Inquiry

Research Pursuits and Creative Activity

Something in the Air

Dust particles are attracting serious and increasing attention from researchers, particularly an Iowa engineer who will study how pollution in Asia affects the air people breathe in the western United States.

Gregory Carmichael, professor of chemical and biochemical engineering, is studying how Asian pollution is affecting California and the rest of the western United States. Internationally known for his studies on the environmental impact of Asian development, Carmichael found that rapid industrialization in Asia is affecting California air quality. His new research includes measuring and analyzing Asian pollution as it crosses the Pacific so that scientists can better determine how to reduce it.

As part of his research, Carmichael has conducted experiments off the coast of Asia and over the Western Pacific to sample large air masses of pollution flowing from such industrial centers as Hong Kong, Shanghai, and Tokyo. With a new three-year, $310,000 grant from the National Oceanic and Atmospheric Administration, Carmichael will begin using data gathered with an aircraft specially equipped to measure pollutants like carbon monoxide, sulfur dioxide, and dust.

Got Flouride?

Many Americans owe their good dental checkups in part to the fluoride added to their tap water in the last century. But many people in rural areas still drink water from wells, and in many parts of the world, including most European countries, fluoride is not yet a staple ingredient in municipal water supplies.

Fluoridated milk may provide an alternative, according to investigators in the UI College of Dentistry. In collaboration with a researcher from the Czech Republic, they will study the impact of fluoridated milk on tooth decay, comparing how samples of human teeth fare in four different solutions: deionized water, plain milk, or one of two different concentrations of fluoridated milk.

Fluoridated milk currently is available in some countries as an alternative.

Searching the Friendly Skies Pays Off

Airport delays during bad weather may be greatly reduced by providing pilots with computerized "pathway-in-the-sky" guidance displays, according to a University of Iowa engineering professor.

Tom Schnell, assistant professor of industrial engineering and director of the Operator Performance Laboratory in the Center for Computer Aided Design, has been awarded a two-year, $120,000 grant to assess pilot performance on flight decks equipped with guidance systems called synthetic vision information systems (SVIS).

Such systems might help commercial air carriers make much better use of existing airspace, permitting more planes to land safely during low visibility conditions. Schnell will study how to make SVIS user-friendly for pilots and how best to fit the system into display monitors.

Able to Make a Difference

The Law, Health Policy & Disability Center at The University of Iowa received $100,000 as part of a $1.2 million U.S. Department of Labor grant for research aimed at increasing employment opportunities for adults with disabilities and the state and local programs that serve them.

The director of the center and principal investigator of the project, law professor Peter Blanck, notes that the grant was disbursed to aid One-Stop Career Centers, federally backed networks of employment, training, and educational programs offered by states.

The project also assists state and local Workforce Investment Boards and leaders who oversee adult-oriented employment programs.

No Fun in the Sun

For decades, health experts have been admonishing sun worshippers about the risks of skin cancer. Now scientists are warning that the pursuit of solarization indoors isn't such a hot idea either.

In recent years, tanning booths have given Americans one more way to become bronze gods and goddesses, but William Ting, a resident in dermatology at Iowa, and Cortney Vest, a third-year medical student, have serious doubts that it's a safe way. They will use a one-year $10,000 grant from the Skin Cancer Foundation to take a more careful look at the craze.

The research comes on the heels of a University of Iowa Health Care skin cancer screening that suggests many people think tanning booths are harmless.

Talking Up Voice Health for Teachers

Teachers represent a mere sliver of the American workforce (about four percent), but they're a much bigger slice of the pie among patients afflicted with voice disorders. Roughly 20 percent of patients who complain of voice problems are teachers.

Researchers in the UI Department of Speech Pathology and Audiology have received a three-year, $447,000 grant from the National Institute on Deafness and Other Communication Disorders (part of the National Institutes of Health) for a project that aims to clear up the problem. Teaching the Teacher about Healthy Vocalization aims to teach teachers how to adopt healthy on-the-job speaking habits. One of the project's goals is an educational web site called *Teachers Express*.

"It's an unusual but much needed project. Little has been done to teach teachers about vocal health. However, teachers are 32 times more likely to have voice disorders than people in other professions," says Julie Ostrem, program associate in speech pathology and audiology and the study's principal investigator.

Voice problems include hoarseness, running out of breath, and swelling in the neck—difficulties that may become so severe they force teachers to prematurely abandon their careers, Ostrem says.

PRESIDENTIAL PRESS Graduate student Holly Huffman shows interim UI president Willard "Sandy" Boyd how to run a press at the University's Center for the Book, where Huffman designed and printed *Never Too Brief: Commencement Remarks*, a limited-edition book containing seven speeches from Boyd's tenure as UI president from 1969 to 1981.

Huffman, who is pursuing a master's degree in library and information science, says she had no idea that Boyd would again take the University helm when she chose material for her final project in The Handprinted Book, a course offered through the Center for the Book. She says she chose to feature Boyd's speeches because of their uplifting content.

Inquiry

On High Alert

Long before terrorist attacks in the fall of 2001 set off a national alarm about biological warfare, scientists at The University of Iowa knew full well the potential threat of infectious diseases and natural disasters. Now, a new center on campus will run interference for the public against both manmade and natural emergencies.

The Iowa Center for Public Health Preparedness, one of seven academic centers in the United States, was established within the College of Public Health in November of last year under the auspices of the Centers for Disease Control and Prevention's Bioterrorism Preparedness Initiative. Grants totaling $1 million from the initiative will pay for the Iowa center's work of training and educating the state's health and emergency workers.

During an eight-month train-the-trainer program, staff from the Iowa Center for Public Health Preparedness will recruit at least 60 professionals and volunteers, including first responders, pharmacists, laboratory technicians, and veterinarians, to complete a certificate in public health preparedness. The program's graduates then will return to their communities to train others how to prepare for, detect, and respond to biological threats and other public health emergencies.

It's All Related

Establishment of a center of research this past fall in the Department of Biological Sciences will put Iowa on the map as a leader in the emerging discipline of comparative genomics, the study of the interrelatedness of life forms.

A $700,000 grant from the Roy J. Carver Charitable Trust of Muscatine funded the start of the UI Center for Comparative Genomics. Housed in the recently renovated Old Biology Building, the center will be one of the first of its kind in the United States. Presiding over the center is one of the preeminent names in the field, William Ballard, former Pritzker Associate Curator of Chicago's Field Museum.

"The goal of the center is to establish the relationships among the diverse life forms on the planet and the historical basis for this diversity," says Jack Lilien, chair of biological sciences. "Research will focus on analysis of DNA sequences from many diverse organisms to establish the commonalities and differences among them."

Milk Bank

Providing mothers' breast milk is the best way to help premature infants get the nutrition and disease protection they require to thrive, so a University of Iowa Health Care team under the direction of Ekhard Ziegler, Iowa professor of pediatrics, is working to establish the Mother's Milk Bank of Iowa.

"While advances in neonatal medicine help these infants survive, providing them with appropriate nutrition can be a challenge. Healthy women who are breastfeeding their own babies but who have additional milk to donate will make contributions to the milk bank on behalf of mothers who have little or no breast milk for their premature newborns," says Jean Drulis, a program associate in pediatrics who is working on funding to get the initiative under way by the end of 2002.

The bank would be the first in the state and one of only six in the nation to provide pasteurized donor human milk to at-risk infants in need.

Jailhouse Prof

An Iowa professor is willing to go to jail for her new project. A $10,000 grant from Humanities Iowa will put Rachel Williams, assistant professor of art education, behind bars at the Iowa Correctional Institution in Mitchellville, Iowa, where she will coordinate a writing project for female inmates and prison staff.

Williams' Women on the Inside project calls for a program of study inside the prison walls, including an exploration of women's autobiographical writing and studying side by side with scholars on issues of American culture and history. Williams says she believes the humanities can play a vital role in the lives of a community whose inhabitants are largely victims of violence, poverty, substance abuse, and mental illness.

Williams has amassed extensive scholarly research about incarcerated women. She hopes to produce a DVD and a book based on her project, with plans for distribution to more than 1,000 public libraries, cultural centers, colleges, and universities throughout Iowa.

Food Additive May Gum Up the Works

A food additive contained in many items on supermarket shelves around the world may not be okay to eat.

Recent findings in Europe and the United States suggest that assumptions about the safety of carrageenan—a gum derivative of red seaweed used to thicken and improve the texture of foods such as pudding, ice cream, yogurt, and cottage cheese—need to be reconsidered. The common additive may need to be better regulated by the Food and Drug Administration, according to Joanne Tobacman, UI assistant professor of clinical internal medicine.

"Evidence from animal models has demonstrated that degraded carrageenan causes ulcerations and malignancies in the gastrointestinal tract," says Tobacman, who has studies under way to review the carcinogenic mechanisms associated with carrageenan and to identify possible links to breast cancer.

Stomach acid and food preparation, the researcher explains, may lead to degraded carrageenan by transforming the higher molecular weight form of the substance into the lower molecular weight form. She says other gums, such as locust bean, guar, and xanthan, have similar thickening properties and can be used instead of carrageenan.

Keepers of the Farm

If the family farm is still alive, women may be the reason. The story has gone mostly unappreciated, however, because not much has been done to document the work of farmers' wives and other women who have taken care of the farmlands of the Midwest. Staff from the Iowa Women's Archives of the University of Iowa Libraries will reverse that failing, through an initiative called Voices from the Land: An Oral Documentary Project in Iowa.

A grant of more than $7,000 from the State Historical Resource Development will fund a study that looks at how women became defenders of the farm in the last century. Project archivist Doris Malkmus will conduct interviews of Iowa women who championed grassroots protests, legal work, and other forms of activism during the austere farm crises of the 1960s and 1980s.

Color slides and black-and-white photographs will supplement the stories. The material will join the thousands of memorable, yet little known, stories that reside on closed shelves inside the Iowa Women's Archives on the third floor of the University's Main Library and in the special collections department at Iowa State University. In both places, anyone can request to view the stories and images.

After the War

Was a new culture that made sexual toys and pornography readily available good or bad for Germany? Elizabeth Heineman, associate professor of history, has been awarded a one-year, $40,000 research fellowship from the National Endowment for the Humanities to work on a book examining the expansion of sexual consumer culture in Germany after World War II.

With memories of Nazism fresh in mind, citizens of West Germany often hotly debated the place of sexuality in health care, social reform, and dreams of a better life, according to Heineman. Her research will examine how the marketing of explicit sexual goods in West Germany became a contentious topic for a country emerging as a prominent force in the international economy of the last half of the past century.

The project will highlight a half-century of changing consumer tastes, social mores, legal frameworks, and business practices.

Study of the Stutterer

Clues to improved treatment of early childhood stuttering may emerge from a closer look at how the disorder develops.

That simple thesis is the starting point for two Iowa researchers. In a collaborative study funded by a $4 million grant from the National Institute on Deafness and Other Communication Disorders, Patricia Zebrowski and Jerald Moon, associate professors of speech pathology and audiology, will attempt to place young children who stutter into subgroups of development. They also will examine the speech motor skills of children who do and don't stutter.

Zebrowski and Moon are working with data collectors at the University of Illinois at Urbana-Champaign, Purdue University, and the University of Wisconsin at Milwaukee.

Journalism Exchange

Coffers of two different agencies have opened a treasure trove of opportunity for journalism students at home and abroad. Grants from the William Randolph Hearst Foundation of New York City and the U.S. Department of Education (in the amount of $200,000 each) to the School of Journalism and Mass Communication in the UI College of Liberal Arts and Sciences will launch a visiting lecture program at the school and finance an international exchange program.

The Hearst grant will bring distinguished professional journalists to campus for lectures, workshops, and informal gatherings with students.

The second grant—part of a four-year Department of Education initiative called Crosscurrents: Journalism and Globalization—establishes a student exchange program with five other institutions in Canada, Mexico, and the United States. The University of Iowa is one of only two schools in the United States involved in the program; the other is the University of Georgia.

Shipping Sea Shells to Researchers

The next time your evening includes a candle-lit dinner and a nice plate of weathervane scallops, give an appreciative nod to the UI Center for Global and Regional Environmental Research.

The Alaska Department of Fish and Game has asked Iowa researchers for help in managing Alaska's shellfish industry. The department's two-year, $95,600 contract with the UI center will produce definitive chemical data for fisheries experts, replacing less-reliable methods of estimating scallop population age and growth. From sites in the Gulf of Alaska and the Bering Sea, volunteers on scallop boats will collect shells for shipment to the UI campus, according to Scott Carpenter, associate research scientist in the UI Center for Global and Regional Environmental Research and manager of the Paul H. Nelson Stable Isotope Laboratory.

Analysis of the shells at The University of Iowa will include genetic testing to examine similarities among the various populations.

IN THE TRENCHES Students in Professor Tom Charlton's three-week Field Research in Archaeology class dug up the past this summer, spending eight hours a day excavating the grounds around Iowa City's Plum Grove Historic Site, a seven-room brick house built in 1844 by Iowa's first territorial governor, Robert Lucas, and his wife, Friendly. Four other families lived in the house after the Lucases, until the state bought the property in 1943. Charlton, in charge of excavations at the site since 1974, says finds have included the Lucas-period cellar entry, an 1880s-era bone trench for livestock, and broken bottles—possible evidence of the home's rumored Prohibition role as a distribution point for bootleg alcohol.

Ear Yea!

Many people have a form of deafness so severe that regular hearing aids can't help. But their lives might be changed through a tiny device called a cochlear implant—tested and refined at The University of Iowa—that allows them to hear conversations and be part of the noisy world around them.

This is the cutting-edge technology under study by the multidisciplinary UI Cochlear Implant Clinical Research Center team, involving electrical engineers, audiologists, surgeons, psychologists, and even a music professor.

Cochlear implants replace damaged inner ear structures responsible for severe hearing loss, according to Bruce Gantz, head of otolaryngology at The University of Iowa and the center's director. The devices have proved successful in profoundly deaf people, but Gantz says researchers believe the implants also might help those with some level of hearing.

One of the center's projects will investigate ways to measure more accurately the level of hearing loss in congenitally deaf infants. Another project focuses on improving the implant's fidelity in capturing the sound of music. Music and speech belong to disparate spectrums of sound, Gantz says, and, because the device was designed to aid speech transmittal, music through the small implant comes out more muddy than melodic. UI professor of music Kate Gfeller has joined the team of scientific and medical researchers in the effort to fine-tune the implant.

Inquiry

Hunting Down the Answers to a Disease

Two Iowa research teams will take different tacks in tracking down solutions to the hereditary central nervous system disorder known as Huntington's disease.

One team may lead the way to trials of experimental drugs for slowing down the disease. A $6.4 million grant from the National Institute of Neurological Disorders and Stroke will allow researchers led by Jane S. Paulsen, professor of psychiatry, neurology, and psychology, to investigate early brain and behavioral changes in 500 at-risk persons across 20 study sites throughout North America.

Another team will study ways for family members to cope with the diagnosis of Huntington's. Janet K. Williams, associate professor of nursing, along with her colleagues in the College of Nursing, received a grant of nearly $1.5 million from the National Institute of Nursing Research.

Historical Effort

History, James Joyce said, was a nightmare from which he was trying to wake up. Many schoolchildren would be quick to echo his sentiment, but they would be the ones who never had Elise Fillpot for their teacher.

The Ph.D. candidate from The University of Iowa's College of Education has written a special curriculum to make history come alive through personal stories, local events, and critical research ploys. Using a large Teaching American History grant (more than $700,000 from the U.S. Department of Education and believed to be the largest grant ever secured by a UI College of Education graduate student), Fillpot will try out her plan in the public school district of the small Iowa town of Washington.

Enrolled in the college's policy and leadership doctoral studies program, Fillpot calls her project Bringing History Home. Among other things, she plans to bring home to Washington, Iowa, an appreciation for the contributions minorities have made to American history.

National Attention

Joining forces with the Newberry Library in Chicago and a dozen research campuses, The University of Iowa has had a hand in creating an unprecedented national program devoted to American Indian studies.

The University of Iowa is a member of the Committee on Institutional Cooperation (CIC), which, in response to growing demand and fueled by the vast archives and rich resources of the Newberry Library, has launched the American Indian Studies Consortium to facilitate the training of graduates in anthropology, history, literature, education, and other fields where research focuses on the cultures and experiences of Native Americans.

Linda Maxson, dean of the College of Liberal Arts and Sciences, participated last fall in the planning of the initiative. Each year, one CIC-affiliated faculty member will spend a year at the Newberry to conduct research and to teach a spring seminar to graduate students from the collaborating institutions. Graduate students at participating universities can apply for short-term fellowships to support research on their dissertations.

Life After Birth

Giving life to a baby girl or boy can bring many joys. But nearly 10 percent of mothers suffer from a form of depression sometime during the first 12 months after having their babies.

UI researchers who study the problem of postpartum depression—severe enough sometimes to prompt thoughts of suicide—have received a five-year, $1.9 million grant from the National Institute of Mental Health to investigate how psychotherapy delivered in the community can help women with the condition.

Postpartum depression is often underdiagnosed and undertreated, says Scott Stuart, associate professor of psychiatry and psychology and a principal investigator in the study.

Spin Electricity

Research in a new field of technology may spell the end of the computer hard drive. "Spintronics" is a phenomenon known to physicists since the early years of the 20th century, but only recently have people like Iowa's Michael Flatté, professor of physics and astronomy, begun exploring the possibilities of this new twist on electricity.

Two grants totaling nearly $1.3 million from the U.S. Department of Defense will help Flatté develop the theory behind the faster electronic devices of the future.

Conventional semiconductor electronic devices move electrons back and forth to generate electric currents. But, spintronics theory introduces the idea that electrons behave as though they spin. Spintronic technology could lead to computer memory devices much faster than today's hard drives and that require no input of electrical power to maintain stored information. The technology also could lead to high-speed optical switches for telecommunications.

Prostate Cancer Vaccine Created with Common Cold Bug

The nation's first clinical trial of a vaccine for prostate cancer is under way on the UI campus.

Led by David Lubaroff, professor of urology and microbiology, and Richard Williams, professor of urology, the trial will help determine how well the vaccine stimulates an immune response and if this response has a therapeutic effect on prostate cancer, considered the leading cause of death among men in the United States.

"The advantage of a vaccine is that it can use the patient's own immune system to treat the cancer rather than administering other drugs that may or may not be specific to the cancer," says Lubaroff, who notes that vaccine therapy for any cancer is a relatively new area of research. "In addition, the vaccine can help enhance the immune response over time."

The researchers created the vaccine from a virus that causes the common cold but which has been engineered to be noninfective in humans. The disabled virus, known as an adenovirus, can then be used as a vector, or carrier, of other genes that researchers insert into the virus.