

Center for Research on Occupational and Environmental Toxicology

NEWSLETTER

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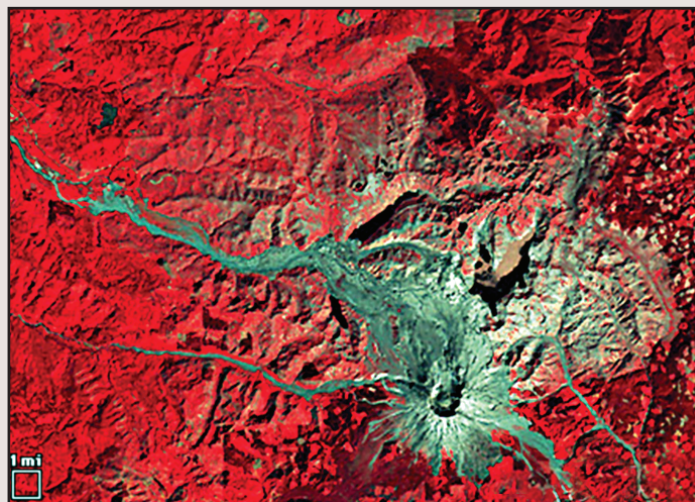
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- SBRC Student Wins Two American Chemical Society Awards
- CROET Predoctoral Candidate Wins National Research Service Award



VOL. 9, NO. 2, 2001



Landsat Satellite image of Mt. St. Helens, taken in 1988.

CROET Research Focuses on Sleep Cycles

Within a small structure of the brain called the suprachiasmatic nucleus (SCN) resides a biological "pacemaker," or clock, that controls sleep and wakefulness in rhythm with the daily rotation of the earth. Knowledge of how this circadian clock functions is important, because approximately 20 percent of workers in the United States are engaged in occupations that require them to be awake during odd hours, and all are at risk for work-related stress and injury due to disruption of this clock. A normal consequence of aging is a deterioration of sleep quality and an inability to tolerate shift work. This change reflects alterations in either the circadian pacemaker or in the response of the pacemaker to environmental stimuli such as light.

Recently, Dr. Charles Allen of the Center for Research on Occupational and Environmental Toxicology (CROET), and his cadre of graduate students and postdoctoral fellows, staged a presentation of their research on the circadian system. This is one in a series of internal seminars in which CROET faculty open up their research program for review and critique by Center staff. This review process ensures that each of the Center's research programs benefits from the collective wisdom of the research staff, and it promotes cross-fertilization of ideas and collaboration within CROET. The focus of Dr. Allen's research is to better understand the physiology of pacemaker neurons within the SCN, information that can help us to avoid problems associated with adapting to modern-day work schedules.

Dr. Allen began with an overview of the circadian clock, focusing on the roughly 8,000 neurons within the SCN that possess this internal timekeeping system. The circadian clock

Main Article... (continued from page 1)

within these neurons, in its most basic form, consists of a set of proteins that generate a self-sustaining feedback loop with a free-running period of approximately 24 hours. The activity of these SCN neurons is altered by inputs from other parts of the brain, most notably from sensors within the retina of the eye. These inputs, which are activated by environmental factors such as light and temperature, can act to either advance or retard the timing of the circadian clock and thereby alter the sleep/wake cycle. Signaling within this system is achieved through a variety of neurotransmitters and their associated receptors.

Dr. Allen's overview was followed by a series of presentations by graduate students and post-doctoral fellows, who presented their research on a variety of issues that are critical to understanding the circadian clock. Si-Hyun Kim presented the results of his work to define specifically what signaling mechanisms are activated on the surface of SCN neurons using a technique called patch clamping. Masayuki Ikeda addressed the role that intracellular calcium plays in the control of SCN neuron activity. Heinrich Gompf described his research into how a special neurotransmitter, orphanin FQ, alters the rhythmic cycles of activity in SCN neurons. Finally, Erin Jobst presented her investigations on a subpopulation of SCN neurons that express a protein called calbindin, and which are known to possess the strongest rhythmic pulses in the SCN. She wants to find out how these neurons behave in response to inputs from other neurons.

While each of these presentations addressed specific aspects of SCN neuron physiology in isolation, each piece of data presented fits nicely into the larger picture of how the circadian clock functions. Our ability to see this larger picture is important, because disruption of the circadian clock is a major cause of lost worker productivity. Understanding the mechanisms controlling our circadian clock will enable us to develop more effective strategies to prevent work-related stress, injury and illness.

CROET HEALTH AND SAFETY SEMINARS

Stress in the Workplace: Challenges for the 21st Century*
Co-sponsored by Portland State University Psychology Department

October 26, 2001
Oregon Conference Center
Portland, OR

* In light of the recent tragedies in New York, Washington, D.C. and Pennsylvania, we have invited OHSU's Dr. J. David Kinzie to speak on Post-Traumatic Stress Following a National Disaster. Dr. Kinzie is certified in psychiatry and neurology with special interests in the psychiatric treatment of refugees, post-traumatic stress disorder and depression. For a complete seminar schedule and registration information, please visit our website at www.croetweb.com.

OUTREACH

CROET is providing exhibits at the following conferences.

Southern Oregon Occupational Safety & Health Conference

October 10-12, 2001
Smullin Center, Medford, Oregon

Western Pulp & Paper Workers Safety & Health Conference

December 4-7, 2001
DoubleTree Hotel-Jantzen Beach, Portland, Oregon

Cascade Safety, Health & Environmental Conference

March 12-14, 2002
Hilton Eugene & Conference Center, Eugene, Oregon

Registration flyer for materials is scheduled for mailing in October 2001.

<http://www.cbs.state.or.us/external/osh/educate/conferences/confer.htm>

GRANTS

Below are grants received by CROET scientists since our last newsletter. Amounts listed are received over the duration of the grants, which range from one to five years. Most grants also provide "indirect" costs to OHSU that support the research.

Scientist	Funding Agency	Title	Total Award
Patton, B	NIH	Laminins and Neuromuscular Synapse Formation	\$1,208,000
Turker, MS	NIH	Gene Silencing in Cancer: A Model System	\$1,057,000

ISSUES

Radon

Radon - it's a radioactive gas you can neither see, smell nor taste, but it may be a health hazard in your home or workplace. Radon is estimated to cause 15,000 Americans to die each year from lung cancer, according to a 1998 report by the National Academy of Sciences (NAS) on radon in indoor air (<http://www.epa.gov/iaq/radon/beirvi.html>). In fact, the Surgeon General has warned that radon is the second leading cause of lung cancer in the United States today, second only to smoking. And of smokers, the risk of lung cancer is especially high for those whose homes contain high levels of radon.

Radon evolves from the natural (radioactive) breakdown of uranium in soil, rock and underground water. Because radon is a gas, it can seep up through the foundations of buildings and build up to high levels in areas that are poorly ventilated. It quickly decays into minuscule radioactive particles that can get stuck deep within the air spaces of the lung, where they emit carcinogenic alpha particles. Over a period of years, exposure to high levels of radon can produce pulmonary injury and cancer. You and your family are most likely to receive your greatest exposure at home, because that's where you spend most of your time.

The issue of radon sprang to the forefront recently in Portland, Oregon, where it was detected in a middle school at levels above the U.S. Environmental Protection Administration (EPA) action limit of 4 pCi/L (picocuries per liter) of air. The radon hazard in Portland is actually tied to events that occurred thousands of years ago, when the ancient Missoula ice dam broke, sending billions of gallons of water to the sea. The area where Portland lies is estimated to have been under 400 feet of water. Within this water was a large amount of uranium-bearing granite material that settled out to form the Alameda ridge area of Northeast Portland. Today, radon gas emissions from the earth are higher in this area than in surrounding areas.

TESTING FOR RADON

The EPA has identified and mapped areas of the United States with the potential for elevated indoor radon levels. The EPA's Map of Radon Zones (<http://www.epa.gov/iaq/radon/zonemap.html>) assigns each of the 3,141 counties in the United States to one of three zones based on radon potential:

- Zone 1 counties have a predicted average indoor radon screening level greater than 4 pCi/L
- Zone 2 counties have a predicted average indoor radon screening level between 2 and 4 pCi/L
- Zone 3 counties have a predicted average indoor radon screening level less than 2 pCi/L



It is important to note that, although Zone 2 and 3 homes are predicted to have average indoor radon levels below the EPA action level, this does not guarantee that your home is safe. Testing is the only way to know if you and your family are at risk from radon. The EPA and Surgeon General recommend testing all homes below the third floor. EPA also recommends testing in schools. Testing is inexpensive and easy, and testing kits are generally available at your local hardware store.

FIXING A RADON PROBLEM

Since there is no known safe level of radon, there may always be some risk. But the risk can be reduced by lowering the radon level in your home and workplace. There are simple ways

to fix a radon problem that aren't too costly, and even very high levels can be reduced to acceptable levels. In some cases, sealing cracks in floors and walls may help to reduce radon exposure. In other cases, simple systems using pipes and fans may be used. These systems, called "sub-slab depressurization," do not require major changes to your home. They remove radon gas from below the concrete floor and the foundation before it can enter the home. Similar systems can be installed in houses with crawlspaces.

Because the right system for reducing radon depends on several factors, including the design of your home, you should use a contractor who has been trained to fix radon problems. A trained mitigation contractor can study the radon problem in your home and help you pick the right treatment method.

For more information on radon gas, radon testing and remediation, visit the Oregon Health Division's radiation control section web page: <http://www.ohd.hr.state.or.us/rps/radon/radon.htm> or try the EPA's website on radon: <http://www.epa.gov/iaq/radon/index.html>.

2001 CALENDAR

Send calendar notices to altshul@ohsu.edu or FAX to (503) 494-4278

Human Factors and Ergonomics Society 45th Annual Meeting
Minneapolis, Minnesota, USA
October 8-12

Phone: (310) 394-1811
Fax: (310) 394-2410
E-mail: lois@hfes.org
Web: <http://www.hfes.org>

**Work in the Global Village: An International High-Level
Conference on Work Life in the 21st Century**
Helsinki, Finland
October 15-17

Fax: +358 9 2413 804
Web: <http://www.occuphealth.fi/e/project/globalwork/>

**The American Public Health Association's 129th
Annual Meeting and Exposition**
Atlanta, Georgia, USA
October 21-25

Phone: (202) 777-2470
Fax: (202) 777-2531
Web: <http://www.apha.org>

**Mold: Its Effects, Remediation Management and
Prevention Strategies : 2001 Teleconference**
2:00 - 3:00 pm EST
October 23

Phone: (416) 250-7444 or 1-877-250-7444

Plant & Facilities Expo (PFE) Conference and Exposition
Atlanta, Georgia, USA
October 24-26

Phone: (770) 279-4388
Fax: (770) 381-9865

**World Occupational Exposure Values Symposium:
International Cooperation on Scientific and Technical Issues**
Brussels, Belgium
November 2-6

Phone: (513) 742-2020
Fax: (513) 742-3355
E-mail: meetings@acgih.org
Web: <http://www.WOEV.org/geninfo.htm>
or <http://www.acgih.org>

ASHRAE Indoor Air Quality Conference:
IAQ 2001 Moisture, Microbes and Health Effects:
Indoor Air Quality and Moisture in Buildings
San Francisco, California, USA
November 4-7

Web: <http://www.ashrae.org/meet/iaq2001.htm>

**Canadian Society of Safety Engineering 2001
Professional Development Conference and Trade Show**
Vancouver, British Columbia, Canada
November 12-14

Phone: (905) 893-1689
Fax: (905) 893-2392
Web: <http://www.csse.org>

**Preventing and Managing Workplace Violence,
Harassment and Conflict**
Toronto, Ontario, Canada
December 6

Phone: (416) 943-3388
Fax: (416) 943-2735
E-mail: norman.keith@ca.evi.com

National Ergonomics Conference and Exposition
Las Vegas, Nevada, USA
December 11-13

Phone: (212) 370-5005 or 1-800-222-2596
Fax: (212) 370-5699
E-mail: ContExhib@aol.com
Web: <http://www.ergoexpo.com>

**XXVth International Symposium of the International Section for
the Prevention of Occupational Risks in the Construction Industry:**
**Dynamic Management of Health and Safety in
the Construction Industry - Practicable Solutions**
Paris, France
December 12-14

Phone: (33) 1 40 05 38 02
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E-mail: construction.issa@cramif.cnams.fr
Web: <http://www.cramif.fr>

Center for Research on Occupational and Environmental Toxicology

CROET, the Center for Research on Occupational and Environmental Toxicology at Oregon Health & Science University, conducts research, provides consultations and offers information on hazardous chemicals and their health effects. CROET includes approximately 100 scientists and research staff exploring a range of questions relating to health and the prevention of injury and disease in the workforce of Oregon and beyond. CROET's Toxicology Information Center is open to the public and is staffed to answer Oregonians' questions about chemical and other occupational exposures. CROET's website also provides answers to questions about industries found in Oregon through links on a series of pages devoted to industry-specific topics.

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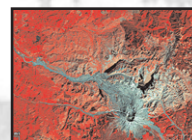
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Landsat Satellite image
of Mt. St. Helens,
taken in 1988



Standard radiation
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- Join our e-mail mailing list
- Updated Occupational Safety Pages
- Health information for Municipal Waste Haulers
- List of the Top Five information requests to the TIC

KUDOS

1999/2000 Successful Year for CROET Grants

As any scientist will tell you, grant writing is the bread-and-butter of research. This simple reality makes grantsmanship an extremely competitive activity, one in which CROET scientists have recently excelled. In the 1999/2000 biennium, 70 percent of all grants submitted by CROET researchers were awarded. Forty-one percent of these awards came from the National Institutes of Health (NIH) and

the National Institute of Occupational Safety and Health (NIOSH). To give you an idea of how CROET scientists compare: In fiscal year 2000, only 32 percent of all grants submitted to agencies within NIH were awarded, and of all grants submitted to NIOSH, only 23 percent were funded. In light of these statistics, CROET scientists have tallied a phenomenally successful grant-writing year.

SBRC Student Wins Two American Chemical Society Awards

Kim Hageman is a student working with Dr. Jennifer Field at Oregon State University, with support from the Training Core of our Superfund Basic Research Center (SBRC) at OHSU. Kim recently received two separate awards for academic excellence: the American Chemical Society 2001 Division of Environmental Chemistry Graduate

Student Award and the American Chemical Society 2001 Division of Environmental Chemistry Graduate Student Paper Award for her paper titled "In-situ anaerobic transformation of trichlorofluoroethene in trichloroethene-contaminated groundwater." We commend Kim for her excellent contributions to the SBRC.

CROET Predoctoral Candidate Wins National Research Service Award

Erin Jobst, a predoctoral student in Charles Allen's lab, has been granted a three-year (F31) National Research Service Award (NRSA) for a project titled "Neurophysiology of Calbindin Neurons in the Suprachiasmatic Nucleus (SCN)." The SCN is a brain structure involved in the control of circadian cycles of sleep and wakefulness

(see the feature article in this issue). This grant will allow Erin to study the characteristics of a subpopulation of SCN neurons that contain calbindin, a neural calcium-binding protein. Erin will be investigating the circadian firing properties of these neurons, as well as their responses to a variety of neurotransmitters.

Oregon Health & Science University includes the Schools of Dentistry, Medicine and Nursing; OHSU Hospital; dozens of primary care and specialty clinics; three research institutes and several outreach and public service units. OHSU is an equal opportunity, affirmative action institution.

Oregon Health & Science University
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