



CURPA NEWS



Newsletter of the Council on Undergraduate Research Physics and Astronomy Division

Spring 2014

Message from the Chair

I hope your spring is off to a great start and that you have some time to enjoy this edition of the Physics and Astronomy (P&A) Division's newsletter. As always, I would like to thank Nadine Barlow for taking the time and effort to put our Division's newsletters together. If you have something to submit to our next newsletter, scheduled for the fall, please contact Nadine at Nadine.Barlow@nau.edu.

There has been some exciting developments related to undergraduate research that you will find throughout this edition. The first highlight is that on April 4 the General Council of the American Physical Society (APS) unanimously endorsed the concept that all undergraduates majoring in physics and astronomy should have a research experience. You can access this statement, along with the context they provided, using the link

www.aps.org/policy/statements/14-1.cfm

On behalf of my fellow councilors, I would like to thank all of you for your feedback on and support of prior APS drafts. As John Mateja points out in his article on page 2, now comes the hard part – finding ways to make this a reality! To assist departments, we have teamed with the APS Office of Education to develop a series of vignettes highlighting practices that encourage, support, and lead to increases in research experiences for undergraduates. If you or your department has any experience with this, as I am sure many of you do, please consider submitting an article (Word format) to John at jmateja@murraystate.edu. These articles will be shared with the larger

physics and astronomy communities through the APS and CUR websites.

Mentoring undergraduate researchers did you say? I am pleased to announce that councilors and members of the CUR P&A Division received a REU award from the National Science Foundation to do just that! This two-year pilot program aims to provide research experiences for students early in their physics and/or astronomy career, specifically for students enrolled at small four-year comprehensive institutions and community colleges. Participants will be working in research labs around the country with communication within the cohort occurring on-line. Students participating in this program, along with their projects, can be found on pages 3-4. We will highlight some of the research these students performed in upcoming newsletters.

Finally, I would like to thank everyone who took part in the P&A councilor elections along with congratulating those individuals who were elected (they can be found in John Armstrong's article on page 3). Advocating for undergraduate research is a passion for many of us. While a number of service activities take a significant amount of time and effort, they can often be the most enjoyable and fulfilling. Regretfully I won't be attending this year's national conference, due in part to hosting our NSF-REU summer research program. However, if there is anything the P&A Council can help you with in advocating for and promoting undergraduate research, please contact me.

Have a safe and enjoyable summer and we look forward to getting you the next

edition of the CUR Physics and Astronomy newsletter in the fall.

Michael Jackson
Chair, CUR Division of Physics and Astronomy
Central Washington University
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APS Calls for Research Opportunities for Undergraduate Physics and Astronomy Majors!

The idea that all undergraduates majoring in physics and astronomy should have a research experience received an important endorsement when the General Council of the American Physical Society (APS) voted unanimously on April 4, 2014 to adopt the following statement:

The American Physical Society calls upon the nation's four-year colleges and universities and their physics and astronomy departments to provide or facilitate access to research experiences for all undergraduate physics and astronomy majors.

An accompanying "Context" statement goes on to say:

Research experiences provide students with many benefits, including skills in problem definition, project design, open-ended problem solving, use of modern instruments and techniques, data collection and analysis, analytical and computational modeling, and communication of evidence-based technical arguments. These skills are of great value to students as they go on to engage in future science, engineering, business, education, government, or other careers. Participation in research has been shown to increase retention in STEM (science, technology, engineering and mathematics) degree programs, support students' decisions to pursue STEM careers, and enable students to move more effectively from the classroom to professional practice.

The action by the General Council follows work by many individuals in the physics and astronomy communities, particularly those from APS' Committee on Education and the Forum on Education and the Council on Undergraduate Research's Physics and Astronomy Division, to get such a statement adopted. The APS statement now joins similar statements adopted by the Society of Physics Students, Council on Undergraduate Research, American Astronomical Society, American Association of Physics Teachers, and the APS Committee on Education. These statements can be viewed on the Society of Physics Students web site at: http://www.spsnational.org/governance/statements/2008undergraduate_research.htm.

Of course, making such statements and realizing what the statements ask us to do are two entirely different things. It is now incumbent upon us to work collaboratively to make undergraduate research experiences for all physics and astronomy majors a reality, either on our campuses or through off-campus opportunities. To help departments grow even more vibrant programs and to showcase current best-practices, the APS Department of Education and Diversity and the CUR Physics and Astronomy Division would like to develop a series of vignettes/brief articles that highlight practices that encourage, support, and lead to increases in research experiences for undergraduates. If you or your department has a practice, a course in which undergraduate research is embedded, funding strategies, internship placement strategies, etc. that you believe would enable others to enhance undergraduate research in their programs, we invite you to submit an article via email to John Mateja at jmateja@murraystate.edu (please submit the article as a Word attachment). These articles will be shared with the larger physics and astronomy communities through the APS

and CUR websites. Working together as a community, we can realize what our societies now envision for our undergraduate majors. When we accomplish this important outcome, we can be proud that our disciplinary area will be the first to have ever done so.

John Mateja
Murray State University
jmateja@murraystate.edu

Welcome New CUR P&A Councilors

Congratulations to new and returning councilors for 2014. The members of the CUR Physics and Astronomy Division are looking forward to working with all of you.

New Councilors:

- Matthew Beaky, Juanita College
- Terry Oswalt, Embry Riddle Aeronautical University Daytona Beach
- Raul Peters, Paine College
- Doug Petkie, Wright State University
- Toni Sauncy, Angelo State University
- Brian Utter, James Madison University
- Andrew West, Boston University

Re-elected Councilors:

- John Armstrong, Weber State University
- Mark Bierman, Wartburg College
- Horace Crogman, University of California - Merced
- Michael Jackson, Central Washington University

Here's to a great year!

John Armstrong
Weber State University
jcarmstrong@weber.edu

CUR Physics and Astronomy REU Site

Councilors and members of CUR's Physics and Astronomy Division applied for and received funding from the National Science Foundation to host an REU site. This project aims to provide research experiences for students early in their physics and/or astronomy career, specifically for students enrolled at small four-year comprehensive institutions and community colleges. Although the grant formally supports 6 students, additional funding has been provided by the Washington Space Grant Consortium and the Council on Undergraduate Research to support a seventh student. The students, their projects, and their mentors are listed below. The program will run from June 2 through August 8, 2014. The second year of this pilot project will be run during summer 2015.

- Garrett Arnhold, Edmonds Community College, "Biophysics of synchronization and chaos," Dr. Sorin Oprisan, College of Charleston
- Jose Barajas, Yakima Valley Community College, "Measurement of optically pumped far-infrared laser frequencies," Dr. Michael Jackson, Central Washington University
- Nicole Cutri, Bay Path College, "The effect of defects on microtubule persistence length," Drs. Tav Hawkins and G. Sudhakaran, University of Wisconsin-La Crosse
- Emily Dick, James Madison University, "A search for variability among highly evolved stars," Dr. Terry Oswalt, Embry-Riddle Aeronautical University
- Alfredo Santacruz, Whittier College, "Exploring the limits of planetary habitability using orbital dynamics,"

Dr. John Armstrong, Weber State University

- Zach Swanson, Doane College, “Developing oxide materials for optoelectronic applications,” Drs. Seth King and G. Sudhakaran, University of Wisconsin-La Crosse
- Katherine Taylor, Merrimack College, “Terahertz photoacoustic spectroscopy,” Dr. Doug Petkie, Wright State University

Michael Jackson, PI
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and
John Mateja, PI
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2014 Posters on the Hill

CUR's *Posters on the Hill* will be held on Tuesday, April 29 and is tentatively scheduled in the Rayburn building, Washington DC. This year, 60 posters were selected from nearly 580 completed applications. The students selected to represent the Physics and Astronomy Division are:

- Mark E. Sellers and Philip Luke Spinolo, Rhodes College, (Advisor: Dr. Brent Hoffmeister), “Diagnosing osteoporosis: A promising new ultrasonic technique”
- Jillian Bolinger, University of Massachusetts Dartmouth, (Advisor: Dr. Robert Fisher), “Predicting The Signature of Thermonuclear

Supernovae Resulting from Merging White Dwarf Stars”

- Rance Solomon, Middle Tennessee State University, (Advisor: Dr. Daniel Erenso), “Alternative New Approaches to Early Detection and Effective Treatments of Cancer”

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

- Kyla Koboski, Hope College, (Advisor: Dr. Jennifer Hampton), “Characterization of Hydrogen Evolution Reaction on Dealloyed Porous NiCu”

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/.

Michael Jackson
Central Washington University
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Conference on “Redesigning the Physicist”

I am writing today to let you know about a great opportunity coming up in June 2014, for physics faculty. In conjunction with the annual Department Chairs' conference, APS is hosting a conference for physics faculty

on physics innovation and entrepreneurship education.

The conference, *Redesigning the Physicist: Innovation and Entrepreneurship Education for the 21st Century*, will focus on strategies for implementing Innovation and Entrepreneurship education into undergraduate classrooms. Sessions will feature existing programs which have successfully implemented innovation and entrepreneurship components (such as the Scienceworks program at Carthage College, and the Case Western Physics Entrepreneurship Program), as well the "success stories" of students who have graduated from these programs and started companies or found successful employment in companies as a result of these programs.

The conference also will focus on resources for educators who are interested in developing innovation and entrepreneurship curricula, or in promoting entrepreneurship among their students and faculty. Representatives from the National Collegiate Innovators and Inventors Alliance (NCIIA) will provide information on existing programs focusing on translating research into viable commercial innovation, and discuss new opportunities for collaboration with departments seeking to implement innovation and entrepreneurship components.

The conference will be held at the American Center for Physics on June 5 - 6, 2014. Housing and registration deadline is Wednesday, April 30. For more information, and to register for the conference, please visit: www.aps.org/programs/education/conferences/innovation.cfm.

*Crystal Bailey
Careers Program Manager
American Physical Society*



CUR Conference 2014

CUR is hosting its 16th National Conference, "Creating the Citizens of Tomorrow: Undergraduate Research for All," June 26-July 1 in Washington, DC—a fitting location for its theme of democratizing undergraduate research! In situating the conference in our nation's capital, CUR will highlight cross-disciplinary connections and collaborations among higher education, government agencies, and non-profit organizations.

The overall goals of the conference are to encourage broad participation in undergraduate research and to make visible its benefits to students, faculty, colleges and universities, and communities. Students who participate in undergraduate research are better prepared in their fields of study as well as more informed as citizens as they learn skills of problem-solving, critical thinking, and communication. But as faculty and institutions still face barriers to giving every student a significant research experience, this conference focuses on creative ideas and practical solutions for meeting those challenges. Conference participants will share strategies and models that have helped strengthen undergraduate research in their institutions—in plenary talks, an exciting variety of conference sessions, and through the informal networking that is a hallmark of CUR conferences.

The CUR National Conference is a place where faculty, administrators, staff, academic partners, and policy-makers share

peer-reviewed studies of undergraduate research and showcase models of undergraduate research activities at all types of colleges and universities, in all disciplines. Goals for the conference are to highlight the value of undergraduate research and for participants to learn from each other to broaden the opportunities for undergraduates to participate in undergraduate scholarly work.

Registration is now open and your CUR Physics and Astronomy Councilors look forward to seeing you there. For more information, please visit the conference website at:

www.cur.org/conferences_and_events/cur_conference_2014/.

CUR is offering a limited number of travel grants to attendees with demonstrated need. For more information about the travel grants, see:

www.cur.org/conferences_and_events/cur_conference_grants/

Kudos To:

(We are always looking for contributions to the Kudos section from all P&A Division members. If you have exciting news about yourself and/or your undergraduate research students, please let CURPA News editor Nadine Barlow know so we can include it in the next newsletter.)

Undergraduate students **T. Guido** and **B. Tulegenov**, together with mentor Anatoly Streltsov (Embry-Riddle Aeronautical University Daytona Beach), presented a paper entitled “Substorm-related ULF waves at high latitudes” at the National Radio Science Meeting in Boulder, CO, Jan. 8-11, 2014. A paper on the topic has been submitted to the Journal of Atmospheric and Solar-Terrestrial Physics.

Marlon Ramos (Univ. NV Reno) presented a paper entitled “Impact crater morphology of the Moon: Eastern Nearside (45°S-45°N 0°-90°E) at the 45th Lunar and Planetary

Science Conference in Houston, TX on March 18. Ramos worked on the project during his summer 2013 REU experience with mentor Nadine Barlow at Northern Arizona University.

Axel Burgos (Embry-Riddle Aeronautical University Daytona Beach) is a NASA MUST/McNair Scholar working at NASA Ames Research Center with mentor Bogdan Udrea as part of the Lunar Plant Growth Habitat Team. Alex has worked on a program to maintain a habitat with living plants on the Moon. He is collecting data and performing follow-on trouble-shooting on a parabolic flight this spring in Houston.

Nadine Barlow (Northern Arizona University) will be a panelist on the Brookings Institute’s A. Alfred Taubman Forum on Public Policy focusing on the US space program and America’s role in space exploration. The event will take place May 14 in Washington, D.C.

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)

Three Visiting Assistant Professor of Physics Positions, Embry-Riddle Aeronautical University Daytona Beach Campus: The Department of Physical Sciences at Embry-Riddle Aeronautical University invites applications for three (3) Non-Tenure-Track positions, most likely at the Assistant Professor level in Physics. One position may be renewed yearly, whereas the other two positions are one-year sabbatical replacement positions.

Applicants with experience in teaching undergraduate physics are particularly encouraged to apply. Interest in engaging undergraduate students in research would be a plus. Applicants must have a Ph.D. in

Physics or a related field and be available to teach beginning in late August, 2014.

The Physical Sciences Department has about 35 faculty. It is home to one of the leading ABET-accredited undergraduate Engineering Physics programs in the US, as well as growing BS Space Physics, MS Engineering Physics, and PhD Engineering Physics programs. We expect to begin a new BS program in Astronomy & Astrophysics in August, 2014. The Department also provides service courses in physics, chemistry, astronomy, biology, and environmental science to other majors.

The position will remain open until filled. For consideration, please complete an online application and upload a full CV, unofficial transcripts, any additional information on teaching experience and a statement of teaching philosophy, as well as the names, telephone numbers and email addresses of at least three professional references. All materials should be submitted through the link at: www.erau.edu/jobs

Embry-Riddle is an affirmative action/equal opportunity employer and does not discriminate on the basis of race, religion, gender, age, national origin, disability, veteran status, or sexual orientation. Embry-Riddle is also committed to diversity and inclusion in higher education. We continually strive to recognize, respect and celebrate the differences and cultural identities among individuals as we recruit, support, and embrace our diverse community. We work to provide a safe environment where self-expression is welcome. We strive to create a campus climate free of discrimination so that networks, partnerships and cultural competency continue to be fostered through leadership, integrity, care and respect.

Inquiries may be addressed to: Terry D. Oswalt, Ph.D., Chair, Dept. Physical Sciences, Embry-Riddle Aeronautical

University, Office: (386) 226-7571, Fax: (386) 226-6621, Terry.Oswalt@erau.edu.

Physics Instructor, Northern Arizona University: The Department of Physics & Astronomy at Northern Arizona University invites applications for an academic year, non-tenure track, instructor position for the 2014-2015 academic year. The position will begin 18 August 2014. The instructor will teach lower division physics courses up to 12 credit hours per semester during the 2014-2015 academic year. The assignment will typically be four courses or some equivalent combination of lectures, recitations, and laboratory sessions. The instructor will also be expected to participate in department service. The salary range for a new instructor is \$36,000 to \$41,000 per academic year, depending on qualifications. This position is renewable pending satisfactory job performance, availability of funds, and program needs.

Minimum qualifications: A Master's degree in physics or a closely related field. Applicant must be able to begin work, with all degrees completed, on 18 August 2014.

Preferred qualifications: A strong academic record; experience teaching physics courses at the college level; evidence of high quality teaching and commitment to student success; strong communication skills; the experience and/or commitment necessary to work with a diverse population.

Applicants should submit a letter of application, a curriculum vitae (including a current e-mail address), a description of your approach to pedagogy and student success, unofficial copies of your undergraduate and graduate transcripts, and contact information for three references who know your teaching to:

Physics Instructor Screening Committee
Department of Physics & Astronomy
NAU Box 6010

Northern Arizona University
Flagstaff, Arizona 86011-6010

The committee will begin reviewing files on 30 April 2014. Consideration of applications will continue until available position is filled or closed.

The Department of Physics and Astronomy has 12 permanent faculty members and offers bachelor's degrees in physics and astronomy, as well as a master's degree in applied physics. For more information about the Department, see <http://www.physics.nau.edu>.

Northern Arizona University is a 26,000-student institution with its main campus in Flagstaff, a four-season community of about 67,000 at the base of the majestic San Francisco Peaks. NAU's emphasis on undergraduate education is enhanced by its graduate programs and research as well as distance learning. All faculty members are expected to promote student learning and help students achieve academic outcomes. The university is committed to a diverse and civil working and learning environment.

Northern Arizona University requires satisfactory results for the following: a criminal background investigation, an employment history verification and a degree verification (in some cases) prior to employment. You may also be required to complete a fingerprint background check. Additionally, NAU is required to participate in the federal E-Verify program that assists employers with verifying new employees' right to work in the United States.

Please see www.nau.edu/hr and position number 600792 for full position announcement.

Your CURPA Councilors

***John Armstrong, Weber State University.
CUR Nominations Committee.
Nadine Barlow, Northern Arizona University.
CURPA News Editor and CUR Fellows
Committee.

Maria Bautista, Kapi`olani Community College.
*Matthew Beaky, Juanita College.
***Mark Biermann, Wartburg College.
**Horace Crogman, University of California
Merced. CUR Finance Committee.
Beth Cunningham, AAPT.
Chris Hughes, James Madison University.
***Michael Jackson, Central Washington
University. CURPA Chair and CUR Posters
on the Hill Review Committee.
Liubov Kreminska, University of Nebraska at
Kearney.
John Mateja, Murray State University. NCUR
Oversight Committee and CUR Executive
Board.
Duncan McBride, National Science Foundation.
CUR Treasurer, CUR Finance Committee
and CUR Investments Committee.
David McGee, The College of New Jersey.
Sorinel Oprisan, College of Charleston. CUR
Quarterly Editors Board.
***Terry Oswald, Embry-Riddle Aeronautical
University Daytona Beach.
**Raul Peters, Paine College.
**Doug Petkie, Wright State University.
Mohammad Samiullah, Truman State
University.
*Toni Sauncy, Angelo State 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.

*Term begins July 1, 2014

**Elected/relected to new 2 year term beginning
July 1, 2014

***Relected to new 3 year term beginning July 1,
2014

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 Summer/Fall 2014 issue is ***September 1, 2014***.