From the Chair

This will be my last privileged opportunity to extend warm greetings to all alumni and friends of the Department of Physics and Astronomy at WWU under the ‘From the Chair’ headline. Winter quarter 2015 was my last as Chair of the department; meanwhile, my friend and colleague Andreas Riemann has been selected to take over. I am extremely grateful for the thirteen years I was allowed to serve the department—faculty, staff, and the many students—and for all the support I have been given and the relationships I have been a part of. As the department and I move on, I strongly encourage all alumni to stay in touch. It has been, and will remain, one of the central pleasures of life at WWU Physics/Astronomy for us to hear from you all. When you get a chance, drop us an email at physics@wwu.edu or call us at 360-650-3818. If you have plans to visit Bellingham, please do stop by.

During my time as Chair, the department faculty has undergone significant turnover. Together, over the past decade-and-a-half, we have hired a group of extremely talented and engaged (and engaging) people, and I am very proud of all of them. This past year, we were fortunate to hire two new folks: Dr. Kevin Covey, an astronomer interested in stellar formation and evolution, and Dr. Melissa Rice, a planetary scientist involved in the Mars rover projects. You can access their websites from the physics website. Both are outstanding young scientists and cool people!

Once again, I say a heartfelt ‘thank you’ to all of the great friends and alumni I have interacted with in my capacity as chair. Please drop us a line and let us know the latest!

-Brad Johnson

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Graduating Class 2015


2014 Outstanding Graduate: Tyko Shoji

The winner of both the Outstanding Graduate Award and the Outstanding Service Award for 2014 was Tyko Shoji. Tyko came to Western after completing a B.A. in Liberal Arts at Soka University of America. He chose to attend Western because he wanted to study physics in a small department with exceptional research opportunities for undergraduate students. Throughout his three years at Western, he conducted research with Dr. Janelle Leger on organic light-emitting electrochemical cells. After a successful research proposal, Tyko spent a summer working at the Environmental Molecular Sciences Laboratory at the Pacific Northwest National Laboratory in Richland, WA on his research. His work culminated in an article he published in a peer-reviewed journal. He also traveled to several national conferences to present his research. Tyko was also a teaching assistant for introductory physics courses and worked for Professor Kathleen Kitto developing content for her introductory materials science course. After graduating from Western with a double major in Physics and Mathematics and a minor in Materials Science, Tyko entered the Physics PhD program at the University of Colorado - Boulder. He has branched into the field of applied optics and is now conducting research on chip-scale ultra-fast laser sources.
New Faculty Profile
Kevin Covey

Dr. Kevin Covey uses telescopes around the world -- and orbiting above it -- to study how stars, stellar clusters, and (exo)-planetary systems form and evolve. Currently, he is leading analyses of data collected by the Sloan Digital Sky Survey’s near-infrared, multi-object APOGEE spectrograph, which provides precise measurements of the properties and velocities of stars in nearby, young stellar clusters. Analyzing these data, Kevin & his colleagues are untangling the star formation histories and dynamics of these stellar nurseries. Dr. Covey is also actively involved in several programs that monitor the brightness of stars in clusters with well-determined ages to reveal how a star’s rotation rate and stellar properties evolve over time. By analyzing data collected at optical and infrared wavelengths, from telescopes on the ground and orbiting far above the Earth, Kevin and his collaborators can identify eclipsing binaries, transiting planets, and the presence and properties of stellar starspots.

Before coming to Western, Kevin received his PhD in Astronomy from the University of Washington, and was awarded NASA’s Spitzer and Hubble Postdoctoral Fellowships to support his research at the Harvard-Smithsonian Center for Astrophysics and Cornell University. Kevin comes to Bellingham from Flagstaff, Arizona, where he was astronomer at Lowell Observatory. When not studying the cosmos from behind a telescope mirror or computer screen, Kevin enjoys recreational cycling and cheering for the Portland Trailblazers.

New Faculty Profile
Melissa Rice

Dr. Melissa Rice is an Assistant Professor of Planetary Science, with a joint appointment in the Geology Department and the Physics & Astronomy Department. She received her Ph.D. in the Department of Astronomy at Cornell University, and before arriving at Western she was a Postdoctoral Scholar at the California Institute of Technology. Her research focuses on the sedimentology, stratigraphy and mineralogy of planetary surfaces; the current aim of her work is to help constrain the habitability of ancient environments on Mars. She is a collaborator on the active NASA Mars Science Laboratory Curiosity and Mars Exploration Rover Opportunity missions, and her research with students at Western involves analyzing the multispectral imaging data from the rover missions. She is also part of the team that is designing and building the cameras that will be part of NASA’s next Mars rover, launching to Mars in 2020.

Faculty Sabbatical Updates

During Fall and Winter quarters 2014/2015, Andreas Riemann did sabbatical research at the Freie Universität Berlin, Germany after having established a connection for a research project with Prof. Katharina Franke two years prior at an international workshop. The group of Dr. Franke has several state-of-the-art Scanning Tunneling Microscopes. His sabbatical research project addresses the possibility of inducing changes of chemical states of individual molecules absorbed on surfaces, specifically the ring-opening/ring-closing state of various spiropyran molecules.

Andrew Boudreaux will take a sabbatical in the upcoming academic year to work with longtime collaborator Suzanne Brahmia at Rutgers University. They plan a controlled study of the effectiveness of “Physics Invention Tasks” in the introductory course at Rutgers. Invention tasks are a set of materials for supporting the development of students' mathematical reasoning in physics, and are intended to bridge the gap between the ways that math concepts, such as ratio and function, are taught in math courses, and the ways those concepts are used in physics.
WWU Planetarium Changes its Name to Dr. Leslie E. Spanel Planetarium

As many of you know, the WWU planetarium is one of the most heavily and broadly utilized facilities on campus. Among the department’s friends and alumni, many may remember the old theater—with the circles of wooden church pews and the analog Spitz projector, all installed in the mid-1950’s. Others may remember the installation of the first all-digital projector in 2004, and the major renovations that accompanied it. This past year, the facility underwent another major upgrade, thanks to the incredible support and generosity of former Washington State Senator Harriet Spanel. The theater now boasts state-of-the-art Digistar 5 hardware and software, and a new high-resolution, high-contrast projection system.

At a ceremony in the spring of 2014, the newly upgraded planetarium was officially named the Dr. Leslie E. Spanel Planetarium, in memory of the late Les Spanel. Les was a Physics/Astronomy faculty member from 1968-2002, and he chaired the department from 1998-2002. Les was instrumental in keeping the planetarium alive and well for many years, ensuring that it was preserved during the demolition and remodel of Haggard Hall in the mid-1990s, and it was his goal the theater become a center of education and community outreach on campus. The planetarium now holds public shows twice a month, numerous special private shows for community groups, and next academic year, a partnership with the Bellingham Public Schools will allow every fourth grader to visit the Spanel planetarium with their class.

If you find yourself in Bellingham in the future—be sure to visit the Spanel Planetarium!

Undergraduate Research Conference 2014

At the end of spring quarter each year our department runs a day-long “Undergraduate Research Conference” at which our majors present the results of research they have been working on in senior research projects with our faculty. The energy and enthusiasm displayed by our students’ is always spectacular. Here are the highlights from last year’s conference.

<table>
<thead>
<tr>
<th>Name</th>
<th>Project Description</th>
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<tr>
<td>Kyle Hoke</td>
<td>Plasmon Polariton Modes in High Index Dielectric Structures</td>
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<td>Holly Christenson</td>
<td>Uncertainty in the Extinction-to-Reddening Ratio in the Near Infrared Due to Error in the Assumed Spectral Type of Main-Sequence Background Stars</td>
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<td>Jacob Borg</td>
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<td>Jaron Kropp</td>
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<td>Evan Johnson</td>
<td>Exploring Particle Transport Properties of One-Dimensional Crystal Lattices with Overlap Impurities</td>
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<td>Andrew Wray</td>
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<td>Colin Sarkis</td>
<td>Mechanochemical Synthesis and Characterization of Iron Doped TiO₂</td>
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<tr>
<td>Emily Granston</td>
<td>Assessing Effectiveness of Lab Curriculum in Promoting Student Understanding of Kinematics</td>
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<td>Tyko Shoji</td>
<td>Progress Toward Tunable White Light-Emitting Electrochemical Cells</td>
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<tr>
<td>Nathan Bradshaw</td>
<td>Biocompatible Silk Poly (pyrrole) Composite Electromechanical Actuators</td>
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Please Join Us:

Events in 2015

May: Back to Bellingham (May 15 - 17)
  WWU Scholars Week (May 11 - 15)
  Physics Undergraduate Conference (May 17th, 1-2:30pm and 3-4:30pm)
June: Saturday June 6: The annual picnic! (please RSVP with the department)

Contact info:
phone: (360)650-3818
email: physics@wwu.edu

Women in Physics Club

WWU Women in Physics was founded this year by a group of students in the physics program. After attending a conference for undergraduate women in physics, the founders formed the club with the goal in mind of promoting and supporting diversity in physics. They have focused on cultivating a strong and inclusive community in the physics department this year, and have organized quarterly game nights. Also, they have done outreach to the community by performing lab demos for elementary school children visiting WWU’s campus with Compass2Campus.

Recently, they held an event entitled, “How To Be an Astronaut,” in which Wendy Lawrence spoke about her experience as a NASA astronaut. For more information about upcoming events hosted by WWU Women in Physics, email wwu.womeninphysics@gmail.com or visit their Facebook page.