

**2014
Annual Report
Department of Biological Sciences**

**Missouri University of Science &
Technology**

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Note: This Annual Report is prepared to improve communications with the S&T Biological Sciences community. To reduce the environmental impact of our activities, the report is published online; printed copies are available upon request. We publish the calendar annual report in February of the following year. We hope you find this information useful and the format accessible. Your feedback and ideas are welcome.

Useful BioSci Links

- Department biosci.mst.edu
Missouri S&T www.mst.edu
BioSci Donations givingtomst.missouri.edu
BS&T Biology FaceBook [Missouri S&T Biology](#)

Department of Biological Sciences

Chair's Summary - 2014

Robert S. Aronstam



Department Update

The Missouri S&T Department of Biological Sciences embodies an academic community focused on learning and discovery. The S&T BioSci community provides a supportive, collegial, challenging and rewarding environment for its faculty, students and staff.

Faculty



Dr. Stephen Roberts was recruited as the founding Dean of the College of Arts, Science and Business. Dr. Roberts academic appointment is as a professor in our department.



Dr. Julie Semon joined the faculty in July as an assistant professor. Dr. Semon is establishing a Laboratory of Regenerative Medicine.

Several BioSci faculty members were honored with awards this year. Associate Professors **Terry Wilson** and **Katie Shannon** received Faculty Achievement Awards, Dr. David Westenberg received an Outstanding Faculty award for Service, and **Dr. Ann West**, Adjunct Lecturer, received a CERTI eaching commendation.



Faculty award recipients: Ms. Terry Wilson, Dr. Katie Shannon, Dr. David Westenberg and Dr. Ann West.



Ronald L. Frank, Ph.D.

**Associate Professor
Laboratory of Plant Molecular Genetics**

Research Interests

Identification of gene families and other functional sequences using computer algorithms
Evolution and expression of gene families in plants
Structure and expression of phenylalanine ammonia-lyase gene family in soybean

Education

Houghton College, Houghton, NY, B.S. General Biology, 1978
The Ohio State University, Columbus, OH, M.Sc., Genetics, 1981
The Ohio State University, Columbus, OH, Ph.D., Genetics, 1985
USDA Agricultural Research Service, Beltsville, Postdoctoral Fellow, 1985-88

2014 Teaching

WS14: General Genetics (BioSci 231)
WS14: Genomics (BioSci 301)
FS14: Molecular Genetics (BioSci 4323)
FS14: Evolution (BioSci 2233)
Undergraduate advisees: 31 majors
Undergraduate researchers: Kirsten Kelly (BIO 390)
Graduate Students: Lisa Snoderly-Foster M.S. May 2014

Michael Sadler M.S.



Dr. Frank with talks with students interested in genomic research at the Helix-sponsored Open Lab.



Chen Hou, Ph.D.

Assistant Professor
Laboratory of Animal Physiology

Research Interests

Metabolic basis of aging; Energetic basis of animal growth and reproduction; Mammalian respiratory physiology; Eusocial insects physiology and social network

2014 Publication

C. Hou. Increasing energetic cost of biosynthesis during growth makes refeeding deleterious. *American Naturalist*, **184**: 233-247.

M. Hayes, L. Jiao, T. Tsao, I. King, M. Jennings, and **C. Hou.** High temperature slows down growth in tobacco hornworms (*Manduca sexta* larvae) under food restriction. *Insect Science*, DOI: 10.1111/1744-7917.12109. (All the co-authors are S&T students in Hou lab; the 1st author is an undergraduate student.)

2014 Invited Speech

Hou, C., Energy allocation and tradeoff during animals' growth: Two examples of universality in biology. Colloquium seminar, Physics Department at University of Missouri-Columbia, March, 2014.

2014 Poster presentations

Energetics of Unitary and Super-organisms in Response to Stresses. National Academy Keck Future Initiative: Collective Behavior, Irvine, CA, November, 2014

Food restriction-induced changes in energy budget and metabolic scaling during ontogeny: A case study on hornworms. Gordon Research Conference: Unifying Ecology Across Scales, Biddeford, ME, July, 2014

2014 Teaching

Spring: Human Anatomy and Physiology II (Bio 3343)

Summer: Evolution (Bio2233)

Fall: Biology of Aging (Bio3001)

Mathematical modeling in biology (Math4097) (Co-taught with Dr. John Singler, 50%)

2014 Award:

National Academy Keck Future Initiative Travel Award for Workshop "Collective Behavior: From Cells to Societies." Irvine, CA, November, 2014.

2014 Advising

Undergraduate researchers (8): Lindsay Koerperich, Kathryn Koerperich, Caitlin Wilkes, Azriel Domingo, Julie Petru, Mary Puleo, Xavier Baker, and Hannah Goodman;

Graduate advisee: Lihong Jiao and Kaushalya Amunugama

2014 Activities

Reviewer of peer-reviewed international journals: *Proc. Natl. Acad. Sci. U.S.A.*; *BioSystem*; *American Naturalist*; *Functional Ecology*; *Oikos*;



Yue-wern Huang, Ph.D.

Professor

Director, Laboratory of Bionanotechnology and Molecular Toxicology

Research Interests

- Nanomaterial toxicity in the aspect: how physiochemical properties of nanoparticles contribute to molecular toxicity mechanisms
- Using nanomaterials and cell-penetrating peptides (CPPs) to deliver biologically active molecules into the cell for biomedical applications
- Pollutants and environmental health

2014 Peer-reviewed Journal Publications

2014. Yue-Wern Huang, Han-Jung Lee, Larry M. Tolliver, and Robert Aronstam. Delivery of nucleic acids and nanomaterials by cell-penetrating peptides: opportunities and challenges. *BioMed Research International* (In press).

2014. Microsugar Chang, Yue-Wern Huang, Robert S. Aronstam, and Han-Jung Lee. Cellular delivery of noncovalently-associated macromolecules by cell-penetrating peptides. *Current Pharmaceutical Biotechnology*, 15:267-275.

2014 Book Chapters

2014. Betty R. Liu, Yue-Wern Huang, Robert S. Aronstam, and Han-Jung Lee. Chapter 8: Cell-Penetrating Peptide-Mediated Protein Uptake in Cyanobacteria. In *Cyanobacteria: Ecological Importance, Biotechnological Uses and Risk Assessment*. Douglas Davison (ed.): Nova Science Publishers, Hauppauge, New York, pp 171-181.

2014 Presentations

Invited Speeches

2014, May 26. National Taiwan Normal University. Title: Biology and Beyond. Taipei, Taiwan.

2014, May 23. National Taiwan Normal University. Frontiers in Biopharmaceuticals Conference. Title: Materials for Biomedical Applications. Taipei, Taiwan.

Conference Presentations

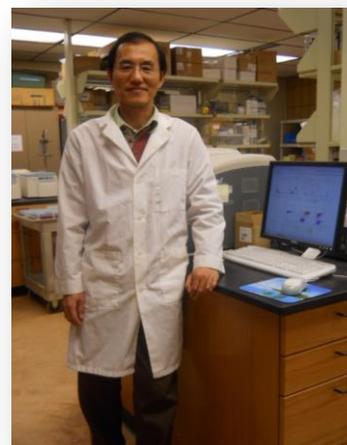
2014, March 23-27. 53rd Annual Meeting of the Society of Toxicology. Influence of Transition Metal Oxide Nanoparticles on Cell Death and Cell Cycle in A549 Cells. Yue-Wern Huang, Larry M. Tolliver, Fang Yao Stephan Hou, Robert S. Aronstam, and Han-Jung Lee. Phoenix, AZ, USA.

2014 External Funding

2014 – 2016. Reduction of the BMP2 Dose Required for Bone Regeneration through the Use of a New Intrinsically Osteoinductive Hydroxyapatite Carrier. PI: Mohamed N. Rahaman; **Co-PI: Yue-Wern Huang** (25%). NIH R15.

2014 Pending Proposals

2015 – 2018. Engineering Bioresponsive Nanoparticles for Breast Cancer Treatment. PI: Sutapa Barua; **Co-PI: Yue-Wern Huang** (40%). \$507,500.



- 2015 – 2017. Increasing Biosynthetic Costs Make Later-onset Short-term Food Restrictions More Protective. PI: Chen Hou; Co-PI: Yue-Wern Huang (20%) and Paul Nam, NIH R21. \$258,831
- 2015 – 2019. New Synthetic Biomaterials with Intrinsic Osteoinductivity for Bone Regeneration. PI: Mohamed N. Rahaman; Co-PI: Yue-Wern Huang (25%). NSF. \$402,616.
- 2015 – 2016. Dynamic Biosynthetic Cost and Food Restriction's Effect. PI: Chen Hou; Co-PI: Yue-Wern Huang and Paul Nam. University of Missouri Research Board. (Submitted)
- 2015 – 2017. 3D Printing of Ti Fiber Reinforced Bioglass Implants for Bone Repair. PI: Ming Leu; Co-PI: Yue-Wern Huang (40%). NIH R15. \$456,539.
- 2015 – 2017. Bioglass-based Glucose Sensors. PI: Chang-Soo Kim; Co-PIs: Yue-wern Huang (20%), Matt O'Keefe, and Delbert Day. NIH R21. \$185,775.
- 2015 – 2018. Tradeoffs between Metabolism, Growth, and Health Maintenance. PI: Chen Hou; Co-PI: Yue-wern Huang (20%). NSF. \$311,194.
- 2015 – 2017. Cellular Damage Is More Sensitive to Biosynthetic Rate Than Metabolic Rate. PI: Chen Hou; Co-PI: Yue-Wern Huang (20%) and Gayla Olbricht. NIH R15. \$452,980.

2014 Teaching/Mentoring

- SS14: Toxicology; Tissue Engineering; Techniques in Appl & Env Bio
- FS14: Ecology; Nanobiotechnology
- Undergraduate advisees: 20 bio majors
- Graduate students: Larry M. Tolliver
- Undergraduate students: Logan Featherston; Kent Lin; Kwther Albash; Anthony Bitar; Rosamond Hoyle

2014 Activities

- Program Evaluation Committee. National Taiwan University Institute of Ecology and Evolutionary Biology. Taipei, Taiwan.
- Platform/Poster Proposal Reviewer. Society of Toxicology Nanotoxicity Specialty Session.
- Editorial Board: Frontiers in Environmental Health (Review Editor)
- Reviewer of peer-reviewed international journals: Expert Opinion on Drug Delivery; Biomaterials, Langmuir; Advanced Materials Letters; Cell Biology and Toxicology; Toxicology; Journal of Applied Toxicology; Journal of Membrane Biology (BioMed Central); Journal of Agricultural and Food Chemistry
- Chair, S& T Institutional Animal Care and Use Committee
- Chair, Biological Sciences Graduate Program
- Chair, Faculty Search Committee





Melanie R. Mormile, Ph.D.

Professor

Environmental Microbiology Laboratory

Research Interests

Microbial populations in hypersaline environments
Bio-energy production by halophilic/halotolerant bacteria
Retrieval of enzymes for industrial use from extremophilic bacteria

2014 Active Members of Laboratory

Tiffany Edwards-Master's Thesis Candidate
Abigail Campbell-Undergraduate Student in Biological Sciences
Dylan Courtney-Undergraduate Student in Chemical Engineering, OURE Fellow
Ethan Hamilton-Undergraduate Student in Biological Sciences
Ava Hughes-Undergraduate Student in Biological Sciences
Jenn Parks-Technician
Yi Cui-Volunteer

2014 Grants

Extremophiles in Lake Magic, an Acidic Saline Lake in Australia. NASA-EPSCoR Missouri Research Infrastructure Development Award. \$18,800 over 12 months.

2014 Publications

Mormile, M.R. Going from Microbial Ecology to Genome Data and Back: Studies on a Haloalkaliphilic Bacterium Isolated from Soap Lake, Washington State. *Frontiers in Microbiology*, 5: 628.
doi:10.3389/fmicb.2014.00628.

Paul, V.G., S.D. Minter, B.L. Treu, and M.R. Mormile. Ability of a haloalkaliphilic bacterium isolated from Soap Lake, Washington, to generate electricity at pH 11.0 and 7% salinity. *Environmental Technology*, **35**: 1003-1011.

Roush, D.W., D.A. Elias, and M.R. Mormile. Metabolic capabilities of the members of the Order Halanaerobiales and their potential biotechnological applications. *Current Biotechnologies*, **3**: 3-9.

2014 Invited Presentations

Going from microbial ecology to genome data and back again: Studies on a haloalkaliphilic bacterium isolated from Soap Lake, Washington State. Department of Geological Sciences, University of Missouri, Columbia, Missouri, October 10. (*Regional Level*)

2014 Abstracted Presentations

Edwards, T., and M.R. Mormile. pH Dependent Antibiotic Resistance of an Alkaliphilic Halotolerant Bacterium from Soap Lake, Washington. (Platform) *Ann. Meet. Am. Soc. Microbiology*, May 17-20, Boston, MA. (*National level*).

2014 Teaching

SP14: Bio Sci 401, Special Topics, Geomicrobiology
SP14: Bio Sci 402, Problems in Applied and Environmental Biology, focused on research behind the book "Spillover"

FS14: Bio Sci 1201, Introduction to Biological Sciences
FS14: Bio Sci 3313, Microbiology
FS14: Bio Sci 4313, Introduction to Environmental Microbiology
FS14: Bio Sci 6313, Environmental Microbiology

2014 Activities

- Academic Editor for PLoS ONE
- Associate Editor for SIMB News
- Member of the Editorial Boards for: Environmental Technology; Agricultural, Food and Analytical Bacteriology; Frontiers in MicroBio Technology; Frontiers in Extreme Microbiology
- Served as peer-reviewer for the following journals: Astrobiology; Biotechnology for Biofuels; Environmental Science and Technology; Geobiology; and the International Journal of Hydrogen Energy
- Actively served on the following national committees: The American Society for Microbiology's Committee on the Status of Women in Microbiology of the Public and Scientific Affairs Board; The EMD Millipore Alice C. Evans Award Selection Committee; the Industrial Microbiology and Biotechnology Annual Meeting Program Committee
- Actively served on the following international committee: Subcommittee on the Taxonomy of the *Halomonadaceae* of the International Committee on Systematics of Prokaryotes
- Served as the Chair of the Missouri University of Science and Technology Provost Search Committee
- Actively served on the following Missouri University of Science and Technology' committees: MSM-UMR Alumni Association Awards Committee; Campus Promotion and Tenure; Best-in-Class Selection Committee
- Academic Faculty Advisor for the Mars Rover Design Team
- Academic Faculty Advisor for Helix, the Undergraduate Student Organization of the Department of Biological Sciences
- Secretary (January-May) for the Faculty Senate of Missouri University of Science and Technology
- President-Elect (June-December) for the Faculty Senate of Missouri University of Science and Technology



Dev Niyogi, Ph.D.

Associate Professor

Director, Laboratory of Freshwater Ecology

Research Interests

Freshwater ecology, aquatic biogeochemistry, microbial ecology of streams and lakes

2014 Publications

Kitto, J.A.J, D.P. Gray, J.S. Harding, H.S. Greig, and **D.K. Niyogi**. *In press*. Metacommunity theory and stream restoration: evidence for mass effects on stream invertebrate communities in a mine impacted landscape. *Restoration Ecology*.

2014 Teaching

SP14: Freshwater Fish Ecology (BioSci 300)

SU14: Field Ecology (BioSci 252)

SU14: Ecology (BioSci 251)

SU14: Field class in freshwater ecology (through University of Colorado)

FS14: Freshwater Ecology (BioSci 354)

FS14: Introduction to Environmental Science (BioSci 151)

Graduate research advisees: 1

Undergraduate research advisees: 6

2014 Activities

At Missouri S&T, I am continuing my research on ecosystem processes in streams, and the use of molecular tools to describe microbial communities of streams. One main focus is on the effects of stream drying on communities of microbes, algae, and animals. One graduate student and several undergrads have been helping with these studies. I am also collaborating with local scientists and conservationists with the Mill Creek Watershed Coalition and their efforts to study and conserve a unique watershed near Rolla. Travis Thompson, a graduate student, completed his M.S. thesis on conservation of the plains topminnow in the watershed. Several undergraduate students are examining water quality in the Mill Creek watershed as part of the OURE program on campus. Kate Menke, Chelsea Ehret, and Sierra Comer are looking at nutrient concentrations in springs and streams throughout the watershed, while Edna Armstrong and Morgann Kleeschulte are measuring concentrations of *E. coli* in waters across the area.



Dr. Niyogi's Freshwater Ecology class at the Little Prairie Conservation Area.



Katie Shannon, Ph.D.

Associate Teaching Professor , Department of Biological Sciences

Director, Cytokinesis Laboratory

Director, Cellular Imaging Facility

Research Interests

Regulation of actomyosin ring assembly and contraction

Cytokinesis is the physical separation of cells, accomplished by contraction of a ring containing actin and the molecular motor myosin. Regulation of cytokinesis is essential to ensure that cell division occurs between chromosomes segregated by mitosis. If cytokinesis fails, aneuploidy results, leading to cell death or tumorigenesis. The current focus is on a protein essential for cytokinesis in the budding yeast *Saccharomyces cerevisiae* called IQG1. This protein interacts with many other proteins, including actin, a small GTPase, a kinase, a phosphatase, and formins, a class of actin nucleating proteins. Regulation of these interactions during the cell cycle is an area of active research.

2014 Presentations

Shannon, K.B. (2014) Cdc14 Regulates Actin Ring Formation in Budding Yeast Via Dephosphorylation of Iqg1 December 7, 2014 Poster, American Society for Cell Biology Annual Meeting, Philadelphia, PA

Shannon, K.B. (2014) Flipped Fridays in Cell Biology. December 8, 2014 Poster, American Society for Cell Biology Annual Meeting, Philadelphia, PA

Shannon, K.B. (2014) Adventures in Flipping-Flipped Fridays in Cell Biology. July 18, 2014 Poster, Society for the Advancement of Biology Education Research (SABER) Annual Meeting, Minneapolis, MN

Shannon, K.B. (2014) Analysis of a Cell Model Project. July 19, 2014 Poster, Society for the Advancement of Biology Education Research (SABER) Annual Meeting, Minneapolis, MN

Shannon, K. (2014) Flipped Fridays: Adventures in flipping Cell Biology, Talk, Teaching and Learning Technology Conference, March 13-14, Missouri S&T, Rolla, MO

2014 Awards

Faculty Achievement Award

National Academies Education Fellow in the Life Sciences

2014 Grants

eFellows Program, Tier 2, Missouri S&T Provost office and Educational Technology 2014 (P.I.) “Redevelopment and Enhancement of Cellular Biology”, \$2,000

2014 Teaching

WS14: Cell Biology (Bio211), BioDesign (Bio375), co-taught with Dr. Westenberg, Developmental Biology (Bio315)

FS14: Senior Seminar (Bio4010), Cancer Cell Biology (Bio4353/6353), Cell Biology (Bio2213)

2014 Advising

OURE students: Kelsey Crossen

Undergraduate lab researchers: John Walsh, Madison Mara, Caitlin Siehr, Alex Ayers, Stephanie Kroger, Alyssa Castro

Masters student: Daniel Miller defended his thesis “Dephosphorylation of Iqg1 by Cdc14 Temporally Regulates Actin Ring Formation” MS Applied and Environmental Biology

Twenty Undergraduate Advisees

2014 Activities

- Co-advisor, iGEM student synthetic biology team, supervised project
- Reviewer, Journal of Microbiology & Biology Education (JMBE)
- Advisory Board member, Student Design and Experiential Learning Center (SDELC)
- Speaker, “HeLa Cells and Cell Culture” Campus One Book Event
- Judge, OURE fellows presentations, Undergraduate Research Conference
- Member, Experiential Learning Committee
- Member, Discipline Specific Curriculum Committee
- Presented background on HeLa cell research for the Rolla Public Library Summer Reading Program



Dr. Shannon and Dr. Westenberg attended the National Academies Northstar Summer Institute at the University of Minnesota in July 2014



Julie Semon, Ph.D.

Assistant Professor

Laboratory of Regenerative Medicine

Research Interests

Identifying molecular and therapeutic differences of mesenchymal stem cell subpopulations
Interactions of mesenchymal stem cells with extracellular matrix and endogenous cell populations
Trafficking and fate determination of mesenchymal stem cells

2014 Publications

Semon, J.A., Maness, C., Zhang, X., Sharkey, S., Beutler, M.M., Shah, F.S., Pandey, A.C., Gimble, J.M., Zhang, S., Scruggs, B.A., Strong, A.L., Strong, T.A., Bunnell, B.A. Comparison of human adult stem cells from adipose tissue and bone marrow in the treatment of experimental autoimmune encephalomyelitis. *Stem Cells Res Ther* Jan 9;5(1):2 (2014).

Zhang, X., Bowles, A.C., **Semon, J.A.**, Scruggs, B.A., Zhang, S., Strong, A.L., Gimble, J.M., Bunnell, B.A. Transplantation of Autologous Adipose Stem Cells Lacks Therapeutic Efficacy in the Experimental Autoimmune Encephalomyelitis Model. *PLoS One* Jan 21;9(1):e85007 (2014).

McFerrin, H.E., Olson, S.D., Gutschow, M., **Semon, J.A.**, Sullivan, D.E., Prockop, D.J. Rapidly Self-Renewing Human Multipotent Marrow Stromal Cells (hMSC) Express Sialyl Lewis X and Actively Adhere to Arterial Endothelium in a Chick Embryo Model System. *PLoS One* Aug 21;9(8):e105411 (2014).

Zhang, S., Danchuk, S.D., Bonvillain, R.W., Scruggs, B.A., Strong, A.L., **Semon, J.A.**, Gimble, J.M., Betancourt, A.M., Sullivan, D.E., Bunnell, B.A. Interleukin-6 mediates the therapeutic effects of adipose-derived stem cells in lipopolysaccharide-induced acute lung injury. *Stem Cells* Jun;32(6):1616-28 (2014).

2014 Grants

Center for Biomedical Sciences and Engineering Grant Program, Missouri S&T (P.I.)
“Mesenchymal Progenitor / Stem Cells and Bioactive Glass Fibers Increase Angiogenesis”

2014 Presentations

Poster presentation: Midwest Conference on Cell Therapy and Regenerative Medicine, Kansas City, MO
“Comparison of Adult Stem Cells in the Treatment of a Mouse Model of Multiple Sclerosis”

Poster presentation: Phelps County Regional Medical Center - Missouri S&T Collaboration, Rolla, MO
“Mesenchymal Stem/Progenitor Cells in the Treatment of a Mouse Model of Multiple Sclerosis”

Guest lecturer: Biomaterials (Bio Sci / Cer Eng 5210)
“Tissue Response to Biomaterials”

2014 Advising

Undergraduate researchers: Kody Bassett, Daniel Park, Danielle Jones, Jordan Powell

2014 Activities

- Reviewer: Regenerative Medicine, Stem Cells Translational Medicine, Biochimie
- Judge: Missouri S&T Chancellor’s Scholarship
- Member: *ad hoc* committee, Biomedical Science and Engineering degree program



Matthew S. Thimgan, Ph.D.

**Assistant Professor
Laboratory of Genetic & Behavioral Sleep
Research**

Research Interests

Genes and metabolic pathways that regulate both the sleep and wake cycles
Pathways that mitigate the negative consequences of sleep deprivation, with a focus on lipid metabolism pathways
Salivary biomarkers of sleep deprivation

Publications

Stephane Dissel, Laurent Seugnet, **Matthew S. Thimgan**, Neal Silverman, Yasuko Suzuki, Pamela Thacher, Melissa M. Burnham, and Paul J. Shaw . Differential activation of immune factors in neurons and glia contribute to individual differences in resilience/vulnerability to sleep disruption. *Brain Behavior and Immunology*. 2014 Oct 30. pii: S0889-1591(14)00472-3.

Matthew S. Thimgan, Laurent Seugnet, John Turk, and Paul J. Shaw. Identification of genes associated with resilience/vulnerability to sleep deprivation and starvation in *Drosophila*. *SLEEP*. 2014 Nov 20. pii: sp-00336-14.

Invited presentations

Missouri University of Science and Technology, Department of Biology
“How Neo sees sleep: Mathematical approach to identify adequate sleep”

National Presentations

American Professional Sleep Societies
“Relationship of sleep and wake bouts in *Drosophila*”

Regional presentations

Midwest *Drosophila* Conference (Student oral presentation)
“Metabolic influence on sleep”
Midwest *Drosophila* Conference (Student presentation)
“Correlation between sleep and health in *Drosophila*”

Teaching

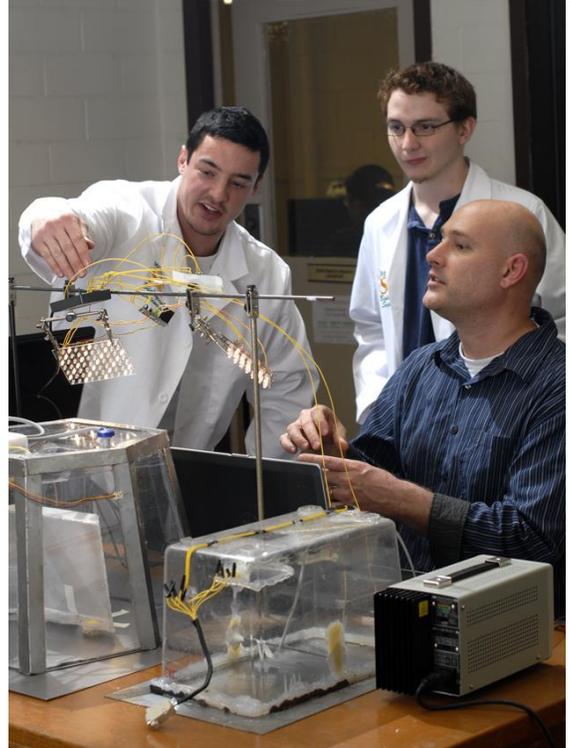
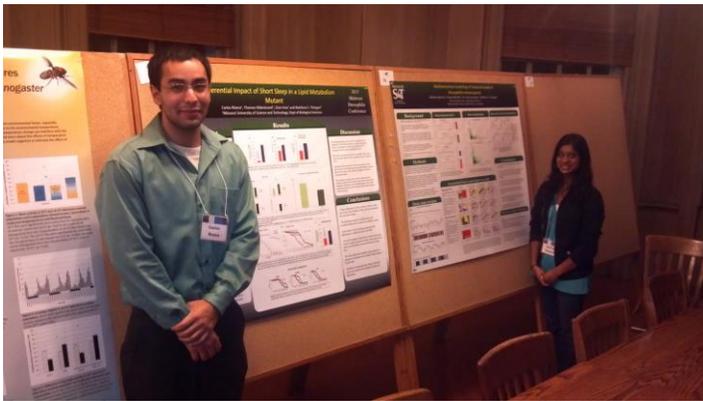
SS2014: Bio 2001: Sleep: Function and Dysfunction
Bio 4099: Undergraduate research topics
FS 2014: Bio 3333: Anatomy & Physiology I
Bio 4099: Undergraduate research topics
Chem 4001: Neurochemistry (2 Guest lectures)
Graduate researchers: Carlos Rivera, Courtney Fiebelman

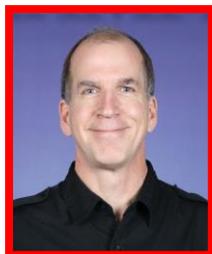


Undergraduate researchers: Dillon Barton, Thomas Congdon, Sahitya Injamuri, Jack Colaric, Elizabeth Theonen, Julie Nguyen, Ali Mueller, Lisa Kinder, Caron Harada, Aaron Latal, Meagan Windsor, Amanda Martin-Erb, Harriet Lumula, Chauncey Depew

Other activities

UM Research Board Grant Reviewer
Abstract reviewer SLEEP Meeting 2014
Pre-med Committee
Improved Faculty Orientation 2014 Committee





David J. Westenberg, Ph.D.

**Associate Professor,
Chair, Pre-Medicine Advisory Committee,
Faculty Athletics Representative**



Research Interests

Rhizosphere microbiology, legume symbiosis, quorum sensing, antibacterial materials

Research Lab Members: Graduate Students: Brian Haslag (SP 2014), Crystal Meeks; **Undergraduate Students:** Serena Austin, Carol Baker, Bradley Bare, Adrian Black, Rachel Connell, Alex Evans, Courtney Filer, Victoria Grill, Jeremiah Herbert, Samantha Huckontod, Hannah Kim, Desirae Lavatai; Kent Lin, Justin Lovelady, Sarah Moeller, Ashley Peters, John Plihal, Cera Thomason, **High School Students:** Vasanth Balakrishnan, Annie Gao

Abstracts

Westenberg, D.J., Mixer, P., Gyure, R, Martin, M.. 2014 That's EDUtainment. ASM Conference on Undergraduate Education, Boston, MA

Westenberg, D.J. 2014 Flipping the Microbiology Laboratory to Improve Student Preparation and Increase Student Interaction. Teaching and Learning Technology Conference, Rolla, MO

Presentations:

Technology to Achieve Active Learning. 2014. Digital Transformation – Impacts on Research, Science and Teaching” San Francisco, CA, September 12, 2014

Flipping the Microbiology Laboratory to Improve Student Preparation. Missouri S&T Board of Trustees, Rolla, MO April 24, 2014

The Plant Whisperers: How Environmental Microbes Tame the Plant Kingdom. 2014 Albrecht Lecture, University of Missouri, Columbia, MO, April 23, 2014

Symposia Organized

The American Society for Microbiology Presents: ASM and the Clinical Microbiologists. 2014. National Association of Biology Teachers Annual meeting, Cleveland OH.

Teaching

SP14: Microbiology (BioSci 221); Microbiology Lab (BioSci 222); Communication Workshop for Pre-Health Professions (Pre-Med 310), Biological Design and Innovation (BioSci 375)

FS14: General Genetics (BioSci 2223), Microbiology Lab (BioSci 3319)

Extramural Funding

Missouri Dept. of Higher Ed. Grant, \$ 292,695 Science Ed. & Quantitative Literacy: An Inquiry-based Approach (10%)

Dow Chemical Corporation. \$75,000, “Collaborative Study on Contaminant Fate: Phytoremediation Mass Flux and Biodegradation Assessment for DOW Midland. (25%)

2014 Activities

Chair, ASM Committee on K-12 Education

Faculty Athletics Representative

Chair, Missouri S&T Pre-Medicine Advisory Committee



Advisor for Scrubs, the Missouri S&T Pre-Health student organization
Co-Advisor for the Missouri S&T iGEM team
Judge for S&T Annual Undergraduate Research Conference
Conducted a BioBuilder workshop at the Center for Advanced Professional Study, Blue Valley School District, KS
Participated in the 2014 BioBuilder Summit at MIT
Summer SEQL Workshop for K-12 teachers
Attended the 2014 National Academies Northstar Summer Institute in Minneapolis, MN
Member of the Missouri S&T Performing Arts Series, Conflict of Interest, Service Learning Advisory and Athletics Advisory Committees
Numerous presentations to visiting students such as SHPE, MITE, Expanding Your Horizons and various school groups.

2014 Awards, Honors

Distinguished Advisor Award – S&T Student Life
National Academy of Sciences Education Fellow in the Life Sciences
Faculty Athletics Representative Fellow - NCAA
Adrian Black, Rachel Connell and Justin Lovelady earned S&T OURE Fellows Awards, Bradley Bare, Hannah Kim and John Plihal earned S&T OURE awards





Terry Wilson, M.S.
Associate Teaching Professor
Assistant Affiliate Director, PLTW Biomedical

2014 Teaching

- SP14: Biodiversity (Bio1223)
- SP14: Biodiversity lab (Bio 1229, 3 sections)
- SP14: Cellular Biology Lab (Bio 2219, 2 sections)
- FS14: Principles of Biology lecture (Bio 1213)
- FS14: General Biology Lab (Bio 1219, 3 sections)
- FS14: Cellular Biology Lab (Bio 2219, 3 sections)

2014 Activities

- PRO advisor for first year students
- Hosted Project Lead the Way summer training institute for secondary science teachers

Awards

- Missouri University of Science and Technology Faculty Achievement Award 2014
- Provost's eFellows Course Redesign Grant for Cellular Biology Lab



Faculty Scientific Communications

2014 Annual Report



BioSci Faculty (left to right): Melanie Mormile, Dev Niyogi, Terry Wilson, Matt Thimgan, David Westenberg, Robert Aronstam, Ron Frank, Chen Hou, Yue-Wern Huang and Katie Shannon. Missing: Julie Semon

Research Articles:

Chang, M., **Y.-W. Huang**, **R.S. Aronstam** and H.-J. Lee, Cellular delivery of noncovalently-associated macromolecules by cell penetrating peptides, *Curr. Pharmaceut. Biotechnol.* 15: 267-275, 2014.

Dissel, S., L. Seugnet, **M.S. Thimgan**, N. Silverman, Y. Suzuki, P. Thacher, M.M. Burnham and P.J. Shaw . Differential activation of immune factors in neurons and glia contribute to individual differences in resilience/vulnerability to sleep disruption. *Brain Behavior and Immunology*. 2014 Oct 30. pii: S0889-1591(14)00472-3, 2014.

Hayes, M., L. Jiao, T. Tsao, I. King, M. Jennings and **C. Hou**, High temperature slows down growth in tobacco hornworms (*Manduca sexta* larvae) under food restriction. *Insect Science*, DOI: 10.1111/1744-7917.12109, 2014.

Hou, C., Increasing energetic cost of biosynthesis during growth makes refeeding deleterious. *American Naturalist*, **184**: 233-247, 2014.

Huang, Y.-W., H.-J. Lee, L.M. Tolliver and **R.S. Aronstam**, Delivery of nucleic acids and nanomaterials by cell-penetrating peptides: opportunities and challenges. *BioMed Research International*, 2014.

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Thimgan, M.S., L. Seugnet, J. Turk and P.J. Shaw, Identification of genes associated with resilience/vulnerability to sleep deprivation and starvation in *Drosophila*. *SLEEP*. pii: sp-00336-14, 2014.

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Zhang, X., A.C. Bowles, **J.A. Semon**, B.A. Scruggs, S. Zhang, A.L. Strong, J.M. Gimble and B.A. Bunnell, Transplantation of Autologous Adipose Stem Cells Lacks Therapeutic Efficacy in the Experimental Autoimmune Encephalomyelitis Model. *PLoS One* Jan 21;9(1):e85007, 2014.



Field Ecology class at Bray Conservation Site, May 2014.

Book Chapter

Liu, B.R., **Y.-W. Huang**, **R.S. Aronstam** and H.-J. Lee, Chapter 8: Cell-Penetrating Peptide-Mediated Protein Uptake in Cyanobacteria. In *Cyanobacteria: Ecological Importance, Biotechnological Uses and Risk Assessment*. Douglas Davison (ed.): Nova Science Publishers, Hauppauge, New York, pp 171-181, 2014.

Invited Talks, Seminars

Invited Talks

Hou, C., Energy allocation and tradeoff during animals' growth: Two examples of universality in biology. Colloquium seminar, Physics Department, University of Missouri-Columbia, March, 2014.

Huang, Y.-W., Materials for Biomedical Applications. Frontiers in Biopharmaceuticals Conference, Taiwan Normal University. Taipei, Taiwan, May 23, 2014.

Huang, Y.-W., Biology and Beyond National Taiwan Normal University. Taipei, Taiwan, 2014.

M. Thimgan, How Neo sees sleep: Mathematical approach to identify adequate sleep, Missouri University of Science and Technology, Department of Biology, 2014.

Mormile, M., Going from microbial ecology to genome data and back again: Studies on a haloalkaliphilic bacterium isolated from Soap Lake, Washington State. Department of Geological Sciences, University of Missouri, Columbia, Missouri, October 10, 2014.

- Westenberg, D.J., Flipping the Microbiology Laboratory to Improve Student Preparation. Missouri S&T Board of Trustees, Rolla, MO April 24, 2014.
- Westenberg, D.J., Technology to Achieve Active Learning: Digital Transformation – Impacts on Research, Science and Teaching, San Francisco, CA, September 12, 2014.
- Westenberg, D.J., The Plant Whisperers: How Environmental Microbes Tame the Plant Kingdom. 2014 Albrecht Lecture, University of Missouri, Columbia, MO, April 23, 2014.

Conference Presentations/Abstracts

- C. Hou, Energetics of Unitary and Super-organisms in Response to Stresses. National Academy Keck Future Initiative: Collective Behavior, Irvine, CA, November, 2014.
- Edwards, T. and M.R. Mormile. pH Dependent Antibiotic Resistance of an Alkaliphilic Halotolerant Bacterium from Soap Lake, Washington, Ann. Meet. Am. Soc. Microbiology, Boston, MA, 2014.
- Hou, C., Food restriction-induced changes in energy budget and metabolic scaling during ontogeny: A case study on hornworms. Gordon Research Conference: Unifying Ecology Across Scales, Biddeford, ME, July, 2014.
- M. Thimgan, M., Relationship of sleep and wake bouts in *Drosophila*, American Professional Sleep Societies, 2014.
- Semon, J.A., Comparison of Adult Stem Cells in the Treatment of a Mouse Model of Multiple Sclerosis, Midwest Conference on Cell Therapy and Regenerative Medicine, Kansas City, MO, 2014.
- Semon, J.A., Mesenchymal Stem/Progenitor Cells in the Treatment of a Mouse Model of Multiple Sclerosis, Phelps County Regional Medical Center - Missouri S&T Collaboration, Rolla, MO, 2014.
- Shannon, K.B., Adventures in Flipping-Flipped Fridays in Cell Biology, Society for the Advancement of Biology Education Research (SABER) Annual Meeting, Minneapolis, MN, 2014.
- Shannon, K.B., Analysis of a Cell Model Project. Poster, Society for the Advancement of Biology Education Research (SABER) Annual Meeting, Minneapolis, MN, 2014.
- Shannon, K.B., Cdc14 Regulates Actin Ring Formation in Budding Yeast Via Dephosphorylation of Iqg1, American Society for Cell Biology Annual Meeting, Philadelphia, PA, 2014.
- Shannon, K.B., Flipped Fridays in Cell Biology, American Society for Cell Biology Annual Meeting, Philadelphia, PA, 2014.
- Shannon, K.B., Flipped Fridays: Adventures in flipping Cell Biology, Talk, Teaching and Learning Technology Conference, March 13-14, Missouri S&T, Rolla, MO, 2014.
- Westenberg, D.J., Flipping the Microbiology Laboratory to Improve Student Preparation and Increase Student Interaction. Teaching and Learning Technology Conference, Rolla, MO, 2014.
- Westenberg, D.J., P. Mixer, R. Gyure and M. Martin, That's EDUtainment. ASM Conference on Undergraduate Education, Boston, MA, 2014.
- Yue-Wern Huang, Y.-W., L.M. Tolliver, F.Y.S. Hou, R.S. Aronstam and H.-J. Lee, Influence of Transition Metal Oxide Nanoparticles on Cell Death and Cell Cycle in A549 Cells, Annual Meeting of the Society of Toxicology.. Phoenix, AZ, USA, 2014.



Genetics class participating in annual Recombination Dance

**Seminar Program
2014 Annual Report**

Seminar director: Dr. Dev Niyogi (Spring)
Dr. Matt Thimgan (Fall)

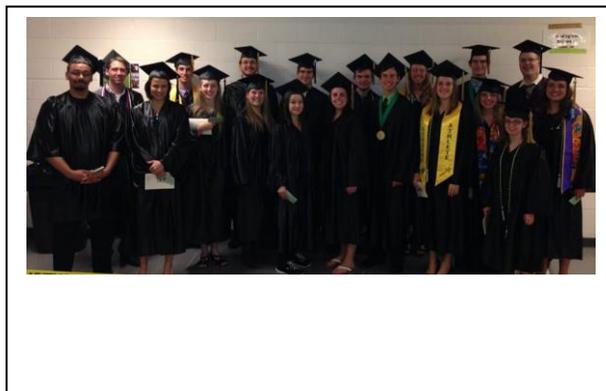


Date	Speaker	Institution	Topic
Feb 4	Dr. Matt Thimgan	Missouri S&T	How neo see sleep: Mathematical Approaches to identify adequate sleep.
Feb 10	Chang-Soo Kim	Missouri S&T	Analytical use of easily accessible optoelectronic devices: Colorimetric approaches focused on oxygen quantification.
Feb 17	Dave Westenberg	Missouri S&T	Silence of the Legumes: The search for alternative quorum sensing molecules in Bradyrhizobium japonicum.
Feb 24	Jordan Wilson	USGS	An approach to understanding E. coli sources at a public swimming beach in Missouri.
Apr. 4	Brian Kreiser	So Mississippi	Conservation Genetics in the Southeastern United States: A tale of Turtles and Fishes.
Apr. 7	David Mendoza-Cozatl	UMC	Long-distance transport and seed loading of essential and toxic heavy metals.
Apr. 14	Paul Schwieger	Missouri State	Protein production and metabolic engineering of acetic acid bacteria for the production of bio-based chemicals
Apr. 21	Lihong Jiao	Missouri S&T	The title is "Energy Tradeoffs Between Growth, Metabolism and Cellular Damage".
Apr. 28	Lisa Snoderly-Foster, Dan Miller	Missouri S&T	

Date	Speaker	Institution	Topic
Sept. 8	Jeff Price	UMKC	Circadian rhythms
Sept. 15	Ron Frank	Missouri S&T	Bioinformatic analysis of soybean/plant genomes
Sept. 22	Jana Marcette	Harris-Stowe University	Mechanisms of synaptic assembly in C. elegans
Sept. 29	Ming Leu	Missouri S&T	How advanced manufacturing can intersect with biological sciences
Oct. 6	Paul Shaw	Wash U	Sleep in Drosophila
Oct. 13	Marha Bhattacharya	Saint Louis College of Pharmacy	Mechanisms of neuronal regeneration
Oct. 20	Robert Aronstam	Missouri S&T	Mechanisms of calcium release from the ER
Oct. 27	Yongbin Zhang	National Center for Toxicol. Res, FDA	Toxicology
Nov. 3	Yinfa Ma	Missouri S&T	"Novel fiber-optic taper-based pH and temperature sensors for single cell measurement:
Nov. 10	Mahesh Thakkar	UM-Columbia	Sleep and ethanol

Undergraduate Education 2014 Annual Report

Missouri S&T's thriving **Biological Sciences** community included 267 undergraduate majors in 2014 (4th week fall semester enrollment reports). Dr. Katie Shannon chaired the Undergraduate Education Committee in 2014.



2014 Highlights

- Service learning courses engaged in by all seniors
- 45 BioSci majors graduated in 2014; 22 graduated with honors: 6 Summa Cum Laude, 7 Magna Cum Laude, 9 Cum Laude
- 5 Biology students earned OURE Fellows awards – Anthony Bitar and Caleb Trecuzzi, Rachel Connell and Justin Lovelady and Adrian Black

Courses Offered

Spring 2014

- Bio 110 General Biology
- Bio 112 General Biology Lab
- Bio 113 Biodiversity
- Bio 114 Biodiversity Lab
- Bio 150 Biotechnology in Fil
- Bio 201 Special Topics
- Bio 211 Cell Biology
- Bio 212 Cell Biology Laboratory
- Bio 221 Microbiology
- Bio 222 Microbiology Lab
- Bio 231 General Genetics
- Bio 246 Human Anatomy and Physiology II
- Bio 247 Human Anatomy and Physiology II Laboratory
- Bio 271 Issues in Public Health
- Bio 300 Special Problems
- Bio 301 Special Topics
- Bio 315 Developmental Biology
- Bio 334 Genomics
- Bio 341 Tissue Engineering I
- Bio 370 Toxicology
- Bio 375 Biological Design and Innovation I
- Bio 383 Pharmacology
- Bio 388 Biomedical Problems
- Bio 390 Undergraduate Research
- Bio 400 Special Problems
- Bio 401 Special Topics



- Bio 402 Problems In Applied And Environmental Biology
- Bio 410 Graduate Seminar
- Bio 441 Tissue Engineering II
- Bio 470 Advanced Toxicology
- Bio 475 Techniques In Applied And Environmental Biology
- Bio 490 Graduate Research
- Bio 493 Oral Examination

Summer 2014

- Bio 110 General Biology
- Bio 201 Special Topics
- Bio 211 Cell Biology
- Bio 231 General Genetics
- Bio 235 Evolution
- Bio 251 Ecology
- Bio 252 Field Ecology
- Bio 300 Special Problems
- Bio 301 Special Topics
- Bio 375 Biological Design and Innovation I
- Bio 390 Undergraduate Research
- Bio 490 Graduate Research
- Bio 493 Oral Examination33

Fall 2014

- Bio 1113 General Biology
- Bio 1173 Introduction to Environmental Sciences
- Bio 1201 Introduction To Biological Science
- Bio 1213 Principles of Biology
- Bio 1219 General Biology Lab
- Bio 2213 Cell Biology
- Bio 2219 Cell Biology Laboratory
- Bio 2223 General Genetics
- Bio 2233 Evolution
- Bio 2263 Ecology
- Bio 2333 Nutrition
- Bio 3000 Special Problems
- Bio 3001 Special Topics
- Bio 3313 Microbiology
- Bio 3319 Microbiology Lab
- Bio 3333 Human Anatomy Physiology I Lab
- Bio 4010 Seminar
- Bio 4099 Undergraduate Research
- Bio 4313 Introduction to Environmental Microbiology
- Bio 4323 Molecular Genetics
- Bio 4329 Molecular Genetics Laboratory
- Bio 4353 Cancer Cell Biology
- Bio 4363 Freshwater Ecology
- Bio 5000 Special Problems

- Bio 5001 Special Topics
- Bio 5010 Graduate Seminar
- Bio 5040 Oral Examination
- Bio 5099 Graduate Research
- Bio 5210 Biomaterials I
- Bio 6202 Problems In Applied And Environmental Biology
- Bio 6210 Biomaterials II
- Bio 6273 Techniques In Applied And Environmental Biology
- Bio 6313 Environmental Microbiology
- Bio 6353 Advanced Cancer Cell Biology
- Bio 6363 Advanced Freshwater Ecology
- Bio 6413 Molecular Cell Biology

Bio-Star Awards

BioStar award winners for AY14 were announced in April. These awards recognize outstanding achievements by BioSci students. A faculty committee selected the winners; the winners received a certificate and flash drive.

- Graduating Senior: Toni Knar and Clayton Buback
- Campus or Community Service: Lindsay Koerperich
- Undergraduate Research: Adrian Black
- First Year Student: Abigail Campbell
- Graduate Teaching Assistant: Tiffany Edwards
- Graduate Research: Lisa Snoderly-Foster



S&T Undergraduate Research Day

BioSci students participated in the **Annual Undergraduate Research Conference** (April 2014)

BioSci Students receiving awards included:

Abigail Campbell - 1st place – Research Proposal Poster

Lauren Anderson -3rd place – Research Proposal Poster

Clayton Buback – 2nd place - Egeineering Oral Presentation.

Rachel Glenn - was the year's Gale Hufham Scholarship winner

Serena Austin, Sierra Comer, and Kate Menke - were awarded the Troutbuster Scholarship



Troutbusters Scholarship Winners Serena Austin, Sierra Comer, and Kate Menke



Undergraduate Research Conference



Rachel Glenn
Gale Hufham Scholarship Winner



Kelsey Crossen
Amgen Scholar

Field Courses
2014 Annual Report

BioSci has been offering an increasing number of field courses and incorporating field exercises in their regular courses.



Cave Biology, 2014



Field Ecology, 2014



Freshwater Ecology Field Test
2014



Freshwater Ecology Field Trips
2014

Graduate Education

2014 Annual Report

The Department instituted a M.S. degree in Environmental and Applied Biology in 2002, and graduated its first student in 2004. Many of our graduates enter doctoral training programs at institutions across the nation, most of the others are employed in the medical and biotech industries.

Drs. Yue-wern Huang chaired the department's Graduate Studies Committee in 2014. Options for instituting doctoral level training in biology on the Rolla campus continue to be explored and are incorporated in our strategic plan.

One thesis student earned an MS degree in Environmental and Applied Biology.

2014 Graduate Students

(*non-thesis)

Cremer, Lesley*
Edwards, Tiffany
Fiebleman, Courtney
Jiao, Lihong
Meeks, Crystal
Miller, Daniel
Palihawadana, Amunugama
Rivera, Carlos
Sadler, Michael
Snoderly-Foster, Lisa
Thompson, Gregory
Tolliver, Larry
Wang, Hsiu Jen (Sharen)
Watters, Richard



2014 Thesis Defenses

Richard J. Watters	"in Vivo Evaluation of Angiogenic Effect of Borate Glass Implants in SKH1 Hairless Mice"	Roger Brown
Daniel Patrick Miller	"Dephosphorylation of Iqg1 by Cdc14 Temporally Regulates Actin Ring Formation"	Katie Shannon
Lihong Jiao	"Energy Tradeoffs Between Food Assimilation, Growth, Metabolism and Maintenance"	Chen Hou
Lisa Snoderly-Foster	"Characterization of a Plant Gene Family Expanded in Glycine Max"	Ronald Frank
Gregory Travis Thompson	"Ecology of a Declining Great Plains Fish. <i>Fundulus Sciadicus</i> , in the Missouri Ozarks"	Dev Niyogi

Senior Seminar Service Learning Class

2014 Annual Report

Biological Sciences Department incorporates a service-learning experience as part of its required senior capstone course.

Students work in groups to propose, research, develop, complete, and present service-learning projects that are related to the biological sciences. There are multiple objectives of the service learning activity: 1) to address a need in the community that is broadly related to core concerns of a biology curriculum, 2) to develop students' skills in organizing group endeavors and formalizing, justifying, proposing and presenting their ideas (in oral and written form); 3) to enhance students' sense of community responsibility and accountability; and 4) to provide students with opportunities to participate in activities that will enhance their employability and academic maturity. Our corporate partners emphasize the importance of team dynamics in the workplace.



Figure 1 Students deliver a presentation on bats to a local Girl Scout troop

Dr. Katie Shannon has directed the department's service learning course for the last 5 years. The nature of our students' service learning projects is diverse and impressive. Students provided presentations at an after school program at the Centre, to second graders at the Bray Conservation Area, and to Rolla Middle School students, raised funds for a variety of worthy causes including Cystic Fibrosis, Breast Cancer, and Congenital Heart Disease, built bat houses, and collected food for local children. Photos of some of the projects are posted on the BioSci Facebook page ("[Missouri S&T Biology](#)").

Student Projects 2014

- **Unaccompanied Minor Project** – Raised money and awareness for the Lutheran Immigration and Refugee Service, and their "Act of Love" campaign
- **Helping College Students Cope with Psychological Stress** – provided students with information on how to deal with stress and give them an opportunity to reduce stress by assisting PsychCo with puppies at the puck
- **Increasing Roosting Habitat for Native Missouri Bats** – Built and installed a bat house in Ber Juan park
- **Rett Syndrome: Alice's Journey** – raised money for a local five year old girl who has Rett Syndrome
- **Play It Safe** – First aid presentation to Rolla Middle School students
- **Cystic Fibrosis Fundraiser** – Silent auction to raise money for the Cystic Fibrosis Foundation
- **Combating Malnutrition and Food-Insecurity in Children**– food drive for students who were partnered with the Hope Alliance organization for the weekend backpack program
- **Paint it Pink** – Sold raffle tickets to win Blues tickets to raise funds for the Breast Cancer Research Foundation
- **CHD Awareness** – Distributed wrist bands to increase awareness of Congenital Heart Disease
- **Reconnecting Society and Nature at the Marguerite Bray Conservation Area**- beautify and restore the conservation area and provide education for second grade students from Truman Elementary
- **Science Demonstrations: Supplementing After-School Programs** – presented science demonstrations to students in an afterschool program at The Centre to nurture learning outside the classroom
- **Fitness Fun Day**-free event for local kids to promote exercise and health
- **Responsible Pet Ownership**-Made fliers for St. James animal shelter and students on campus on responsibilities of pet ownership



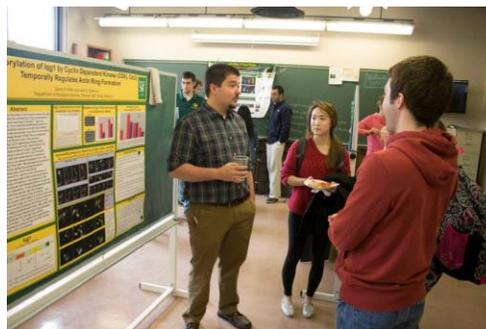
Figure 2 Crystal Ford with students who made "slime"

Helix

2014 Annual Report

Helix: Missouri S&T's Life Sciences Club.

Helix strives to provide a sense of companionship for students studying Biological Sciences and other related fields. We encourage participation in service and social events.



Open Lab

2014 Activities:

- Helix Trip to Kansas City, MO for the regional ASM conference
- Ice-cream social
- Welcome Back Float Trip
- Open lab to introduce students to research opportunities within Schrenk
- S'mores and Scheduling (to aid underclassmen in registering for classes)
- Volunteering with the Humane Society
- Adopt-A-Family
- Meet Your Professor Night to encourage students to communicate with professors.
- Graduate School informational



Meet Your Professor Night



ASM conference in Kansas City, MO

2014 Officers:

President: Candace Miller, Sahitya Injamuri

Vice President: Thomas Congdon

Secretary: Rosa Hoyle

Treasurer: Kathy Koerperich

Historian: Grace Dietzler

Public Relations Officer: Caitlin Wilkes

OrgSync Coordinator: Delaney DeJanes

Student Council Representative: Lindsay Koerperich

Helix Faculty Advisors: Dr. Melanie Mormile & Dr. David Westenberg



Smore's n' Scheduling



Gifts for Adopt-a-family

Missouri S&T International Genetically Engineered Machines Team

The Missouri S&T iGEM team is a synthetic biology research and design team affiliated with the iGEM Foundation, which is dedicated to research and education as well as the advancement of open collaboration in the field of synthetic biology. The team participates in the iGEM yearly competition between teams from around the world.



The Missouri S&T iGEM team seeks to...

- Engineer synthetic biological systems to help advance the iGEM Registry of Standard Biological Parts and the field of synthetic biology
- Increase awareness of synthetic biology
- Provide experiential research opportunities to undergraduate students



2014 Highlights

- Earned a Bronze medal at the 2014 Giant Jamboree in Boston, MA
- Several large scale public relations educational events
 - Presented during 2014's Engineers' Week at the St. Louis Science Center
 - The Science behind *The Immortal Life of Henrietta Lacks*, a collaboration with the S&T English and Technical Communication Department
 - Participated in S&T's *Expanding Your Horizons*, an event to show middle school girls opportunities and career paths in STEM fields
- Formed a closer connection with the Student Design and Experiential Learning Center to better promote our team and the SDEL

Project & Competition

Coal is the most-used resource for electricity generation in the world, making it one of the largest contributors to global air pollution and acid rain. The team aimed to design and make possible a biological solution to the nitrogen oxide pollutants in coal flue gasses, the main cause of acid rain.

The final design of our project was a cyanobacterium genetically engineered to convert all forms of nitrogen oxide pollutants into inert gasses or nitrogen-rich compounds that could be used to produce fertilizer. This design targeted both nitrogen oxides and carbon dioxide, since cyanobacteria naturally fix CO₂, further reducing the impact of coal flue gasses on the environment. We were successful in isolating a nitrogen-fixing gene from *E. coli* and submitted it to the iGEM Parts Registry to qualify for competition.

Eight members of the team joined 2300 other students from 245 iGEM teams around the world at the Giant Jamboree in Boston, MA to present our project and compete for the gold. Each team prepared a presentation and a poster about their project and showcased them to judges and fellow students alike; competing and informing the community about their work. The MST iGEM team took home a Bronze medal, information on many new synthetic biology applications, and many useful tips from other teams.



2014 Officers

Emily Puleo – President
 Hannah Frye – Vice President
 Katerine Nelson – Public Relations Officer
 Nocona Sanders – Treasurer
 Kelsey Crossen – Secretary

Matthew Lindner – Webmaster
 Levi Palmer/Kira Buckowing – Lab Manager
 Kira Buckowing – Safety Liaison & Socials Chair
 Advisors: Drs. Westenberg & Shannon

Phi Sigma Biological Sciences Honor Society
2014 Annual Report

Phi Sigma: Missouri S&T's Biological Sciences Honors Society



2014-2015 officers:

President: Jamie Phelps

Vice President: Donny Roshan

Treasurer: Kirstin Bier

Secretary: Jenae Rankin

Community Relations: Hannah Kim

Faculty Advisor: Dr. Ronald Frank

2014 Spring Semester Activities:

- Pasta Lunch raised money for the Outstanding Freshman Scholarship
- Penny Wars raised money for the Outstanding Freshman Scholarship
- Inducted new members
- Cleaned for Adopt-A-Highway

2014 Fall Semester Activities:

- Cleaned for Adopt-A-Highway
- Pasta Lunch raised money for the Outstanding Freshman Scholarship
- Chose a winner for the Outstanding Freshman Scholarship (winner is now at another school)
- Held meetings to keep everyone informed of the activities
- Members volunteered at various organizations throughout campus and in conjunction with other biological sciences organizations.



Miner Medicine (formerly Scrubs)
Pre-Med & Biomedical Engineering Society

Mission: Miner Medicine (Minermed) is MS&T's pre-medical and biomedical engineering society. As such, we are dedicated to aiding our members in their pursuit of the medical arts as well as presenting healthcare information to the student body. Moreover, Minermed strives to enrich our members scholastically, socially, and through serving others. Throughout the year we invite speakers to come discuss their various fields of expertise in addition to coordinating various events.



Officers 2014

President- Lauren Moore
Vice President- Anne Safron
Correspondence- Wyatt Eikermann
Secretary- Jamie Phelps
Treasurer - Kiran Patel
HOSA Chair- Zach Woolsey
Public Relations- Beth Wilkins
Stuco Rep.- Robert Pearson
Community Relations- Katie McDonald
Hospital Relations- Donny Roshan

Where we are going: *In 2015 we will be continuing to, and introducing the following:*

- Continuing to hear from various speakers
- A medical mission's trip to Uganda in summer 2016!
- Strengthening relationships with Joe's Peer's, Student Health, and PCRMC
- Visiting various medical schools throughout the state
- Establishing a research team
- Planning various social events for our

Officers 2015

President- Zachary Woolsey
Ex Officio- Lauren Moore
Vice President- Kiran Patel/ Wyatt Eikermann
Correspondence- Wyatt Eikermann
Secretary- David McCoy/ Kayln Jones
Treasurer- Chance Walker
Community Relations- Maddie Mara
Outreach Chair- Kayla Smith
Social Chair- Anne Safron
Web Admin- Nick Statesel

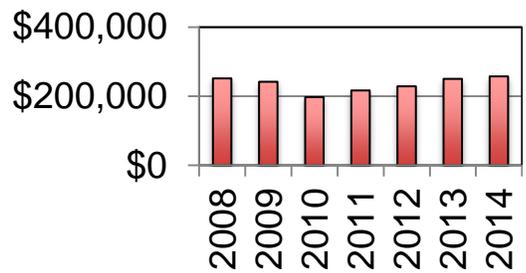
Donors
2014 Annual Report

BioSci Partners 2014

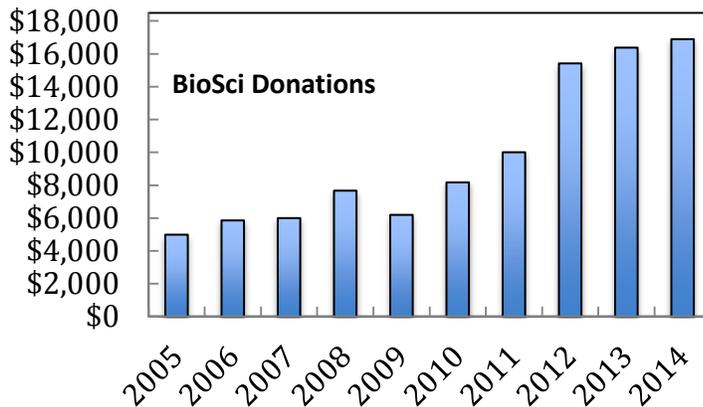
We are pleased to recognize those who supported the department in 2014. Donations to the department increased to a record \$16,900. The consistent support we receive from our alumni and friends is vital for the further development of our academic programs. In particular, this support allows us to explore innovative ideas in both teaching and research.

Contributions are welcome at any time and can be made on the S&T web site (givingtomst.missouri.edu) (be sure to designate Biological Sciences as the recipient fund). The cadre of BioSci alumni continues to grow, although half have graduated in the decade, reflecting our recent growth.

Finally, **TroutBusters of Missouri** renewed their funding of scholarships for S&T Ecology students, and Mr. Fred Kielhorn continued his strong support of the iGEM student design team.



Value of BioSci endowment funds at the end of the indicated calendar years. The Gale-Hufham, Heilbrunn and Summers funds provide student scholarships; our other funds support faculty and student research.



We appreciate all you do to support the department and its students and hope you will continue to be able to do so. We welcome your feedback on any of our activities or plans, and invite you to visit when you are in Rolla.

Donations to the BioSci department in the indicated calendar year.

Donations of \$1000 and above

Joan Aronstam
Robert S. Aronstam
ExxonMobil Foundation*
Fred Kielhorn
Joseph A. Safron
Troutbusters of Missouri

Betsy Dampler
Jonathan Kwantes
Leonard J. Lutz
Paula M. Lutz
Monsanto Fund*
Katherine Phillips
Robert L. Phillips
Paul Stricker
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Rachel Carter
Amy Johnston
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Michael W. McMenus
Gabriel J. Olivo-Bonnely
Hal Stover Padgett
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William Rich
Brad Rucker
John Stansfield

Julie Stansfield
Marcie Rucker
Sara J. Stephans

Richard Schmidt
Erica K. Shannon
Larry M. Tolliver
Julie Townsend
Clarissa C. Young
Robert B. Young

Donations < \$100

Tina Almond
Kathleen B. Bottroff
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Brian Harris
Katherine Harris
Katie M. Herington
Habiba R. Inusah
Avery B. Joseph
Lisa Lindesmith
Stanley Lindesmith
Annie Milne
Steven C. Peppers
Christina Schmidt

Donations \$500 - \$599

Baxter International Foundation*
James Fiechtl
Rebecca Fiechtl
Mark Statler

Donations \$250 - \$499

Christopher Bollinger
Heather Bollinger
Ann M. Caudill