

Innovation and Research

AMSEC researchers are developing solar panels to generate electricity for a tenth of the cost of today's technology.

AMSEC designing next-generation solar panels

Faculty at the Advanced Materials Science and Engineering Center (AMSEC) are working on the next generation of solar panels thanks to a three-year, \$970,000 grant from the National Science Foundation. The AMSEC team is building and testing a new type of solar collector that uses a plastic polymer impregnated with special dyes to capture and collect the sunlight and transport that light to a system of silicon chips that turn it into electricity. Because the plastic solar collectors are much cheaper to produce than traditional silicon-based solar arrays, and because the new system is inherently more efficient – the new arrays will collect light from the entire visible spectrum instead of just from the red wavelength as silicon panels now do – the cost of producing a watt of electricity from these solar panels could be one-tenth the cost of using today's traditional silicon panels. The AMSEC team working on the project comes from a number of departments at WWU: Physics Professor **Brad Johnson**, Chemistry Professor **David Patrick**, Mathematics Associate Professor **Stephen McDowall**, Chemistry Assistant Professor **John Gilbertson** and AMSEC Assistant Professor **Janelle Leger**. About 15 to 20 undergraduates will have a chance to work on the project over the next three years, as well as a number of graduate students.

Feds award \$730K grant to design hybrid bus

The Federal Transit Administration awarded Western a \$730,000 grant to design a lightweight hybrid bus now being built at the Technology Development Center, a Port of Bellingham facility leased by WWU and Bellingham Technical College. The 24-foot, 15-passenger paratransit shuttle will run on non-petroleum-based fuel and include an improved design for better aerodynamics and driver control. The plan is to build a "proof-of-concept" vehicle by late 2013 to enable interested organizations to conduct feasibility analyses. Market analysis indicates a potential national demand for such a hybrid bus of up to 3,000 vehicles annually. Also involved in the project are Transition Composites, Janicki Industries, Kitsap Transit, Whatcom Transportation Authority (WTA), the Port and Airtech.

Grant funds study of border wait times for trucks

The Border Policy Research Institute received \$49,000 from the Washington State Department of Transportation to analyze cargo operations at the Blaine border crossing. The research was performed in cooperation with U.S. Customs and Border Protection (CBP) and was based upon prior BPRI research in which Decision Sciences Associate Professor **Mark Springer** modeled new lane and booth configurations at the border cross-

ing. At CBP's request, the BPRI conducted a field test of Springer's configuration, resulting in a 70-percent reduction in aggregate delay time for trucks headed southbound at Blaine.

Grant for quake database assists disaster planning

A \$45,000 grant from the Washington Emergency Management Division will help create a database for use in earthquake disaster planning. Environmental Studies Assistant Professor **Scott Miles** and Research Associate **Rebekah Green** of Western's Resilience Institute received the grant to build the database, which will include 20 earthquake disaster scenarios to be used for training exercises and planning. Graduate student **Ben Kane** of Davis, Calif., will assist with the project.

Wise's book, "Emerald Bay" is the basis for a ballet

English Professor **Christopher Wise's** new book, "Emerald Bay: From the Lost Archives of Mark Twain," was the basis for a ballet staged by Northwest Ballet Theatre in Seattle, Mount Vernon and Bellingham. Wise's book, set in Bellingham Bay and the Puget Sound region in 1885, recounts the adventures of Dirty Dan Harris, the historical founder of Fairhaven. It also tells the tragic love story of a Chinese sea captain, Li Puo, and Julie O'Connor, a young woman of Irish ancestry.

Etnier funded to study climate change in Alaska

With the help of a \$126,000 National Park Service grant, Anthropology Research Associate **Michael Etnier** will study archaeological samples and climate change in southwest Alaska. The research funds, part

of a cooperative agreement with the National Park Service, will assist Etnier's study of archaeofaunas — samples of shells and animal bones — to try understand how ecological communities have responded to climate change. The research could reveal how larger animals have responded to climate change for 8,000 years, allowing researchers to gain a better idea of how species could be affected in the future.

Grant funds Bodensteiner's alpine lakes research

A National Park Service grant will help Environmental Sciences Associate Professor **Leo Bodensteiner** continue his research into aquatic alpine ecosystems in the North Cascades National Park complex. Bodensteiner will use the \$42,744 grant to study baseline conditions in the ecosystems, which includes surveying fish, amphibians, and invertebrates. He is also studying water chemistry characteristics, mapping of the lakes, and human disturbance. Bodensteiner's research is part of the National Park Service's larger effort to understand lake disturbances and develop restoration projects in the North Cascades, Mount Rainier and Olympic national parks. Bodensteiner also said the ongoing research in Washington state will allow



WWU graduate student Chelsea Mack of East Lansing, Mich., in the computer lab aboard ship during a NSF-funded Geology research trip to the Lo'ihī seamount in Hawaii. Mack was among 13 Western students and recent graduates, led by Geology Associate Professor Jackie Caplan-Auerbach.

WWU Environmental Sciences students to participate and gain professional experience in their field of study.

Faculty present in Research Presentation Series

From plague in medieval Europe to contemporary science fiction faculty members presented a wide variety of research topics at spring quarter's Faculty Research Presentation Series. Presentations included:

- Art Associate Professor **Cara Jaye's** "Crossover 2: A Collaborative Mixed Media Art Exchange."
- Elementary Education Assistant Professor **Maria Timmons Flores'** "Building Bridges with Migrant Youth."
- History Associate Professor **Peter Diehl's** "Plague in Early Medieval Europe."
- Economics Professor **Julia Hansen's** "The Value of Park and Trail Amenities: Evidence from a Hedonic Housing Study."



Walter Dorwin Teague, left, inspects in the interior of a Boeing Stratocruiser; Teague is the subject of a new documentary film by Industrial Design Associate Professor Jason Morris.

- English Assistant Professor **Lysa Rivera's** "Far Out: Science Fiction in Black America."
- Classical Languages Associate Professor **Diane Johnson's** "The Heroines of Eobanus Hessus: Classical Myths and Christian Traditions."
- Biochemistry Assistant Professor **Paul Spiegel's** "Ribosomes: Ancestral Molecules, Antibiotics and Connection Between Genotype and Phenotype."
- Psychology Assistant Professor **Kate McLean's** "Kids Telling

Stories: Adolescent Identity Development in Conversations with Mothers and Friends."

- Human Services Assistant Professor **Raine Dozier's** "Trends in the Well-Being of Women of Color, 1979-2009."

Students join Hawaiian submarine volcano study

More than a dozen students and recent graduates joined Geology Associate Professor **Jackie Caplan-Auerbach** on a research trip to study the Lo'ihi seamount, Hawaii's youngest submarine volcano. Funded by the National Science Foundation, 13 WWU students and recent graduates spent a week in September dropping ocean-bottom seismometers around the volcano, which monitor tiny earthquakes in and around Lo'ihi and allow the researchers to study its internal structure. The team returned to Lo'ihi in summer 2011 to retrieve the seismometers for analysis. Western students and recent graduates on the research team included: **Kevin Bellamy**, Tacoma; **Tyler Cox**, Woodinville; **Susan Dickerson**, Seattle; **Emily Grover**, Sumner; **Greg Horning**, Portland, Ore.; **Chelsea Mack**, East Lansing, Mich.; **Dara Merz**, Vancouver; **Britta Nelson**, North Bend; **Tyson Throgmorton**, Cashmere; **Morgan Vane**, Seattle; **Sarah Weeks**, Portland, Ore. and **Kayleigh Wilson**, Woodinville.

Morris working on documentary on design pioneer

Industrial Design Associate Professor **Jason Morris** is developing a feature-length documentary about design pioneer Walter Dorwin Teague, who designed many of the products and places that defined modern

America: Kodak cameras, the Boeing Stratocruiser aircraft, Steinway pianos, Sparton radios, Texaco service stations, Stueben glassware, the Marmon 16 automobile, and the 1939 World's Fair. Through the support of Teague Design and the Teague family, new materials have been rediscovered that shed new light on Teague's story. These include drawings, sketches, film, video and photographs never before seen by the public.

Rare prehistoric bird track on display in Geology

Fifty million years ago, when what is now Washington state was covered with a verdant subtropical rainforest, a 380-pound flightless bird called *Diatryma* stalked the floodplains of the region's meandering rivers. Although *Diatryma* was long thought to have existed in this region, a recent discovery by geologists from Western Washington University of a fossilized footprint of this 7-foot-tall bird proves that it did indeed roam the forests of the Pacific Northwest, said **George Mustoe**, a paleontologist at WWU. In fact, the track is the world's only known track of any giant extinct bird. The track, which measures almost a foot in length, was found in the Chuckanut Formation east of Bellingham. The 1,300-pound sandstone slab which holds the *Diatryma* track was helicoptered to a nearby road and transported to WWU, where it is on display in the Geology Department. The slab also holds a number of smaller bird footprints; one may be from an ancient ancestor to the heron, others are smaller shorebirds.

Math faculty examine local skin cancer rates

Whatcom County's elevated rates of melanoma will get a closer look by Math Associate Professor **Victor Chan**, thanks to a \$3,500 grant from the Peace Health St. Joseph Medical Center Foundation. Melanoma is a particularly dangerous type of skin cancer, and for more than a decade, Whatcom County's melanoma incidence rates invariably exceed the national and state averages. The research group consists of Chan, Mathematics Assistant Professor **Amy Anderson**, and Western students **David Whitney** of Richland and **Mike Switzer** of Bellevue.

Medler studies fire's role in human evolution

Long-burning fires caused by lava flows in the African Rift Valley may have played a significant role in human evolution, according to Environmental Studies Associate Professor **Michael Medler's** research. "Speculations about the effects of fire and lava flows on human evolution," appears in the most recent issue of the online journal *Fire Ecology*. Medler's research contributes to an emerging notion that human evolution has been influenced by fire. Medler proposes that many of the attributes that separate humans from other primates may be evolutionary ad-

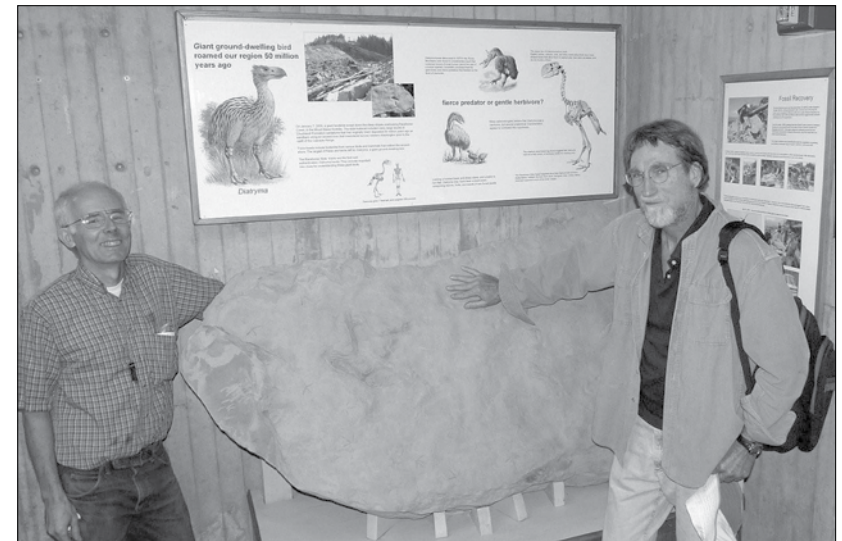


Photo by Dave Tucker

George Mustoe, left, and Keith Kemplin with the sandstone slab containing the giant extinct bird foot track that they discovered. The track is now on display on the first floor of the Environmental Studies building.

Michael Medler's research explores how fire helped make us human.

aptations that resulted from easy access to the fires at the leading edges of lava flows in the African Rift Valley. Access to fire could have allowed cooked food, freeing more caloric energy, and leading to the development of humans' uniquely short intestines, small mouths, and most importantly, larger brains. Medler's article outlines how the location of important early human ancestors coincides with the timing and location of many lava flows. He is continuing his research, with the help of Huxley College students, to combine maps of significant hominid archeology sites with maps of lava flows occurring in the same locations and time spans that our ancestors were evolving.

Hsueh's book examines colonial constitutions

History Associate Professor **Vicki Hsueh's** latest book, "Hybrid Constitutions: Making and Unmaking Power and Privilege in Colonial America," published by Duke University Press, explores the development of early American colonial documents. The book examines how the charters, constitutions and treaties of early America were affected by colonial encounters. "Creation and revision of these documents was heavily shaped not only by colonial ambition but by a sense of insecurity, contingency, and limited knowledge and resources," Hsueh said. This more insecure and ambiguous origin of colonialism offers important resources for assessing contemporary indigenous claims in the U.S. and former settlers' colonies, such as Australia and New Zealand.

Federal grants fuel research at Shannon Point

Western's Shannon Point Marine Center in Anacortes

received several significant grants this year to fund cutting-edge marine research, including:

- More than \$867,000 in two federal grants from the National Science Foundation and the North Pacific Research Board. The three-year funding from the NSF, in collaboration with scientists at the Scripps Institute of Oceanography, will investigate a group of microscopic bacteria that is responsible for a large proportion of the Earth's photosynthesis. This diverse group of microbes produces carbon at the base of the oceanic food web that ultimately supports larger sea animals. Meanwhile, the funding from the North Pacific Research Board lasts four years and will examine factors in survival of five commercially important groundfish in the Gulf of Alaska. Shannon Point scientists will collaborate with those at the University of Washington, University of Alaska, and the National Oceanic and Atmospheric Administration.
- A \$400,000 grant from the NSF will also continue funding the center's Research Experiences for Undergraduates Site through 2015. The program recruits undergraduates from Western and from colleges and universities nationwide to spend the summer at the marine center in Anacortes, carrying out independent research projects under the supervision of resident and visiting faculty. Shannon Point has obtained NSF funding for the program for 25 consecutive years

Shannon Point internships now in arts, diving

For decades, Shannon Point Marine Center has offered top-notch experiences for students in research, but Western's marine research center expanded its

internship offerings in summer 2011 to include experiences in diving and the arts. The American Academy of Underwater Sciences and the Our World-Underwater Scholarship Society selected Shannon Point as the host site for their scientific diving internship for summer 2011. The intern, selected by the sponsoring organizations, joined Shannon Point's research team conducting restoration and out-planting work with the threatened native Pinto abalone. Meanwhile, a WWU arts major spent the summer at Shannon Point, working with a faculty adviser to learn more about the research work at the center and applying it to his or her artistic work. The student artist may also help the marine scientists learn how to communicate their work more effectively to a wider audience.

NSF Noyce Grant funding scholarships and summer stipends for future math and science teachers

The National Science Foundation's \$900,000 Noyce Grant, which supports students who plan to become mathematics or science teachers, has so far funded \$210,000 in scholarships. Noyce grant funding also included stipends for approximately 60 first- and second-year students to serve as summer interns in area school districts working with summer-school students; so far, the grant has supported 20 students working in summer school programs. Secondary Education Professor **Bruce Larson** and Science, Math and Technology Education Director **George "Pinky" Nelson** are the principal directors of the Noyce Grant.

Conference explores building a smarter border

The Border Policy Research Institute teamed with the Consulate General of Canada, Seattle, to host a seminar regarding the "Beyond the Border" initiative recently unveiled by President Obama and Canadian Prime Minister Stephen Harper. Held in Seattle, eight short papers from Canadian and American experts were presented, each followed by a lively discussion among the group of scholars and policy professionals in attendance. Proceedings were provided to federal officials participating in the Beyond the Border Working Group, recently created by Obama and Harper to boost continental security and bilateral trade by re-engineering border processes for the 21st century.

Wallin research explores mountain goat populations

Environmental Science Professor **David Wallin** received a pair of grants from The Mountaineers Foundation and the Washington Department of Fish and Wildlife to continue his work studying the regional decline of the state's population of mountain goats in the Cascades. Wallin is researching how the I-90 corridor isolates the goats from each other, making them much more vulnerable, and also how healthy populations of goats might be fostered in other areas of their historical range. The grants will pay for a graduate student and undergraduate interns who are doing field work in the high alpine zones, collecting genetic material and mapping the goat populations.

A National Science Foundation grant funds scholarships and internships for students becoming science teachers.