

# The Mole Street Journal

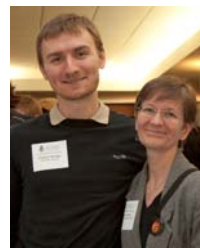
Department of Chemistry and Biochemistry

Volume 12, Issue 5

May 2013

## Honors Night and Awards

The department hosted its annual Honors Night April 25, 2013 at the UARK Bowl on Dickson Street. The evening began with Honors College chemistry majors making poster presentations of their research. Senior Honors College students in the department must make a poster presentation in addition to defending and writing a thesis. Following the poster session, the department awarded more than \$25,000 to scholarship and award recipients during a ceremony and dinner. Photos are by Denise Greathouse. See insert for names and awards.



### Special points of interest:

- Honors Night
- Zheng gets CAREER award
- Barnett receives Fulbright grant
- Students defend, pass cumes
- Fulbright IT has a security tip

### Inside this issue:

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## Faculty News

### On the Go

**Charles Wilkins** attended and chaired a session at the 9th North American FT MS Conference in Key West, FL, April 28-May 1.

**Peter Pulay** presented in March "Ultrafast Quantum/Molecular Mechanics Calculations. Applications to Halide Ions near the Air/Water Interface" at Hong Kong City University, Zhejiang University in Hangzhou, China, Tsinghua University, Beijing, and Xi'an Jiaotong University, Xi'an, China. He also presented "Selection of Active Spaces for Multiconfigurational Wavefunctions" at Xi'an Jiaotong University, Xi'an, China and Peking University.

**Matt McIntosh** gave seminars at the Univ. of TN Health Science Center, Memphis TN, on 3/27 and at St. Jude's Children's Research Hospital, Memphis, TN, 3/28 entitled "Toward a Pharmaceutically Relevant Claisen Rearrangement."

*Presentations at the 245th ACS meeting, New Orleans, April 7-11:*

**Neil Allison** presented "Study of the development and implementation of organic chemistry animations in the classroom to facilitate learning" in the CHED section. The work is co-authored with J.T. Allison.

**Colin Heyes** presented "Radiative and Non-radiative lifetime engineering of quantum dots for quantifying biomolecules in complex environments."

**Feng Wang** gave an invited talk, "Predicting phase transitions in water at coupled cluster quality with simple energy expressions" Symposium "Accurate Characterization of Non-covalent Interactions: From Small Molecules to Supramolecular Chemistry."

**Christena Nash** presented "Redox-magneto-hydrodynamic pumping and stirring with PEDOT-modified electrodes," co-authored with **Ingrid Fritsch**.

**Benard Omogo** made an oral presentation "Connecting structural defects and optical properties of core-shell quantum dots induced by interfacial lattice strain," co-authored by M. Benamara and **C.D. Heyes**.

**Sarah Phillips** presented "Perfusion fluid additives and affinity agents to improve recovery in microdialysis," co-authored with **Julie Stenken**.

**Leanne Mathurin** presented a poster "Synthesis of Au/Ag-CdS Hybrid Nanostructures as Efficient Photocatalysts, co-authored by **J. Chen**.

**Parth Patel, F. Gao, A.D. Kight, R.L. Goforth, R.L. Henry, &**

**Colin Heyes** authored a poster "Immobilizing and characterizing the interdomain conformational dynamics of cpSRP43 proteins on PEG-modified surfaces." Gao presented.

### Publications

Katherine Self, **Huajun Zhou**, Heather Greer, **Z. Ryan Tian**, Wuzong Zhou. "Reversed Crystal Growth of ZnO Microdisks." Chem. Commun. 2013, DOI:10.1039/C3CC41208C.

**Huaun Zhou, Z. Ryan Tian**. "Recent advances in multistep solution nanosynthesis of nanostructured three-dimensional complexes of semiconductive materials." Progress in Natural Science: Materials International 2013. (accepted).

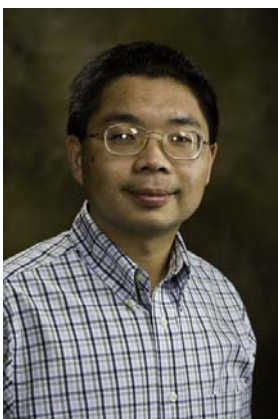
### Accomplishments

**Neil Allison** was nominated as a 2013 Outstanding Faculty by UofA Associated Student Government and Students Residents' Interhall Congress.

**Wei Shi** has been named recipient of a Robert C and Sandra Conner Endowed Faculty Fellowship. This fellowship is to support career advancement of faculty who provide the highest quality teaching, research and service to the college.

**Julie Stenken** is a recipient of one of this year's Fulbright College Master Researcher Awards.

## Zheng Receives NSF Career Award



With this CAREER Award, the Chemistry Synthesis program is supporting the research of Professor Nan Zheng of the University of Arkansas. Organic reactions driven by visible light are an ideal sustainable chemistry, as they use abundant sunlight, are operationally simple, and often have high atom economy. Nitrogen radical cations are synthetically useful yet underutilized electrophilic nitrogen sources. Professor Zheng will develop new

and innovative chemistry utilizing nitrogen radical cations generated under visible light photoredox conditions.

Professor Zheng will also initiate three educational projects that interweave his research and teaching. The goals

of these projects are to improve the learning experience of the students in organic chemistry courses and expose them to researches such as drug design and sustainable chemistry that are interesting and relevant to them. The first project is to develop 3-D contents to improve how organic chemistry is taught. Some of the 3-D contents include using the Computation/Visualization Facility in the Center for Protein Structure in the Department of Chemistry and Biochemistry at the University of Arkansas to teach some basic concepts of drug design as well as using a 3D visualization system to help the students "see" stereochemistry better. The second educational project involves designing new experiments for advanced undergraduate organic labs and organic chemistry II labs based on the proposed research. The last educational project focuses on introducing sustainable chemistry to organic chemistry II lectures.



## Student News

**James D. Barnett** was awarded a Fulbright grant to conduct chemistry research. His interest is to investigate the application of copper complexes in the design of more effective, less toxic anticancer drugs. He was officially invited by Prof. Patrick Gamez of the University of Barcelona to work in his inorganic chemistry lab. The research focuses on the investigation of copper(II) complexes for oxidative destruction of cancer cell DNA. He will conduct research there for 9 months, starting October 2013. Fulbright applicants ranged from graduating seniors and advanced graduate students to doctoral candidates. He looks forward to a very productive experience abroad, full of cultural immersion and promising scientific findings to improve the transatlantic brotherhood among the unique cultures of Spain and the U.S. James is currently a research associate in chemistry at the University of Arkansas working in Dr. **Susanne Striegler's** lab. He graduated from Auburn University in the fall of 2012, double majoring in Biomedical sciences and Spanish. His hometown is Childersburg, Alabama.



Undergraduate **Kanesha Day** was highlighted in a University of Arkansas Short Takes film at [shorttakes.uark.edu](http://shorttakes.uark.edu), entitled "Kanesha's Passion: Part Art, Part Science." She is exploring her interests and discovering new passions, while being an Honor's College junior, majoring in chemistry and minoring in drama. She says, "I kind of get the best of both worlds, I get the science—I know how it works, then I get the mind and I know how people feel. And if Chemistry is cold, hard facts, then drama is like a release from that. Exploring the mind, exploring emotions, exploring the human experience." She says she is more likely to play the role of pharmacist in the near future. She is gaining valuable experience, assisting with research that could lead to a new drug to treat Parkinson's disease. Kanesha is a student in **Matt McIntosh's** lab.



Graduate students (pictured left to right) **Sarah Phillips, Marlena Patrick, Colette Robinson, and Rande McBride** attended the 245th meeting of the American Chemical Society in New Orleans, LA April 7-11. Also in attendance were **Christena Nash, Leanne Mathurin, Benard Omogo, Kolawole Ayinuola, Neil Allison, and Colin Heyes.**



## Students Defend



**Roger Williams** defended his dissertation April 23. His title was "New effects of aging and lattice intercalation on surface properties of titanate nanobelts." His research mentor is **Z. Ryan Tian.**



**Eric Taylor** defended his Master's Thesis, "Synthesis of platinum and platinum-copper branched nanoparticles for electrooxidation of methanol" April 24. His research

mentor is **Jingyi Chen.**

## Completed Cumes



**Haibin Wu**, Chanqchun, China, passed his 7th cume April 19. He received his B.S. from Lanzhou University. His advisor is **Jingyi Chen.**

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## Safety Tip: by Bill Durham

Pay attention to what you place in the container for waste disposal. Certain combinations may become explosive. For example, hydrogen peroxide and acetone or perchloric acid and most organic compounds, particularly alcohols, are not to be mixed.

  
Department of Chemistry  
and Biochemistry

## Excellence in the Central Science

### Quick Security Tips from IT

Have computer viruses ever slowed down your computer? This month we'll talk about how easily they can get on your computer, and steps to avoid them.

Viruses arrive in a variety of ways:

1. From untrusted emails that may include harmful attachments or malicious web links.
2. Visiting infected web sites.
3. Using out-of-date applications that are vulnerable and can be exploited.
4. Search Toolbar downloads from unknown providers.
5. Installing Adware or Malware.
6. By inserting an infected USB stick.

Steps to prevent viruses:

1. Never respond to or open links in attachments from an unknown or untrusted sender. Also, always use care when something unexpected arrives from a trusted sender.
2. When visiting unknown sites, be aware of the links you're following before you click through. Watch for suspicious and persistent pop-up ads.
3. Sometimes sites can have infected banner ads. Regularly updating applications such as Java, Adobe Flash, Shockwave, and others are best practices.
4. It's wise to choose just one search toolbar if absolutely necessary. Google and Bing are most common choices.
5. Watch out for software installs that are not familiar, pay attention to software downloads, and carefully read the install steps. Some installers provide additional and unwanted applications.
6. Insert trusted USB sticks into trusted machines only. Viruses can travel quickly on infected sticks.

Other critical steps to protect your computer:

1. Make sure to use the appropriate current antivirus software provided by the UA.
2. Make sure your Windows, Apple, or Linux systems are fully patched.
3. Immediately forward suspicious mail as an attachment to security@uark.edu for analyzing.
4. Ask your tech support for help with corrective measures if you think you have a virus. arscup@uark.edu or 5-7512.
5. Always keep your password(s) safeguarded!



## Calendar of Events

### May

- 3 Dead Day
- 6-10 FINAL EXAMS
- 11 Commencement
- 13 May Intersession Classes Begin
- 23 Last day of May Intersession classes
- 24 May Intersession Final Exams
- 27 Memorial Day Holiday
- 28 Classes begin for first 5-week summer session (5/28-6/28). Labs meet M-Th.

*The department of chemistry and biochemistry at the University of Arkansas strives for excellence in research, teaching and service in chemistry - the central science. We aspire to positions of leadership regarding the discovery of new scientific knowledge, the training of students, and the economic development of the State of Arkansas. We seek to recruit and retain a diverse group of the best faculty, students and staff to address the challenges of the future through interdisciplinary and multi-disciplinary research and education.*

## Library Hours

CHBC Library (CHEM 225)  
<http://libinfo.uark.edu/chemistry>  
575-2557

### Spring Semester Hours, Jan. 14, 2013—May 12, 2013

Monday—Thursday	8 a.m.-5 p.m.
Friday	8 a.m.-6 p.m.
Saturday—Sunday	Closed

### Exceptions to Regular Hours

Friday, May 10	8 a.m.-5 p.m.
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The chemistry and biochemistry library resources can be accessed in the following LibGuides: <http://uark.libguides.com/content.php?pid=110953>. Please bookmark for future use. Theses and dissertation resources can be found on the following LibGuide: <http://uark.libguides.com/content.php?pid=123035&sid=1057466>.



# Honors Night

Photo Key from page 1. Reading from left to right, top to bottom.

## Row 1:

1. Jacob Sacks Awardees: Shicong Xu, Keaton Piper, Karina Sanders. Not pictured: Vasupradh Suresh Kumar
2. Dupont Chemistry Scholarship: Jiyeon Yoo Myers
3. Preston Scrape and Ingrid Fritsch
4. Dan Davis, Department Chair and Emcee for the evening

## Row 2:

1. Barbara Wertheim Campbell Awardees: Alta Johnson and Ashley Miller. Alta also received the ACS Organic Award and the Arthur and Lois Fry Scholarship.
2. Coulter Jones Awardees: Colby Smith, Taylor Needham, Timothy Burnside. Not pictured: Jesse Roberts

## Row 3:

1. American Chemical Society Awardees: Derek Pyland, Emily Miller, Colton Kordsmeier, Ryan Manso, Alex Jones, Emily Crossfield, Rebekah Langston, Matthew McMahon, Gayatri Suresh Kumar, Arshan Dehbozorgi, Chris Moutos
2. Samir Jenkins and Chris Moutos
3. ACS Analytical Awardees: Clinton Peter and Jordan Haynie. Not pictured: Matthew Faubion

## Row 4:

1. Frederick A. Kekulé Awardee: Akash Patel
2. Octa Norma High Scholarship Awardees: Matthew McMahon, Kelsey Sparks. Also receiving award are Keaton Piper (see Sacks picture), and Jacob Baxter, Sushanath Kumar, and Samuel McLelland (all not pictured).
3. ACS Hach Land Grant Scholarship Awardee: Robert Engler
4. Kanasha Day, Annie Coleman, and Katherine Ramey

## Row 5:

1. Ethyl Corporation Scholarship Awardee: Shicong Xu.
2. Monica Mabie Awardee: Mary Tucker. Not pictured: Megan Wood
3. William K. Noyce Scholarship Awardee: Gayatri Suresh Kumar
4. Banquet Scene, Jiyeon Yoo Myers being announced for her award.

## Row 6:

1. Devin Kennedy
2. Honorary Scholar Awardees: Shicong Xu, Kelsey Wells, Colby Smith, Megan Wary, Kelsey Sparks, Jake Usery, Rebecca Simpson, Kaila Pianalto, Parth Patel, Rachael Pellegrino, Preston Scrape, Caroline Chen, Akash Patel, Bailey Barnes, Christopher Sonntag, and Kaitlyn Bryant. Not pictured: Mathias Bellaiche, Kanasha Day, Bethany Doss, Hayden Dunn, Taylor Ghahremani, and Gretchen Grosch.
3. Haley Birch

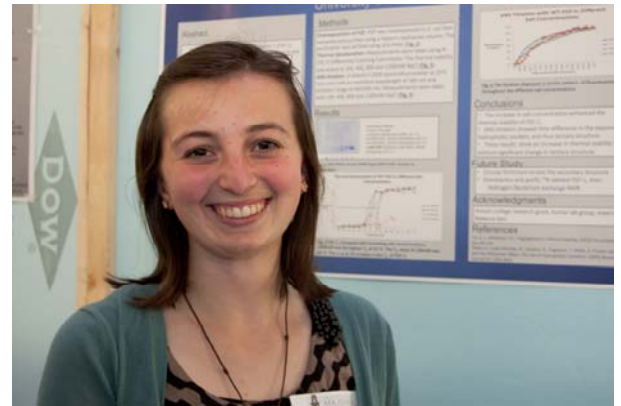
## POSTER PRESENTATIONS

1. Kaitlyn Bryant "*Optimization of Growth and Characterization of Phosphodiesterase 4D N-Terminal Catalytic Domain and its Interaction with Rheb*" Research mentor – Paul Adams
2. Timothy Burnside "*Site-Directed Mutagenesis of Yeast Cytochrome C M80A*" Research mentor – Frank Millett
3. Emily Crossfield "*Characterization of a Novel Affinity Tag for Purification of Recombinant Proteins*" Research mentor – Suresh Kumar

4. Arshan Dehbozorgi *"Characterization of a Thermostable Quadruple Mutant of Human Fibroblast Growth Factor 1"* Research mentor – Suresh Kumar
5. Alta Johnson *"New Methods of Green Pharmaceutical Synthesis"* Research mentor – Matt McIntosh
6. Alex Jones *"Thermodynamic Characterization of a Destabilized Mutant of the Human Acidic Fibroblast Growth Factor"* Research mentor – Suresh Kumar
7. Kaneko Mizuho *"Effect of Ligand Binding/Unbinding Equilibrium on Single Particle Fluorescence of Core-Shell Quantum Dots"* Research mentor – Colin Heyes
8. Devin Kennedy *"Analysis of Polystyrene-co-Pentafluorostyrene by MALDI TOF-MS"* Research mentor – Charles Wilkins
9. Colton Kordsmeier *"Characterization of Antimicrobial Methylated Tryptophan Retro-lactoferricin Peptides by Solid-state NMR and Fluorescence Spectroscopy"* Research mentor – Denise Greathouse
10. Nabih Masri *"Total Synthesis of ( $\pm$ )-minfiensine via a Visible Light Mediated Oxidative C-N Bond Formation/Aromatization Cascade"* Research mentor – Nan Zheng
11. Matthew McMahon *"Analyzing Organic Solar Cells using MALDI-MS"* Research mentor – Charles Wilkins
12. Ashley Miller *"Characterization of a Stabilizing Mutant of the Human Fibroblast Growth Factor"* Research mentor – Suresh Kumar
13. Amir Mortazavi *"Qualitative and Quantitative Assessment of Melanocyte-specific Autoantibodies Prior to and throughout Development of Autoimmune Vitiligo in Smyth Line Chickens"* Research mentor – Gisela Erf
14. Christopher Moutos *"Membrane Permeability Induced by Stereo and Retro Analogs of Histatin 5"* Research mentor – David McNabb
15. Parth Patel *"Immobilizing and Characterizing the Inter-domain Conformational Dynamics of CpSRP43 Proteins on PEG-Modified Surfaces"* Research mentor – Colin Heyes
16. Kaila Pianalto *"Characterization of Specific Electron Transfer Interactions between Cytochrome c and Cytochrome c Oxidase"* Research mentor – Frank Millett
17. Keaton Piper *"TiO<sub>2</sub> Nanofiber-bioscaffold Crystal Lattice Modifications and Electrochemical Sensing Capabilities"* Research mentor – Ryan Tian
18. Derek Pyland *"Applications of PEPS-HDX-ESI-MS to Study Protein Folding, Structure, and Stability"* Research mentor – Wesley Stites
19. Preston Scrape *"Microfluidic Flow Induced by Redox-Magnetohydrodynamics Distant from Electrode Diffusion Layers"* Research mentor – Ingrid Fritsch
20. Rebecca Simpson *"Investigation of the Structural Stability of cpSRP43 Chromodomain 2 through Hydrogen-deuterium Exchange"* Research mentor – Suresh Kumar
21. Colby Smith *"Solid-state NMR and Fluorescence Spectroscopy of Antimicrobial Methylated-tryptophan Lactoferricin Peptides with Gln, Gly or Pro as the Central Residue"* Research mentor – Denise Greathouse
22. Kelsey Sparks *"Comparison of Interfacial Tyrosine, Tryptophan, and Phenylalanine Residues as Determinants of Orientation and Dynamics of Transmembrane Peptides"* Research mentor – Roger Koeppel
23. Julie Tran *"Characterization of the Structure of the C-terminal Domain of Alb-3"* Research mentor – Suresh Kumar
24. Jake Usery *"Understanding the Binding Interactions of the 43kDa Subunit of cpSRP with the C-terminal Domain of Alb3"* Research mentor – Suresh Kumar
25. Fang Weng *"Utilization of Transmembrane Convection to Increase Microdialysis Sampling Recovery"* Research mentor – Julie Stenzen
26. Bailey Barnes *"A Study of the Synthesis and Chemistry of Stabilized Transition Metalla-anthracenes"* Research mentor – Neil Allison
27. Jacob Baxter *"A New Photocatalyzed Cascade for Fused Indolines"* Research mentor – Nan Zheng
28. Claire Bewley *"Design of a Novel Affinity Chromatography Method for Purification of Heparin Binding Proteins"* Research mentor – Wei Shi
29. Dana Bodenner *"Improving Photocatalytic Activity by Appending a Quinone to Ru-polypyridyl to Prolong Lifetime of Separation of Charges"* Research mentor – Nan Zheng
30. Ross Burnett *"Identification of Consensus Glycosaminoglycan Binding Amino Acid Sequences in Proteins"* Research mentor – Suresh Kumar
31. Annie Coleman *"Comparative Bioinformatic Analyses of the Membrane Transport Proteins Encoded in the Complete Genomes of Acidothermus cellulolyticus and Thermobifida fusca"* Research mentor – Ravi Barabote

32. Kanesha Day *"Towards the Synthesis of Antascomicin B: A Beneficial Natural Product"* Research mentor – Matt McIntosh
33. Bethany Doss *"Influence of Cholesterol on Membrane-Spanning Proteins"* Research mentor – Roger Koeppel
34. Hayden Dunn *"Investigation of Biophysical Characteristics of Ribosomal Protein L23 (RPL23) and its Binding Characteristics Towards the Chloroplast Signal Recognition Particle 43 (cpSRP43)"* Research mentor – Suresh Kumar
35. Robert Engler *"Lipids Analysis: Uncertainty in Extraction Efficiency versus Uncertainties in Sample Workup"* Research mentor – Bill Durham
36. Nathan Falls *"Investigation of the Functional and Structural Properties of the Ank-CD2 Domain of cpSRP43"* Research mentor – Suresh Kumar
37. Taylor Ghahremani *"Characterization of K-126-D Fibroblast Growth Factor Mutant"* Research mentor – Suresh Kumar
38. Taylor Gohman *"Trapping Molecules in Nanocages for Drug Delivery"* Research mentor – Jingyi Chen
39. Gretchen Grosch *"Studies on Immobilized Metal Ion Affinity Chromatography of Mustard Gas Alkylation Products"* Research mentor – Wesley Stites
40. Erin Jeffrey *"Azole Alkylation or Azole Derivative Alkylation"* Research mentor – Matt McIntosh
41. Rebekah Langston *"Exploring the Inhibition of  $\beta$ -Galactosidase"* Research mentor – Susanne Striegler
42. Samuel McLelland *"Improving Photocatalytic Activity by Appending a DABCO Ring to Ruthenium Polypyridyl Complex to Prolong Lifetime of Charge Separation"* Research mentor – Nan Zheng
43. Blake Mertens *"Overexpression, Purification, and Characterization of Interleukin-1 Alpha"* Research mentor – Suresh Kumar
44. Khanh Nguyen *"Differential Binding of Bacterial Collagen-binding Domains to Type 1 Collagen Fibrils from Three Species and High-density Collagen Scaffold"* Research mentor – Joshua Sakon
45. Edouard Oudin *"Stability and Polymerization Kinetics of Transparent Inverse Miniemulsions"* Research mentor – Susanne Striegler
46. Rachael Pellegrino *"Understanding the Structural Determinants for the Stability of the Human Fibroblast Growth Factor"* Research mentor – Suresh Kumar
47. Katherine Ramey *"Characterization of Recombinant TAT-FGF"* Research mentor – Suresh Kumar
48. Reece Ritter *"Application of H/D Exchange Mass Spectrometry to Extract Protein Folding Energies and Folding Rates of Staphylococcal Nuclease"* Research mentor – Wesley Stites
49. Karina Sanders *"Elucidation of the Structural Determinants of Hyperthermostability of Rubredoxin Protein from Pyrococcus furiosus"* Research mentor – Suresh Kumar
50. Chris Sonntag *"Cancer Immunotherapy by Induced Apoptosis in 4T1 Cells using Dichloroacetate, a Metabolic Modulator"* Research mentor – David Zaharoff
51. Gayatri Suresh Kumar *"Relationship of Ergosterol Composition to Fluconazole Sensitivity in Candida Species"* Research mentor – David McNabb
52. Samantha Wages *"Development of a Three-Phase Method for Recombinant Protein Recovery"* Research mentor – Paul Adams
53. Chris Wallace *"Thiolated Chitosan as a Novel Vehicle for Intravesical Delivery"* Research mentor – David Zaharoff
54. Hans Wang *"Characterization of a Catalytic GAP Domain Derivative Protein of Phosphodiesterase 4D"* Research mentor – Paul Adams
55. Megan Wary *"Cytochrome P450 as a Molecular and Physiological Marker to Fescue Toxicosis in Cattle"* Research mentor – Charles Rosenkrans
56. Kelsey Wells *"Visible Light Mediated [3+2] Annulation of Cyclopropylanilines with Allenes"* Research mentor – Nan Zheng
57. Chase Wingfield *"Homology Modeling of the Three-dimensional Structure of MdrA, Disulfide Reductase from Methanosarcina acetivorans"* Research mentor – Suresh Kumar
58. Megan Wood *"Optimizing Moderately Short Antimicrobial Membrane-active Peptides"* Research mentor – Denise Greathouse
59. Shicong Xu *"Perfecting a Three Phase Method of Protein Purification"* Research mentor – Paul Adams





2013 Honors & Majors Poster Presentations

