CSU/Japan Partnership Explores Promising New Cancer Therapy

This schematic shows the HIMAC facility in Chiba that includes a large linear accelerator and dual synchrotrons. The facility has three treatment rooms for cancer patients, a physics research area, and a room dedicated to radiobiology research.

This year, more than 500,000 Americans are expected to die of cancer – 1,500 people a day. Cancer is the second most common cause of death in the United States – exceeded only by heart disease – accounting for nearly one of every four deaths.

Now, in an unprecedented partnership with Japan, Colorado State University will begin research into a new and promising treatment for cancer – carbon ion therapy – which is currently not available in the United States.

“This partnership gives Colorado State University ready access to study a unique cancer therapy that has shown great promise in Japanese clinical trials. This therapy is not being studied anywhere else in the United States,” said Dr. Jac Nickoloff, Head of the Department of Environmental and Radiological Health Sciences. “We want to understand the genetic regulation of tumor responses to carbon ion therapy, including DNA repair pathways and DNA damage signaling pathways, and how cancer and normal cells respond to this novel therapy.”

The relative survival rate for all cancers diagnosed between 1996 and 2004 was 66 percent, up from 50 percent in 1975-1977. The improvement reflects the diagnosis of certain cancers at an earlier stage and improvements in treatment. But cancer survival statistics vary greatly and there are still cancers with extremely low rates of cure, including pancreatic and brain cancers. Carbon ion therapy may offer new hope for patients with these devastating diseases.

The partnership involves a trilogy of cancer expertise from the College of Veterinary Medicine and Biomedical Sciences: the recently launched international Center for Environmental Medicine, the Animal Cancer Center, and the Department of Environmental and Radiological Health Sciences.
Welcome

Dear Friends,

Last year, in the Spring 2009 edition of Emitter Magazine, we announced the formation of the new international Center for Environmental Medicine and the signing of rare research and education partnership agreements with Gifu University and the National Institute of Radiological Sciences in Japan. The focus of the NIRS agreement was collaborative research and training in cancer radiation therapy, particularly carbon ion therapy.

I’m happy to report that since then, we’ve made significant progress on our goals. We have hired our first faculty member (also a Colorado State University graduate) who has a joint appointment with NIRS. Dr. Takamitsu Kato joined the Department this spring and will continue to hold a joint appointment as research programs and partnerships in carbon ion therapy continue to grow between NIRS and CSU.

On May 27 and 28, as a part of these endeavors, Colorado State University hosted the first joint symposium on carbon ion therapy. The symposium was sponsored by the National Institute of Radiological Sciences, Japan; Colorado State University; and the University of Colorado. The symposium covered topics ranging from basic molecular and cellular DNA damage responses to current clinical trials in cancer radiation therapy in large-animal models and humans. Scientists from CSU, NIRS, and CU presented their latest research findings and perspectives for future basic and translational research, and clinical trials directed toward improving cancer therapy.

Carbon ion therapy is an exciting breakthrough in cancer treatment. But, with only three carbon ion therapy centers in the world, it is difficult to conduct research that will help us understand the action and best applications of this important treatment modality. With two of these centers in Japan, our relationship with NIRS allows us to conduct research at their facility in Chiba, train graduate students and exchange faculty members, and work together on collaborative grants both in Japan and here in the United States.

In other news, in this edition of Emitter you’ll read about our graduate program in ergonomics and meet two students who have recently completed that program and are ready to move on to their next challenge. You’ll also read about our faculty members and students who have received awards and honors; the reaccreditation of our undergraduate program in Environmental Health; new Cancer Supercluster funding to support one of our core laboratories; and so much more.

I hope you enjoy the Summer 2010 edition of Emitter Magazine. I welcome your questions and comments on the magazine and its contents, as well as suggestions for articles in future editions. Please drop us a line or give us a call with your input.

Best regards,

Jac A. Nickoloff, PhD
Professor and Head
Department of Environmental and Radiological Health Sciences

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The ERHS Emitter is published two times annually by Colorado State’s Department of Environmental and Radiological Health Sciences and produced by Communications and Creative Services. We welcome your questions, comments, and story suggestions. You can e-mail your comments to Carol Borchert, ERHS Emitter editor, at carol.borchert@colostate.edu. You also can visit us on the Web at www.cvmbs.colostate.edu/erhs/.

Dr. Jac Nickoloff with his lab group, from left to right: Dr. Amanda Ashley, graduate student Jingyi Nie, and undergraduate students Jeff Wischhusen and Courtney Amerin.
The Center for Environmental Medicine, which will house this new research initiative, was launched in 2008 at CSU in partnership with Japan during a trade mission trip led by Colorado Gov. Bill Ritter.

Counterparts in Japan are Gifu University School of Medicine and the National Institute of Radiological Sciences, called NIRS, located in Chiba, which is Japan’s equivalent of the U.S. National Institutes of Health. NIRS is home to HIMAC, a heavy ion medical accelerator in Chiba— one of only three heavy ion medical accelerators operating worldwide, including another facility in Japan and one in Germany.

Carbon ion therapy works in a similar way to traditional radiation therapy that uses photons, in that a cancerous tumor is targeted with the goal to destroy cancer cells. Carbon ions, however, are particles with mass whereas photons are massless. The size of carbon ions allows them to cause more havoc and create irreparable damage when they hit a cancer cell. Another benefit: unlike traditional radiation therapies, carbon ion treatments cause relatively little damage to healthy cells in the path to the tumor. Scientists can control the depth in the body that the ions penetrate, and tailor the “shape” of the energy deposited by the carbon ions to closely match the shape of a tumor. Once the ions reach the tumor, the energy is delivered in a very narrow zone, almost like an explosion within the tumor. The treatment provides doctors with important options when targeting tumors near sensitive structures such as the brain.

“One particular area of interest is the impact of carbon ion therapy on stem cells,” said Dr. Nickoloff. “One theory is that tumors begin with stem cells and that’s what makes it so difficult to cure some cancers. Stem cells are resistant to conventional therapy and can remain after treatment, ready to proliferate again. Carbon ion therapy causes damage that is much more complex and difficult for the cancer cell to repair. We want to see if that damage is persistent. We’ve brought in a leader in the field of stem cells to help us understand that problem, Dr. Xiao-Jing Wang, a Professor and Director of the Head and Neck Cancer Research Program at the University of Colorado.”

In Japan, more than 5,000 patients have already been treated with experimental HIMAC therapy. CSU, NIRS, and CU will partner on research into heavy ion radiotherapy and eventually embark on clinical trials to treat naturally occurring tumors in larger animals such as cats and dogs, and in humans.

“Our partnership with Japan also has led to the first joint faculty appointment between a U.S. university and a Japanese research institute, with the hire of a CSU alum and native of Japan who has expertise in toxicology and cancer,” said Dr. Bill Hanneman, Director of the Center for Environmental Medicine. “Dr. Takamitsu Kato began working at CSU in April and he will travel to NIRS twice a year to pursue research projects using the HIMAC.”

Exterior of the HIMAC facility in Chiba, Japan
Cancer Biology Symposium Sparks Collaborative Ideas in Carbon Ion Therapy Research

When William Henry Bragg first plotted the energy loss of ionizing radiation during its travel through matter, he described a pronounced peak at the end of the curve where energy loss increases before the particles come to rest. This phenomenon, known as the Bragg peak, is key to the development of innovative radiation therapy using high-energy photons and protons that deliver damaging radiation to cancer cells while minimizing the effects on healthy surrounding tissue.

On May 27 and 28, Colorado State University conducted a joint symposium with the University of Colorado and Japan’s National Institute of Radiological Sciences to look at ways to further develop photon and carbon ion radiation therapy approaches. The symposium, “From Cancer Biology to Photon and Carbon Ion Radiation Therapy,” focused particularly on potential collaborative research programs. Dr. Bragg, who died in 1942, most surely would have been impressed to see how far the science of ionizing radiation has come.

“The key goals of the symposium were to share information, identify critical gaps in knowledge, and develop collaborative projects,” said Dr. Jac Nickoloff, Head of the Department of Environmental and Radiological Health Sciences and one the symposium’s organizers. “This was an opportunity to not only learn from each other, but to develop a better understanding of how we can work together to advance cancer therapy with more effective treatments. We are particularly interested in carbon ion radiotherapy and the development of research, training, and educational opportunities with our partners in Japan.”

Dr. Tony Frank, President of Colorado State University, addressed attendees and noted that no single university or country can meet the challenges that cancer presents, and stronger partnerships are essential to moving forward. Dr. Yoshiharu Yonekura, President of NIRS, said the joint symposium would help to expand international cooperation and emphasize the role of mutual collaboration as countries and institutions work together to cure cancer.

During the two-day symposium, attendees shared 15, 20-minute presentations on a variety of topics in high- and low-LET radiation, clinical cancer biology, and challenges and opportunities with cell and animal models. Keynote speakers discussed the evolution of charged particle research, carbon ion radiotherapy, and mouse genome instability and cancer.

“We are entering a new era in charged particle therapy,” said Dr. Eleanor Blakely, Lawrence Berkeley National Laboratory, in her keynote address. “Scientific advances in research with charged particles have been significant during the past four decades, but as more information is obtained, further questions arise. Advancement in veterinary radiation oncology may help us answer some of these questions while benefiting humans and their companion animals.”
The Cesium Irradiation Laboratory in the Department of Environmental and Radiological Health Sciences has received a $15,000 grant from the Cancer Supercluster at Colorado State University for maintenance and operational support. The laboratory provides irradiation services to both on-campus and off-campus clients, principally for biomedical research.

“The irradiators we have are unique and offer a service that would be difficult at best for anyone to establish today,” said Dr. F. Andrew Ray, an Associate Professor in ERHS, who supervises the Cesium Irradiation Laboratory. “Irradiators are expensive, burdensome, and have a lot of safety and security regulations. It’s nice for our users to have access to our services without having to deal with the expense or bureaucracy.”

The laboratory’s irradiators are found in several locations in the Molecular and Radiological Biosciences Building and can be configured to support a diverse range of research applications and goals. Equipment currently available includes five cesium irradiators, one cobalt irradiator, and an X-ray machine. The specific purpose of the laboratory is to provide accurate, convenient and reliable access to ionizing radiation to CSU and off-campus investigators. Irradiations include molecular compounds, cell cultures, animal and human cells, bacteria, and whole and partial body irradiation for small-animal studies.

“Investigators with the Cancer Supercluster have a particular interest in supporting the Irradiator Core, and the Cesium Irradiation Laboratory plays an important role in providing investigators with the irradiation services they need,” said Dr. Ray. “Currently, we are undergoing a transition in our fee and funding resources, and the grant from the Cancer Supercluster will allow us to support ongoing maintenance while enabling us to put aside money for future needs.”

Additional information and costs for the Cesium Irradiation Laboratory’s services can be found at the lab’s website at http://www.cvmbs.colostate.edu/erhs/cesium_irradiation.htm.
During World War II, airplane pilots weren’t only struggling with live ammunition coming their way. They were stymied by cockpit designs that created an environment disposed to pilot error (such as confusing the configuration of control knobs in aircraft cockpits), which sometimes led to catastrophic results. From these and earlier experiences, the study of ergonomics (or human factors) began to develop with a flourish, focusing on the design of jobs, equipment, and workplaces built to fit the needs of the worker.

“Ergonomics is not just making sure someone sitting behind a desk has a good chair and proper alignment of their arms with their keyboard,” said Dr. John Rosecrance, a Professor in the Department of Environmental and Radiological Health Sciences and Director of the Ergonomics Graduate Program. “It involves workplace design in factories and farm settings, high-tech offices and low-tech manufacturers, airports, retail shops, and everything in between.”

Ergonomics as practiced in the workplace seeks to reduce injury and illness while increasing productivity and improving quality. In the Department of Environmental and Radiological Health Sciences, ergonomics is a growing field and the Department has established an interdisciplinary Ergonomics Training Program open to students with backgrounds in psychology, environmental health, industrial hygiene, engineering, occupational health fields, and other areas of study. Three levels of ergonomic training available include the master’s level, doctoral level, and an occupational ergonomics certificate program.

“One can easily imagine some of the problems workplaces face by thinking about work activities in our own homes,” said Dr. Rosecrance. “Imagine if every time you sat down for a meal and then cleared the dishes, you stacked the dishes on the floor, then someone picked them up from the floor and put them in the dishwasher, then took them out of the dishwasher and stacked them back on the floor. That is the sort of work method we often see in many manufacturing facilities. That type of work process leads to a sore back, takes longer to complete and, because you are handling the product (dishes) so much, leads to a greater chance of dirty as well as broken dishes.

“Through the application of ergonomic principles, we can help owners and workers improve their work environments while at the same time increasing productivity and quality measures. That’s how we sell ergonomics.”

Dr. Rosecrance and his graduate students work cooperatively with companies to implement organizational change and collaborate with experts to help plans become realities. Experts involved with ergonomic studies at the ERHS include occupational health psychologists, biomedical engineers, public health workers, epidemiologists, and others. Research work and workplace application is conducted as per client request but also through government agencies and private funding. The Ergonomics Graduate Program has ongoing research projects with local Fort Collins companies including breweries, dairies, construction firms, and others.

In the ERHS Ergonomics Graduate Program, the focus is on three major industries: manufacturing, construction, and agriculture. Dr. Rosecrance said four goals within those areas include injury prevention and wellness, work efficiency, quality of product or services, and quality of work life for the employees.

“In terms of our research expertise, it involves the assessment of exposures to risk factors that can lead to injury or illness,” said Dr. Rosecrance. “These exposures may include work methods that involve forceful muscle contractions, highly repetitive movements, or awkward postures. If we look at the poultry or red meat processing industry, for example, we see exposure to all of these risk factors with jobs that involve eviscerating, cutting, trimming, deboning, sorting, packaging, and lifting.”

All core faculty involved in the Ergonomics Graduate Program have active research programs that are funded from a variety of external sources. Graduate students are eligible to compete for pilot research project funding through several centers at Colorado State University including the CDC-funded Colorado Injury Prevention Research Center, the NIOSH-funded High Plains Center for Agricultural Health and Safety, and the NIOSH-funded Mountain and Plains Education and Research Center.
The first thing you notice when you walk into Dr. John Rosecrance’s office is the height of his desk. A closer inspection reveals that the desk surface moves up and down to transport its computer and accompanying work materials to differing heights allowing for a standing or seated work position. A selection of chairs complements the different desk heights, and small accoutrements (e.g. ergonomically designed mouse) make you acutely aware of the lackluster design of your own workstation.

Dr. Rosecrance doesn’t just teach and research ergonomics, he lives it.

“We see ergonomics all around us every day and are affected by it every day,” said Dr. Rosecrance. “When you check in at the airport, the service agents have been standing all day long, they are physically and mentally fatigued, and they often have had customers complaining to them. Is that going to affect how well they are able to deliver good customer service? Absolutely. Is that going to affect you? It probably will, and not in a good way.

“Through ergonomics, we try to prevent injury and illness, increase efficiency, and enhance the quality of product or services while improving the quality of worklife. A better workplace is a win/win for everyone, from workers to employers to customers.”

Dr. Rosecrance, originally from California, has a background in physical therapy. He graduated with his undergraduate degree in physical therapy from California State University, Fresno, and specialized in sports medicine. He worked in hospitals and clinics in Santa Barbara, then eventually decided to pursue higher education. After taking a year off to cycle around Australia and New Zealand, he moved to Chapel Hill, N.C., where he completed his master’s in biomechanics and exercise physiology. Still not ready to settle down, he spent six months cycling in eastern and western Europe then moved to the University of Iowa to work on his PhD.

At the University of Iowa, he became involved with research in the field of ergonomics. The multidisciplinary aspects of the field along with the ability to apply science to improve people’s lives led to his doctorate. He arrived at Colorado State University in 2003 with a charge to develop a nationally recognized graduate program in ergonomics and has been devoting himself since to that endeavor. He now is Director of the Interdisciplinary Ergonomics Training Program, and also affiliated with training funds and research through the Mountains and Plains Education and Research Center, one of 17 national centers funded by the Centers for Disease Control and the National Institute for Occupational Safety and Health.

“It’s rewarding to be a part of this program, particularly in regards to the success of our students and the impact we have on industry,” said Dr. Rosecrance. “The work we do, whether helping to improve worker safety in dairies or helping local microbreweries improve their work environments, is very satisfying.”

Dr. John Rosecrance, below right, on an ergonomics site visit.
Ergonomics Graduate Enjoys Challenges of Helping Dairy Workers Work Safe

Despite the idyllic image of long-lashed, brown cows grazing in rich green pastures with Americana-style barns in the background, anyone who’s ever worked on a dairy knows it’s a challenging environment – especially today’s large-scale dairies with up to 10,000 cows. Workers put in eight-to-10 hour shifts, suffer from repetitive motion and posture injuries, endure high-muscle loading, labor in often inclement weather, and handle large dairy cows that occasionally give an unexpected kick.

Given the tough working environment, it’s no wonder that the dairy industry has a large number of worker’s compensation claims, with nearly 50 percent of those claims resulting from injuries in the milking parlor. The agriculture sector employs only 0.8 percent of the Colorado workforce, yet has the fifth highest rate of claims at 16.2 per 1,000 employees (from Colorado Department of Labor and Employment’s Work-Related Injuries in Colorado 2005).

“It’s hard, dirty work and we are here to figure out how dairy owners can increase efficiency and productivity on their farms, while making working conditions safer for their employees,” said Dr. David Douphrate, who is a Special Faculty member in the Department of Environmental and Radiological Health Sciences. “Workers in the dairy industry make an important contribution to producing a commodity that serves a big need. If we can make their jobs safer, we will also be helping to trim the costs of business and produce dairy commodities cost-effectively.”

Dr. Douphrate did not start out his career with a plan to work in dairy ergonomics. After graduating from Texas A&M, he attended the University of Texas Medical Branch at Galveston, where he obtained his Master of Physical Therapy. He worked as a physical therapist and in administrative roles, and also continued his academic studies to complete a Master of Business Administration. Looking for new challenges, he became interested in ergonomics after realizing that much could be done to prevent the injuries that brought people to physical therapy in the first place. He applied to the PhD program at the University of Iowa where Dr. John Rosecrance was on the faculty. When Dr. Rosecrance, who specializes in ergonomics, moved to Colorado State University, Dr. Douphrate became the first ergonomics graduate student in the Department of Environmental and Radiological Health Sciences.

Dr. Douphrate finished his PhD in 2008 and worked as a postdoctoral student until 2009 when he was appointed as a Special Faculty member. In September, he will leave Colorado State for the University of Texas School of Public Health at the San Antonio Regional Campus. He will continue his work on dairy safety in his new role, as well as continue the partnerships he has built at Colorado State.

“We are studying dairies in New Mexico, Texas, Utah, South Dakota, North Dakota, and Colorado, and will carry on this study with, we hope, renewed funding,” said Dr. Douphrate, who works closely with the dairy community. “Right now, we are continuing to survey workers to find out issues that impact them, get their ideas on how to make their work easier and safer, study how we can improve productivity and efficiency, and how we can protect the health of the cow and the health and safety of the worker.”

Dr. Douphrate said the next step will be to analyze specific interventions and make recommendations to dairy owners and workers. Dairy owners have been an important partner in the dairy study, as have dairy extension specialists at the states’ land-grant institutions.

ERHS Spring/Summer 2010 Calendar

Aug. 23 – Fall Classes Begin at Colorado State University (www.colostate.edu).


Oct. 15-17 – Colorado State University Homecoming and Family Weekend (www.colostate.edu).


Dec. 17-18 – Colorado State University Fall 2010 Commencement (www.commencement.colostate.edu).
Ergonomics Student Realizes Dream, Just Not the One She Expected

Growing up in the small town of Elsberry, Mo., Angie Dartt had dreams of becoming a veterinarian. Interested in all the animal “ologies,” she completed a four-year degree in biology with an environmental studies certificate. But, while she was in school, life kept throwing her other possibilities.

“By happenstance, I had an internship in health physics, and radiation health and safety,” said Dr. Dartt. “After my summer internship, I worked at the University of Missouri Research Reactor and learned more about health physics.”

But Dr. Dartt wasn’t ready to leave her dream behind and she turned her focus back to animals. She worked with her biology professor studying river and forest health, including using insect studies to determine the health of ecosystems. In her senior year, Dr. Dartt worked for the United States Geological Survey and a small switch started to turn on as she came to realize she was working around chemicals and in extreme-use environments (a jump into a freezing stream to fix a USGS motor boat). When the time came to select a graduate program, Dr. Dartt visited the CSU website and was looking at health physics when something else drew her attention – industrial hygiene. Intrigued by her own work experiences, she arrived at CSU in 2003 ready to begin her graduate studies.

“I didn’t know much about ergonomics until John Rosecrance came to lecture in one of my classes, and then everything just came together,” said Dr. Dartt. “The practical application of research to help people improve the quality and safety of their workplace really appealed to me and I decided to focus on ergonomics. I love the ability to make a direct difference in the lives of people who benefit from improved workplace health and safety.”

Under Dr. Rosecrance, Dr. Dartt immediately became involved with several studies including one that evaluated exposures to awkward postures in appliance manufacturing. At that same time, she was involved in a study evaluating hand-tool use and how different designs (including handles that would accommodate smaller hands) impact user health and safety. The posture study was finished in 2008, though out of that study a second project was launched on awkward-posture exposures at the New Belgium Brewery in Fort Collins, Colo. Dr. Dartt recently completed her PhD dissertation that focused on exposure to awkward postures and the effects on worker health and safety.

While at CSU, Dr. Dartt also worked at the Eastman Kodak Co. in Windsor, in industrial hygiene and ergonomics. She was named the Health, Safety and Environment Manager in 2008 and left Kodak in February after five years with the company. Dr. Dartt graduated in May and has been hired by Golder Associates in the fields of industrial hygiene, health and safety, and ergonomics. Her husband, Joseph, who came with her to CSU to study geology, switched majors to receive his degree in industrial hygiene and now works for the Occupational Safety and Health Administration.

“It will be hard to leave CSU and all the great people here, but we hope to stay connected,” said Dr. Dartt, who is the first member in her family to receive a PhD. “I look forward to having more time to focus on national and local industrial hygiene organizations and would like to get involved in international efforts to promote worker health and safety, and to help establish training programs in other parts of the world.”
Environmental Health Undergraduate Program Recognized for Excellence

The undergraduate program in Environmental Health has recently completed the accreditation process with the National Environmental Health Sciences and Protection Accreditation Council and has received full accreditation for six years. The accreditation renewal was approved and announced at the EHAC Council Meeting in June at the National Environmental Health Association’s 74th Annual Educational Conference and Exhibition in Albuquerque, N.M.

“In 1973, the Environmental Health undergraduate program at Colorado State University was the first program nationwide to be accredited by EHAC,” said Dr. David Gilkey, Associate Professor in the Department of Environmental and Radiological Health Sciences and Director of ERHS Undergraduate Education. “Since that time, our undergraduate program has consistently received excellent reviews and been viewed as one of the best in the nation. We go far beyond training competent environmental health professionals who can promote public health.”

The National Environmental Health Science and Protection Accreditation Council develops and applies accreditation guidelines for institutions of higher education that strive to ensure premium quality education and training of environmental health science and protection practitioners. Accreditation can range from one to six years, and institutions may be ranked as acceptable, acceptable with provisions, or can have accreditation denied.

In its CSU site-visit report, the accreditation team cited numerous areas of excellence in the Environmental Health undergraduate program including specialty areas in epidemiology, occupational health, ergonomics, industrial hygiene, health physics, cancer biology, and environmental toxicology. In addition, the report noted that the Department’s internship experience is well organized, documented, and evaluated, with students preparing an “impressive internship portfolio” to evaluate outcomes. The team met with student groups, faculty and staff, the environmental health advisory committee, and toured ERHS laboratories and other campus facilities available to EH students including Morgan Library, the Center for Academic and Student Achievement, and the Institute for Learning and Teaching.

Laboratory resources referenced by the site-visit team included research laboratories in which undergraduate students participate in ongoing investigations with faculty mentors, and teaching laboratories, including a new dedicated undergraduate environmental health laboratory facility. The Department boasts excellent job placement for its environmental health graduates, with more than 45 percent of those graduates going on to pursue advanced degrees.

“In addition to our facilities, curriculum, and research programs, what really sets us apart is the diversity of the faculty members involved with the environmental health program, and the expertise and experience they bring to our students,” said Dr. Gilkey. “Whether its ergonomics or toxicology, we have some of the best people in the field teaching courses as well as coming in to the classroom for guest lectures to expose our students to relevant topics.

“We have one of the largest environmental health undergraduate programs in the nation with an amazing faculty involved in teaching, research, service, and mentoring who inspire our students. We are very pleased with the EHAC report and look forward to continuing to serve our students.”

In its CSU site-visit report, the accreditation team cited numerous areas of excellence in the Environmental Health undergraduate program including specialty areas in epidemiology, occupational health, ergonomics, industrial hygiene, health physics, cancer biology, and environmental toxicology.
In May 1993, there was an outbreak of an unexplained pulmonary illness in the southwestern United States, including the Four Corners region of Colorado, Arizona, New Mexico and Utah. John Pape was at the center of intense efforts to understand the cause of this outbreak, which was killing previously healthy young adults. Hantavirus, transmitted by rodents, was the suspect, though this was a new variant soon named Sin Nombre virus and the new disease was called hantavirus pulmonary syndrome.

During his nearly 30 years with the Colorado Department of Public Health and Environment, Pape has been on the front line of nearly every emerging infectious disease emergency including, most recently, West Nile disease and chronic wasting disease. As an epidemiologist with the Communicable Disease Program, he had statewide responsibility for zoonotic disease surveillance and control. He retired from the state last year and, this year, was honored with the 2010 Distinguished Alumni Award from the College of Veterinary Medicine and Biomedical Sciences. Pape graduated in 1982 from the then-Department of Environmental Health at Colorado State University with a degree in environmental health and a concentration in epidemiology.

“I should have John Reif (a Professor in the Department of Environmental and Radiological Health Sciences) and Lance Perryman (Dean of CVMBS) write me referrals for veterinary school; that might up my chances,” joked Pape. What he is seriously considering though, is the Master of Public Health program through the Colorado School of Public Health, to continue his education and look at other opportunities for a “second” career.

“The time I’ve been here, I’ve seen tremendous changes in not only disease concerns, but in the technologies that help us with our work, from the advances in data processing that allow us to understand more quickly complex epidemiological problems to molecular fingerprinting to get a better sense of how diseases are being transmitted,” said Pape, who, though not a veterinarian, functioned in that capacity for the Department of Public Health and Environment for 25 years, so much so that he was made an honorary member of the Colorado Veterinary Medical Association.

Pape joined the state health department following graduation and moved to Grand Junction where he worked as a field epidemiologist, including some work in zoonotics. He worked closely with Dr. John Emerson who eventually asked Pape to join him in Denver as a field epidemiologist and assistant to the state veterinarian. When Dr. Emerson, also a CSU graduate, retired a couple of years later, funds were not available to hire a new veterinarian and Pape moved into that role in his capacity as an epidemiologist.

The irony for Pape is that when he came to Colorado State University, his intention was to apply to veterinary school. When he realized how difficult it was to get into veterinary school, he looked at other options and environmental health let him work in animal health, public health, zoonotic investigations, and emerging diseases research. Now that he is retired, though continues to work unofficially on some longer-term research projects, he is looking at his options once again.
Many students arrive at Colorado State University unsure of what they want to study or, just as often, begin in one major then graduate in something altogether different. But for Courtney Amerin, a research assistant in Dr. Jac Nickoloff’s laboratory, such uncertainty never existed. From the time she was a child growing up in rural Fort Lupton, she was fascinated by science and knew she wanted to be a doctor. When the time came to go to college, she decided she wanted to go to the “best science school around,” and that was Colorado State University.

When Amerin arrived at CSU, she was accepted into the Honors Undergraduate Research Scholars program and eventually was placed in the laboratories of Drs. Marie Legare and Bill Hanneman in the Department of Environmental and Radiological Health Sciences. Mentored by Dr. Amanda Ashley, a postdoctoral fellow in ERHS, Amerin quickly began to excel in the details of scientific discovery.

“I found that working in a research laboratory really complemented my interest in medical practice,” said Amerin. “I liked to investigate every possibility and look at new ways of approaching challenges. With Amanda, I was working to develop a new chemotherapy agent that worked different from current chemotherapy approaches and it was interesting to think how one day this basic laboratory research work might show up as a new clinical approach to cancer therapy.”

From her laboratory work with Dr. Ashley, Amerin moved to Dr. Susan Bailey’s laboratory where she did a project with her mentor Dr. F. Andrew Ray, and then to Dr. Nickoloff’s laboratory where she currently works on Metnase and DNA repair processes. Metnase is a human fusion protein that promotes random DNA integration and the pathway that repairs double-strand breaks in DNA (nonhomologous end-joining), and it stimulates chromosome decatenation (unlinking) by Topoisomerase IIα. Studies in Dr. Nickoloff’s laboratory may lead to more efficient and safer human gene therapy protocols. They also are investigating the new pharmaceutical neoamphimedine that will thwart the mechanism of Metnase and may be an important new therapeutic approach for the treatment of cancer.

“In working in the laboratories, I learned that I like biology in the laboratory more than in the classroom,” said Amerin. “Just being able to apply what I was learning, and understand it in a much more practical way, I think gave me an advantage over students who weren’t involved in undergraduate research. It really was an important part of my overall experience at CSU.”

Amerin graduated this spring with her Bachelor of Science in biology, and is now looking forward to attending Rocky Vista University College of Osteopathic Medicine in Parker, Colo., this fall. She would eventually like to study dermatopathology (which will require a three-year residency plus an additional one to two years in dermatopathology training), and begin her own practice, but continue working in biomedical research as well.
The Department of Environmental and Radiological Health Sciences welcomes Drs. Christopher Allen and Takamitsu Kato to Colorado State University. Both have joined the Department as Assistant Professors.

Dr. Allen comes to CSU from the University of New Mexico’s School of Medicine and Cancer Center, Department of Pathology. He worked in the High-Throughput Flow Cytometry Laboratory and was co-investigator on a National Institutes of Health project that developed high-throughput flow cytometry assays, and participated in a national program to screen chemical libraries with interesting biological effects. Prior to that, he was a postdoctoral fellow in the UNM Biology Department’s Yeast Genomics Laboratory.

Dr. Allen completed his undergraduate work at the Berklee College of Music in 1976, then returned to school and completed his bachelor’s degree from Whitman College, Wash., in biology and chemistry in 1997. He attended the University of New Mexico School of Medicine where he completed his Doctor of Philosophy in biomedical sciences in 2003. He is a member of the Science Advisory Board, the American Society of Cell Biology, and the Genetics Society of America.

Dr. Kato joins Colorado State University from the National Institute of Radiological Sciences in Chiba, Japan, where he will continue to hold a joint appointment as research programs and partnerships in carbon ion therapy continue to grow between NIRS and CSU. Dr. Kato joined NIRS in 2006 as a radiological researcher following his graduation from Colorado State University with a PhD in radiological health sciences. While a doctoral student at CSU, Dr. Kato worked with Dr. Joel Bedford to study low-dose radiation and DNA repair.

Dr. Kato completed his undergraduate degree at the International Christian University, Tokyo, Japan, in 2002. He is the recipient of several awards including one from the Japanese Radiation Research Meeting for best poster, a travel award from the Radiation Research Society Meeting, and he was named outstanding PhD Candidate at Colorado State University in 2006.

The American Industrial Hygiene Association’s Board of Directors approved the nomination of Dr. Stephen Reynolds as a Fellow of AIHA. Dr. Reynolds is a Professor in the Department of Environmental and Radiological Health Sciences. He was honored during the President’s Reception at the American Industrial Hygiene Exposition and Conference in May.

“Only 5 percent of the AIHA membership can qualify for the Fellow Award, which is given to those individuals who have made significant contributions to the field of industrial hygiene,” wrote Cathy Cole, AIHA President, in her award letter to Dr. Reynolds. “You can be proud that your accomplishments are recognized by your peers as outstanding contributions to the Association and to the profession.”

In 2001, Dr. Reynolds joined the faculty at Colorado State University and soon become Director of the High Plains Intermountain Center for Agricultural Health and Safety. He also is Deputy Director at the Mountain and Plains Education and Research Center. His current work focuses on the relation of respiratory disease to organic dust and bioaeresols, as well as endotoxins from gram negative bacteria. He also is developing genetic studies to look at the human susceptibility side of exposures, a particularly important issue for those who are especially sensitive to endotoxin exposure.

“Dr. Reynolds is a leader in his field, and his colleagues and students have benefited greatly from his hard work and creativity in building a vibrant research and teaching program in industrial hygiene,” said Dr. Lance Perryman, Dean of the College of Veterinary Medicine and Biomedical Sciences. “We are very proud that he has been recognized by AIHA for his contributions to improving workplace health and safety.”

In addition to his roles at HICAHS and the Mountains and Plains ERC, Dr. Reynolds is a faculty affiliate with the Colorado School of Public Health. He also is Chair of the American Conference of Governmental Industrial Hygienists.
Jessica Lucero was awarded the Outstanding Student Award from El Centro. Lucero received the award at the 2010 El Centro Awards Ceremony on May 7. Lucero graduated this May with her Bachelor of Science in environmental health.

She was recognized for her leadership and volunteerism, including serving as president of the Environmental Health Student Association and volunteering with organizations including CSUnity, RamRide, and the Northern Colorado AIDS Project; and working at the Center for Advising and Student Achievement. This year marks the 27th anniversary of recognizing talented Latino student leaders and faculty members who make a positive difference at Colorado State University and in the Fort Collins community.

Lucero also was selected as the Environmental Health Student of the Month for the Association of Environmental Health Academic Programs, with her profile appearing on their website in January 2010.

Hannah Reed was selected as one of the Centers for Disease Control’s 2010 interns for its Summer Program in Environmental Health. Competition for the internship is very intense and Reed is the second CSU environmental health student selected in as many years.

“It’s impressive to note that the CSU Environmental Health Program has now had a SUPEH intern for two consecutive years,” noted Capt. Michael E. Herring, Senior Environmental Health Scientist with the CDC National Center for Environmental Health, in correspondence with Dr. David Gilkey. “Given the very large pool of applicants we get for SUPEH, that confirms the excellence of your program and the caliber of your students. Congratulations on the great job you are doing preparing and training the future environmental health workforce.”

Phoenix Mourning-Star, a graduate student studying environmental epidemiology, received the Rotary International Ambassadorial Scholarship last November. As a recipient of the scholarship, Mourning-Star traveled to New Zealand where he studied the international legal issues of environmental refugees. Mourning-Star was selected following a nomination from the downtown Fort Collins Rotary Club of district 5440 and a series of rigorous interviews.

Dr. Kenneth Blehm was awarded Outstanding Faculty Mentor for the College of Veterinary Medicine and Biomedical Sciences by Dr. Lance Perryman, Dean of the College, on May 14 during commencement ceremonies for the College’s undergraduate students in Biomedical Sciences, Environmental Health, and Microbiology. Dr. Blehm holds a joint appointment as Associate Dean for Undergraduate Education for the College and is a Professor in the Department of Environmental and Radiological Health Sciences where he focuses his research and teaching on industrial hygiene.

Dr. Thomas Johnson, an Assistant Professor in the Department of Environmental and Radiological Health Sciences, received the N. Preston Davis Instructional Innovation Award for his continuing efforts to make education engaging, interesting and effective to on-campus and off-campus learners. Dr. Johnson heads up the graduate program in health physics and creates for his students exciting experiential learning opportunities including field trips to regional industrial facilities and an annual trip to the Los Alamos National Laboratory in New Mexico. The award is a Universitywide honor.

Dr. Jennifer Peel, an Assistant Professor of Epidemiology in ERHS, was featured in a segment on 9News in January on recent ozone regulations proposed by the Environmental Protection Agency. The story can be viewed at http://www.9news.com/rss/article.aspx?storyid=130464.
Dr. John Reif, a Professor in the Department of Environmental and Radiological Health Sciences, will be retiring from Colorado State University after more than 30 years of service.

Dr. Reif started his professional career as a small-animal practitioner after receiving his DVM from Cornell University. He was interested in graduate work and pursued advanced training in epidemiology and internal medicine at the University of Pennsylvania, Graduate School of Medicine.

He held a National Institutes of Health postdoctoral fellowship in cancer epidemiology and was on the faculty at the University of Pennsylvania before coming to Colorado State University in 1979. At CSU, Dr. Reif served as Chairman of the Department of Environmental Health, as well as Assistant Dean for Curriculum for the College of Veterinary Medicine and Biomedical Sciences. In 1987, Dr. Reif was awarded a Fogarty Senior International Fellowship from NIH for studies of cancer in farmers in New Zealand.

HEALTH AND MEDICAL PHYSICS CORNER

Graduate students and faculty members in the Health Physics Program have received numerous honors and awards this year recognizing their academic excellence and professionalism.

Health Physics Society Travel Grant Awardees for 2010
Felicity Cunningham  Haitao Dong
Elizabeth Gillenwalters  Cheri Hall
Nicole Martinez  Christopher Pedersen
Nikolas Roche

Health Physics Society Fellowship Awards
Nicole Martinez – Burton J. Moyer Award
(top Health Physics Society award)
Nikolas Roche – Robert Gardner Fellowship

Nuclear Energy Institute Travel Award to the Health Physics Forum
Christopher Pedersen

Radiation Health Scholarship (inaugural award)
Christopher Pedersen

What’s New

• Two Health Physics graduate students are working this summer in their field of study. Nikolas Roche is working at Sandia National Laboratory in New Mexico, and Elizabeth Gillenwalters for the United States Geological Survey at their TRIGA nuclear reactor in Colorado.

• This spring, Health Physics students taught a class on the basics of radiation to sixth-grade students at the Mountain School in Los Alamos, N.M.

• In faculty news, Dr. Thomas Johnson, Director of the Health Physics Graduate Program, received the Colorado State University N. Preston Davis Award for Instruction Innovation. The award recognizes technology-related instructional innovation or the significant encouragement of such innovation.
ERHS Graduate Students Receive Numerous Scholarships and Awards

The Department of Environmental and Radiological Health Sciences is proud to congratulate our many graduate students who received scholarships and awards this year (Health Physics recipients listed in separate article).

**ERHS Graduate Student of the Year**
- Joshua Schaeffer

**EPA STAR Fellowship**
- Brie Hawley

**Erma Byrd Scholarship**
- John Frazev
- Miriam Koesterich
- Julie Sampson
- Natalie Schwatka
- Daniel Autenrieth (award continued)

**American Industrial Hygiene Foundation**
- Daniel Autenrieth
- Miriam Koesterich
- Joshua Schaeffer

**DeField Industrial Hygiene Award**
- Daniel Autenrieth

**Research and Scholarly Excellence Fellowship**
- Emily Nowacki

**Carol Lynne Baird Memorial Scholarship**
- Annette Shtivelband