Alumni Reunion A Huge Success

Approximately 80 alumni of the UWRF Physics department returned to campus on April 24-25, 2015 for a once-a-decade reunion. Alumni from the 1960’s through the 2010’s took part in some or all of the events.

Friday afternoon and evening, the early arriving alumni got a chance to wander through the department, chatting with current students about their projects, as well as with current and former faculty and other alumni. Rainy weather caused the planned Society of Physics Students’ (SPS) picnic at Glen Park to be moved to the dry interior of the Physics hallway and classrooms, but the enthusiasm of the gathering was not dampened at all.

Saturday began with groups alternately touring the campus and virtually touring the universe in a planetarium show led by Eileen Korenic and Arriety Lowell. Campus highlights included the Swensen sundial and the newly remodeled North Hall Auditorium, where a few alumni recalled Neal Prochnow’s conservation of energy demonstration of a mass swinging from a long rope attached to the ceiling.

After a relaxing lunch and time to talk, everyone gathered in the new Active Learning Classroom in Hagestad Hall to gain a little experience into how Direct Measurement Videos (DMV) are used in the classroom to engage students. Matt Vonk, one of the developers of DMVs, led everyone through a few of the videos and showed how students do ‘video experiments’ in class and as part of their homework.

The next events took place back in Centennial Science Hall (the “new” science building for some alumni). Everyone divided up into three groups to rotate through three presentations. Earl Blodgett, Historian of the national SPS organization, gave an overview of the local SPS chapter’s activities, history, and did a few demos the chapter does during outreach events. Jim Madsen gave an overview of the IceCube project at the South Pole, and noted how UWRF contributes to that international research collaboration. Finally, students Gillian McDonald, Angela Ludvigsen, Peter Gagliardi, and Elliot Pachniak showed off four different research projects they were working on in the recently remodeled Optics

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Lab. Some of the alumni present had worked on an earlier stage of one of the projects when they were students, so they were able to see how things had progressed.

Finally, after an energetic social hour and dinner, everyone gathered for the ‘Four Favorite Demos’ show. Lowell McCann, Dick Peterson, Erik Hendrickson, and Carl Nelson each showed a demonstration or two. The demos included self-siphoning bead chains, a ping-pong cannon, fun with liquid nitrogen (with stories about how to make your audience faint), and a variety of pressure demos including a bed of nails.

As an added bonus, the skies were clear, so the observatory was opened up for a little star-gazing as the night wound up. The alumni who came to the reunion seemed unanimous in their enjoyment of the event, and some even suggested having reunions more often than every decade.

Thank you to all who could make it, we hope even more will be able to make it to the next one - whenever it happens!
A graphical look at the growth of the physics program at the University of Wisconsin - River Falls (also known as River Falls State Normal School, River Falls State Teacher's School, Wisconsin State College - River Falls, Wisconsin State University - River Falls). The vertical axis shows the number of graduates with physics degrees per year and the horizontal axis shows the staff members during each time period.
Projects: Flights, Levitation, Photons, and More

Student-led projects were a focal point of the spring semester again this year. Several were aided by Undergraduate Research, Scholarly, and Creative Activity (URSCA) grants written by students to support their work. These relatively new local grants can provide support for both stipends and supplies, and are instrumental in making some student projects possible.

Robert Dietrich used an URSCA grant to help fund a high-altitude balloon launch in which he hoped to measure cosmic ray events, along with pressure and position data.

An URSCA grant supported Peter Malchow’s study of the resistivity of thin evaporated gold films, and along with Peter Gaigliardi and Tyrel Danielson furthered the nearly complete development of a Scanning Tunneling Microscope.

Nate Shokwiler examined ways to influence the flow of fluids in microfluidic channels using electric fields.

Jon Tarpinian worked to design and build a simple IR camera using only a single sensor.

Peter Gaigliardi, with URSCA support, calibrated a camera using only a single sensor.

Kelly McFarland developed and tested a magnetic levitation system that could support objects that were well over 100 grams.

Dominic Bugni redesigned, developed, and tested a 3D printer which future students will be able to use for their projects.

Gillian McDonald, with support from the Falcon Scholars program, designed and built a rangefinder that would be suitable for use by golfers.

Scott Neby examined Wavelet Transformations as alternatives to simple Fourier Transforms.

Kelly McFarland and Victoria Wahlgquist successfully built and tested an acoustic levitation system using ultrasonic waves to levitate small objects.

Angela Ludvigsen and Elliot Pachniak used an URSCA grant to continue experiments on aerosol droplets using an optical trap.

An URSCA grant supported Gillian McDonald and Angela Ludvigsen’s work to develop single photon experiments to probe some fundamental questions about Quantum Mechanics.

Mini March Meeting Reunion

This past March, an impromptu reunion of current and former URF students took place in San Antonio, Texas, where the American Physical Society was holding its annual March Meeting. Angela Ludvigsen, a current student, was presenting her research with Lowell McCann at the meeting and met up with alumni (L to R from middle) Charlotte Evans of Rice Univ., Dwight Lehman of Sandia National Labs, and Devin Underwood of HRL Laboratories who were also attending and presenting at the meeting.

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Physics Department Hosts ‘UWRF Science Exploration Day’

In an effort to reach out to the local community and recruit top local talent, the physics department welcomed 45 science students (mostly 3rd year students) from Hudson High School on May 15th for a morning of learning, activities, and fun. The event started with a planetarium show hosted by Eileen Korenic and then students selected between sessions about the following topics: Cosmic Rays, Computational Physics, Icecube, Levitating With Laser Light, Physics and Flight, Women in Science and Engineering, and Special Relativity. The event wound up with a design challenge where teams of 3 students competed for ten minutes to build the tallest tower with 78 toothpicks and a bag of small fresh marshmallows. The winning height was 40.5 cm.

Students investigate principles of airplane flight using straws, funnels, and ping pong balls. Photos by Veronica Ellingson.

At the spring Physics Banquet this year, seven students were inducted into the Sigma Pi Sigma Physics Honors Society and the 2014-15 scholarship winners were announced. The named scholarship winners are:

Angela Ludvigsen - Earl Albert Scholarship
Victoria Wahlgquist - Earl Albert Scholarship
Tyrel Danielson - Curt and Dee Larson Scholarship

The winners of physics department scholarships are:

Farris Al-Humanyani, Justyne Dalske, Justin Diercks, Brendon Gearhart, Alexander Haas, Samantha Pedek, Kyle Swanson, and Dylan Windsor.

In addition, Roman Alvarado of Medford High School was awarded a freshman scholarship.

Hernandez and Ludvigsen Earn National Scholarships

This year two URF students were awarded scholarships from national physics associations. Raven Hernandez, a Broad Field Science - Physics major from Elk Grove, IL, was awarded one of four Barbara Lotze Scholarships for Future Teachers from the American Association of Physics Teachers. This $2000 scholarship supports outstanding students who are preparing to teach physics at the high school level.

Angela Ludvigsen, from St. Paul, MN, was awarded a Leadership Scholarship from the national Society of Physics Students (SPS) organization. The $2000 scholarship is awarded based on academic achievement and involvement in SPS. Angela served as an SPS associate zone councilor this past year, as well as being an officer in the local chapter. Angela will spend 8 weeks in Paris, France working in a research group using ultrafast lasers as part of the ‘Optics in the City of Light’ international Research Experiences for Undergraduates program this summer.

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Engineering Class Examines Campus Building

The open design of the new University Center (UC) is an excellent (and easily accessible) resource for identifying many of the structural design elements students analyze in the PHYS 254 Mechanics of Materials / Deformable Bodies course. On May 2, PHYS 254 students went to the UC to locate cantilevered beams, pin-like connections, and fixed supports. Students identified wood, concrete, metal, and composite elements in tension and compression. They also identified which elements were supporting significant loads and which were mostly aesthetic in nature. Prof. Rellen Hardtke reviewed some of the challenges faced during construction, such as unexpectedly shallow bedrock on the west side of the site and its proximity to the protected watershed of the South Fork of the Kinnickinnick River. The UC is located on the former site of the Ames Lab School building.

Students taking this course are nearly all Dual Degree Engineering or Applied Physics majors. Although there were a relatively small number this year, 25 students have already registered for the Engineering Statics class for fall. The Physics/Engineering Dual Degree program was started in the 1990s by Prof. John Shepherd.

The department is always interested in internship and work experience opportunities for our physics and engineering students. Please contact Rellen.Hardtke@uwrf.edu or your favorite UWRF Physics Professor to let us know of ways current students could help your organization during the academic year and/or summer.

Rocket Team Advances to Midwest Regional Competition

The UWRF FalconOne rocket team competed in the Wisconsin Space Grant Consortium event May 2, 2015, at Bong Recreation Area near Racine, WI. They did well enough to qualify for and compete in the May 20 “Midwest Regional Collegiate Rocket Competition” which was open to the top three teams from any state competition and took place in North Branch, MN. This year’s rocket team included Robert Dietrich, Farris Al-Humayani, Jose Bermeo, Justin Diercks, and August Fritze.

The design goal for these competitions was to achieve the maximum altitude of a boosted dart (the un-powered second stage of the rocket) with a specified motor. In addition, the rocket needed to record downward facing video of the entire launch, have a stable flight of all components to apogee, and recover all components in re-launchable condition. The FalconOne rocket flew beautifully, but the final results are not yet in. (Scores are based on preflight design reports, presentations, and a final post-flight report in addition to the launch itself.) Currently, there is no national competition to compete in, so this will be the last launch of the year for FalconOne, regardless of the outcome.

The FalconOne rocket takes flight at the regional competition in North Branch, MN.