

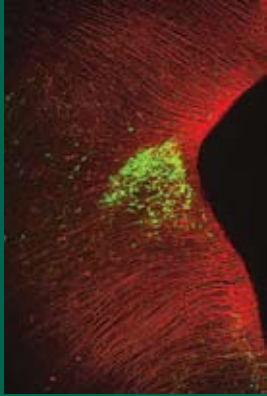
Biomedical Sciences Update

College of Veterinary Medicine and Biomedical Sciences

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Green fluorescent neurons in developing hypothalamus

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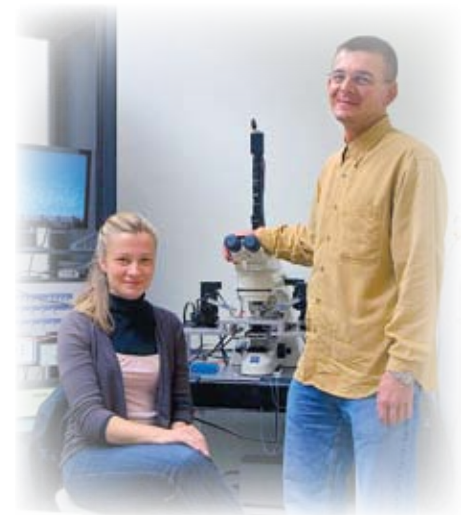
BMS International Connections – Research is Changing as Globalization Takes Hold

It may seem like an overly specialized micro-niche, but Dr. Gregor Majdic is one of the few people in the world who can transplant adrenal glands in neonatal mice. That fact alone helps to explain why the internationalization of research and education is essential to the advancement of biomedical sciences.

Dr. Stuart Tobet, a Professor in the Department of Biomedical Sciences, studies the migration of neuronal cells into groups and what affects their movements. He investigates the differences between the two sexes in how functions are carried out, and in the ability to protect and recover from internal and external assaults including strokes and brain injury that occur during development. To make his research possible, he needs the skills of someone like Dr. Majdic; but people like that are hard to find and almost impossible to hire. Collaboration is essential.

“Research into the workings of the brain is exceptionally challenging, so working with Dr. Majdic in a team effort means we can meet the challenges more creatively and with better results,” said Dr. Tobet. “We study processes during development here, whereas they carry out functional testing in adults over there. The more we learn the better we are able to put some of the pieces together about how the brain works.”

Dr. Majdic is an Assistant Professor in the Department of Veterinary Faculty, Center for Animal Genomics, at the University of Ljubljana in Slovenia. In 2005, Colorado State University and the University of Ljubljana formalized a working relationship with a Memorandum of Understanding that allows the two laboratories to work together in a way that will improve cooperation and speed up progress in studies of



Eva Rozsa and Dr. Jozsef Vigh

hormone-independent sex differences in the brain.

Colorado State, through its strategic plan, is committed to growing areas of study that address global challenges and creating international partnerships to face those challenges. The Department of Biomedical Sciences has sought like-minded institutions that share its vision and values for higher education in areas such as Japan, Eastern Europe, South America, and India.

Dr. Jozsef Vigh, formerly of the Vollum Institute in Portland, Ore., arrived at Colorado State last year with strong Hungarian ties. He was recently joined in his laboratory by Eva Rozsa, a graduate student from Hungary, the first of what he hopes will be a steady stream of international recruits.

“This summer I talked to our faculty members and we began to establish the groundwork to bring Hungarian graduate students to Colorado State University,”

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Welcome

Dear Friends,

In July, our Department had a visit from friend and faculty member, Dr. Nicholas Booth, who joined Colorado State University in 1948 and served as both Physiology Department Head and Dean of the College of Veterinary Medicine and Biomedical Sciences (1966-1971). During his visit, Dr. Booth shared stories of his time at Colorado State, toured our facilities, met with faculty members, observed the computerization of the animal and human anatomy laboratories, and learned about the state of research at the College today. He left with us a signed textbook and some articles, an appreciation for the rich history of our Department and College, and a reminder that the ability to adapt to change often defines the success of an organization.

Today, the Department of Biomedical Sciences is undergoing changes that will enable us to meet the research and instructional challenges of the future by growing successful established programs and developing new ones that will thrive, despite the challenges of our current funding climate. We are actively recruiting new faculty members and developing a strategic plan for the Department that will lead us in new directions. We are working across Departmental, College, and University boundaries to establish collaborative research projects that will mean new opportunities for our graduate and undergraduate students, and open up new fields of study for our faculty members.

In this edition of Biomedical Sciences Update, you'll learn more about how the Department is working internationally in a variety of teaching, research, and outreach projects. In Dr. John Rash's laboratory, scientists have developed techniques that allow them to visualize and tag molecules in ways that are redefining molecular biology. The work, which is supported by an international cadre of researchers, would not have been possible without cross-border cooperation and the sharing of people, resources, and technology. Other examples in the laboratories of Drs. Jozsef Vigh, Stuart Tobet, and George Seidel show but a small sample of the international footprint of the Department.



Dr. Barbara Sanborn, Department Head; Dr. Pete Hellyer, Associate Dean; Dr. Nicholas Booth; and Dr. Lance Perryman, Dean.

You'll also meet two of our faculty members, Dr. Michael Tamkun and Dr. Thomas Hansen, in our faculty profiles, and catch up with Dr. Matthew Wheeler, a 1985 alumnus. We have undergraduate and graduate news, including our Goldwater Scholars profile and a review of the BMS Retreat in Estes Park. Dr. Gordon Niswender, University Distinguished Professor, is featured in these pages as we honor his many contributions to the Department and Colorado State.

You will note that our format has changed slightly to facilitate our commitment to "Go Green" with the rest of the campus and, frankly, to cut our publishing costs. We operate on a lean budget and work hard to maintain items such as enrichment programs for our students and communication with our alumni and friends. We hope you find this issue as informative and entertaining as the previous ones.

In closing, this spring we will be graduating our first full class of undergraduates in the Biomedical Sciences degree program. I know I speak for many faculty members when I say that it has been a privilege and a delight to watch these students grow in confidence and ability during their time here in the Department of Biomedical Sciences. It will be with great pride that we watch as they take their next steps, many going on to professional schools or graduate studies, but we hope that, like Dr. Nicholas Booth, they will keep in touch and always remember they are welcome to come "home" anytime.

Best regards,

A handwritten signature in cursive script that reads "Barbara Sanborn".

Barbara M. Sanborn, Ph.D.
Professor and Head,
Department of Biomedical Sciences

Biomedical Sciences Calendar

- Dec. 8** Annual meeting of the Front Range Neuroscience Group. For more information, visit www.frng.colostate.edu
- Dec. 19-20** Colorado State University Fall 2008 Commencement (www.colostate.edu)
- April 8** Frontiers in Biomedical Sciences Series will feature Dr. Shoukhrat Mitalipov, an Assistant Scientist in the Division of Reproductive Sciences at Oregon Health and Science University and specialist in primate embryonic stem cell research. (www.cvmb.colostate.edu/bms/fibs.htm).
- May 15-16** Colorado State University Spring 2009 Commencement (www.colostate.edu).
- Cell and Molecular Biology Seminar Series:** For a complete schedule, visit www.colostate.edu/Depts/CMB/seminars.html.
- Physiology Seminar Series:** For a complete schedule, visit www.cvmb.colostate.edu/bms/seminar.htm.
- Molecular, Cellular, and Integrative Neurosciences Seminar Series:** For a complete schedule, visit www.cvmb.colostate.edu/mcin/seminar/.

International Connections

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Dr. John Rash

said Dr. Vigh, who studies retinol neurophysiology. "It is mutually beneficial as we get trained and motivated hands in the laboratory while the students get experience in our labs, are able to take classes, make connections, learn the language, and then return to Hungary to finish their studies. We are establishing connections that will help us develop more collaborative relationships with other institutions."

Colorado State is well known internationally for its work in animal reproduction and Dr. George Seidel sees evidence of that everywhere he travels representing the Animal Reproduction and Biotechnology Laboratory.

"I was in Italy earlier this fall and couldn't believe the number of people who came up to me after my lecture and either knew me, knew someone at ARBL, or had attended one of our continuing education programs," said Dr. Seidel, a University Distinguished Professor in the Department of Biomedical Sciences. "Everywhere I travel, the story is pretty much the same and it's wonderful to see the impact our program has had worldwide. This is the place where things happen and get done."

Dr. Seidel noted that in addition to the benefits of shared research and expertise, an international presence on campus and abroad helps the advancement of international understanding. The

Animal Reproduction and Biotechnology Laboratory on the Foothills Campus hosts at any one time between 10 and 20 visiting scientists who stay sometimes for a few weeks and sometimes for months. ARBL helps them acclimate and get set up in Fort Collins.

Back on the Main Campus, at the laboratory of Dr. John Rash, recent advances in techniques to visualize and tag molecules could not have been possible without access to breakthroughs in laboratories in Japan.

"Our current research centers on the roles of gap junctions between neurons and between glial cells," said Dr. Rash, a Professor in the Department of Biomedical Sciences. "In our studies, we use confocal microscopy and immunocytochemistry, freeze-fracture electron microscopy, and immunogold labeling to correlate structure and function at the subcellular and molecular levels. Recent developments in technology have shown us that there are dramatically more gap junctions in more locations and in different neuronal cell types than previously believed. We are now one of only a few places in the world where this type of work can be done, and the field is wide open for use by the next generation of molecular neuroanatomists."

The challenge, said Dr. Rash, is that the work is highly technical and requires years of training. His laboratory hopes to recruit internationally so that the techniques developed in freeze fracture that allow both sides of the fracture to be captured, can be taught to a new generation of scientists.

Throughout these laboratories and others in the Department of Biomedical Sciences, students, staff, and faculty members are realizing the benefits of international cooperation in research and teaching programs. When Dr. Seidel looks around his laboratory now, the faces and the voices represent nationalities from all over the world, and are certainly more diverse than in 1972 when he joined the Animal Reproduction Laboratory. These individuals represent successful internationalization efforts in research, teaching, and outreach for the benefit of all.

BMS Welcomes New Faculty Member

Dr. Quinton Winger has joined the Department of Biomedical Sciences as an Assistant Professor, coming to Colorado State University from Utah State University where he was an Assistant Professor in the Department of Animal, Dairy and Veterinary Sciences.

Originally from Canada, Dr. Winger attended the University of Western Ontario where he received his bachelor's degree in genetics and master's degree in physiology. He then attended Texas A&M University where he completed his doctoral degree in veterinary physiology, graduating in 2000.



Dr. Quinton Winger

Dr. Winger moved to Colorado for a postdoctoral fellowship, first at the Colorado Center for Reproductive Medicine and then at the University of Colorado Health Sciences Center. In 2004, he joined the faculty at Utah State University.

Dr. Winger's research focuses on reproductive physiology using several different transgenic mouse strains to investigate pregnancy and early embryo development. Dr. Winger is the recipient of several honors and awards including a Lalor Foundation fellowship, American Cancer Society Institutional Research Grant, Bill Bottom Award for Outstanding M.Sc. Research, and Dean of Medicine Graduate Student Fellowship. Dr. Winger, who became a U.S. citizen earlier this year, is a member of the Society for the Study of Reproduction. His research laboratory is located at the Animal Reproduction and Biotechnology Laboratory.

University Distinguished Professor Leaves Remarkable Legacy, Looks Toward the Future

At a time in his life when Dr. Gordon Niswender was preparing for the decelerated pace of semi-retirement, his family home in Windsor took a direct hit from the tornado that devastated the small Colorado community on May 22. Though he and his wife were one of the lucky families – the roof stayed on their home and no one was hurt – one of their horses had to be euthanized, and their property looked like a war zone.

Dr. Niswender weathered the storm and its aftermath with grit, determination, and a sense of humor, qualities that have served him well during his long career at Colorado State University. That career is charting a new course as he hands over the reins for programs he has helped to build from the ground up to others, leaving a legacy of animal health and resource management that is recognized worldwide for its innovative teaching, research, and outreach programs.

“Dr. Niswender is a University Distinguished Professor and he carries that title honorably,” said Dr. Thomas Hansen, Director of the Animal Reproduction and Biotechnology Laboratory. “His international reputation and his impact on reproductive biology are exceptional. He has conducted stellar work on immunoassays in farm animals that detect hormones in blood, and exhaustive studies that clarify the function of the corpus luteum in pregnancy.

“In outreach programs, he interacts so well with people and producers and has an innate understanding of the animal industries. On a personal note, he is an individual who is more concerned about the success of the entire unit, rather than on his own personal ambitions. A major driving force for my decision to join Colorado State was my respect for Dr. Niswender and the opportunity to work with him.”

Dr. Niswender came to Colorado State in 1972 as an Associate Professor in the then Department of Physiology with an interest in exploring the reasons for high pregnancy loss in domestic animals. Dr. Niswender was particularly inter-



Dr. Gordon Niswender

ested in the corpus luteum, a temporary endocrine structure that forms in the ovary during ovulation and is involved in the production of progesterone, a steroid hormone needed to maintain pregnancy. His laboratory focuses on the molecular mechanisms which control the synthesis and secretion of progesterone.

“In domestic animals and humans, between 25 percent and 50 percent of pregnancies are lost during the first month,” said Dr. Niswender. “In production agriculture, those losses represent billions of pounds of animal protein and billions of dollars in income. In women, especially for those who have difficulty getting pregnant or sustaining a pregnancy, understanding the regulation of the corpus luteum is key to helping them deliver healthy babies. I was interested in understanding what regulates the corpus luteum and what actions we could take to prevent such high losses.”

With long-term funding from the National Institutes of Health and the United States Department of Agriculture, Dr. Niswender has devoted his career to developing assays and methods of

studying the corpus luteum in domestic animals, and using those animals as models for humans. While, he notes, members of his research team haven’t solved all the mysteries surrounding regulation of the corpus luteum, they have gotten a lot closer.

Dr. Niswender’s research program was only one part of his far-reaching work at Colorado State. In 1984, he was asked to be Associate Dean of Research for the College of Veterinary Medicine and Biomedical Sciences (he held the position for 14 years), and also was Interim Dean until Dr. James Voss took over. During the same time, he was the Director of the Animal Reproduction and Biotechnology Laboratory and, in 1983, was asked to serve as Director of the newly established Western Center for Integrated Resource Management (WCIRM).

Though Dr. Niswender is approaching formal retirement, he will remain active at Colorado State, in an alternate type of faculty appointment. This new phase in his life also holds the promise of new adventure. In addition to his small horse and cattle operation in Windsor, he is a sought-after artisan of silver jewelry, including being commissioned to design and produce custom Western-style belt buckles. The intricate designs of his jewelry, and dramatic use of richly colored semi-precious stones, have all the markings of a rewarding second career.

“I’ve had a fulfilling career at Colorado State, and will continue to enjoy the opportunity to work with many wonderful people,” said Dr. Niswender. “The friendship of my colleagues and energy of my students will continue to greatly enrich my life.”

(Editor’s Note: On Nov. 7, a symposium and reception were held in Dr. Niswender’s honor at Colorado State University. Six of Dr. Niswender’s former graduate students reflected on their time at Colorado State with Dr. Niswender and provided updates on where they are now in research and careers.)

Faculty Profile

ARBL Director's Early Experiences Shape Interest in Reproductive Sciences

If anyone ever was completely suited to his field of study, it's got to be Dr. Thomas (Tod) Hansen, Director of the Animal Reproduction and Biotechnology Laboratory at Colorado State University. His father, Dr. Richard (Ray) Hansen, was the first obstetrician/gynecologist specialist in Fort Collins; he also had a passion for Limousin cattle and was an early adopter of embryo transfer technology developed at ARBL to improve herd genetics and herd health.

"At a young age, I learned how to do artificial insemination for our Limousin cattle herd and developed an interest in assisted reproduction technology," said Dr. Hansen. "My dad was one of the first people to use embryo transfer in his cattle operation, and I became fascinated in how these new technologies were impacting cattle production. In addition, my dad actually taught some seminars on reproductive biology through CSU, so he had a great relationship with the people in the then Animal Reproduction Laboratory."

Growing up in Fort Collins, Dr. Hansen took advantage of Colorado State University's proximity, graduating with his bachelor's degree in Animal Science, while continuing to work with his father at the family ranch. He went on to receive his master's and doctoral degrees, both in reproductive physiology, from Texas A&M University. He took a postdoctoral fellowship in molecular biology at the University of Missouri, staying on as a Research Assistant Professor until 1990. Dr. Hansen then headed back west, to the University of Wyoming, where he rose to the rank of Professor of Reproductive Biology in the Department of Animal Science.

During his 15 years in Wyoming, Dr. Hansen maintained an active research laboratory in reproductive physiology, taught endocrinology and started an undergraduate internship program. In 2005, he returned to Colorado State University as the Traubert Professor in the Department



Dr. Thomas Hansen

of Biomedical Sciences to take over as ARBL Director. One of his biggest challenges, noted Dr. Hansen, was figuring out the complexities of this Colorado State Program of Research and Scholarly Excellence, including its collaborative relationships with three departments and two colleges, managerial relationship to the Equine Reproduction Laboratory, and management of the Foothills facilities, animal care, and finances.

"The history of ARBL is rich with 'firsts,' and I was truly fortunate to come to an institution that had been so well managed and so grounded in basic science, yet took full advantage of applying that science to real-world problems," said Dr. Hansen. "We have been able to continue that work, bringing new facilities on line, attracting new faculty and graduate students, and developing innovative research, education, and outreach programs."

Dr. Hansen's own research work is centered in four areas: maternal response to early pregnancy, including how the embryo signals to the mother, and the possible development of an early pregnancy test for cattle; maternal and fetal

immune response to bovine viral diarrhea virus infection during pregnancy; using mice as a model to understand how an embryo implants, what the signaling mechanisms are, and why some embryos live and others die; and working with Dr. Jason Breummer of ARBL's Equine Reproduction Laboratory on how maternal recognition of pregnancy occurs in the mare.

He also works with Dr. Russell Anthony and others at ARBL on understanding the complications in negotiating the "development windows" of pregnancy that result in recurrent miscarriage, preeclampsia, intrauterine growth restriction, congenital malformation, preterm delivery, and fetal demise.

"While much of our work is to enhance reproduction in cattle and horses, what we are discovering also has implications for human reproduction," said Dr. Hansen. "ARBL has maintained a competitive NIH training grant for postdoctoral and graduate students for the past 30 consecutive years because of its stellar research and training program that has relevance to human health. It's very rewarding for me to be a part of this process and to continue to have discoveries of importance to reproductive health at the Animal Reproduction and Biotechnology Laboratory."

(Editor's Note: ARBL is the originator and primary sponsor of the annual Rocky Mountain Reproductive Science Symposium, a regional symposium held each spring designed to develop increased interaction among academic institutions, hospitals, clinics, and industry with shared research and clinical translational interests in reproductive sciences. Other sponsors include the University of Wyoming, University of Colorado Health Sciences Center, University of Northern Colorado, University of Nebraska, and New Mexico State. More information on the 2009 symposium will be posted at the ARBL website early next year at www.cvmb.colostate.edu/bms/arbl.)

Faculty Profile

Researcher's Studies Detail Intricacies of Ion Channel Regulation

Many Americans have heard of the Japanese delicacy known as fugu, sashimi made from the toxic pufferfish, combining great taste with the intriguing possibility of death. For Dr. Michael Tamkun, a Professor in the Department of Biomedical Sciences, poisoning by fugu is an interesting case study in ion channel regulation and the importance that regulation plays in the electrical excitability of the nervous and cardiovascular systems.

Fugu contains lethal amounts of tetrodotoxin, a potent neurotoxin that shuts down electrical signaling in nerves by plugging sodium channels. Tetrodotoxin is located primarily in the internal organs of the pufferfish, especially the liver and ovaries, and also the skin, so the fish can be carefully prepared by a licensed fugu chef and eaten without ill effect. Accidental poisonings are very rare.

"In our laboratory, we are interested in ion channel regulation within neuronal and muscle membranes, and in understanding the role voltage-gated ion channels play in these systems," said Dr. Tamkun, who has, on a visit to Japan and in the name of science, sampled fugu with no ill effect. "We are particularly interested in how ion channel proteins move around in cells, forming microdomains that often concentrate a number of signal transduction molecules, and capturing images that illustrate these dynamic functions."

The laboratory works mainly with a potassium channel known as Kv2.1, one of 60 members of this family type in the body.

"Why we have 60 different genes encoding in this protein class is another question, but it probably is because it gives the cells the capability to regulate in different ways," said Dr. Tamkun. "What we are doing in our lab is studying how these channels move in living cells using a technique that tethers fluorescent proteins to the channel allowing us to capture video sequence of how the ion channel trafficks."

Research programs in Dr. Tamkun's laboratory include the analysis of ion channel trafficking using live cell, confocal laser scanning imaging; the purification of Kv channels to identify components of the channel-containing macromolecular complex; and the eventual development of a mouse model that expresses tagged Kv channels. His work also is expanding to encompass a relatively new focus for the Department, that of cardiovascular science.

"This is a time of growth and renewal in the Department of Biomedical Sciences and we are actively recruiting faculty members in both neuroscience and cardiovascular sciences," said Dr. Tamkun. "In reproduction, a number of our faculty members are retiring and we are bringing in a new generation of scientists. It's an exciting time to initiate collaborative projects using our combined strengths to develop new research programs. Building research partnerships is especially important as the federal funding environment, particularly in the National Institutes of Health, continues to be challenging."

Dr. Tamkun grew up in Florida where, early on, he became interested in venoms and toxins, and how those agents act on neurons. He attended the University of South Florida where he received his bachelor's and master's degrees before moving to Seattle and the University of Washington, where he worked on tetrodotoxin-sensitive sodium channels and received his doctoral degree in pharmacology. He then moved to Baltimore, and Johns Hopkins University for a postdoctoral fellowship where he worked on the cell biology of sodium pumps. Dr. Tamkun continued this work at Vanderbilt University in Tennessee, where he stayed for 10 years, before coming to Colorado State in 1997.

Now a Professor in the Department of Biomedical Sciences, Dr. Tamkun also is a faculty affiliate with the Department of Biochemistry and Molecular Biology; the Program in Molecular, Cellular, and Integrative Neurosciences; and the Program in Cell and Molecular Biology.



Dr. Michael Tamkun

Alumni Profile

From Assisted Reproduction to Stem Cell Research, BMS Graduate Enjoys Diverse Career in Research



Dr. Matthew Wheeler

It's hard to imagine the bustling metropolis of Los Angeles, with a bucolic dairy in the middle of the city, but that's how things were when Dr. Matthew Wheeler was growing up. Those City of Angels cows, and the cows on his grandmother's family dairy farm in the state of Washington, were early influences on Dr. Wheeler and on his eventual educational and career choices that led him to the then Animal Reproduction Laboratory, and Dr. George Seidel, at Colorado State University.

"I grew up in the city, but I still had a few important agricultural influences as a child," said Dr. Wheeler, who is now a Professor at the University of Illinois. "We had the dairy farm close to our house in Los Angeles, my great-grandmother had a farm in northern California with an orchard and small collection of livestock, and then my grandmother's family were dairy farmers. Early on, I developed an interest in cows."

That interest first took Dr. Wheeler to the University of California, Davis, where he graduated with a bachelor's degree in Animal Science and then a master's degree in Reproductive Biology. His major professor encouraged Dr. Wheeler to apply to Colorado State University so he could work with Dr. Seidel.

Dr. Wheeler started as a doctoral student at Colorado State in 1979 and went to work on in-vitro fertilization in cattle, as ARL (now the Animal Reproduction and Biotechnology Laboratory) was pushing the IVF envelope by trying to make the technology more routine and introduce it to the battery of procedures available to producers. Dr. Wheeler stayed at Colorado State until 1985, receiving his doctorate in Physiology and BioPhysics. He became a fellow at the University of Virginia's Medical School where he joined the Endocrine Department, and began using the domestic pig as a model to study follicular development. He then moved to the University of Wisconsin where he continued his research work in follicular development, supported in part by a National Institutes of Health individual training grant. In 1989, he joined the faculty at the University of Illinois.

"When I arrived at Colorado State, Dr. Seidel said I should take some additional classes to hone my math skills, but I didn't listen to him and I do regret that," said Dr. Wheeler. "He was smarter than me then and he's still smarter than me now."

Today, Dr. Wheeler is a professor in four different departments as well as a faculty affiliate with the Beckman Institute. His appointments reflect the nature of his collaborative research programs, which include assisted reproduction, but also encompass stem cell research that may one day provide new hope and treatments for cancer and other diseases. He is a Professor in the Departments of Animal Science, Bioengineering, and Veterinary Clinical Medicine, and the Institute for Genomic Biology. He also is Director of the Large Animal Transgenic Animal Center at UT's College of Agricultural, Consumer and Environmental Sciences.

"One of the exciting things we are investigating is the use of adipose tissue to generate bone from fat," said Dr. Wheeler. "I talk with our physicians here and the real-life implications make our work even more urgent. We can use regenerative biology to help replace bone destroyed by cancer or traumatic injury. With our military, 26 percent of wounded soldiers coming back from Iraq have cranio-facial injuries, and if we can help treat them more successfully with these new technologies ... well, it would be great to have just a small part in that."

Dr. Wheeler's laboratory has a number of research interests including transgenic animal technology, early embryonic development, microfluidics, nanometer-scale integrated systems, and the biology of single mammalian embryos and embryonic stem cells. He works collaboratively with partners across UI, including engineers who challenge his math skills.

"When I arrived at Colorado State, Dr. Seidel said I should take some additional classes to hone my math skills, but I didn't listen to him and I do regret that," said Dr. Wheeler. "He was smarter than me then and he's still smarter than me now."

In addition to his research and teaching duties, Dr. Wheeler also is a UI Faculty Athletics Representative, ensuring that athletes are in compliance with the Big Ten Conference and NCAA rules regarding academic performance and scholastic requirements. He said he enjoys working with the athletes, a number of whom he's employed in his laboratory and encouraged to further explore the sciences.

"I could not have imagined when I started out in animal sciences the things that I am doing today," said Dr. Wheeler. "But my graduate work at Colorado State University really helped to prepare me by giving me the tools I need to approach research problems creatively and with the right expertise, as well as to know where to go when there is expertise required that I don't have."

Biomedical Sciences Distinguished Professor Honored with ASAS Award



Dr. George Seidel

Dr. George Seidel, a University Distinguished Professor in the Department of Biomedical Sciences and a member of the National Academy of Sciences, is the recipient of the Animal Physiology and Endocrinology Award from the American Society of Animal Science. The award was presented during the Society's annual conference in July.

Dr. Seidel's research focuses on fertilization and culture of cattle and horse embryos, including oocyte maturation, micromanipulation, and embryo cryopreservation. Another interest is identifying genes expressed abnormally

in cloned embryos. He is making practical the sexing of bovine semen by flow cytometry including recent experiments in which calves of the predicted sex were produced using sorted semen.

That ASAS honor was in addition to Dr. Seidel's being recognized in February as Researcher of the Year at the Researchers Recognition Dinner and Award Ceremony. Dr. Terry Nett, also in the Department of Biomedical Sciences, was recognized at the event as well for research resulting in approved patents. Hosts and supporters of the research recognition event were Hensley Kim & Holzer LLC, a Denver-

University Awards

Provost's N. Preston Davis Award for Instructional Innovation

Dr. Richard Bowen, Department of Biomedical Sciences (recognizes use of technology to further or significantly encourage instruction innovation).

Honors Professor of the Year

Mark Frasier, M.S.

College Awards

Innovative Instructional Methodology

Undergraduate Education: Mark Frasier, Department of Biomedical Sciences

PVM Education: Dr. Ray Whalen, Department of Biomedical Sciences

Pfizer Animal Health Award for Research Excellence

Dr. Elaine Carnevale, Department of Biomedical Sciences

O.E. Thornburg Graduate Research Excellence Awardees

Albert Gonzales (Scott Earley lab)
Scott Purcell (Russell Anthony/
George Seidel laboratories)

O.E. Thornburg Undergraduate Research Excellence Awardees

Hamid Gari
Daniel Woldvedt

based law firm providing legal counsel in the areas of technology startups, CSU Ventures, Colorado State University Office of Economic Development, Colorado State University Office of Vice President for Research, and the Colorado State University Research Foundation.

In addition to Drs. Seidel's and Nett's awards, numerous Biomedical Sciences faculty members were honored at the College of Veterinary Medicine and Biomedical Science's Annual Scholarship and Awards Luncheon, and at the University's Celebrate! Colorado State Awards Banquet, both held in April.

Frontiers Seminar Series Bringing Regenerative Medicine Researcher to CSU

The Frontiers in Biomedical Sciences Seminar Series is hosting a visit and lecture on April 8, 2009, by Dr. Shoukhrat Mitalipov, an Assistant Scientist in the Division of Reproductive Sciences at Oregon Health and Science University (OHSU).

Dr. Mitalipov is Co-Director of the Assisted Reproductive Technologies and Embryonic Stem Cell Core Laboratory at the Oregon National Primate Research Center. The main focus of Dr. Mitalipov's lab is genetic and epigenetic characteristics of human and monkey embryonic stem, or ES, cells. ES cells allow investigations into the mechanisms regulating early primate development and differentiation in vitro. Human ES cells, a research area of ongoing controversy, may also provide the foundation for the field of regenerative medicine and may offer hope for the treatment of a wide range of clinical conditions that can be attributed to the loss or malfunction of specific cell types.

Dr. Mitalipov received his master's degree in Reproductive Biology from



Dr. Shoukhrat Mitalipov

Timiriasev Academy, Moscow, Russia, and earned a doctorate in Developmental Genetics and Stem Cell Biology at the Research Center for Medical Genetics, Russian Academy of Medical Sciences. He moved to Utah State University in 1995 to conduct postdoctoral research in stem cell

and developmental biology. Dr. Mitalipov moved to OHSU in 1998.

The Frontiers in Biomedical Sciences Seminar Series was initiated by the Department of Biomedical Sciences five years ago with the intent of sponsoring outstanding speakers on leading-edge topics in the biomedical sciences that would appeal to large and diverse audiences. In October, Frontiers hosted Dr. Michael Marletta, the Aldo DeBenedictis Distinguished Professor of Chemistry, University of California, Berkeley. Dr. Marletta, who also is a Faculty Scientist at Lawrence Berkeley National Laboratory, presented the lecture, "Sensing Gases (NO vs. O₂) Selectively in Biology: Chemistry to the Rescue."

The Series is jointly sponsored by the Department of Biomedical Sciences, the Program in Molecular, Cellular, and Integrative Neuroscience, and the Cell and Molecular Biology Program at Colorado State University. For additional information on the Frontiers lecture, visit the Department's website at www.cvmbs.colostate.edu/bms/fibs.htm.

Front Range Neuroscience Group Plans Annual Conference

The Front Range Neuroscience Group (FRNG), the local chapter of the National Society for Neuroscience, will hold its sixth annual conference on Monday, Dec. 8, from 10 a.m. to 7 p.m., at the Fort Collins Marriott. The annual meeting is an opportunity for neuroscience researchers, trainees, vendors, and others to exchange information about their research and research resources, and to learn about local opportunities for collaboration and career advancement.

Keynote speaker for the event is Dr. Kristen M. Harris, University of Texas, Austin, who will present a lecture titled "Structural Plasticity of Hippocampal Synapses, a Cellular Mechanism of Learning." The meeting will begin with a workshop on engineering one's career titled "Meeting Challenges, Making Choices, and Understanding Their Impact on Your



Continual Career Development," organized by Dr. Joan King of Beyond-Success LLC.

A poster session will showcase the latest in neuroscience research from investigators along the Front Range. Trainees will be chosen to present their research in a special oral session to highlight some of the exciting work being done in the Front Range.

The Front Range Neuroscience Group is comprised of individuals in the Front Range with a strong inter-

est in neuroscience research. Members include students and faculty at regional universities as well as other research centers. The chapter goal is to promote local neuroscience research, training, and information dissemination. For a complete schedule of meeting events and times, registration, or additional information, visit the FRNG website at FRNG.colostate.edu.

BMS Undergraduate Students Selected for Prestigious Goldwater Honor

Two students in the Department of Biomedical Sciences were honored by the Barry M. Goldwater Scholarship and Excellence in Education Foundation, the first time since 2003 that Colorado State University has had students selected for scholarship recognition by the prestigious foundation.

Daniel Woldtvedt, a senior, was named a Goldwater Scholar while Ashley Denney, also a senior, received an honorable mention.

The Goldwater Scholars were selected on the basis of academic merit from a field of 1,035 mathematics, science, and engineering students who were nominated by the faculties of colleges and universities nationwide. The one- and two-year scholarships cover the cost of tuition, fees, books, and room and board up to a maximum of \$7,500 per year.

Woldtvedt, who is from Montana, started out at Colorado State pursuing a degree in mechanical engineering. He is working in Dr. Christian Puttlitz's orthopedic bioengineering laboratory creating a computational three-dimensional map of cartilage to incorporate into a computer model of the human spine. Last year, wanting a closer clinical connection, Woldtvedt decided to change majors and pursue a degree in biomedical sciences with plans to go on to dental school. When not at school, Woldtvedt enjoys guiding fly-fishing trips and spending time in his home state.



Daniel Woldtvedt

"After spending time in the laboratory, I decided that I would be too disconnected from the patient working in research, and wanted to work more directly as a health care provider," said Woldtvedt. "I looked at dentistry more seriously and have applied to a number of schools, including the University of Washington; University of Colorado,

Denver; and Oregon Health and Sciences University."

Denney, from Fort Collins, Colo., credits great high school teachers who inspired her to pursue a career in the life sciences. She is working in the laboratory of Dr. Patricia Bedinger where she is conducting genetic research with a model plant species, *Arabidopsis*, focusing on mutations important for pollen function. Denney plans to pursue a combined M.D./Ph.D. program following graduation, hoping to continue to focus on genetics while incorporating research, practice, and teaching into her career.

"Genetic studies provide a very powerful approach to understand how life



Ashley Denney

processes work," said Denney, who will take a year off after graduation before pursuing her postgraduate studies. "It's an area I find very fascinating, and I'm especially grateful to many outstanding mentors at Colorado State for their enormous inspiration and support in light of my goals."

Biomedical Student Association Provides Support, Service, and Fun

The Biomedical Student Association is an organization for undergraduate students majoring or interested in Biomedical Sciences. The purpose of the association is to unite students who have a common interest in Biomedical Sciences and to provide opportunities to learn about Biomedical Sciences beyond the classroom.

The club offers regular monthly meetings during the academic year; guest speakers from various research areas, biotechnology firms, and human/animal health care specialties; the opportunity to meet other students who have similar interests and are enrolled in the same courses; community service activities, including CSUnity, a day of Universitywide community service; and social events.

Officers this year for the Biomedical Student Association are Morgan Lauer, president; Meghan Davidson, vice president; Rebecca McIntire, secretary; Lauren Guy, treasurer; Heather Hergert and Caren Fleischmann, community

volunteer coordinators; Caroline Cervelli, public relations; and Kelsey Miller, Kyle Pickard, and Ryan Ward, CVMBS College Council Representatives. Kelly Swetich, BMS Undergraduate Advisor, is the club's adviser.

For more information on the Biomedical Student Association or to see a calendar of meetings and events, visit their website at www.cvmbs.colostate.edu/bms/ugmajor_studorg.htm.



Members of BSA paint fences during CSUnity, a day of volunteering.

University Honors Scholars Prevalent in Biomedical Sciences Major

Although the number of students in the University Honors Scholars program is a small percentage of the overall University population, fully 37 percent of Biomedical Sciences majors are honors students. That statistic keeps faculty and staff busy, ensuring that honors students are challenged in meaningful ways and reap the full benefit of their educations while at Colorado State University.

In the honors program, undergraduate education is enhanced through small, interdisciplinary seminars and honors courses. In the Department of Biomedical Sciences, honors students frequently work in faculty laboratories and have faculty mentors. In 2008, Mark Frasier, Associate Professor in the Department of Biomedical Sciences, was recognized as the 2008 Honors Professor of the Year for the University Honors Scholars program.

In addition to participating in University Honors courses and seminars, honors students are required to have two honors courses in their major. In Biomedical Sciences, BMS 302 (physiology laboratory) and BMS 360 (physiology) are both offered as honors classes. Students also can work with faculty to create an honors “track” in other classes by taking on additional work both in and out of the classroom. Students also participate in community outreach. Particularly popular with BMS students is teaching in the local junior high schools.

“Almost all of our students are eligible to be honors students, so our faculty and staff members work closely with the students to bring them the experiences they need to help them be successful,” said Kelly Swetich, Undergraduate Advisor for the Department of Biomedical Sciences. “Since most of our honors students plan on going on to professional or graduate school, the honors program provides them with an opportunity to work closely with faculty members, gain research experience, and even work on thesis projects that could impact their future educational and career goals. In addition, the Honors Scholars program gives students a superior way to fulfill the University’s graduation requirements.”

The University Honors Scholars program (Track 1) is designed for outstanding students who wish to fulfill a majority of their general education requirements through innovative interdisciplinary seminars. Discipline Honors Scholar program (Track 2) is designed for outstanding students who have completed many general education requirements and wish to focus on upper division Honors experiences in their majors.

For additional information on the University Honors Scholars program or the Honors Program in the Department of Biomedical Sciences, visit the University website at www.honors.colostate.edu or the Department’s undergraduate page at www.cvmbms.colostate.edu/bms/undergradprog.htm.



From left to right are Honors Scholars Helenka Rowe, Georgia Eubanks, Chelsea Green, and Melissa Noble. The students participated in a two-semester honors project to reconstruct skeletal remains, a complicated and lengthy project where the students combined learning of human osteology with artistic and mechanical skills.

BMS Research Retreat



The Fifth Annual BMS Research Retreat was held Sept. 12 and 13 at the YMCA of the Rockies in Estes Park. The event featured two keynote speakers, graduate student and postdoctoral fellow speakers, poster sessions for graduate students and postdoctoral fellows to display and discuss their work, and social gatherings. The event was organized by the Graduate Student Association in the Department of Biomedical Sciences. Dr. Ron Tjalkens, an Associate Professor in the Department, gave the first keynote address on Parkinson’s disease, and Dr. Barbara Sanborn, Department Head, gave the second keynote address followed by a panel discussion on interviewing for a job. The following graduate students and postdoctoral fellows received Research Excellence Awards during the retreat: Jill Guttormsen (Quinton Winger laboratory) and Katie Torley (Gerrit Bouma laboratory), for Best Oral Presentations; Aida Ulloa (Barbara Sanborn laboratory), Best Graduate Student Poster; and Daesuk Chung (Sanborn laboratory), Best Postdoctoral Poster.





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