter edition of the Physics and Astronomy Division's newsletter. During the past few months, CURPA members have been busy with a variety of activities related to undergraduate research. For example, Mark Biermann served as a facilitator at the *Beginning a Research Program Involving Undergraduates at a PUI Institute* this past November while Chris Hughes co-chaired the organizing committee for *Symposium AAA: Undergraduate Research in Materials Science — Impacts and Benefits* at the Materials Research Society meeting recently held in Boston. Fellow CURPA member Dave McGee was an invited speaker at the event. Let us know what you've been doing!

CURPA councilors have been involved with the development of five strategic pillars to aid the organization in planning and envisioning the future of undergraduate research. These pillars were adopted by CUR this past August and focus on areas that Councilors have deemed most important to the mission of the organization. The five pillars are:

- **Integrating and Building Undergraduate Research into Curriculum and Coursework**
- **Assessment of the Impact of Undergraduate Research**
- **Diversity and Inclusion in Undergraduate Research**
- **Innovation and Collaboration in Undergraduate Research**
- **Internationalization and Undergraduate Research**

Task Forces have been developed to assist with advancing each of the pillars. For

example, Maria Bautista and Andrew West are involved with the Diversity and Inclusion pillar while Mohammad Samiullah (Sami) is chairing the Internationalization and Undergraduate Research Task Force. For more information about these pillars, please visit

[www.cur.org/about\\_cur/strategicpillars/](http://www.cur.org/about_cur/strategicpillars/).

Additionally councilors will be providing short updates on how the Task Forces are advancing each of the pillars in upcoming newsletter articles.

These are several examples of activities performed by CURPA councilors and members. Each winter we elect eight CURPA members to the Council who serve three-year terms. One advantage in having elections is the opportunity to see what people are working on and what they are interested in. Please take advantage of this opportunity to check out those who are running for a councilor position. As you look at candidate biographies, please consider running for a position sometime in the future. Serving on the council is a great way to connect with others interested in and advocating for undergraduate research.

In this edition of the CURPA newsletter, you can find other information on undergraduate research including our division's REU program and NCUR 2015 along with an outline for how your student can apply for a NCUR 2015 travel award. If you have something to submit to our spring newsletter, please contact Nadine at [Nadine.Barlow@nau.edu](mailto:Nadine.Barlow@nau.edu) by the April 3 newsletter deadline. We are always looking for contributions from within the division, including articles, job announcements, promotions, and awards.

Once again, best wishes to the start of 2015. Please feel free to contact me if you have questions or suggestions at how councilors can help advocate and promote undergraduate research, including assisting you in such activities.

*Michael Jackson*  
 Chair, CUR Division of Physics and Astronomy  
 Central Washington University  
[jacksonm@cwu.edu](mailto:jacksonm@cwu.edu)

### ***New Video about Women in Physics***

Toni Sauncy and I proudly present the video production "HerStories: Wisdom and Encouragement from Women in Physics." <https://www.youtube.com/watch?v=ofE-mJFJR5w&feature=youtu.be>.

We hope you agree that the video is very moving. We are touched by the stories and words of wisdom and encouragement from many women in physics from around the world. Feel free to distribute the video to your colleagues and women who are considering a career in physics. Toni and I hope to have many, many individuals watch the video.

*Beth Cunningham*  
 Executive Officer, AAPT  
[bcunningham@aapt.org](mailto:bcunningham@aapt.org)

### ***2015 CURPA REU Program***

Do you know a student who is interested in physics/astronomy and looking for a 2015 summer research project? If so, consider directing them to CURPA's 2015 REU program:

<http://www.cwu.edu/physics/reuprogram>

This program seeks to provide students early in their academic education with a faculty mentored research experience. There is an emphasis on recruiting students from traditionally underrepresented groups as well as from community colleges and universities where access to research for undergraduates is limited. At our website, students can find more information about the program, what projects will be offered for

the 2015 summer, and how to apply. **The application deadline is Feb. 20, 2015.**

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 and  
*John Mateja*  
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### ***2014 CUR REU Profiles***

In the fall newsletter we briefly discussed the first year of our division's pilot REU program funded by the National Science Foundation (award number 1358879). During the 2014 summer, seven undergraduates, all rising juniors, participated in this REU program with additional support provided by CUR and the Washington Space Grant Consortium. The profiles for three of these students appeared in the fall newsletter while the profiles for another two appear in this edition.



*Alfredo during his visit to the Wild Horse Wind and Solar Energy facility.*

*Katherine Taylor (KT), Merrimack College:* KT's project, "Terahertz photoacoustic spectroscopy," was performed at Wright State University with Dr. Doug Petkie. KT is pursuing a degree in math and physics.

*Alfredo Santacruz, Whittier College:*  
Alfredo's project, "Exploring the limits of planetary habitability using orbital dynamics," was performed at Weber State University with Dr. John Armstrong. Alfredo is working toward his degree in physics.

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### ***Instituting a Research Blog***

The following is an excerpt from the initial blog post for students in the CUR Research Experiences for Undergraduates. Starting as part of the 2014 summer CUR REU program, students were invited to keep a collective research blog hosted by Wordpress: <https://curreu.wordpress.com>. Students are asked to write a minimum of once per week or as often as they like. It can be used as a sounding board for research frustrations and a place to post periodic progress reports. The comments to the entries help build cohesion between the members of the research team. The blog is not a substitute for frequent meetings with students, but provides another avenue for mentors to assess student performance. If you or your students are interested in joining, please contact John Armstrong, or start your own!

***"Talk to The Bear:*** Science, ultimately, is a process of communication. You observe, experiment, theorize, and share the results with the community. They might be your scientific peers, the public, policy makers...whomever has an interest in the results of your work.

"But science in absence of communication has little value. So, here is a forum for our communication. Here is where you will document your successes, ask

questions, pose solutions, and generally keep us abreast of your progress.

"There is value in writing about your research. My first postdoc advisor, Hugh Kieffer, used to keep a Teddy Bear in his office. When I would come in to ask a question about my research code, he'd usually say "Talk to The Bear" and walk out. I found that explaining my problem to The Bear would usually bring some insight I'd missed. Sometimes, the simple act of recounting our progress – or lack thereof – can spawn new solutions.

"Which puts me in mind of another bit of research advice, this by way of my spouse and colleague Stacy Palen. She says "When you've reached the point where you know what to do next, quit. Write down what you plan to do, and start fresh the next day."

"So this is what I hope you get out of this forum. This is a place to post your progress, document your failures, and write down what to do next. This will help you keep track of your research and keep your peers informed about your plans.

"And should you run into problems? Well, there's always The Bear."

*John Armstrong*  
Weber State University  
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### ***Wiki Pages for Teaching and Research***

As undergraduate research mentors, we are faced with many challenges. It is often the case that the research projects we carry out have a longer lifespan than the typical time an undergraduate student stays with our research group, which can be as short as one semester. As a result, one challenge of undergraduate research is to ensure the continuity of the research project. In the process, the research mentor must bring the new undergraduate research assistant up to the speed, which often involves covering a large upper-division background that the

students may miss. This is usually done through an independent study that allows students to cover, under research mentor's supervision, the missing background. For example, it may be the case that a student interested in computational biophysics research, although familiar with other programming languages, has very limited hands-on experience with Matlab programming language. The way we remedy this issue is usually through an independent study that covers the necessary background and exercises. Sure enough, sooner or later we will have to go through the same steps again with another undergraduate for the same or similar research project. After teaching such individual study courses many times, we rewrote the syllabus and the content of the respective Matlab independent study course over and over until it retained what we consider the most important concepts and skills someone should master in order to effectively contribute to our research project.

One possible solution to providing students with a structured material that can be accessed from everywhere is through wiki pages. Although there are many free wiki services for academic use, we found pbworks.com to be a pretty convenient and flexible interface. A wiki system allows web pages to be created and edited using a common web browser. No special training is required and editing or adding a new linked webpage to an existing wiki is just one click away. The free version of wiki from pbworks.com allows unlimited wiki pages for academic use; each wiki receives a unique URL link and can only be accessed with a password set by each invited user. The creator of the wiki has the option of inviting more people to join the collaborative workspace using their email address. Users of a workspace can also delete or assign specific read/write privileges.

For all my independent studies wiki pages that were used over the years to train undergraduates on specific topics (e.g. learning the basics of Matlab programming [matlabprimer.pbworks.com](http://matlabprimer.pbworks.com)) the students only have read privileges. I selected this option to preserve the integrity of the syllabus and the content of the course. However, for other wiki pages, such as the summer 2014 research project on interval timing ([summer2014timing.pbworks.com](http://summer2014timing.pbworks.com)) the research students have read and write privileges such that they can contribute to the wiki as their research project progresses. At the same time, they are given read privileges to the previous years' research projects on the same or similar topics, e.g. [summer2013intervaltiming.pbworks.com](http://summer2013intervaltiming.pbworks.com), such that they can understand what were the research objectives of previous teams, what they accomplished, what useful reference they gathered, what stumbling blocks they encountered, where they disseminated their results, and how they formatted their posters, short talks, etc.

The wiki pages have all the advantages of cloud-based applications: secure access from everywhere and a simple environment for collaborative work on a given topic. My students use wiki for reporting the status of their project, keeping track of different versions of the computer code they developed, and a repository for important references they found while researching the project. Among other things, I use the wiki pages to monitor the progress of the project and to assess the contribution of each student even at individual level since the wiki system keeps track of who modified a page.

Additionally, the wiki system from pbworks.com allows password-protected access to a wiki page using a guest account. For example, I created the wiki page [bmec.pbworks.com](http://bmec.pbworks.com) as part of the educational component of my NSF Careers

grant to share with everyone the details of the “Biophysical Modeling of Excitable Cells” course I created for the students at College of Charleston. This wiki page can be accessed by all the students who were invited using their emails, but also by everyone who types the username: guest and the password: guest. Try it!

Sorinel Oprisan  
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### ***2015 Posters on the Hill***

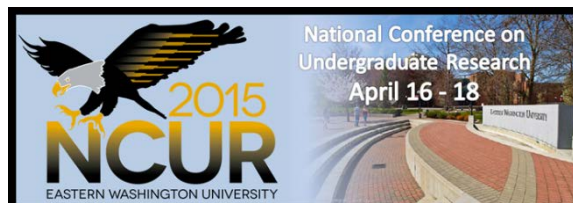
Abstracts submitted to the *Posters on the Hill* event are currently under review. About 450 completed abstracts were submitted this year, with each abstract evaluated by three reviewers. Selections should be announced at the beginning of February. The event is tentatively scheduled for April in the US Capitol, Washington DC.

Michael Jackson  
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### ***NCUR 2015***

The 2015 National Conference on Undergraduate Research (NCUR) will be held at Eastern Washington University, April 16-18, 2015. This is a major venue for undergraduate students to present their research and consists of a variety of invited talks as well as oral and poster presentations, visual arts displays, and performances. Registration is now open through March 13, although the deadline for early registration is February 19. For more information about NCUR, including links for registration and a

draft schedule, please go to [http://www.cur.org/ncur\\_2015/](http://www.cur.org/ncur_2015/).



### ***2015 NCUR Travel Award:***

The CUR Physics and Astronomy division is pleased to offer a limited number of travel awards for students attending the National Conference on Undergraduate Research (NCUR) at Eastern Washington University, April 16-18, 2015. Applying for the travel award is easy!

When your abstract is accepted by NCUR, please send an email to Michael Jackson ([jacksonm@cwu.edu](mailto:jacksonm@cwu.edu)) with the following information:

- Your name and contact information,
- Your student’s name and contact information, and
- Your NCUR acceptance letter.

Awards will be made on a first-come, first-serve basis. Selected applicants will have their student registration fee paid by the CUR Physics and Astronomy Division. Please note:

- A maximum of one CURPA 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 CURPA members.
- CURPA councilors may apply, but will receive an award only if there are no remaining applications from the general CURPA membership.

Thank you and please feel free to contact me if you have any questions.

*Michael Jackson*  
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### ***Upcoming CUR Events***

For more information about these upcoming events, please see the CUR webpage at [www.cur.org](http://www.cur.org).

- CUR Dialogues 2015: Climbing the Ladder to Funding Success: Diverse Sources, Diverse Pathways. Renaissance Arlington Capital View Hotel. Registration deadline: Feb. 6, 2015.
- Undergraduate Research Week, April 13-17, 2015.

### ***Opportunities***

*(If you have a job opening that you would like to advertise here, please send the ad to CURPA News editor Nadine Barlow for inclusion in the next newsletter)*

***PhD Program in Engineering Physics.*** The Physical Sciences Department at Embry-Riddle Aeronautical University in Daytona Beach, FL, offers a Doctor of Philosophy (Ph.D.) degree program in cutting edge areas of engineering physics. Areas of research include aeronomy/upper atmospheric physics, astronomy/astrophysics, space physics and space plasmas, spacecraft instrumentation, spacecraft systems engineering, spacecraft power and thermal control, dynamics and control of aerospace systems, space robotics/autonomous systems, and remote sensing.

The department houses more than 20 faculty members engaged in federally-funded research. Assistantships and fellowships are available to well-qualified applicants. Physical Sciences research labs include the Spacecraft Engineering Research Lab, the Space Physics Research Lab, the Atmospheric Physics Research Lab, the Space Plasma Lab, and the Computational

and Observational Atmospheric Dynamics Lab.

The minimum entry requirement to the program is a Bachelor's or Master's degree in physics, engineering, or a suitably related field. A minimum CGPA of 3.2/4.0 is required for both the Bachelor's and Master's degrees completed. The program also requires a minimum GRE (verbal plus quantitative) score of 1200 in the old scale and 310 in the new scale obtained within the previous two years of the application.

Applicants are required to submit statements of goals (2 to 5 pages) and reasons for wishing to pursue doctoral studies, incorporating interests and background, and 3 letters of recommendation. All applicants whose native language is not English, or who were educated at schools where English was not the language of instruction in all disciplines, must submit their official TOEFL scores sent directly from the testing authority. The minimum acceptable score is 600 on the paper-based exam, 250 on the computer-based exam, and 105 on the internet-based exam.

Application Deadline is March 15, 2015 for US students and February 15, 2015 for international students. The application form is available at:

<http://www.erau.edu/admissions/>

### **For more information, contact**

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Graduate Program Committee  
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Phone: (386) 226-7753

<http://daytonabeach.erau.edu/college-arts-sciences/physical-sciences/index.html>

### ***Your CURPA Councilors***

John Armstrong, Weber State University. Integrating Research into the Curriculum Task Force and CURPA Webmaster.

Nadine Barlow, Northern Arizona University. CURPA News Editor and Co-Chair CUR Fellows Committee.

Maria Bautista, Kapi`olani Community College. Diversity and Inclusion Task Force.

Matthew Beaky, Juanita College. CUR Finance Committee.

Mark Biermann, Valparaiso University. Constitution and ByLaws Committee.

Horace Crogman, University of California Merced.

Beth Cunningham, AAPT. CURPA Mentoring program.

Chris Hughes, James Madison University. Program Review Committee.

Michael Jackson, Central Washington University. CURPA Chair, CUR Posters on the Hill Committee, Innovation and Collaboration Task Force, and CUR Executive Board.

Liubov Kreminska, City College of New York.

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.

David McGee, The College of New Jersey. Internationalization and Undergraduate Research Task Force.

Sorinel Oprisan, College of Charleston. CUR Quarterly Editors Board.

Terry Oswalt, Embry-Riddle Aeronautical University Daytona Beach. Advocacy Advisory Committee.

Raul Peters, Paine College. Nominations Committee.

Mohammad Samiullah, Truman State University. Internationalization and Undergraduate Research Task Force.

Toni Sauncy, Texas Lutheran University.

Allyn Smith, Austin Peay State University. CUR Posters on the Hill Review Committee.

Gubbi Sudhakaran, University of Wisconsin La Crosse. NCUR Oversight Committee.

Brian Utter, James Madison University.

Andrew West, Boston University. Diversity and Inclusion Task Force.

#### ***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 editor Nadine Barlow at Nadine.Barlow@nau.edu. Deadline for the Spring 2015 issue is ***April 3, 2015***.