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NIH Protein Biotechnology  
Training Program News &  
Reviews

2013 - 2014

# News & Reviews

WASHINGTON STATE UNIVERSITY NIH  
BIOTECHNOLOGY TRAINING PROGRAM

## Message from the Director

Each year the students in the Biotechnology Training Program work hard all year long to plan, organize, and host the Annual Biotechnology Symposium. This year's symposium on 'Regenerative Medicine' was another resounding success. Five leaders in the field were invited to present at this all day event, which concluded with a graduate student poster session. The speakers were: **Dr. Glenn Prestwich** (University of Utah), **Dr. Gail Naughton** (Histogen), **Dr. Wouter Van't Hof** (Athersys, Inc.), **Dr. Charles Murry** (University of Washington) and **Dr. Michael Urdea** (Tethys). From talking with a number of the trainees, I think one of the best 'lessons' from the symposium were the stories about failures and that not everything goes the way one anticipates when starting up and running a entrepreneurial enterprise based on biologics. Those in the audience were privileged to learn about the trials and tribulations, some completely unexpected, from this group of innovative scientists. Congratulations to **Simon Newkirk**, **James Rosser** and **Tim Harrington** on the first, second and third placements, respectively, in the poster competition. Also, honorable mentions go to **Kim Cotton**, **Stacy Hathcox**, and **Seth Nydam**. A GIANT thank you goes to the President of the Biotechnology Training Program's Trainees, **Kylie Allen**, who was instrumental in working with all the other student trainees who worked so diligently to put on such a wonderfully success-

ful event!

This past year a number of trainees successfully defended their dissertations and graduated from WSU including: **Jerome Babuta**, PhD (CHEBE, **Haluk Beyenal**, PI), **Tyson Koepke**, PhD (MPS, **Amit Dhingra**, PI), **So Na-gaoka**, PhD (SMB, **Pat Hunt**, PI), and **Ryan Renslow** PhD (CHEBE, **Haluk Beyenal**). Congratulations to each of you and best wishes in your future endeavors.

In other trainee news, **James Lewis** (MPS) received a USAID Borlaug International Food Security Fellowship to support his research in Ethiopia for June-December, 2013. **Benjamin Kasten** (Chem) was awarded the 2012 Frank Fowler Scholarship for Chemistry. **Kimberly Cotton** (MPS) received the Loyal H. Davis Fellowship from the Institute of Biological Chemistry here at WSU.

Eight students are performing internships this summer – this must be a new record! – **Kim Cotton** (MPS), **Tyson Eucker** (SMB), **Stacy Hathcox** (SMB), **Benjamin Kasten** (Chem), **Shao Yeh Lu** (VMP), **Desiree Mendes** (Chem), **Yesenia Rodriguez** (P/T), and **Jackie Stone** (VMP). I am really looking forward to hearing all about their adventures in industry in the Forum meetings next year.

In faculty trainer news, **Dr. Cynthia**

**Haseltine** (SMB) was granted tenure and promoted to Associate Professor and **Dr. Guy Palmer** received the 2013 Eminent Faculty Award (Congrats Cynthia and Guy!). **Wendy Brown**, **Nancy Magnuson**, and **Ray Reeves** were promoted to Biotech Program Emeritus Faculty status. We thank them for their years of service and dedication to the Biotech Program. We fully anticipate that they will continue to advise and participate in the Program's activities for many years to come.

As you all know, the renewal for the Biotechnology Training Grant was submitted earlier this year, at the end of January, and we were notified not too long ago that NIH will be site visiting us here in Pullman on **MAY 30**. This is terrific news but we have some work to do to prepare for their upcoming visit. Many of you have already been contacted about the schedule for groups to meet with the review panel and I want to thank you in advance for taking the time out to meet with them. I know you will all do a great job showing the review panel what a terrific program we have here at WSU in the NIH Protein Biotechnology Training Program! Go Cougs!

Margaret Black



# Symposium Speaker Profiles

**Dr. Glenn Prestwich**  
University of Utah

**Dr. Glenn D. Prestwich** is Presidential Professor of Medicinal Chemistry and Presidential Special Assistant for Faculty Entrepreneurism at the University of Utah. His research includes the areas of phosphoinositide and lysolipid signaling, synthetic extracellular matrices for regenerative medicine, and glycosaminoglycan derivatives as safe and effective anti-inflammatory agents. His research has led to the co-founding of six companies including Echelon Biosciences, Glycosan BioSystems, and GlycoMira Therapeutics. He received the Governor's Medal for Science and Technology for 2006 and was awarded the 1998 Paul Dawson Biotechnology Award and the 2008 Volwiler Research Award of the American Association of Colleges of Pharmacy. In 2010, he received the University of Utah Distinguished Scholarly and Creative Research Award and the "Rooster Prize" of the International Society

for Hyaluronan Science. During 34 years as a faculty member, he has published over 600 technical papers, patents, and book chapters, and has trained over 125 postgraduate scientists. He is also a commercially-rated pilot and sings first tenor in the Utah Symphony Chorus.



## BIOTECHNOLOGY SYMPOSIUM 2013

The WSU NIH Biotechnology program held our 22<sup>nd</sup> Annual Biotechnology Symposium on April 26th 2013. Thank you to all who added to its success this year!

**Dr. Mickey Urdea**  
Tethys Bioscience

**Dr. Urdea has devoted his 30-year career to human diagnostics** in a variety of capacities. He has been involved in the discovery of new biomarkers, the development of new technologies for biomarker discovery, validation and commercialization, diagnostic test development, manufacturing and marketing, and the management of companies involved in these activities. Dr. Urdea founded and is a Managing Partner for Halteres Associates. He also founded and is the Chief Executive Officer of Tethys Bioscience. He serves as a consultant and is on the scientific advisory boards and boards of directors of a number of biotechnology, diagnostics, venture capital and philanthropic organizations. He was a member of the Bill and Melinda Gates Foundation Diagnostic Forum. Dr. Urdea is an author on nearly 200 peer-reviewed scientific publications, ~ 300 abstracts and international scientific presentations, and more than 100 issued and pending patents. He received his BS in Biology and Chemistry from Northern Arizona University in Flagstaff and his PhD in Biochemistry from Washington State University in Pullman.



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► INTERNSHIP REPORTS AND TRAINEE/TRAINER AWARDS, PRESENTATIONS AND ACHIEVEMENTS..... **4 –9**



# Symposium Speaker Profiles



**Dr. Charles Murry**  
University of Washington

**Dr. Charles (Chuck) Murry** is currently a Professor of Pathology, Bioengineering and Medicine/Cardiology at the University of Washington. He serves as Director of the Center for Cardiovascular Biology and Co-Director of the Institute for Stem Cell and Regenerative Medicine. In addition to running his research laboratory, he practices diagnostic cardiovascular pathology and is actively involved in teaching medical students and graduate students. Dr. Murry is a native of North Dakota and did his undergraduate work in chemistry at Bismarck Junior College and the University of North Dakota. He obtained his MD and PhD degrees from Duke University in 1989 and 1988, respectively. His PhD thesis, done with Drs. Keith Reimer and Bob Jennings, focused on mechanisms of cell injury during myocardial ischemia and reperfusion and included the first description of the phenomenon of ischemic preconditioning.

UNIVERSITY of  
WASHINGTON



**Dr. Wouter Van't Hof**  
Athersys, Inc.



**Dr. Van't Hof** received a BSc from the University of Amsterdam in 1987 and a PhD degree in Cell Biology from Utrecht University in the Netherlands in 1992. He has over 10 years of industrial experience in translational development of adult stem cell therapies. Dr. Van't Hof is currently the Senior Director of Regenerative Medicine at Athersys, where he has gained broad experience in technology transfer, product characterization, process development, preclinical safety, regulatory discourse, and clinical study design and management. He is also actively involved in the International Society for Cell Therapy (ISCT) and the Alliance of Regenerative Medicine (ARM) with a main interest in establishing road maps for potency evaluation of cell therapy products. Before joining Athersys in 2002, he served on the faculty at Weill Medical College of Cornell University in New York City as an Assistant Professor of Cell Biology in the Institute for Genetic Medicine. Between 1993 and 1999 he was a postdoc at Cornell University Medical College and the Memorial Sloan-Kettering Cancer Center in New York City.



**Dr. Gail Naughton**  
Histogen, Inc.

**Dr. Gail Naughton** founded **Histogen, Inc.** in 2007 and currently serves as CEO and Chairman of the Board for the Company. She has spent more than 25 years researching the tissue engineering process, holds more than 95 U.S. and foreign patents, and has been extensively published in the field. Dr. Naughton served as Dean of the College of Business Administration at San Diego State University from 2002 until 2011, where she helped to make SDSU the first campus in the nation to found a Ph.D./MBA in life sciences. In 2000, Dr. Naughton received the National Inventor of the Year award by the Intellectual Property Owners Association in honor of her pioneering work in the field of tissue engineering. She sits on the Board of directors of the CR Bard (NYSE: BCR) and the La Jolla Institute for Allergy and Immunology, as well as in the Advisory Board of Georgia Tech, the Ackerman Foundation,

and Perminova. Dr. Naughton earned her B.S. in biology from St. Francis College and her PhD in Basic Medical Sciences and her M.S. in histology from the New York University Medical Center. She earned an executive MBA in 2001 from the Anderson School at the University of California, Los Angeles.



INTERNSHIP REPORTS AND  
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# Internship Reports

## Jerome Babauta

Gamry Instruments (Warminster, PA)

I had a chance to complete my internship requirement at Gamry Instruments in Warminster, PA from July 23, 2012 to September 14, 2012. Gamry Instruments is a company that produces high-quality potentiostats and other electrochemical devices that are used for precision electrochemistry. Their expertise in construction, operation, and troubleshooting are highly valuable to my research. For this reason, I opted to have my internship under their guidance. While there, I learned and practiced several advanced electrochemical techniques that would later be used in my proposed research. These advanced techniques include the use of electrochemical quartz crystal microbalance, electrochemical impedance spectroscopy, and “rotating disk electrode”-based electrochemistry. After my internship stay, I would also work with Gamry Instruments to create application notes for their company website as well as conduct several key studies in biofilms in our lab here at WSU.

The electrochemical techniques that I learned during my internship are traditionally taught in terms of clean inorganic and organic electrochemistry. However, in practice, using these techniques in more complicated systems like corroding materials or microbially influenced corrosion requires a strong background and experienced mentors. In my case, I wanted to apply these techniques to study the electrochemical activity of a special type of bacteria that formed biofilms. We give the name “electrochemically active biofilms” to these biofilms. Studying the electrochemical activity of these biofilms, such as *Geobacter sulfurreducens* and *Shewanella oneidensis* MR-1 biofilms, helps us to understand how electrons migrate from inside the cell to substances far removed from the cell. This electron transfer is different than the traditional cell respiration



## Redefining Electrochemical Measurement

where terminal electron acceptors such as oxygen typically penetrate cell membranes. To enable extracellular respiration, these bacteria must transport electrons outside cell membranes using extracellular, electrochemically active mediators. The electrochemical techniques I learned during my internship were absolutely necessary to isolate and study this electrochemical process at the fundamental level.

Since Gamry Instruments was not equipped to handle biological samples and experiments, I used a proxy for electrochemical active biofilms during my internship. I used flavin mononucleotide (FMN), a known mediator utilized by *S. oneidensis* MR-1 biofilms. The goal was to produce electrochemical parameters that characterized the electron transfer processes of FMN at an electrode. These electrochemical parameters include the standard heterogeneous rate constant, exchange current density, and also the charge transfer resistance. The first two parameters could be determined using “rotating disk electrode”-based electrochemistry. The charge transfer resistance was determined using electrochemical impedance spectroscopy. Finally, the mass change during electron transfer at an electrode surface was investigated using electrochemical quartz crystal microbalance. Although I cannot go into more details, these techniques were successfully used in biofilms after my return to WSU. The proposed work was successfully completed.



Potentiostats



Software



Accessories

To learn more about Gamry Instruments visit their website at <http://www.gamry.com/>.

# Internship Reports

## Alan Budgeon

E.J. Gallo Winery (Modesto, CA)

Internship was performed at E&J Gallo Winery in Modesto, CA from July to October. My department was enology, as part of the VCE research and development part of the winery. My tasks were varied depending upon which project I was assigned to. I assisted the grape metabolomics work by helping with primer building and ordering. I also performed enzymatic assays for pectinases in association with moscato production. Finally, in regards to sparkling wine products, I was asked to develop a photographic method for analyzing quality of sparkling wines and champagnes utilizing bubble quantities and size from just above nucleation sites to the wine-air interface.

## James Rosser

ReachBio (Seattle, WA)

This summer, I completed my Internship requirement at a small life sciences company called ReachBio. ReachBio is considered a contract research organization and is located just north of Seattle in a small neighborhood called Fremont. Contract research organizations are becoming more important in the role of developing new biologics and/or compounds to combat the various diseases because it allows for the utilization of specialized skill sets for monetary compensation without the cost of implementing those skills and techniques within a large-scale pharmaceutical company.

ReachBio specializes in hematopoietic drug toxicity testing using human, non-human primate, and/or mouse bone marrow. Their skill sets can predict drug toxicity in the blood using an *in vitro* culturing system, a test that is becoming increasingly more important during the development of novel therapeutics. Essentially, a candidate drug compound and hematopoietic progenitors are mixed, plated on a methylcellulose-based media and cultured for two weeks. Blood progenitors that are primitive in their differentiation will divide and differentiate. If the drug compound is toxic to the blood, it will inhibit the growth and differentiation of the white blood cells. From these experiments,  $IC_{50}$  values are calculated and ultimately drug toxicity for the compound is determined.



E&J. Gallo Winery



In addition, ReachBio sells vials of enriched frozen human white blood cells that are separated using different cell surface markers. We routinely received human bone marrow, human cord blood, or a leukapheresis and separated cells using a density gradient to enrich white blood cells and then magnetic activated cell separation (MACS) cell surface targets such as CD34 or CD4 to target hematopoietic progenitors or T cells, respectively. To ensure cell purity we used flow cytometry to show double positive staining for a white blood cell marker (CD45) and the cell marker of interest (CD34 or CD4).

The internship was very productive. I learned a completely new skill set including hematopoietic cell culture and various cell separation techniques. In addition, I have taken this skill set back to my research lab at Washington State University and applied it to my own current research project.



To learn more about E & J Gallo Winery visit their website at [www.gallo.com/](http://www.gallo.com/).

To learn more about ReachBio visit their website at [www.reachbio.com/](http://www.reachbio.com/).

# Internship Reports

## Seth Nydam

Avian Health and Food Safety Laboratory (Puyallup, WA)

I completed my internship at the Avian Health and Food Safety Laboratory in Puyallup, Washington from 6/4/12 – 8/3/12. Over the duration of my time there I participated in routine diagnostic testing, which included food safety testing by culture, PCR and ELISA and a series of infectious disease screening including tests for avian influenza, pseudorabies virus, *Mycoplasma*, *Salmonella pullorum*, parasitology and necropsy.

Additionally, I had three independent research projects during my internship. The first project involved test validation for detection of Shiga Toxin-producing *E. coli* (STEC) serogroups O26, O45, O103, O111, O121 and O145. *E. coli* O157:H7 causes approximately 50-80% of STEC infections in humans, while these six serogroups are responsible for the majority of human infections caused by non-O157 STECs. The iQ-Check™ STEC VirX kit (Bio-Rad) was able to identify 11 isolates obtained from the Field Disease Investigation Unit (FDIU) as STEC positive by real-time PCR with a detection limit of approximately  $10^3$  organisms with DNA extraction and  $10^5$  organisms without DNA extraction. The iQ-Check™ STEC SerO kit (Bio-Rad), currently available for research only, was also able to correctly identify the serogroup of all 11 isolates. The SDIX RapidChek® CONFIRM™ non-O157 STEC Immunomagnetic Separation kit's lateral flow immunoassay was additionally able to correctly identify the serogroup of all isolates except for O103 E13333, which was sent to SDIX for further analysis. The detection limit for this test was determined to be approximately  $10^5$  organisms, or 3-5 individual colonies following immunomagnetic separation.

My secondary project involved evaluating a standard PCR confirmation test for *Bacillus cereus* based on the research published by Hsieh *et al*, Journal of Applied Microbiology (1999), 87:481-490. *B. cereus* is another cause of food-borne illness capable of contaminating several types of foods such as rice, meat and vegetables and causing illness via infection and intoxication. The PCR test targets the bacteria's sphingomyelinase gene and is intended for use following presumptive culture identifica-

tion on specialized media. PCR was able to positively detect *B. cereus* with a detection limit of  $\sim 10^5$  organisms, although weak to moderate cross-reactivity was detected against other Gram-positive organisms including *Listeria innocua*, *Lactococcus lactis*, *Streptococcus sanguis* and *Enterococcus durans*.

My third project involved evaluating the ability of a client's cooking process to reduce bacterial contamination. Seven samples of pork and duck product were inoculated with *L. innocua* and six of these subjected to cooking, after which bacteria were enumerated using direct plating and real-time PCR. Real-time PCR revealed similar numbers of bacteria both before and after cooking due to its ability to detect both live and dead bacteria. Direct plating, however, indicated a  $\sim 7 \log_{10}$  reduction of bacteria in the pork product and  $\sim 8 \log_{10}$  reduction in the duck product (except for one sample in which the reduction was  $\sim 4 \log_{10}$ ). These levels of bacterial reduction were considered compliant with the USDA's Food Safety and Inspection Service's (FSIS) current recommendations.



The Avian Health and Food Safety Lab is part of WSU's Washington Animal Disease Diagnostic Laboratory. Information is available at: [http://www.vetmed.wsu.edu/depts\\_waddl/avian.aspx](http://www.vetmed.wsu.edu/depts_waddl/avian.aspx).



# Trainee/Trainer Awards, Presentations, and Achievements

## Trainee Awards

### James Lewis (Molecular Plant Sciences)

Received a USAID Borlaug International Food Security Fellowship to support his research in Ethiopia for June-December, 2013.

### Benjamin Kasten (Chemistry)

Awarded the 2012 Frank Fowler Scholarship for Chemistry.

### Kimberly Cotton (Molecular Plant Sciences)

Received the Loyal H. Davis Fellowship from the Institute of Biological Chemistry here at WSU.

## Trainer Awards

### Dr. Cynthia Haseltine (Molecular Biosciences)

Was granted tenure and promoted to Associate Professor.

### Dr. Guy Palmer (Global Animal Health)

Received the 2013 Eminent Faculty Award.

### Dr. Wendy Brown (Veterinary Microbiology and Pathology (VMP)), Dr. Nancy Magnuson (Molecular Biosciences), Dr. Ray Reeves (Molecular Biosciences)

Were promoted to the Biotech Program Emeritus Faculty status.

## Trainees Who Graduated

Name (Advisor-Area)	Thesis Title	Degree	Current Position
Wayne, Laura (Browse-MPS)	Investigating the electron transfer systems of the endoplasmic reticulum membrane in plants	PhD-2012	Scientist Dow Agrosciences Indianapolis, IN
Koepke, Tyson (Dhingra-MPS)	Linking genes and Physiology utilizing genomics and transcriptomics approaches in sweet cherry ( <i>prunus avium</i> )	PhD-2012	Looking for capital investors for new start-up company in Pullman, WA: Phytelligence
Renslow, Ryan (Beyenal-CHEBE)	Mathematic modeling and nuclear magnetic resonance techniques to understand electrochemically active biofilms	PhD-2012	Linus Pauling Distinguished Postdoctoral Fellowship, Pacific Northwest Laboratory, Richland WA
Babauta, Jerome (Beyenal-CHEBE)	Electron transfer mechanism in electrochemically active biofilms	PhD-2012	Research assistant professor, WSU, Pullman, WA
Nagaoka, So (Hunt-SMB)	Inefficient cell cycle checkpoints allow errors at multiple stages of oogenesis to cause aneuploidy in mouse oocytes	PhD-2012	Post-Doc, Kyoto University, Kyoto, Japan

## 2013 Symposium Poster Winners

### FIRST PLACE:

Simon Newkirk  
(SMB, with Wenfeng An)

### SECOND PLACE:

James Rosser  
(SMB, with Wenfeng An)

### THIRD PLACE:

Timothy Harrington  
(CHEBE, with Haluk Beyenal)

### HONORABLE MENTIONS

Kimberly Cotton  
(MPS, with John Browse)

Stacy Hathcox  
(SMB, with Margaret Black)

Seth Nydam  
(SGAH, with Doug Call)

## Trainee Publications in 2012-2013

### Jerome Babata, Timothy Harrington, and Ryan Renslow

**Babauta, J.T., H.D. Nguyen, T.D. Harrington, R. Renslow, and H. Beyenal.** 2012. pH, redox potential and local biofilm potential microenvironments within *Geobacter sulfurreducens* biofilms and their roles in electron transfer. *Biotechnol. Bioeng.* 109:2651-2662.

### Danny Bottenus

Jubery, T.Z., M.R. Hossan, **D.R. Bottenus**, C.F. Ivory, W.J. Dong, and P. Dutta. 2012. A new fabrication technique to form complex polymethylmethacrylate microchannel for bioseparation. *Biomicrofluidics.* 6:16503-16513.

### Dan Cuthbertson

**Cuthbertson, D., P.K. Andrews, J.P. Reganold, N.M. Davies, and B.M. Lange.** 2012. Utility of Metabolomics toward Assessing the Metabolic Basis of Quality Traits in Apple Fruit with an Emphasis on Antioxidants. *J Agr Food Chem.* 60:8552-8560.

**Cuthbertson, D., J. Piljac-Zegarac, and B.M. Lange.** 2012. Validation of a microscale extraction and high-throughput UHPLC-QTOF-MS analysis method for huperzine A in *Huperzia*. *Biomed Chromatogr.* 26:1191-1195.



# Trainee/Trainer Awards, Presentations, and Achievements

## Trainee Publications in 2012-2013 (cont'd)

Turner, G.W., **D.J. Cuthbertson**, S.S. Voo, M.L. Settles, H.D. Grimes, and B.M. Lange. 2012. Experimental sink removal induces stress responses, including shifts in amino acid and phenylpropanoid metabolism, in soybean leaves. *Planta*. 235:939-954.

### Kelcey Dinkel

Stanton JB, Schneider DA, **Dinkel KD**, Balmer BF, Baszler TV, et al. (2012) Discovery of a Novel, Monocationic, Small-Molecule Inhibitor of Scrapie Prion Accumulation in Cultured Sheep Microglia and Rov Cells. *PLoS ONE* 7(11):e51173.

### Mandi Hopkins

X. Feng, Y. Zhou, A.M. Proctor, **M.M. Hopkins**, M. Liu, D.W. Koh. "Silencing of Apoptosis-Inducing Factor and Poly(ADP-ribose) Glycohydrolase Reveals Novel Roles in Breast Cancer Cell Death After Chemotherapy. (2012) *Molecular Cancer* 11:48.

### Tom Jacroux and Daniel Rieck

**T. Jacroux, D.C. Rieck**, R. Cui, Y. Ouyang, and W.J. Dong, Enzymatic amplification of DNA/RNA hybrid molecular beacon signaling in nucleic acid detection. (2013) *Analytical Biochemistry* 432(2):106-14.

### Adam Johnson and Marilyn Sanchez-Bonilla

Ardiani, A., **A.J. Johnson**, H.M. Ruan, **M. Sanchez-Bonilla**, K. Serve, and M.E. Black. 2012. Enzymes To Die For: Exploiting Nucleotide Metabolizing Enzymes for Cancer Gene Therapy. *Curr Gene Ther*. 12:77-91.

### Benjamin Kasten

**Benjamin B. Kasten**, Tiancheng Liu, Jessie R. Nedrow-Byers, Paul D. Benny, Clifford E. Berkman. Targeting prostate cancer cells with PSMA inhibitor-guided gold nanoparticles. *Bioorg. Med. Chem. Lett.*, 2012, **23**:565-568.

Han Jiang\*, **Benjamin B. Kasten\***, Hongguang Liu, Shibo Qi, Yang Liu, Mei Tian, Charles L. Barnes, Hong Zhang, Zhen Cheng, Paul D. Benny. Novel, cysteine-modified chelation strategy for the incorporation of  $[M(CO)_3]^+$  ( $M = Re, ^{99m}Tc$ ) in an  $\alpha$ -MSH peptide. *Bioconjugate Chem.*, 2012, **23**: 2300-2312. (\*co-first authors)

Tanushree Ganguly, **Benjamin B. Kasten**, Thomas R. Hayes, Paul D. Benny. Recent Advances in Re/Tc Radiopharmaceutical Design Utilizing Orthogonal and Metal Template Based Click Reactions. In *Advances in Chemistry Research, Volume 18*, 2013. James C. Taylor, Ed. Nova Science Publishers, Inc., New York.

### Tyson Koepke and Scott Schaeffer

**Koepke, T., S. Schaeffer**, V. Krishnan, D. Jiwan, A. Harper, M. Whiting, N. Oraguzie, and A. Dhingra. 2012. Rapid gene-based SNP and haplotype marker development in non-model eukaryotes using 3' UTR sequencing. *BMC Genomics*. 13:18.

### Tyson Euker

**Eucker, T.P.**, and M.E. Konkel. 2012. The cooperative action of bacterial fibronectin-binding proteins and secreted proteins promote maximal *Campylobacter jejuni* invasion of host cells by stimulating membrane ruffling. *Cell Microbiol*. 14:226-238.

### McKenna Kyriss

Wyrick, J.J., **M.N.M. Kyriss**, and W.B. Davis. 2012. Ascending the nucleosome face: Recognition and function of structured domains in the histone H2A-H2B dimer. *Bba-Gene Regul Mech*. 1819:892-901.

### Kaitlyn Morse

**Morse, K.**, J. Norimine, J.C. Hope, and W.C. Brown. 2012. Breadth of the CD4(+) T cell response to *Anaplasma marginale* VirB9-1, VirB9-2 and VirB10 and MHC class II DR and DQ restriction elements. *Immunogenetics*. 64:507-523.

**Morse, K.**, J. Norimine, G.H. Palmer, E.L. Suttan, T.V. Baszler, and W.C. Brown. 2012. Association and Evidence for Linked Recognition of Type IV Secretion System Proteins VirB9-1, VirB9-2, and VirB10 in *Anaplasma marginale*. *Infect. Immun*. 80:215-227.

### So Nagaoka

**Nagaoka, S.I.**, T.J. Hassold, and P.A. Hunt. 2012. Human aneuploidy: mechanisms and new insights into an age-old problem. *Nat Rev Genet*. 13:493-504.

### Seth Nydam

Erwin, DP, **SD Nydam**, and DR Call. 2012. *Vibrio parahaemolyticus* *ExsE* is requisite for initial adhesion and subsequent type III secretion system 1-dependent autophagy in HeLa cells. *Microbiology* 158(Pt 9):2303-2314.

Zhou, X.H., **S.D. Nydam**, J.E. Christensen, M.E. Konkel, L. Orfe, P. Friel, and D.R. Call. 2012. Identification of Potential Type III Secretion Proteins via Heterologous Expression of *Vibrio parahaemolyticus* DNA. *Appl Environ Microb*. 78:3492-3494.

### Ryan Renslow and Jerome Babauta

Nguyen, H.D., **R. Renslow, J. Babauta**, B. Ahmed, and H. Beyenal. 2012. A voltammetric flavin microelectrode for use in biofilms. *Sensor Actuat B-Chem*. 161:929-937.

### Daniel Rieck

Zhou, Z.Q.\*, K.L. Li\*, **D. Rieck\***, Y.X. Ouyang, M. Chandra, and W.J. Dong. 2012. Structural Dynamics of C-domain of Cardiac Troponin I Protein in Reconstituted Thin Filament. *J. Biol. Chem*. 287:7661-7674. (\*Coauthors with equal attribution)

Zhou, Z.; **Rieck, D.C.**; Li, K.L.; Ouyang, Y.; Dong, W.-J. 2013. Structural and kinetic effects of hypertrophic cardiomyopathy related mutations R146G/Q and R163W on the regulatory switching activity of rat cardiac troponin I. *Archives of Biochemistry and Biophysics*. **535**:56-67.





# Trainee/Trainer Awards, Presentations, and Achievements

## Trainee Publications in 2012-2013 (cont'd)

### **Scott Shaeffer and Tyson Koepke**

BOOK: **Schaeffer S., Koepke T.,** and Dhingra A. (2012). Tobacco: a Model Plant for Understanding the Mechanism of Abiotic Stress Tolerance. In N. Tujeta et al. (ed). Improving Crop Resistance to Abiotic Stress. Weinheim, Germany: Wiley-VCH Verlag GmbH & Co. KG, Book available for purchase at <http://www.wiley-vch.de/publish/en/booksspecialOffer/3-527-32840-8/?sID=p2qlnooj68su7htl8qrrc2qjt3>.

### **Brian Webb**

Kang, C., R. Hayes, E.J. Sanchez, **B.N. Webb**, Q.R. Li, T. Hooper, M.S. Nissen, and L.Y. Xun. 2012. Furfural reduction mechanism of a zinc-dependent alcohol dehydrogenase from *Cupriavidus necator* JMP134. *Mol Microbiol.* 83:85-95.

Hayes, R.P., **B.N. Webb**, A.K. Subramanian, M. Nissen, A. Popchok, L.Y. Xun, and C. Kang. 2012. Structural and Catalytic Differences between Two FADH(2)-Dependent Monooxygenases: 2,4,5-TCP 4-Monooxygenase (TftD) from *Burkholderia cepacia* AC1100 and 2,4,6-TCP 4-Monooxygenase (TcpA) from *Cupriavidus necator* JMP134. *Int J Mol Sci.* 13:9769-9784.

