

## BIOLOGICAL SCIENCES

### Year of honors

Associate Professor Heiko Schoenfuss was named St. Cloud State University's 2007 Adviser of the Year. He also earned the 2007 College of Science and Engineering's Faculty Research Award. (Read more on p. 28.) A student honor, the 2007 Dennis M. Thayer Leadership Award, went to Allissa Dillman, who is majoring in biochemistry and biomedical science. The award is administered by the Excellence in Leadership Committee of the Center for Student Organizations and Leadership (CSOLD).

### New equipment boosts research potential

New: Agilent 6330 LC/MS System, DCI/BioLafitte BioReactor, Gradient Thermocycler, Kodak Image Station 4000MM Pro. Used (donated by 3M Pharmaceuticals): centrifuges, incubators for cell culture, equipment for animal surgery, a cryomacro-cutting device, refrigerators, freezers, several tissue-culture hoods and systems for purifying water.

### Recent alumnus publishes

Megan Cleland, a 2006 graduate who is pursuing a Ph.D. at the National Institutes of Health/Johns Hopkins University, coauthored "Role of Bax and Bak in Mitochondrial Morphogenesis," published in *Nature* 433, 658-662.

### Interns go national, international

A total of 47 internships were awarded to biological science majors in 2006 – 2007. Locations included Honduras (health care); Australia (marine animal behavior); Bethesda, Md. (National Institutes of Health) and various sites in Minnesota.

### 2007 Student Research Colloquium participation:

27 students, 21 projects, 11 faculty sponsors

### Award-winning student research

- Meghan McGee, Denise M. McGuire Student Research Award (DMMSRA) \$400 for "Biological Effects of Endocrine Disrupting Chemicals on Fathead Minnow Reproductive Endpoints." Sponsor: Heiko Schoenfuss
- Emily Messner, DMMSRA \$350; Student Research Fund Award (SRFA) \$1,495 for "The Effects of WH1-P131 on T-Cell Function and Cytokine Secretion." Sponsor: Marina Cetkovic-Cvrlje
- Emily Messner, Gargi Dayama, Joseph Hobbs, Student Research Colloquium (SRC) Best Poster Semifinalist for "Effect of WH1-P131 on Mixed Lymphocyte Reaction (MLR)." Sponsor: Cetkovic-Cvrlje
- Fei Tsan, DMMSRA \$350; SRFA \$1,250 (fall), \$1,250 (spring) for "Does WH1-P131, an Inhibitor of Janus Tyrosine Kinase 3 (JAK3) Affect Mitogen-Induced T-Cell Proliferation in Vitro." Sponsor: Cetkovic-Cvrlje
- Brooke Jacobson, DMMSRA Participation for "Comparing C-Star Performance in Two Species of Mullet in the Hawaiian Islands." Sponsor: Schoenfuss

- Joseph Carlyon, Joe Eisterhold, SRC Best Poster Honorable Mention \$250; SRFA \$1,200 for "Implementing Management Practices to Restore Native Vegetation at Minnesota Military Training Sites." Sponsor: Jorge Arriagada
- Amir Saleh, SRC Best Poster Semifinalist for "Feeding Biomechanics of Silvery Minnow Fishes." Sponsor: Schoenfuss
- Jennifer Triemstra, SRC Best Poster Semifinalist; SRFA \$1,500 (fall), \$1,500 (spring) for "Salivary Testosterone and Cortisol Levels in Female Rugby Players." Sponsor: Maureen Tubbiola
- Adam Hjelm, SRC Best Poster Semifinalist for "The Effects of SCSU's Alcohol Education Class on Students' High-Risk Alcohol Choices and Behaviors." Sponsor: Patricia Hauslein
- Rebecca Olson, SRFA \$990 (fall), \$500 (spring) for "Foraging Habitat of Nesting Burrowing Owls." Sponsor: Marco Restani
- Marijo Roiko, SRFA \$86 for "Interactions Between Proteins Controlling Toxoplasma Gondii Cell Cycle." Sponsor: Christopher Kvaal
- Alexander Reberg, SRFA \$100 for "Association of Recombinational Toxoplasma Gondii Cell Cycle Genes." Sponsor: Kvaal
- Roberto Cediell, SRFA \$405 for "Ontogeny of Muscle Fiber Type Distribution in Climbing Hawaiian Gobioid Fishes: Muscle and Locomotor Correlation." Sponsor: Schoenfuss
- Kent Grove, SRFA \$1,289 for "The Effects of Fluoxetine/Alkyphenol Exposures on Reproductive Competence of the Male Fathead Minnow." Sponsor: Schoenfuss
- Carolyn Gamble, SRFA \$1,309 for "The Effects of 17 $\beta$ -Estradiol, 4-Nonylphenol and Common Pharmaceuticals Individually and in Mixture on the Common Tydo-Platonic Diatom Species *Melosira Varians*." Sponsor: Matthew Julius
- Robert Janisch, Chris Froelich, August Pamplona, Elizabeth Lieser, SRFA \$1,000 for "Structure-Based Discovery of Drugs to Treat Type II Diabetes." Sponsor: Bruce Jacobson

### Four complete master's theses

- William Kronland, "Effects of Salvage Logging on Cavity Nesting Birds and Small Mammals." Adviser: Restani
- Clara McCarthy, "Habitat Use of Large Raptors at Two Spatial Scales in North Dakota." Adviser: Restani
- Maria Legatt, "Ecotoxicological Assessment of Biologically Active Compounds on Male Fathead Minnows (*Pimephales Promelas*)." Adviser: Schoenfuss
- Annet Kirabo, "Leptin and Glutamate Interactions as Potential Mechanistic Links Between Nutrition and Reproduction." Adviser: Oladele Gazal

**Jorge E. Arriagada**, Professor. Ph.D. 1994, Ohio State University.

conservation, control invasive plants, ethnobotany, floristics, invasive plants, plant identification, plant taxonomy, tropical rainforest, vegetation management, mapping, restoration and studies, wetlands, wild rice

**Marina Cetkovic-Cvrlje**, Associate Professor. M.D., Ph.D. 1997, Medical School, University of Zagreb, Croatia.

immunology, autoimmunity, type 1 diabetes, transplantation of pancreatic islets, Janus tyrosine kinases (JAK3), JAK3 inhibitors in prevention of autoimmunity and transplant rejection

**William Cook**, Assistant Professor. Ph.D. 2003, University of Kansas.

community ecology of insects, plants, mammals and birds, habitat fragmentation, interactions between humans and wildlife, patterns of biodiversity, prairie ecology

#### Publications

Cook, William M. and R. D. Holt. Fire Frequency and Mosaic Burning Effects on a Tall-Grass Prairie Ground Beetle Assemblage. *Biodiversity and Conservation*, 15 (7) 2301 – 2323.

Cook, William M. and R. D. Holt. The Influence of Multiple Factors on Insect Colonization of Heterogeneous Landscapes: A Review and Case Study with Periodical Cicadas. *Annals of the Entomological Society of America*, 99 (5) 809 – 820.

Cook, William M. and S. H. Faeth. Irrigation and Land Use Drive Ground Arthropod Community Patterns in an Urban Desert. *Environmental Entomology*, 35 (6) 1532 – 1540.

**John C. Cornell**, Ph.D. 1976, University of California-Berkeley.

comparative physiology: salt and water balance and ion transport

**Oladele Gazal**, Professor. Ph.D. 1994, Iowa State University.

livestock, neuroendocrinology, nutrition, physiology, reproduction

**Kristin P. Gulrud**, Assistant Professor. Ph.D. 1996, University of Colorado.

mechanisms of bacterial pathogenesis, bacterial toxins, public health microbiology

**Patricia L. Hauslein**, Associate Professor. Ph.D. 1989, Louisiana State University and Agricultural and Mechanical College.

alcohol education, biology education, cognitive science, education, faculty development, science and spirituality, science education

**Bruce Jacobson**, Associate Professor. Ph.D. 1990, Rice University, Houston, Texas.

biodegradation, high resolution protein structure determination, structure-based drug design

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**Matthew Julius**, Associate Professor. Ph.D. 2000, University of Michigan.

**aquatic ecology, diatoms, evolution, limnology, phycology**

*Publications*

Blob, Robert, K. Wright, M. Becker, T. Maie, T. Iverson, M. Julius, and H. Schoenfuss. Ontogenetic Change in Novel Functions: Waterfall Climbing in Adult Hawaiian Gobiid Fishes. *Journal of Zoology*, 273 (2) 200 – 209.

Julius, Matthew. Why Sweat the Small Stuff: The Role of Microalgae in Sustaining Hawaiian Ecosystem Integrity. *Bishop Museum Bulletin in Cultural and Environmental Studies*, 2006, (3) 183 – 193.

Julius, Matthew, M. Curtin, and H. Tanaka. *Stephanodiscus kusuensis*, sp. nov., A New Pleistocene Diatom from Southern Japan. *Phycological Research*, 54 (4) 294 – 301.

Julius, Matthew and H. Schoenfuss. Phylogenetic Reconstruction as a Broadly Applicable Teaching Tool in the Biology Classroom: The Value of Data in Estimating Likely Answers. *Journal of the College Science Teacher*, 35 (7) 40 – 45.

*Grants*

\$250,000 to determine the relationships among the heterokont classes by generating two large molecular data sets, with R. Andersen (Bigelow Laboratory for Ocean Sciences, West Boothbay Harbor, Maine), R. Cattolico and G. Rocap (University of Washington, Seattle, Washington), R. Jansen, E. Ruck and E. Theriot (University of Texas, Austin Texas), S. Draisma (National Herbarium and Leiden University, Leiden, The Netherlands) and H. Kawai (Kobe University, Kobe, Japan). From NSF's Assembling the Tree of Life: A Phylogenetic and Genomic Investigation of the Algal Heterokont Tree, 2006 – 2008.

**Beverly Kochmann**, Professor. Ed.D. 1993, University of Colorado.

**science education**

*Selected Presentations*

Kochmann, Bev and W. Sherman. Balancing This Equation. Moving From Island Programmes, International Conference on Education, Jan. 7, 2007, Honolulu.

Kochmann, Bev et al., Can A "Partnership" Really Work?, AACTE, Feb. 25, 2007, New York.

**Standley E. Lewis**, Professor. Ph.D. 1968, Washington State University.

**entomology, osteology, paleontology, parasitology**

**Anthony Marcattilio**, Professor. Ph.D. 1978, Colorado State University.

**behavioral ecology, foraging and food preferences in animals, general animal behavior**

**Brian Olson**, Assistant Professor. Ph.D. 2003, University of Minnesota.

**molecular biology**

*Publications*

Olson, B. L. and E. N. Olson. Updated Student Study Guide for use with *Biology*, 8th edition by Raven, Johnson, Losos, Mason, and Singer, McGraw-Hill Publishing 2008.

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Olson, E. N., and B. L. Olson. Student Study Guide for use with Introduction to Genetic Principles 1st edition by David Hyde, McGraw-Hill Publishing 2008.

Olson, E. N. and B. L. Olson. Instructors Manual for use with Introduction to Genetic Principles, 1st edition by David Hyde, McGraw-Hill Publishing 2008.

Olson, B. L., M. B. Hock, S. Ekholm-Reed, J. Wohlschlegel, K. Dev, A. Kralli, and S. I. Reed. SCFCdc4 Acts Antagonistically to the PGC-1 $\alpha$  Transcriptional Coactivator by Targeting It for Ubiquitin-Mediated Proteolysis. *Genes & Development* 22 (2) 252 – 264.

#### Grants

\$81,434 collaborative NSF-MRI: Acquisition of a Kodak Image Station 4000MM Pro for the visualization and quantification of DNA, RNA and proteins. From NSF, 2007 – 2009.

**Marco Restani**, Associate Professor. Ph.D. 1997, Utah State University.

**endangered species, migration and dispersal, predator/prey interactions, wildlife disease, wildlife ecology**

#### Certification/Licensure

Certified Wildlife Biologist, The Wildlife Society, Washington, DC (2000).

#### Publications

Hanson, D. A., H. B. Britten, M. Restani, and L. R. Washburn. High Prevalence of *Yersinia Pestis* in Black-tailed Prairie Dog Colonies During an Apparent enzootic Phase of Sylvatic Plague. *Conservation Genetics*, 8 (4) 789 – 795.

Harmata, P. J., M. Restani, and A. R. Harmata. Settlement Patterns, foraging behavior, and reproductive success of ospreys along a heterogeneous riverine corridor. *Canadian Journal of Zoology*, 85 (1) 56 – 62.

#### Grants

\$616,000 for LiDAR Survey of Crow Wing County, with R. M. Rothaus. From the Minnesota Department of Military Affairs, Crow Wing County and Minnesota Department of Transportation, 2007.

**Heiko Schoenfuss**, Associate Professor. Ph.D. 1997, Louisiana State University.

**anatomy, aquatic toxicology, eco-morphology, morphology, vertebrates**

#### Publications

Blob, R., K. Wright, M. Becker, T. Maie, T. Iverson, M. L. Julius, H. Schoenfuss, Ontogenetic Change in Novel Functions: Waterfall Climbing in Adult Hawaiian Gobiid Fishes. *Journal of Zoology*, 273 (2) 200 – 209.

Julius, M. L. and H. Schoenfuss. Phylogenetic Reconstruction as a Broadly Applicable Teaching Tool in the Biology Classroom: The Value of Data in Estimating Likely Answers. *Journal of the College Science Teaching* July/August, 2006, 40 – 45.

#### Grants

\$599,640 for Developing Rapid Assessment Tools to Evaluate the Biological Effects of Complex and Biologically Active Chemical Mixtures, with L. B. Barber, D. Norris, M. L. Julius. From the Environmental Protection Agency: Science to Achieve Results (STAR), 2005 – 2008.

\$63,000 for Assessing the Ecotoxicology of Alkylphenol Mixtures Across the Aquatic Food Chain, with M. L. Julius and L. B. Barber. From the National Institute for Water Resources, 2005 – 2007.

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\$63,000 for Determining the Endocrine Disrupting Effects of Alkylphenols (APs) on the Reproductive Competence of Fishes: Phase 2, Field Studies, with K. E. Lee and L. B. Barber. From the Minnesota Pollution Control Agency, 2005 – 2006.

**Gordon D. Schrank**, *Professor*. Ph.D. 1974, University of Texas Medical Branch at Galveston.

**microbiology**

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**Patricia Simpson**, *Professor*. Ph.D. 1989, Southern Illinois University at Carbondale.

**science education, teacher preparation**

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**Maureen Tubbiola**, *Professor*. Ph.D. 1992, University of Massachusetts.

**behavior, mammalian anatomy, mammalian physiology, neurobiology, reproduction**

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**freshwater ecology, freshwater invertebrates, stream ecology, water quality**

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**Steven F. Williams**, *Professor*. Ph.D. 1974, Oregon State University.

**fish ecology**

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**Jerry O. Wolff**, Ph.D. 1977, University of California, Berkeley.

**evolutionary ecology, mammalogy, behavioral ecology, human sociobiology**

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#### *Selected Presentations*

Wolff, Jerry O. Social Biology of Rodents. Invited Plenary Talk: 3rd International Conference on Rodent Biology and Management, Aug. 28 – Sept. 1, 2006, Hanoi, Vietnam.

Wolff, Jerry O. The Socioecology of Coexistence, Dispersal, Infanticide, and Community Dynamics of Forest Rodents. Invited Speaker, Chinese Academy of Sciences, June 27, 2007, Beijing, China.

#### *Publications*

Wolff, Jerry O. and P. W. Sherman. Rodent Societies: An Ecological and Evolutionary Perspective. University of Chicago Press, Chicago. 610 p. June 2007.

Krebs, C. J., X. Lambin, and J. Wolff. Social Behavior and Self Regulation in Murid Rodents. In J. O. Wolff and P. W. Sherman, eds. Rodent Societies: An Ecological and Evolutionary Perspective. University of Chicago Press, Chicago, p. 173 – 181, June 2007.

Wolff, J. O. and P. W. Sherman. Rodent Societies as Model Systems. In J. O. Wolff and P. W. Sherman, eds. Rodent Societies: An Ecological and Evolutionary Perspective. University of Chicago Press, Chicago, p. 1 – 7, June 2007.

Sherman, P. W. and J. O. Wolff. Conclusions and Future Directions. In J. O. Wolff and P. W. Sherman, eds. Rodent Societies: An Ecological and Evolutionary Perspective. University of Chicago Press, Chicago, p. 489 – 490, June 2007.

Ophir, A. G., S. M. Phelps, A. B. Sorin, and J. O. Wolff. Comparative Social Behavior and Morphology of Prairie Voles from Tennessee and Illinois: Studies from the Laboratory and Field. *Journal of Mammalogy* 88 (4) 989 – 999.

#### Grants

\$151,492 for Collaborative Research: Behavioral and Neuroendocrine Variation in Mammalian Mating Systems. From NSF, 2006 – 2007.

\$12,000 for Behavioral and Neuroendocrine Variation in Mammalian Mating Systems. From International Programs NSF Supplement (for travel to China), 2007.

## Immunology researcher lands 2008 Hellervik Award



Associate Professor Marina Cetkovic-Cvrlje's research on the mechanisms of Janus tyrosine kinase 3 (JAK3) inhibition in prevention of autoimmune type 1 diabetes has landed her the 2008 Lowell Hellervik award.

Administered by the Office of Sponsored Programs, the Lowell Hellervik Award is St. Cloud State University's premier research award. It is bestowed annually to at least one deserving faculty researcher. This year, Cvrlje was the lone recipient, receiving \$2,500.

"The Hellervik Award teaches my students that the hard work and long hours spent doing research in immunology are recognized," Cetkovic-Cvrlje said, adding that it is extremely hard to conduct this research because of the long hours required.

The overall goal of Cetkovic-Cvrlje's research is to develop treatment strategies for the prevention of autoimmune type 1 diabetes. "Type 1 diabetes (T1D) is caused by destructive attack of insulin-producing pancreatic cells by immune cells called T-cells. This devastating disease is unpreventable and irreversible, and the major goal of intensive scientific search is to find a way to prevent T1D. T-cells express a cytoplasmic protein tyrosine kinase called JAK3 that is essential for their function. It has been shown that treatment with a chemical inhibitor of JAK3 kinase prevents T1D development in a mouse model of autoimmune

diabetes. We are currently trying to obtain important information on the diabetes protective mechanism of the JAK3 kinase inhibitor," Cetkovic-Cvrlje said, explaining that her research is basically studying what the JAK3 inhibitor does to T-cells to change their "aggressive" behavior towards pancreatic cells. Understanding the JAK3 inhibitor's action may bring researchers on step closer to developing treatment strategies for the prevention of T1D.

Cetkovic-Cvrlje said she is grateful to her team of one graduate and eight undergraduate student researchers, and to 3M, which recently donated equipment to the Department of Biological Sciences. Previously she shared an incubator and a biosafety hood (equipment essential for sterile tissue culture work) with students, but now one of each is designated for her use.

Regarding the award itself, Cetkovic-Cvrlje said, "Dr. Hellervik's Award would allow my research team to continue with experiments and to generate data that would enable us to compete for extramural funding." Cetkovic-Cvrlje added she is grateful to all who made the award possible, including the Office of Sponsored Programs. "Without their support, the initiation of my research at SCSU would be impossible. I would like to take this opportunity to thank the Office of Sponsored Programs for their constant support and recognition." 🐾

*ARDC staff writer John Yebambaram contributed to this story.*