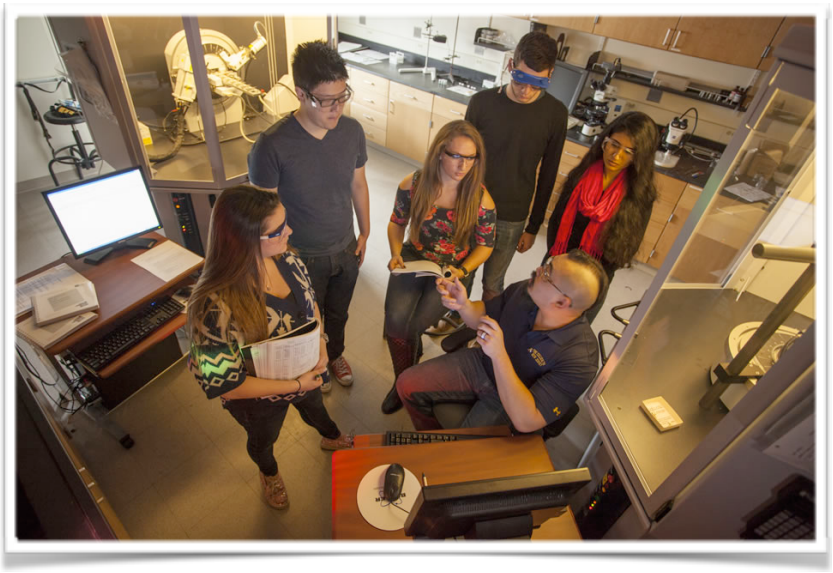

Department of Chemistry

2013-2014 annual report

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Courses Taught

Spring 2013

General Chemistry I (CHE 201)– *Laviska*

General Chemistry II (CHE 202)– *Hirsh, Huang, O'Connor*

Honors General Chemistry II (HON 202)– *Billmers*

Organic Chemistry II (CHE 332)– *Abourahma, Bradley, Hunt*

Analytical Chemistry (CHE 310)– *Krichten*

Sophomore Chemistry Seminar (CHE 316)– *Hunt*

Junior Chemistry Seminar (CHE 317)– *Allison*

Quantum Chemistry (CHE 371)– *Bumagan*

Biochemistry (CHE 430)– *Sen*

Structure and Bonding (CHE 451)– *Chan*

Chemical Biology (CHE 470)– *Guarracino*

Forensic Applications of Mass Spectrometry (CHE 471)– *Allison*

Summer2013

Biochemistry and the Human Body (CHE 111)– *Billmers*

NEW offering

Exploring London Through the Eyes of Art and Chemistry (CHE 103)– *Bradley*

Organic Chemistry II (CHE 332)– *Hunt*

General Chemistry I (CHE 201)– *Huang*

General Chemistry II (CHE 202)– *Krichten*

Fall 2013	Orientation to Chemistry (CHE 099)– *Abourahma, Chan*
	Biochemistry and the Human Body (CHE 111)– *Billmers*
	Photography, Metals and Dyes: The Chemistry of Creating Art (FSP 141)– *Bradley*
	General Chemistry I (CHE 201)– *Huang, Laviska*
	Honors General Chemistry I (HON 201)– *Krichten*
	Analytical Chemistry (CHE 310)– *Krichten*
	Sophomore Chemistry Seminar (CHE 316)– *Guarracino*
	Junior Chemistry Seminar (CHE 317)– *Allison*
	Organic Chemistry I (CHE 331)– *Abourahma, Hunt*
	Organic Chemistry II (CHE 332)– *O'Connor*
	Essentials of Biochemistry (CHE 350)– *Guarracino*
	Forensic Chemistry (CHE 360)– Allison
	Chemical Thermodynamics and Kinetics (CHE 372)– *Hirsh*
	Biochemistry (CHE 430)– *Sen*
	The Wonders of Asymmetric Synthesis (CHE 476)– *Bradley*
NEW offering	Chemical Crystallography and Kitchen Chemistry (CHE 478)– *Chan*
	Student Teaching (CHE 490)– *Bilkers*
Spring 2014	General Chemistry I (CHE 201)– *Billmers*
	General Chemistry II (CHE 202)– *Allison, Chan, Krichten, Laviska*
	Honors General Chemistry II (HON 202)– *Krichten*
	Analytical Chemistry (CHE 310)– *Huang*
	Sophomore Chemistry Seminar (CHE 316)– *Bradley*

Junior Chemistry Seminar (CHE 317)– *O'Connot*

Organic Chemistry II (CHE 332)– *Billmers, Bradley, Hunt*

Quantum Chemistry (CHE 371)– *Bunagan*

Biochemistry (CHE 430)– *Guarracino*

Organometallics and Reaction Mechanisms (CHE 452)– *O'Connor*

NEW offering

Spins: Nuclear Magnetic and Electron Paramagnetic Resonance (CHE 478)– *Hirsh*

Special Topics in Biochemistry: Insect Biochemistry and Toxicology (CHE 476)– *Sen*

Independent research

Fall 2013 Projects

Allison

Brianna Donnelly
Spectroscopy of Questioned Documents

Bridget Kelly
Analysis of Questioned Documents from the IR to the UV– Full Document Spectroscopy

Marcel Powers
Analysis of Proteins in Egg Yolks– Such as Those used in Art Paintings pre:1700 (with Alumnus Emily O'Neill, University of Florida)

Nicole Renkel
Understanding Digital Photography– Can Full Visible Spectra be Obtained From Digital RGB Information?

Abourahma

Marissa Higgins
Determining the Relative Thermodynamic Stability of Pyrazinamide Polymorphs

Elizabeth Johnson
The Intrinsic Dissolution Rate of Pyrazinamide Cocrystals

Patrick Nolty
Effect of Variable Stoichiometric Ratios on Pyrazinamide Cocrystals

Dhaval Shah
Evaluating the Relative Stability of Two Cocrystals of Pyrazinamide and *p*-nitrobenzoic acid

Bradley

Kodjovi Afanyhioun
Continued Studies on the Synthesis of Aromatic Silyl Ketone Derivatives

Shelby Allen
A Study of Variables in the Synthesis of Benzyl Azetidine

Christopher Kirby
Synthesis of 1,4-Dibenzylpiperazines

Cris Ochoa
Study of a More Efficient Synthesis of Benzyl Azetidine

Bunagan

Ryan Chin
Studying the Folding Pathway of Full-Length Human Serum Albumin via FCS

Andrew Apicello
Optimization of a Fluorescence Correlation Spectroscopy set-up

Michael Giordano
Preparation of fluorescently-labeled Human Serum Albumin variants for study via FCS

Chan

Vincent Wu
Synthesis of Quasispin materials

Kartik Rai
Synthesis of Thermoelectric Materials

Lisa Kennedy
Synthesis of Novel Spintronic Materials

William McDermott
Synthesis of Topological Insulators

Lea Palacios
Synthesis of Barium Sulfide Multiferroics

Guarracino

Anginelle Alabanza
The Role of Primary Sequence in Helical Control Compared Across Short Alpha-Peptides

Sanjna Sanghvi
The Role of Primary Sequence in Helical Control Compared Across Short Alpha-Peptides

Camille Robertson
The Role of Primary Sequence in Helical Control Compared Across Short Alpha-Peptides

Hirsh

Niketh Bhashyam
Nitric Oxide Detection by PTIO and MGD-Fe(II) Spin Traps

Kelly Ann Gesuelli
Binding Affinity of Mn(II) in Highly Oxidized Graphene Oxide

Serge Zemerov
Magnetically Oriented DNA Containing a Metal Ion - Nitroxide Radial Spin Pair

Huang

Margaret Chen
Capillary Electrophoresis of Amino Acids

Samantha Mascetti
Analysis of Sulfur-Containing Biomolecules

Hunt

Jessica Bocanegra
Michael Reactions with Knovenagel Adducts

Ryan DeAngelis
Investigations into an Unexpected Aromatization Reaction of 1,2-Cyclohexanedione Ethers

Tyler Higgins
Functionalization of Resveratrol

Taylor Maney
Heck Reactions with Highly Functionalized Bromoarenes
Functionalization of Resveratrol

Marissa Rubenstein
Cyclization Strategies Built Around Nitro-substituted Systems as Michael Acceptors

Amy Solinski
Condensation/Aromatization Reactions with 1,2 Cyclohexanedione

Laviska

Richard Herbster
Kinetics and Thermodynamics of C-H Bond Activation of Alkyl-substituted Pyridines by an Iridium Pincer Complex

Hussnain Sajjad
Dehydrogenation of Primary Amines by an Iridium Pincer Complex

O'Connor

Mia Kunitomo
Evaluating the Insertion of Norbornene into (pi-allyl)Pd Cations Containing Bulky Dialkylbiaryl Phosphine Ligands

Jacob Levene
Synthesis of a New Allyl Halide Containing a Pendent Dimethylphosphonate Group. Preparation of a New Nickel(II) Complex for Catalytic Applications

Michael McDaniel
Synthesis of New Allyl Nickel Complexes Containing Bulky Dialkylbiphenylphosphine Ligands to Serve as Catalysts in Polymerization Reactions

Kieran Mullarney
Collaborative Project with Duquesne University. Determining k_{act} Values for Cu catalyzed ATRA Reactions
James O'Connor
Synthesis and Characterization of Iridium(I) and Iridium(III) Complexes Containing Pyridine Sulfonamide Ligands

Sen

Brittany Pease
Synthesis of POM Derivatives of Bisphosphonate Insect FPPS Inhibitors

Alisa Xhambazi
Preparation of a Phototaffinity Label for Identification of the Mitrochondrial IPP Transporter in *Manduca sexta*.

Spring 2014 Projects

Allison

Brianna Donnelly
Construction of an Instrument for Wavelength-Dependent Irradiation of Questioned Documents

Bridget Kelly
Analysis of Questioned Documents using Spectroscopic Methods
Marcel Powers
Digestion of Proteins found in Paintings – Milk and Egg Yolks were Used as Matrices Before the 1700's

Nicole Renkel
Generation of Complete UV-Vis spectra from Digital Camera (RGB) Information

Abourahma

Marissa Higgins
Developing a Method for Evaluating the Relative Thermodynamic Stability of Polymorphs

Ryan Boyne
Determining the Solubility of Pyrazinamide Cocrystals in Organic Solvents

Elizabeth Johnson
Determining the Intrinsic Dissolution Rate of Pyrazinamide Cocrystals

Bradley

Kodjovi Afanyhioun
Continued Studies on the Synthesis of Aromatic Silyl Ketone Derivatives

Shelby Allen
Further Studies of Variables in the Synthesis of Benzyl Azetidine

Christopher Kirby
Continued Studies on the Synthesis of 1,4-Dibenzylpiperazines

Cris Ochoa
Study of a More Efficient Synthesis of Benzyl Azetidine continues

Bunagan

Ryan Chin
Studying the Folding Pathway of Full-Length Human Serum Albumin via FCS

Priya Gupta
Conformational changes of Late Embryogenesis Abundant (LEA) proteins in choline chloride

Michael Vermuel
Studying the Folding Pathway of Truncated Human Serum Albumin via FCS

Michael Giordano
Preparation of Fluorescently-labeled Human Serum Albumin Variants for Study via FCS

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Vincent Wu
Synthesis of Quasispin materials

Kartik Rai
Synthesis of Thermoelectric Materials

Lisa Kennedy
Synthesis of Novel Spintronic Materials
William McDermott
Synthesis of Topological Insulators

Lea Palacios
Synthesis of Barium Sulfide Multiferroics

Guarracino

Anginelle Alabanza
Synthesis and Purification of a Cyclic Peptide, HTCollagelin

Sanjna Sanghvi
Synthesis and Purification of a Cyclic Peptide, HTNPep

Camille Robertson
Synthesis and Purification of a Cyclic Peptide

Gianna Pastena
Synthesis and Purification of Control Linear Peptides

Hirsh

Kelly Ann Gesuelli
Modeling the Binding Affinity of Mn(II) in Graphene Oxide

Lyle Nolasco
Probing defects of Graphene Oxide through Manganese(II) Binding

Taneka Pearson
Mn(II) Binding of Graphene Oxide

Serge Zemerov
Detection of Electron Spin-Spin Interactions in Co(II)-Nitroxyl Radical Spin Pairs by EPR

Frank Bennett (Department of Mathematics and Statistics)
Mathematical Modeling of the Magnetic Interactions between a Radical and a Metal Ion

Huang

Kimverly Benitez
Analysis of Amino Acids by Capillary Electrophoresis

Margaret Chen
Analysis of Homocysteine in Total Blood Plasma

Hunt

Jessica Bocanegra
Michael Reactions with Knovenagel adducts

Ryan DeAngelis
Investigations into an Unexpected Aromatization Reaction of 1,2-Cyclohexanedione Ethers

Tyler Higgins
Functionalization of Resveratrol

Taylor Many
Heck Reactions with Highly Functionalized Bromoarenes

Marissa Rubinstein
Cyclization Strategies Built around *p*-Nitro-Substituted Systems as Michael Acceptors

Amy Solinski
Condensation/Aromatization Reactions with 1,2-Cyclohexanedione

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Dehydrogenation of Primary Amines by an Iridium Pincer Complex

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Evaluating the Insertion of Norbornene into (pi-allyl)Pd Cations Containing Bulky Dialkylbiaryl Phosphine Ligands

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Britany Pease
Synthesis of POM Derivatives of Bisphosphonate Insect FPPS Inhibitors

Alisa Xhambazi
Preparation of a Phototaffinity Label for Identification of the Mitrochondrial IPP Transporter in *Manduca sexta*

Brendan O'Donnell
Mining for Potential IPP Transporters in Insects

Alexis Jones
In vivo Studies of Potential Insect FPPS Inhibitors

Taylor Horsfield
Characterization of Type 1 Lepidopteran FPPS

Summer Research

Allison

Megan Merbach
Studying Interactions of Artist's Media (Egg Yolk) with Pigments - Are phosphopeptides Altered?

Bunagan

Ryan Chin
Studying the Folding Pathway of Truncated and Full-Length Human Serum Albumin via FCS

Chan

Will McDermott
Discovery of Novel Thermoelectric materials by the Destruction of the Rock Salt Structure of Bismuth Telluride (Bi_2Te_3)

Lea Palacios
Discovery of Novel Thermoelectric materials by the Destruction of the Rock Salt Structure of Bismuth Telluride (Bi_2Te_3)

Guarracino

Kayla Gentile
Development of ‘Artificial’ Peptides that Bind Collagen as Potential Anti-Thrombosis Agents

Dylan Nguyen
Development of ‘Artificial’ Peptides that Bind Collagen as Potential Anti-Thrombosis Agents

O’Connor

Catherine Lee
Polymerization of Norbornene Using Cationic (Pi-allyl)Ni(II) Dialkylbiaryl Phosphine

Mia Kunitomo
Exploring the Reactivity of Norbornene with (Pi-allyl)Pd Cations Containing Dialkyl Biaryl Phosphines

Andrew Ruff
Synthesis, Characterization, and Catalyst Screening for Cp*Ir Pyridine Sulfonamide Complexes

Husnain Sajjad
Progress Towards the Synthesis of [N,N,N]-Dianionic Pincer Ligands to Stabilize Iridium in High Oxidation States

Sen

Taylor Horsfield
Analyzing the Use of Bisphosphonates as Inhibitors of Farnesyl Diphosphate Synthase in *Manduca Sexta*

Alexis Jones
Analyzing the Use of Bisphosphonates as Inhibitors of Farnesyl Diphosphate Synthase in *Manduca Sexta*

Departmental Committee Reports

2013-2014 Activities Report
From Lynn Bradley and Stephanie Sen, 2013-2014 Chair (and Co-Chair)

Academic Affairs

The Academic Affairs Committee was engaged in the evaluation and development of several curricular activities. The Committee prepared departmental course schedules for the 2014-15 academic year, reviewed and updated the academic bulletin, revised course descriptions, and reviewed transfer and change of major applications. In addition to these annual activities, the Committee reviewed and prepared recommendations related to the following: 1) identification of student outcomes that are aligned with American Chemical Society recommendations, 2) teaching/pedagogical components of the Woodrow Wilson Teaching Fellowship program, 3) research requirements and guidelines for CHE393/493, and 4) policy for IP grading of CHE493. The committee also drafted a proposal for expanding the intermediate writing requirement to several courses (*Writing Across the Curriculum*

proposal), which was presented to the Office of Liberal Learning for preliminary review.

2013-2014 Activities Report
From Abby O'Connor, 2013-2014 Chair

Student Affairs

The Student Affairs Committee was engaged in a wide variety of student-centered activities. The Committee organized several campus events during the academic year, including the winter departmental student poster session, the *Celebration of Student Achievement* lunch and awards ceremony, and the departmental graduation ceremony. In addition, the Committee oversaw the evaluation and distribution of departmental student awards, student admission to Phi Beta Kappa, the preparation of departmental pre-registration newsletters, and the solicitation and compilation of faculty and student professional activities to be used for the 2013-14 Departmental Annual Review. The Student Affairs Committee was particularly active in working with both the Office of Alumni Affairs and the Office of Advancement Services on campus. The Committee coordinated departmental efforts related to the 2014 *Young Alumni Giving Campaign*, developing a departmental Facebook page and organizing a faculty-lead email and phone drive. Working collaboratively with the Office of Alumni Affairs, the Department hosted an alumni event at the American Chemical Society National Meeting in Dallas, TX.

2013-2014 Activities Report
From Donald Hirsh, 2013-2014 Chair

Operations

The Operations committee was primarily responsible for preliminary architectural planning of the new Chemistry Annex and of the new STEM building on campus. In collaboration with the architecture and engineering firm EYP, the campus architect office, and representatives from the School of Science and School of Engineering, detailed drawings of the first and second floor chemistry laboratory facilities were prepared. A complete inventory of existing equipment, instrumentation, and chemicals was performed during this process. In

addition to building planning, the Operations Committee began oversight on the acquisition of high-end instrumentation, which was approved for purchase with a portion of the ELF Bond Fund. Other significant activities of the Committee include the development of remote access to NMR data files on the Department's teaching instrument, and the preparation of a proposal for the acquisition of equipment related to the IT mission of the School and Department.

Student Organization Reports

2013-2014 Activities Report
From Anginelle Alabanza, 2013-2014 president

Student Chemists Association (SCA)

This past year, the Sigma Beta chapter of GSE was actively involved in outreach activities both on and off campus. Particularly noteworthy activities included an *Elephant Toothpaste* demonstration at Princeton University's *Energy Activities Night*, and GSE's participation in judging at the Timberlane Middle School Science Fair. Additional departmental activities hosted by the chapter included REU and TCNJ research group interest sessions, Dr. Chan's *Freshman Happy Hour*, and an underclassman peer-mentoring program. A majority of GSE members were also active members of the TCNJ community through their participation in tutoring, athletics, and Greek life.

2013-2014 Activities Report
From Taylor Maney, 2013-2014 president

Gamma Sigma Epsilon (GSE)

The TCNJ Student Chemists Association was very productive this year. Following the graduation of the Class of 2013, SCA sought out to recruit new members. SCA held *Freshman Happy Hours* on Fridays, where members and club advisors educated new majors about the Department and helped acclimate them to college life. With the successful recruitment of 20 new members, the club organized many social events including the Departmental *Thanksgiving Potluck*, a *Masquerade Ball* semiformal, and a trip to the Chemical Heritage Foundation in

Philadelphia, where members connected with students from other ACS chapters. SCA members were active in the community, assisting with elementary, middle school, and high school science fairs, facilitating departmental open houses, giving away free *Periodic Table* cupcakes for Mole Day and pretzels during Finals Fest, and volunteering at a local soup kitchen. SCA also facilitated the professional development of its members by hosting seminars where students could network with professionals. Several members attended the 247th ACS National Meeting to present their research and to promote the activities of TCNJ and SCA.

Class of 2014 Graduates

Kodjovi Afanyihoun
Anginelle Alabanza
Marco Amaral
Andrew Apicello
Anna Banik^
Tina Berlingieri
Christopher Bregna
Ryan DeAngelis
Brianna Donnelly
Steven Douedi
Chloe Fama
Kelly-Ann Gesuelli
Priya Gupta
Richard Herbster
Marissa Higgins
Tyler Higgins
Reshma Jacob
William Kasper
Bridget Kelly
Lisa Kennedy
Jeffery Kurczeski^
Jacob Levene
Samantha Mascetti
Michael McDaniel
Allison McQuillen^
Andrew Mound
Kieran Mullarney
Victoria Nguyen
Lyle Nolasco
Patrick Nolty
Samantha Nowak
James O'Connor
Gianna Pastena
Taneka Pearson
Devon Pesce^
Jenna Petro
Marcel Powers
Kartik Rai
Nicole Renkel
Camille Robertson
Marissa Rubenstein
Dhaval Shah
Sanjna Sanghvi
John Speigel
Sara Wellington
Vincent Wu
Alisa Xhambazi
Serge Zemerov

^ teaching certified

Student Awards

Excellence in Chemistry Awards	Kodjovi Afanyihoun Anginelle Alabanza Ryan DeAngelis Lisa Kennedy Allison McQuillen Kieran Mullarney Lyle Nolasco James O'Connor Gianna Pastena
ACS Division of Organic Chemistry	Tyler Higgins
ACS Division of Analytical Chemistry	William Buchbinder
New Jersey Institute of Chemists	Priya Gupta
Trenton ACS local section award	William McDermott
Philip Dumas Memorial Award	Marco Amaral
Dr. Jerry Goodkin Physical Chemistry Award	Serge Zemerov
Mabel Hores Award in Forensic Chemistry	Nicole Renkel
Howard Nechamkin Award	Jacob Levene
2012-2013 academic year academic awards	*Top chemistry department freshmen* Marc Casale, Sara Martin, and Matt Zajak *Top chemistry department sophomore* William Buchbinder and Andrew Ruff *Top chemistry department junior* William McDermott

Publications

2014 Publications

Tucci, V.K.; O'Connor, A.R.; Bradley, L.M. A Three-Year Chemistry Seminar Program Focusing on Career Development Skills. *J. Chem. Educ.* **2014**, *in press*.

Rai, K.; Wu, V.; Gupta, P.; Laviska, D.A.; Chan, B.C. N-Methyl-N-nitroso-p-toluenesulfonamide. Acta Cryst. (E), **2014**, E*70*, o782.

Cherney, E.; Macor, J.; Papanagapolous, C.; Hunt, D.A. Tandem cyclization reactions of electron rich arylethylamino acid amides. An entry to the dihydroimidazoisoquinolin-3(2H)-one ring system. *Tetrahedron Lett.*. **2014**, *55(34)*, 4837.

Abourahma, H.; Bradley, L.; Lareau, N.M.; Reesbeck, M. A modified Birch reduction for the undergraduate organic laboratory. *J. Chem. Educ.* **2014**, *91,* 443.

Guarracino, D. A.; Alabanza, A. M.; Robertson, C. T.; Sanghvi, S. S. The role of primary sequence in helical control compared across short alpha and beta^3-peptides. *J. Biomol. Struct. Dyn.* **2014**, *ahead of print*.

Lao, B. B.; Drew, K.; Guarracino, D. A.; Brewer, T.; Heindel, D.; Bonneau, R. A.; Arora, P. S. Rational design of topographical helix mimics as potent inhibitors of protein-protein interactions. *J. Am. Chem. Soc.* **2014**, *ASAP*.

2013 Publications

Billmers, J. M. Laboratory Activities for the Single Semester General, Organic and Biochemistry Course, 3rd ed. XanEdu Publishing, **2013**.

Bendrihem, S. A.; Pyle, R.; Allison, J. The analysis of gun-cleaning oil as long-distance gunshot residue and its implications for chemical tags on bullets. *J. Forensic Sci.* **2013**, *58*, 142-145.

De Lill, D. T.; Chan, B. C. Structure and luminescence of a one-dimensional uranium coordination polymer assembled through benzophenone-4,4'-dicarboxylate. *Inorg. Chim. Acta.* **2013**, *404*, 215.

Ferrie, J. J.; Gruskos, J. J.; Goldwaser, A. L.; Decker, M. E.; Guarracino, D. A. A comparative protease stability study of synthetic macrocyclic peptides that mimic two endocrine hormones. *Bioorg. Med. Chem. Lett.* **2013,** 989.

Gramigna, K. M.; Oria, J. V.; Mandell, C. L.; Tiedemann, M. A.; Dougherty, W. G.; Piro, N. A.; Kassel, W. S.; Chan, B. C.; Diaconescu, P. L.; Nataro, C. Palladium(II) and platinum(II) compounds of 1,1′- bis(phosphino)metallocene (M = Fe, Ru) ligands with metal−metal interactions. *Organometallics* **2013,** *32*, 5966.

Jacobs, D. L.; Chan, B. C.; O'Connor, A. R. N-[2-(Pyridin-2-yl)ethyl]-derivatives of methane-, benzene- and toluenesulfonamide: prospective ligands for metal coordination. *Acta Crystallogr.* **2013**, *C69*, 1397.

Laforge, A. D.; Pulido, S. H.; Cava, R. J.; Chan, B. C.; Ramirez, A. P. Quasispin glass in a geometrically frustrated magnet. *Phys. Rev. Lett.* **2013**, *110*, 017203.

Sanders, M. B.; Leon D.; Ndiche, E. I.; Chan, B. C. 1,3-Bis(chloromethyl)benzene. *Acta Crystallogr.* **2013**, *E69*, 1150.

Sanders, M. B.; Furkan, T.; Leonard E.; Chan, B. C. 1,6-Dibromonaphthalen-2-ol methanol monosolvate. *Acta Crystallogr.* **2013**, *E69*, 1149.

Sanders, M. B.; Farrokh, J. C.; Hardie, J.; Chan, B. C. (1H-Imidazol-4-yl)methanol. *Acta Crystallogr.* **2013,** *E69*, 1151.

Hirsh, D. J.; McCracken, J. M.; Biczo, R.; Gesuelli, K.A. Saturation recovery EPR with nitroxyl radical - Dy(III) spin pairs: distances and orientations. *J. Phys. Chem. B* **2013**, *117*, 11960.

Geherty, M.; Melnyk, J.; Chomsky, K.; Hunt, D. A. Halogen-metal exchange reactions of bromoaryl-substituted β-lactams. *Tetrahedron Lett.* **2013***, 54*, 4934.

Weinstein, J. D.; Gonzalez, E. R.; Egleton, R. D.; Hunt, D. A. The 10-patient screening protocol: a paradigm shift for

evaluating pharmacotherapy for Alzheimer's disease. *Consult. Pharm.* **2013***, 28*, 443.

Simpkins, C.; Hunt, D. A. The Michael addition of 1,2-cyclohexanedione to beta-nitro-styrenes (I). The synthesis of 3-aryl-5,6-dihydrobenzofuran-7(4H)-ones. *Tetrahedron Lett.* **2013**, *54*, 3373.

O'Connor, A. R.; Kaminsky, W.; Chan, B. C.; Heinekey, D. M; Goldberg, K. I. Synthesis and characterization of Ir(I) and Ir(III) complexes containing dialkylbiphenylphosphines. *Organometallics* **2013,** *32*, 4016.

Barbar, A.; Couture, M.; Sen, S. E.; Beliveau, C.; Nisole, A.; Bipfubusa, M.; Cusson, M. Cloning, expression, and characterization of an insect geranylgeranyl diphosphate synthase. *Insect Biochem. Mol. Biol.* **2013***, 43*, 947.

Cusson, M.; Sen, S. E.; Shinoda, T. Juvenile Hormone Biosynthetic Enzymes as Targets for Insecticide Discovery. *Advanced Technologies for Managing Insect Pests* **2013***,* 31.

Faculty Presentations

2014 Presentations

O'Connor, A.R. Molecular Magic– A collaboration between scientists and informal science institutions to educate the public about chemistry. AISL PI Meeting, Washington, DC, August 2014.

Guarracino, D.A. Imitating nature with peptidomimetics: Synthetic macrocyclic hormone mimics and artificial peptide helices. American Chemical Society National Meeting, San Francisco, CA, 2014.

O'Connor, A.R.; Ruff, A.*; O;Connor, J.M. Synthesis, characterization, and reactivity of Ir(I) and Ir(III) complexes containing pyridine sulfonamide derivatives. Organometallic Gordon Conference, Newport, RI, July 2014.

O'Connor, A.R.*; O'Connor, J.M.; Carlin, J.W.; Jacobs, D.L.; **Chan, B.C.** Synthesis and characterization of (1,5-bis-cyclooctadiene)iridium(I) complexes containing N-(2-

(pyridin-2-yl)ethyl)sulfonamide derivatives. American Chemical Society National Meeting, Dallas, TX, March 2014.

Laviska, D.L.; **O'Connor, A.R.** Molecular Magic: An exciting new collaboration between The College of New Jersey and the Liberty Science Center that combines service learning with community engagement. American Chemical Society National Meeting, Dallas, TX, March 2014.

Chan, B.C.*; Spray, C.R.*; Smith, S.R.* IONiC/VIPEr workshops: Back to grad school. American Chemical Society National Meeting, Dallas, TX, March 2014.

2013 Presentations

Abourahma, H.; Melendez, J.*; Cullen, B.*; Rai, R.* The interplay between Intermolecular Forces in Pyrazinamide Cocrystals, American Crystallographic Association Meeting, Honolulu, HI, 2013.

Bradley, L. School of Science Colloquium: TCNJ Science Classes Abroad (1 of 3 talks presented), "Exploring London Through the World of Art and Chemistry", The College of New Jersey, September 2013.

Wisnewski, K.*; **Allison, J.** In Pursuit of a Forensic Document Scanner – Combining Spectroscopy and Document Analysis on a Budget, Northeast Association of Forensic Scientists (session: Criminalistics), 39th Annual Meeting, Cromwell, CT, September 2013.

Wisnewski, K.*; **Allison, J.** Spectroscopic Document Analysis, Eastern Analytical Symposium, Somerset, NJ, November 2013.

Chan, B. C.; Buckmire, R. Out on the Campus. oSTEM (Out in STEM), Conference on LGBT science and engineering professionals, biennial Conference, October 2013.

Reisner, B. A.; Campbell, C. J.; Dent, M. R.; Muitterties, A. T.; Boltersdorf, B. A.; **Chan, B. C.**; Forster, P. M. Coordination compounds and hybrid frameworks containing the hydrtris(triazolyl)borate ligand. American Chemical Society, National Meeting, New Orleans, LA, April 2013.

Hirsh, D. J.; Nolasco, L.*; Vittadello, M.; Woronowicz, R.; Chhowalla, M. Radicals in Graphene Oxide: Formation and Relaxation Properties, American Physical Society, Baltimore, MD, March 2013.

O'Connor, A. R.; McDaniel, M.*; McGarry, K.* Exploring the reactivity of cationic (allyl)Nickel and (allyl)palladium complexes containing dialkylbiarylphosphines, Organometallic Gordon Conference, Newport, RI, July 2013

O'Connor, A.R. Progress towards the development of new metal catalysts for the preparation of plastics, TCNJ SoS Colloquium, April 2013.

O'Connor, A.R. Progress toward the synthesis, characterization, and reactivity of nickel and palladium complexes containing hemilabile groups for use in catalysis, American Chemical Society National Meeting, New Orleans, LA, April 2013.

Student Presentations

2014 Presentations

Palacios, L.*; Kennedy, L.; Kita, M.; McDermott, W.; Ndichie, E.; Roesch, R.; **Chan, B.** New potassium rare-earth pnictogen chalcogenides with potential thermoelectric properties. American Chemical Society National Meeting, San Francisco, CA, August 2014.

Sajjad, H.*; **Laviska, D.A.** Exploiting dehydrogenation of primary amines by a PCP-iridium complex: Catalytic generation of several useful nitriles and discovery of an air-stable cyclometalated complex. American Chemical Society National Meeting, San Francisco, CA, August 2014.

Vermeuel, M.*; Chin, R.; Giordano, M.; Gupta, P.; **Bunagan, M.** Studying the folding pathway of truncated and full-length human serum albumin via FCS. American Chemical Society National Meeting, San Francisco, CA, August 2014.

REU – Boise State University

Knox, S.L.*; Johnston, A.N.; Nagarajan, R. Synthesis of 2,2'-dimethyldodecanoyl ACP to understand substrate specificity in LasI catalyzed *Pseudomonas aeruginosa* quorum sensing. American Chemical Society National Meeting, Dallas, TX, March 2014.

Levene, J.*; Sajjad, H.*; Maney, T.; Fama, C.; Knox, S.*; Robold, K.; **O'Connor, A.R.**; **Chan, B.C.** Student chemists association at The College of New Jersey. American Chemical Society National Meeting, Dallas, TX, March 2014.

Mullarney, K.*; Kaur, R.; **O'Connor, A.R.**; Pintauer, T. Measurement of the rate of activation constants (kact) for (TREN-R) copper catalysts utilized in atom transfer radical addition reactions. American Chemical Society National Meeting, Dallas, TX, March 2014.

Kennedy, L.*; Wu, V.*; Rai, K.*; Kita, M.; **Chan, B.C.** New quaternary rare earth bismuth telluride with potential thermoelectric properties. American Chemical Society National Meeting, Dallas, TX, March 2014.

Rai, K.*; Kennedy, L.*; Jacobs, D.L.; **Chan, B.C.**; **O'Connor, A.R.** Research in the inorganic classroom: Structural characterization of sulfonamide derivatives and their metal coordination complexes. American Chemical Society National Meeting, Dallas, TX, March 2014.

Levene, J.L.*; O'Connor, J.M.; **O'Connor, A.R.** One-pot synthesis and characterization of new cationic (-allyl)Ni(II) complexes containing pendent alkylphosphonate groups. American Chemical Society National Meeting, Dallas, TX, March 2014.

McDaniel, M.*; **O'Connor, A.R.**; **Chan, B.C.** Synthesis, characterization, and reactivity of (-allyl)nickel complexes to serve as catalytsts for norbornene polymerization. American Chemical Society National Meeting, Dallas, TX, March 2014.

Herbster, R.*; **Laviska, D.A.** Selectivity in C-H bond activation of substituted pyridines: Overcoming the influence of a strongly coordinating arena heteroatom. American Chemical Society National Meeting, Dallas, TX, March 2014.

Higgins, T.*; **Hunt, D.A.** Additions of primary and secondary amines to a functionalized 1,2-cyclohexanedione. American Chemical Society National Meeting, Dallas, TX, March 2014.

Afanyihoun, K.*; **Bradley, L.M.** Continued studies on the synthesis of aromatic silyl ketones. American Chemical Society National Meeting, Dallas, TX, March 2014.

Rubenstein, M.*; **Hunt, D.** Studies of Michael additions of ethylidenemalonitriles and ethylidenecyanoacetates. American Chemical Society National Meeting, Dallas, TX, March 2014.

DeAngelis, R.*; **Hunt, D.A.** Unexpected aromatization reaction of diosphenol ethers. American Chemical Society National Meeting, Dallas, TX, March 2014.

2013 Presentations

Renkel, N.; Nowak, S.*; **Allison, J.** Luminol for Blood Detection – Should it be an Instrumental Method? Eastern Analytical Symposium (Forensic Science Session), Somerset, NJ, November 2013.

DeMeester, K.; **Bradley, L. M.** Efficient and Green Strategy for the Synthesis of Substituted Aromatic Silyl Ketones. American Chemical Society National Meeting, New Orleans, LA, April 2013.

Apicello, A.; Gupta, P.*; **Bunagan, M.R.** Using Fluorescence Correlation Spectroscopy to Investigate the Unfolding of Human Serum Albumin. American Chemical Society National Meeting, New Orleans, LA, April 2013.

Ndiche, E.; Sanders, M.; **Chan, B.C.** Single Crystal X-ray diffraction project: An approach to conduct authentic research in an undergraduate Inorganic Chemistry course, American Chemical Society National Meeting, New Orleans, LA, April 2013.

Sanders, M.; Pesce, D.*; DeMeester, K.; McGarry, K. **O'Connor, A.R.**; **Chan, B.C.** Student Chemist Association at The College of New Jersey, An outstanding student chapter poster, American Chemical Society National Meeting, New Orleans, LA, April 2013.

McGarry, K.R.; Levene, J.L.*; **O'Connor, A.R.** Synthesis, characterization, and reactivity of new group 10 complexes to catalyze norbornene polymerization, American Chemical Society National Meeting, New Orleans, LA, April 2013**.**

Cordeiro, L.; Oshin, K.; Pintauer, T.; **O'Connor, A.R.** Synthesis, characterization, and kinetic study of copper tris(2-aminoethyl)amine complexes containing para-substituted functional groups American Chemical Society National Meeting, New Orleans, LA, April 2013.

Tiedemann, M.A.*; Mandell, C.L.*; **Chan, B.**; **O'Connor, A.R.**; Nataro, C. Electrochemical and structural characterization of mono- and bis-phosphine chalcogenides. American Chemical Society National Meeting, New Orleans, LA, April 2013.

Sanders, M.; Pesce, D.*; DeMeester, K.*; McGarry, K.; **O'Connor, A.**; **Chan, B.** Student Chemists Association at The College of New Jersey: An outstanding student chapter. American Chemical Society National Meeting, New Orleans, LA, April 2013.

Faculty Grants

TCNJ Internal grants

Support of Scholarly Activity award (SOSA), 2014-2016
Heba Abourahma
John Allison
Stephanie Sen

TCNJ advance Program (TAP), 2013
Heba Abourahma (Travel Grant, Mini Grant, and External Mentorship Award

Mentored Undergraduate Summer Experience award (MUSE) 2013
Heba Abourahma
Donald Hirsh
David Hunt
Abby O'Connor

School of Science Mini grant, 2013
Danielle Guarracino

Sabbatical Leave, academic year 2014-2015
Donald Hirsh
David Hunt

Career Development Award
Abby O'Connor

External grants

National Institutes of Health
Program title: "Mitochondrial import of precursors for isoprenoid synthesis."
PI: **Stephanie E. Sen** and D.A. Schooley,
$419,277, 2013-2015, submitted.

National Science Foundation (DUE)
Program title: "PERSIST 2.0 in Biology and Chemistry (Program to Enhance Retention of Students In Science Trajectories in Biology and Chemistry)."
PI: **Benny Chan**
Co-PI: **Lynn Bradley**, Sudhir Nyak, Don Lovett
$639,000, Awarded in September, 2013

National Science Foundation (Major Research Instrumentation)
Program title: "Acquisition of laser scanning confocal microscopy system for cross disciplinary research and undergraduate training."
PI: Connie L. Hall
Co-PI: Matthew D. Cathell, **Danielle Guarracino**, Sudhir B. Nayak, and Karen Chang Yan, submitted 2013.

Research Corporation for Science Advancement: Single Investigator Cottrell College Science Award
Program title: "Development of novel vasopressin agonists with a potential therapeutic role in Diabetes Insipidus."
PI: **Danielle Guarracino**, submitted 2013.

National Science Foundation (REU, Duquesne University)
Program title: "Integrated Computational and Experimental REU Site." Renewal. Awarded 2013-2015, $300,000.
PI: Jeffery Evanseck
Co-PI: **Abby O'Connor**

American Chemical Society (Petroleum Research Fund)
Program title: "Synthesis of Cationic Nickel(II) Complexes Containing Hemilabile Arms for use as Alkene Hydrogenation Catalysts." Awarded 2013-2015, $50,000.
PI: **Abby O'Connor**

Departmental Seminars

October 2, 2013

Dr. Don Nuzzio, President of Analytical Instrument Systems, Inc.

"Chemistry in the Extreme"

Abstract: The talk will cover the use of electrochemistry to explore and define the real-time chemistry around the hydrothermal vents on the ocean floor and how biological communities formed in these areas. Interest to chemistry students and biology students. The presentation will show actual photos of tube worms and other biological organisms living on the ocean floor near hydrothermal vents. The areas explored are at the tectonic plate boundaries where active volcanoes affect the life at the bottom of the sea.

Dr. Nuzzio graduated from Fairleigh Dickinson University with a degree in Chemistry. He then received his Master's Degree in Physical Chemistry from Rutgers University, where he obtained a PhD in Analytical Chemistry. Nuzzio worked in the pharmaceutical area for eight years, before he began designing electrochemical detectors for HPLC at Princeton Applied Research. After eight years at Princeton Applied Research, he worked at a Biotech Startup for two years. He started AIS in 1990. Dr. Nuzzio's main interest is using instrument development to solve real environmental problems.

October 16, 2013

Dr. K. Travis Holman, Department of Chemistry, Georgetown University

"The Remarkable Chemistry of Container molecules (and their Materials)"

Abstract: "Container" molecules are those that possess the ability to surround and encapsulate smaller molecules, features that have promising implications for a number of potential applications, chemical storage or delivery, sensor technology,

materials science, size-selective catalysis, etc. The potential utility of such molecules is further underscored by Nature's use of self-assembled protein (e.g. viruses, ferritin, enzymes) and related shells to protect and transport molecules, or function as catalytic reaction chambers. Research in the Holman group is at the interface of organic, organometallic, materials, and supramolecular chemistry, focusing partly on the synthesis and study of container molecule scaffolds, and container molecule materials, that selectively recognize/bind various chemical substrates for various purposes. This presentation will focus on aspects of gas capture by container molecules and materials for purposes ranging from MRI-based biosensing, exploiting the solution-phase binding of Xe gas, to solid state gas storage, separation, or sensing. Efforts in the latter arena have mainly been directed toward materials that exhibit permanent microporosity (*e.g.* inorganic zeolites, metal-organic frameworks, etc.). Much less understood, however, are the properties of what we refer to as "microcavity materials"—materials that possess molecule-sized microcavities, but do not formally exhibit micropores. Efforts in our laboratory aimed at engineering microcavity materials for the highly selective inclusion, and in some cases extreme kinetic confinement, of gases will be discussed.

November 5, 2013

Webinar– Trenton Local ACS

"Lighting the Fires that Move your Tires: The Chemistry of Motorcycles and Cars"

The chemistry department at TCNJ and the local Trenton section of the American Chemical Society are hosting a webinar about the chemistry of cars and motorcycles. The information will be of broad interest to all students, faculty and staff.

October 24, 2013

Dr. Christine Thomas, Department of Chemistry, Brandeis University

"Metal-Metal Bonds in Heterobimetallic Complexes and Applications Towards Small Molecule Activation and Catalysis"

Abstract: Our group has been investigating metal-metal interactions in early/late heterobimetallic complexes as a method for tuning redox potentials and sigma bond activation processes.

In a representative Co/Zr complex, withdrawal of electron density from Co by a Lewis acidic Zr center leads to a dramatic shift in the two-electron reduction potential to ~1 V more positive than observed for a monometallic Co analogue. Moreover, reduced heterobimetallic Co/Zr complexes feature metal-metal multiple bonds that lead to unusual geometries at both Zr and Co. The reactivity of these highly reduced, coordinatively unsaturated metal-metal multiple-bonded complexes towards a variety of substrates will be presented in the context of sigma bond cleavage and catalytic applications. In addition, the expansion of this family of molecules to include metal-metal combinations from across the periodic table will be discussed.

February 11, 2014

Webinar and Networking Event

Ms. Virginia Hutchins, Perfumer, Procter & Gamble
Dr. Jianjun Li, Principal Scientist, Proctor & Gamble
Dr. Diane Schmidt, Section Head R&D, Proctor & Gamble

"Love Potion #9: The Chemistry of Scent and Fragrance"

Why do some scents quicken our pulse? Explore the art of chemistry through the production of perfumes used in household products. Join three industry experts as they break down the science of fragrances and how chemists are working to find love potion #9!

March 4, 2014

Dr. Nathan West, Assistant Professor of Chemistry, University of the Sciences

"Developing Sustainable Chemical Feedstock by Utilizing Transition Metal Catalysts"

Abstract: We are developing transition metal catalysts to open up new atom economic pathways to produce valuable chemical feedstocks from renewable resources. One of our key targets is lignin from biomass; lignin is a phenolic polymer contained in plant cell walls. We are developing Mn and Cu oxidation catalysts to break down lignin into substituted aromatic molecules, such as vanillin, that can be used as feedstocks for the chemical industry. We are also developing Pd catalysts to use CO2 as a building block for organic synthesis. Intermolecular

sp3 C-H activation and subsequent C-C coupling reactions of some polar molecules will be reported as well.

April 7, 2014

William Wood, Director of Chemistry, Cambridge Isotopes Laboratories (CIL)

"Stable Isotopes in Spectroscopy and Spectrometry"

Abstract: The talk will cover a range of topics including isotopic enrichment, NMR spectroscopy, and mass spectrometry. Find out where your deuterated solvents and isotopically labeled compounds come from and hear about some exciting applications in chemistry and medicine.

Alumni news

Alumni Awards

Joe Macor (graduate 2009) was awarded the Seaborg Fellowship to work at the Los Alamos National lab in 2014.

Michael Grasso (graduate 2013) applied for a Ruth L. Kirschstein National Research Service Award Individual Fellowship in 2014 (pending).

John Ferrie (graduate 2013) received a National Science Foundation Graduate Research Fellowship, University of Pennsylvania

Rachel Roesch (graduate May 2012) received a National Science Foundation Graduate Research Fellowship, University of Pennsylvania

Alumni Donors

Young Alumni Giving Campaign

Many thanks to those who donated and participated in the event. 32.8% of our young alumni participated.

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Caroline Fanslau
Matthew Molski
Matthew Repp
Harry Rose

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	Christopher Tuohy
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	Anthony Ferro
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	Xi-Jun Chen
	Emily Cherney
	Maryll Geherty
	Erin Quintangeli
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	Katrina Mila Verendia
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