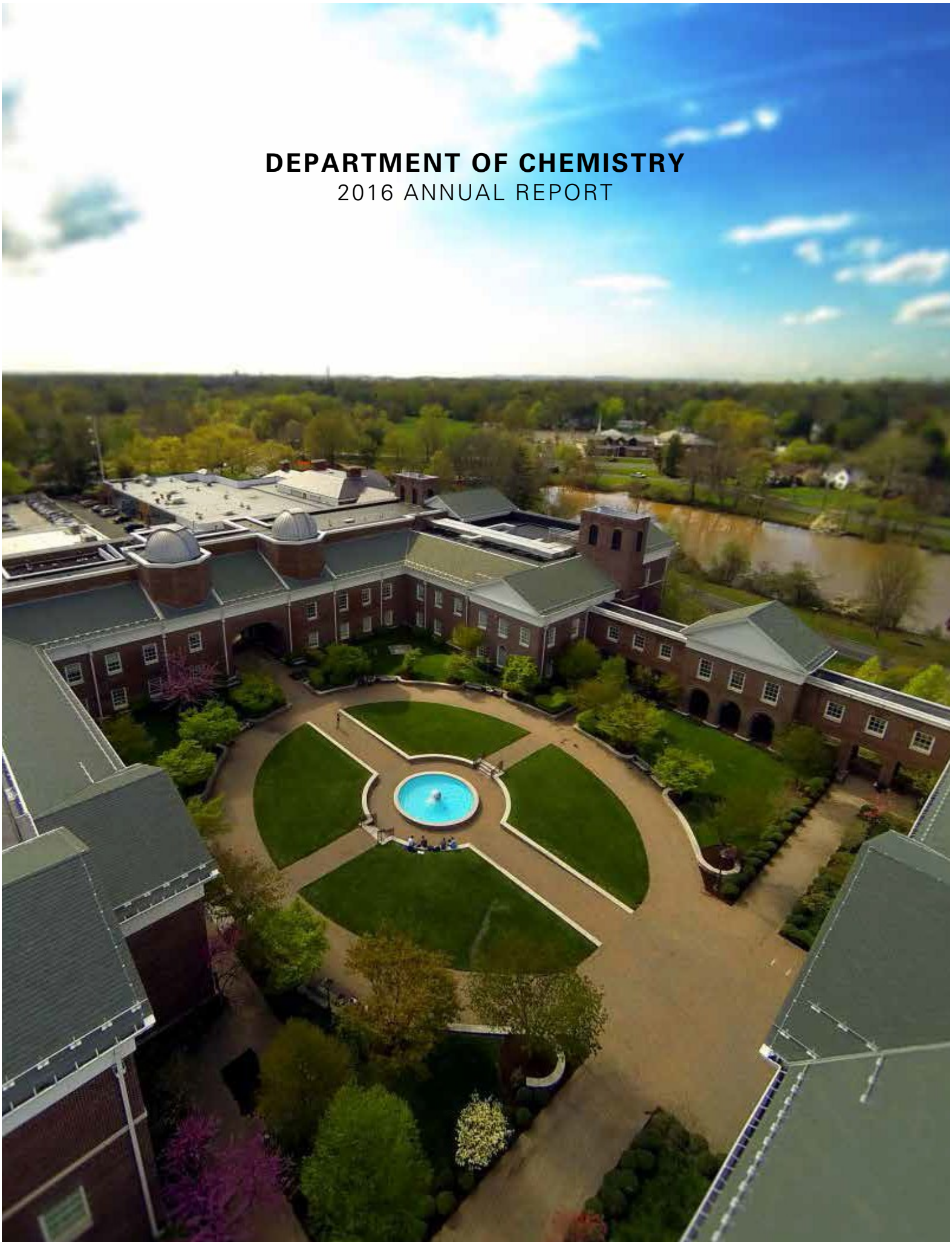
DEPARTMENT OF CHEMISTRY

2016 ANNUAL REPORT



INTRODUCTION

The Chemistry Department of The College of New Jersey had many notable achievement in 2015-2016. This Annual Report summarizes many of the accomplishments of the Department's faculty, staff, and students.

2016 marked the retirement of Ms. Joyce Gaiser and Mr. Leon Duminiak, and the hiring to two new staff members, Ms. Cathie Allison and Dr. Marc Brescia. Cathie started her position as Program Assistant for the TCNJ Chemistry Department in August 2016. She previously served as Program Assistant of the TCNJ Music Department and before then, was administrative assistant at Princeton University and Michigan State University. Marc started his position as instrumentation specialist for the TCNJ Chemistry Department in September 2016. He received his PhD in Organic Chemistry from the University of Maryland, and before then, worked as a process chemist and PI at Merck pharmaceuticals and at Pharmacoepia. Since 2012 Marc has worked as adjunct faculty for the TCNJ Chemistry Department.

Probably the most important news is that we are well underway with the construction of our new chemistry addition. The addition will have two floors of dedicated laboratory classroom and instrumentation space. The first floor will house the organic laboratories. The second will house a new multidisciplinary suite, where we plan to teach upper level analytical, physical, forensics, computational, and inorganic chemistry courses.

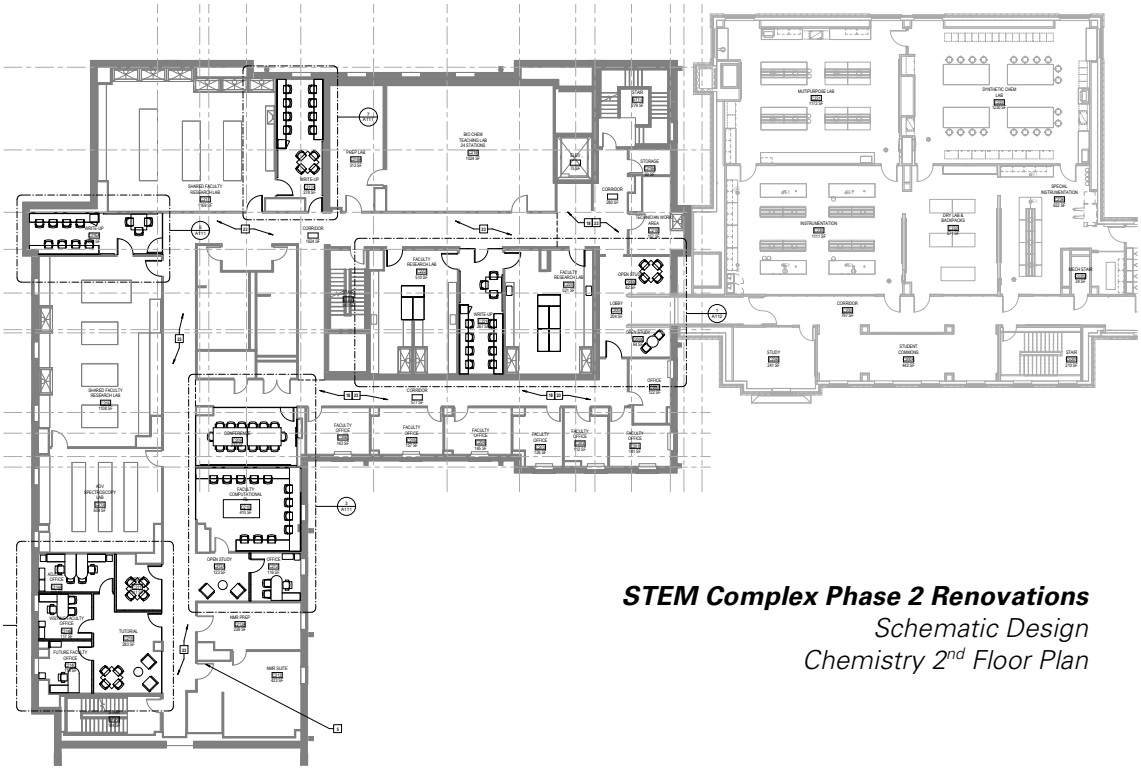
The addition will open at the beginning of the Fall 2017 semester and at that time we will immediately begin Phase 2 construction, which will involve the renovation of various spaces in the current chemistry building to expand research facilities and provide new collaborative spaces. During Phase 2, which will run for approximately a year and a half, we will convert several teaching labs into research labs and we will reconfigure current research labs to create new research spaces. Each research laboratory will have an associated student study area and each floor will have student study rooms and lounge areas.

In addition to new and renovated building space, the Chemistry Department received more than $1.1 million dollars in equipment funding, which has allowed the purchase of a large number of new instruments for our courses and our research activities. Included in these purchases were a MALDI TOF mass spectrometer, a new GC/MS, a Fast Performance LC (FPLC) for protein purification, a benchtop ultracentrifuge, a high throughput plate reader for kinetic studies and fluorescence measurements, a microwave peptide synthesizer, a various other instruments and equipment that will be used to outfit our new inorganic and organic synthetic laboratories, and will expand instrumentation resources in our Department.

In 2015 the Chemistry Department was awarded the TCNJ Mildred Dahne Awards for department excellence and in 2016 we obtained an excellent 5-year certification review from the American Chemical Society. Because the Department provides ACS-certified degrees, we provide a wide range of curricular offerings, instrumentation training, and research opportunities for our students. To conform with new ACS guidelines, we added a polymer chemistry course to our curriculum and also added a new advanced topics course in Computational Chemistry, which was taught by Dr. Joseph Baker. We are working to develop additional ways to further incorporate both Computational Chemistry and Polymer Chemistry into our chemistry curriculum. For the former, we developed laboratory modules that utilize the web-based computational chemistry server, WebMO, in both our general chemistry and organic chemistry courses. We also added two new labs involving polymer synthesis in CHE332 and hope to continue to incorporate content related to Polymer Chemistry into our foundation courses.

TCNJ students demonstrated a high level of commitment and excellence with regard to their curricular and research accomplishments. They again scored in the greater than 90th percentile on the general chemistry ACS exam. 51 students engaged in undergraduate research in 2015-16, and 21 students were co-authors or presented their work at the ACS national meetings in San Diego and Philadelphia. At the San Diego meeting the TCNJ Student Chemists Association received two awards for the activities. Two Chemistry students (Sarah Martin and Tanya Townsend) received honorable mentions for the The Barry Goldwater Scholarship. Elizabeth Johnson (who graduated in 2015) received the National Science Foundation Graduate Research Fellowship to conduct graduate research at Harvard University.

Faculty members were also very busy last year. Professor Chan was on sabbatical leave during the 2015-16 academic year at the University of Pennsylvania. Professors O'Connor and Bunagan were on maternity leave during Spring 2016. And Professors Guarracino and Abourahma were promoted to Associate Professor this past summer. Faculty submitted research and programming grants and several of these were funded, including grants from Dr. Chan and Dr. Baker. Faculty published 9 articles and 7 presentation abstracts and they attended and presented (along with their research mentees) their scholarship at national meetings and at colleges and universities.



STEM Complex Phase 2 Renovations
Schematic Design
Chemistry 2nd Floor Plan

FACULTY AND STAFF

Heba Abourahma (Organic) B.Sc. Saint Mary's University, 1997; M.Sc. University of Ottawa, 1999; Ph.D., University of South Florida, 2004; Postdoctoral, University of Iowa, 2004-2005.

John Allison (Analytical; Director of the Forensic Chemistry Program) B.S., Widener University, 1973; Ph.D., University of Delaware, 1977.

Joseph Baker (Physical/Theoretical) B.S. Physics, Nevada (Las Vegas), 2003; M.S. Physics, University of Arizona, 2006; Ph.D. Physics, University of Arizona, 2011; Postdoctoral, University of Chicago, 2012-2014.

Joanne Billmers (Organic/Nursing Chemistry) B.S. Chemistry, Drexel University, 1980; Ph.D. Organic Chemistry, Drexel University, 1984.

Lynn Bradley (Organic) B.A., College of the Holy Cross, 1985; Ph.D., Duke University, 1990.

Michelle Bunagan (Physical) B.A., Douglass College of Rutgers University, 2003; Ph.D., University of Pennsylvania, 2008.

Benny Chan (Inorganic/Analytical) B.S., Franklin and Marshall College, 1996; Ph.D., Penn State University, 2003; Postdoctoral, Colorado State University, 2002-2005.

Christopher Fazen (Biochemistry, TCNJ Teacher-Scholar Fellow) B.S., Lafayette College, 2002; M.A., University of Scranton, 2006; Ph.D., Syracuse University, 2012.

Danielle Guarracino (Biochemistry) B.A., Cornell University, 2002; M.S., Yale University, 2004; Ph.D. Yale, 2008; Postdoctoral, New York University, 2008-2009.

Donald Hirsh (Physical) B.S., Stanford University, 1984; Ph.D., Yale University, 1993; Postdoctoral, Washington University (St. Louis), 1997.

Jinmo Huang (Analytical) B.S., Chung Shing University, 1972; M.S. New Mexico Highlands University, 1984; Ph.D., University of North Texas, 1987.

David A. Hunt (Organic/ Medicinal) B.S. in Chemistry, Marshall University, 1973; M.S., Marshall University, 1975; Ph.D. Duke University, 1979.

Mirela Manea-Krichten (General/Analytical) B.S. Chestnut Hill College 1981; M.S. University of California, Irvine 1986; Ph. D. University of California, Irvine 1991.

Abby O'Connor (Organometallic/Inorganic) B.S., Lafayette College 2003, Ph.D. University of North Carolina-Chapel Hill 2008, Postdoctoral, University of Washington 2008-2010.

Stephanie Sen (Department Chair, Bioorganic/Biochemistry) B.A., Bryn Mawr College, 1984; Ph.D., Stony Brook University, 1989; NIH Postdoctoral Scripps Research Institute (1989-1990) and Stanford University (1990-1991).

Cathie Allison (Departmental Program Assistant)

Marc Brescia (Scientific Instrumentation Coordinator) B.S., Virginia Polytechnic Institute, 1993; Ph.D., University of Maryland, 1997.

Pam Schmierer (Stockroom/Laboratory Manager)

Michael Aucott (Adjunct Faculty) B.A. Haverford College, 1968; M.S., Environmental Science, Rutgers University, 1987; Ph.D., Environmental Science, Rutgers University, 1997.

Robert Billmers (Adjunct Faculty) Ph.D., Organic Chemistry, Drexel University, 1983; Postdoctoral, West Virginia University, 2003-2004.

Jack Johnson (Adjunct Faculty) B.S., Carleton College, 1972; Ph.D., Inorganic, University of Wisconsin, Madison, 1976.

Thuy Le (Adjunct Faculty) Ph.D., Organic Chemistry, University of Maryland College Park, 1995; M.S., Medicinal Chemistry, University of South Florida, 1989; B.S., University of Bloomsburg, 1983.

Brent Podlogar (Adjunct Faculty) B.S., University of Winsconsin (Parkside), 1984; Ph.D., Organic Chemistry, University of South Florida, 1989; Postdoctoral, Washington University of Medicine (St. Louis), 1989-1991.

Dora Schnur (Adjunct Faculty) B.S., Bucknell University, 1977; Ph.D., Organic Chemistry, Temple University, 1988.

George Theodoridis (Adjunct Faculty) B.S., University of Leeds (UK), 1974; M.S., Food Chemistry, University of Leeds (UK), 1975; Ph.D. Chemistry, Rensselaer Polytechnic Institute, 1980.

COURSES TAUGHT

Summer 2015

- Biochemistry and the Human Body (CHE 111)
  J. Billmers
- Chemical Biology (CHE 170)
  Chan
- General Chemistry I (CHE 201)
  Schnur
- General Chemistry II (CHE 202)
  Podlogar
- Organic Chemistry I (CHE 331)
  R. Billmers, Brescia
- Organic Chemistry II (CHE 332)
  Hunt, Pagnotta

Fall 2015

- Orientation to Chemistry (CHE 099)
  O'Connor
- Biochemistry and the Human Body (CHE 111)
  J. Billmers
- General Chemistry I (CHE 201)
  Aucott, Baker, Brescia, Hirsh, Huang, McGuinness, Podlogar
- General Chemistry I (HON 201)
  Krichten
- General Chemistry II (CHE 202)
  Johnson
- Analytical Chemistry (CHE 310)
  Krichten
- Sophomore Chemistry Seminar (CHE 316)
  Bradley
- Junior Chemistry Seminar (CHE 317)
  Abourahma
- Organic Chemistry I (CHE 331)
  Abourahma, R. Billmers, Hunt, Sawyer, Theodoridis
- Organic Chemistry II (CHE 332)
  O'Connor, Sen
- Forensic Chemistry (CHE 360)
  Allison
- Chemical Thermodynamics (CHE 372)
  Bunagan
- Special Topics in Biochemistry – Chemical Biology (CHE 474)
  Guarracino
- Special Topics in Organic Chemistry – The Wonders of Asymmetric Synthesis (CHE 476)
  Bradley
- Student Teaching Chemistry (CHE 490)
  Richard

Spring 2016

- General Chemistry I (CHE 201)
  Le, Fazen, Sen
- General Chemistry II (CHE 202)
  Allison, Baker, J. Billmers, Brescia, Huang, Podlogar, Schnur
- General Chemistry I (HON 202)
  Krichten
- Analytical Chemistry (CHE 310)
  Huang
- Sophomore Chemistry Seminar (CHE 316)
  Bradley
- Junior Chemistry Seminar (CHE 317)
  Allison
- Organic Chemistry I (CHE 331)
  Sawyer, Fazen
- Organic Chemistry II (CHE 332)
  Abourahma, Bradley, Hunt, Theodoridis
- Forensic Chemistry (CHE 360)
  Allison
- Special Topics in Chemistry – Environmental Chemistry (CHE 370)
  Aucott
- Quantum Chemistry (CHE 371)
  Hirsh
- Biochemistry (CHE 430)
  Guarracino
- Inorganic Structure and Bonding (CHE 451)
  Johnson
- Special Topics in Organic Chemistry – Polymer Chemistry (CHE 476)
  R. Billmers

INDEPENDENT RESEARCH

CHE 393/493 ENROLLMENTS (FALL 2015 and SPRING 2016)

Abourahma
Daniel Curran
Erica Graff
Max Nazario
Monica Strowbridge

Allison
Courney Amster
Kendall Ciriaco
Andrew Csimbok
Matthew Zajac
Allison Zumwalde

Baker
Aleena Andrews
Troy Brier
Heba Jafri
Susan Knox
Maria Minor
Rebeca Saldanha Castro

Bradley
Kaitlyn Dickson
Evan Li

Bunagan
Daniela Mallack

Fazen
Steven King
Joy Mohnot
Irene Molina
Nader Refai
Cody Reiber

Guarracino
Kayla Gentile
Susan Knox
Sara Martin
Dylan Nguyen
Alexis Oldfield
Michelle Onofrio

Hirsh
David Crowell
Jay Decker
Katherine Fomchenko

Hunt
Marc Casale
Andrew Glass
Alec Grossman
Amit Gupta
Catherine Morgan

O'Connor
Matthew Gole
Catherine Lee
Andrew Ruff
William Sabbers
Tanya Townsend

Sen
Andrea Garcia
Brandon Martinez
Priti Patel
Sarah Patterson
Paula Vlana Pinheiro

2016 Celebration of Student Achievement

MAY 2016

Abourahma

Daniel Curran

Investigating Urea's Ability to Form Cocrystals with Benzamides for Nonlinear Optics

Max Nazario

Synthesis of Metal-organic Frameworks Composed of Copper (II) and 1,2,4,5-Benzenetetracarboxylic Acid

Monica Strowbridge

Building Extended Metal-Organic Structures from Dimetal Tetracarboxylate Building Blocks

Abourahma and McGee

Daniel Curran

Functionalized Polymer Films for Optical Patterning Applications

Allison

Allison Zumwalde

Uses of Mass Spectrometry

Courtney Amster and Andrew Csimbok

The 15 Letters

Baker

Aleena Andrews

Investigating the Dynamics and Stability of the PilT Motor Protein Using Molecular Dynamics

Heba Jafri

Molecular Simulations of Lactose-Bound and Unbound Forms of the FaeG Adhesin Reveal Critical Amino Acids Involved in Sugar Binding

Troy Brier

Molecular Simulations of Type IV Pilin Subunits from Three Organisms in a Lipid Bilayer

Baker and Sen

Maria Minor

Investigation of Protein Stability and Binding Modes of Ligands in Human FarnesylPyrophosphate Synthase Using Molecular Dynamics Simulation

Bradley

Evan Li

Cyclization Studies of Intermediates Derived From Aromatic Silyl Ketones

Bunagan

Daniela Mallack

An Investigation of the Structural Dynamics of an Intrinsically Disordered LEA Protein

Fazen

Irene Molina and Steven King

Synthesis of Acetylated Antimicrobial Peptides for Use in Treating Bacterial Persister Cells

Joy Mohnot

Synthesis of Acetylated Temporin F for Use Against Bacterial Persister Cells

Nader Refai

Synthesis of Acetylated Temporin L

Guarracino

Kayla Gentile and Sara Martin

Characterizing Novel Peptides as Anti-Thrombosis Agents

Susan Knox and Dylan Nguyen

The Development of Stabilized Cyclic Peptides with Potential Anti-Thrombosis Activity

Hirsh

David Crowell

NO Distance Measurements in Wild-Type Thermolysin/Inhibitor Complex

Gerald Decker

Stability and Enzyme Kinetics of the Protease Thermolysin

Katherine Fomchenko

Enzyme-Enzyme Proximity Stimulates iNOS Activity

Hunt

Alec Grossman

Preparation and Utility of Highly Functionalized 2-Aminobenzophenones

Amit Gupta

A Study of the Formation of an N-Sn Bond

Andrew Glass

Scope and Limitations of a Tandem Michael Addition-Cyclization via an Alpha, Beta Unsaturated Cyclohexanone

Catherine Morgan

A Spin-labeled Thermolysin Inhibitor Chemical Probe for Protein Measurement

Marc Casale

Reactions of Phenylethylamino Acid Amides

O'Connor

Andrew Ruff

*Exploring the Use of Sodium Formate and Formic Acid as Hydrogen Sources for Transfer Hydrogenation with Cp*Ir(pyridinesulfonamide)Cl Precatalysts and Catalytic Deoxygenation of Acetophenone Derivatives using Tandem Catalysis*

Catherine Lee

Norbornene Polymerization Initiated by Cationic (pi-Allyl)Nickel(II) Complexes Containing Dialkylbiaryl Phosphine Ligands

Tanya Townsend

*Mechanistic and Kinetic Insights into Transfer Hydrogenation using Cp*Ir(pyrdinesulfonamide)Cl Complexes*

William Sabbers

Progress Towards Suzuki-Miyaura Coupling using (pi-allyl)Nickel(halide) Precatalysts Containing Dialkylbiaryl Phosphine Ligands

O'Connor and Chan

Matthew Gole

Synthesis and Electronic Properties of Transition Metal Complexes Containing Sulfonamidoquinoline Ligands

Sen and Baker

Brandon Martinez and Maria Minor

Substrate Binding Analysis of Farnesyl Diphosphate Synthase Usi

Priti Patel and Andrea Garcia

Isolation and Enzymatic Analysis of Type 1 FPPS

SUMMER RESEARCH

SUMMER 2015

Allison

Kendall Lee Ciriaco

Hand On The Mirror & Norm, The Makishi Mask

Allison Zumwalde

Hand On The Mirror & Norm, The Makishi Mask

Baker

Aleena Andrews

Computational Modeling and Simulation of the PilT Motor

Rebeca Saldanha Castro

Modelling and Simulation of Bacterial Membranes in the Presence of Ionic Liquids

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 (p-allyl)Ni(II) Dialkylbiaryl Phosphine Complexes

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 Committees

Academic Affairs

John Allison
Joseph Baker
Lynn Bradley
Michelle Bunagan
Danielle Guarracino, Chair

Operations

Heba Abourahma, Co-Chair
John Allison
Joseph Baker
Donald Hirsh, Co-Chair
Jinmo Huang
David Hunt
Mirela Krichten

Personnel

John Allison
Joanne Billmers
Lynn Bradley, Chair
Benny Chan
Jinmo Huang
Abby O'Connor

Promotions and Reappointment

John Allison
Michelle Bunagan
Lynn Bradley
Jinmo Huang
David Hunt
Abby O'Connor
Stephanie Sen, Chair

Student Affairs

Joanne Billmers
Christopher Fazen
Mirela Krichten, Co-Chair
Abby O'Connor, Co-Chair

Departmental Committee Reports

Academic Affairs

2015-2016 Activities Report

From Danielle Guarracino, 2015-2016 Chair

The Academic Affairs Committee made progress on a number of policies, plans, and activities. In addition to course scheduling and internal student transfer evaluations, the Committee developed an advising resources document that includes general departmental policies and procedures for its majors, and also edited the *Chemistry Bulletin* to provide better information on advanced options courses, external course credit, and research. Updates were made to the *Forensics (CFOR) Specialization* and to each of the Department's program planners, to better define the difference between the ACS with research, ACS without research, and non-ACS degrees. In the fall, the Committee worked on the wording of both the *Chemistry 7-year Medical School* and the *Gateway Scholar* programs to better clarify requirements and expectations for incoming students.

Due to course scheduling changes as a result of faculty leave, the committee initiated a review of the Department's advanced topics course rotation. The Committee distributed a faculty survey that will be used to develop a new rotation schedule.

The Committee, in collaboration with Gamma Sigma Epsilon, initiated a *Faculty Research Talk Series* in Spring 2016 to great success, with each professor sharing their research by giving a short (30 min) talk. Beginning Fall 2016, the Department adopted the use of research placement forms, resulting in 36 students being placed in research labs, with 34/36 receiving one of their top two choices in research assignments. The Committee will continue to work on editing the research forms and on revising the application process to better suit the needs of faculty and students. A standardized CHE 493 laboratory syllabus was developed and edited, for implementation during the 2016-17 academic year.

Student Affairs

2015-2016 Activities Report

From Abby O'Connor and Mirela Krichten, 2015-2016 Co-Chairs

The Student Affairs Committee engaged in a wide variety of student-centered activities. The Committee organized several campus events during the academic year, including the new *State of the Department* assembly and lunch, 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, Goldwater Scholarship nominees, the preparation of two departmental pre-registration newsletters, organization of the department lecture series, and the solicitation and compilation of faculty and student professional activities to be used for the 2015-16 Departmental Annual Report. The 2015 results of the *Graduation Student Feedback Survey* were summarized. The *Travel Contract* for students attending professional conferences was implemented, and the travel of students participating in these conferences was organized. The bulletin board alerting students to REU, MUSE, internships and employment opportunities, as well as three bulletin boards showcasing past award recipients, alumni publications, and alumni location were updated. This committee was especially active in fostering alumni relations through events such as tailgating at Homecoming, an alumni social event in December, and an alumni event in August at the ACS National Conference in Philadelphia; all of which were very well attended. The Student Affairs Committee continues to be particularly active in working with both the Office of Alumni Affairs and the Office of Advancement Services on campus.

Promotions and Reappointment

2015-2016 Activities Report

From Stephanie Sen, 2015-2016 Chair

The Promotions and Reappointment committee reviewed the 2nd Year Appointment of Dr. Joseph Baker and the applications for promotion to Associate Professor of Drs. Abourahma and Guarracino. The committee evaluated materials related to each of these applications, met with the applicants, and provided recommendations to the Dean of the School of Science.

Operations

2015-2016 Activities Report

From Donald Hirsh and Heba Abourahma, 2015-2016 Co-Chairs

The Operations Committee focused much of its efforts on completing planning for the new chemistry wing and Phase 2 renovations of the current Science Complex Chemistry (SCC) building. Faculty laboratory assignments were finalized and research laboratories were then designed according to individual faculty needs. A staging plan for Phase 2 renovations that minimized loss of teaching and research activities was developed. The Committee completed a review of departmental instrumentation inventory and finalized future location assignments of instrumentation to be moved to the new chemistry wing and to other locations within the renovated space of SCC.

The Operations Committee oversaw final purchases that were part of more than $1.1 million in NJ Equipment Leasing Fund (ELF) funding for new Chemistry instrumentation. In addition to conducting instrument specification and vendor review, the Committee oversaw the ordering and installation of equipment requests. The Committee tracked ELF expenditures and surplus monies were reassigned after review of faculty requests. Significant additional purchases were made including Gaussian, WebMO, Agilent-Cary UV/VIS spectrometer (replacement of an aging instrument), and a peptide synthesizer with purification system. Monies were also used to replace current older refrigerators with ones compliant for chemical storage.

Other items that the Operations Committee worked on include the preparation of an annual IT request (a wireless microphone/headset for use in C-121 and a document camera in C-113), which was granted, now providing document cameras in all 3 classrooms of SCC. The Committee also developed a simple *Green-Yellow-Red* coding system for custodial cleaning of laboratory spaces, which will be finalized for use during the 2016-2017 academic year.

Student Organization Reports

Student Chemists Association (SCA)

2015-2016 Activities Report

From Katie Fomchenko, Chemistry Major '17, 2015-2016 Chair

The TCNJ Student Chemists Association (SCA) participated in many events over the past year. Throughout the year, SCA held biweekly meetings in order to inform our members of upcoming events. SCA contributed to professional development by hosting short talks on various subdisciplines of chemistry and research opportunities in the TCNJ Chemistry Department (presented by members of Gamma Sigma Epsilon, the Chemistry Honor Society). SCA also ran its *Connect Program*, where chapter members presented their research at local high schools to encourage students to pursue science in college.

During the fall semester, SCA held numerous events related to professional development, service, and chapter development. A *First Meeting Pizza Party*, a rock climbing trip, a *Cards Against Humanity Stressbuster*, and the annual *Chemistry Thanksgiving Potluck* dinner all provided chapter members the opportunity to bond with each other. SCA also ran *Freshman Happy Hours* to help freshman chemistry majors adjust to college life and create lasting bonds with their peers, that included fun activities like SCA's *Green Chemistry Scavenger Hunt*. Professional development events included volunteering to attend and help run the Philadelphia Inorganic Colloquium hosted at TCNJ, hosting an ACS Webinar on lab safety, and assisting in hosting speakers for the *TCNJ Chemistry Department Lecture Series*. Service events included providing demonstrations about spectroscopes, color, and emission spectra for *National Chemistry Week* at ChemExpo in the Liberty Science Center, and guiding children and adult attendees through a marker chromatography experiment at *National Chemistry Week Night* at Princeton University. SCA also participated in fundraising through our goggle and chemistry department t-shirt sales.

During the spring semester, SCA hosted several professional development events including a viewing of the ACS Webinar, "The Role of Chemistry in Global Security," at Rider University, in collaboration with the Rider SAACS chapter. Chapter members attended the Philadelphia Younger Chemists Committee's poster session at the Philadelphia University of the Sciences, where one member's presentation won third place in the undergraduate division. SCA chapter members also attended the 251st ACS National Meeting. SCA's spring service events included participation at Timberlane Middle School's Science Fair and Yardley Elementary School's Science Fair, where chapter members presented interactive demos and judged science fair projects. Spring Chapter development events included a trip to the NJ State Police Museum, a trip to the Chemical Heritage Foundation, and the annual *Chemistry Semi-Formal*. As a green chemistry initiative, SCA hosted an environmental chemistry lecture and performed a biodegradable packing peanuts demo. SCA ended the year by partnering with GSE to host a chemistry department picnic. Overall, SCA had an enjoyable and productive year.

In the coming year, SCA plans to continue to participate in many events hosted this past year, including the *Connect Program*, the *TCNJ Chemistry Department Lecture Series*, biweekly meetings, *Freshman Happy Hours*, the *Chemistry Semi-Formal*, and a trip to the Chemical Heritage Foundation. We are looking to hosting more *Stressbuster* events throughout this semester and would like to expand our efforts in giving back to the local community by increasing the number of science fairs that we participate in. SCA has already planned some events for the Fall 2016 semester, including participating in ChemExpo during National Chemistry Week, hosting a trip to the Eastern State Penitentiary, and a *Cards Against Humanity Stressbuster* event. In November, SCA will be hosting an Inter-Chapter Relations event with Lafayette College and Rider University at the Crayola Experience Center in Easton, PA. We are looking forward to a fun next year!

Gamma Sigma Epsilon (GSE)

2015-2016 Activities Report

From Tanya Townsend, Chemistry Major '17, 2015-2016 Chair

TCNJ's Sigma Beta chapter of the Gamma Sigma Epsilon (GSE) Chemistry Honor Society hosts a multitude of academic and outreach programs throughout the year. During the 2015-2016 academic year, GSE members gave presentations on the different fields of chemistry at Student Chemists Association (SCA) meetings in order to expose students to career paths in Chemistry. During the fall and spring semesters, GSE managed the peer-mentoring program for all incoming chemistry students, which included both freshmen and transfer students. The mentoring program provides an additional resource for students and fosters connections between upperclassmen and younger students in order to make new students feel welcome into our Department. GSE members also attended freshmen *Brown Bag Lunches* to provide social and academic outreach to freshmen students. GSE partnered with SCA to host the *Green Chemistry Scavenger Hunt* at one of the freshmen *Brown Bag Lunches*. This event served to orient the freshmen to campus and the chemistry building, as well as promote interaction between underclassmen and upperclassmen. GSE organized a *Research Day* to discuss undergraduate research opportunities in the department and to answer any questions or concerns the freshmen students may have.

Additionally, GSE hosted weekly drop-in tutoring for students enrolled in all TCNJ chemistry classes in order to provide students with the opportunity to ask experienced students questions about courses and course content they are struggling with. GSE members attended and spoke at departmental information sessions during *Lion's Open Houses* and provide guided tours around the chemistry department. GSE's participation in such recruitment activities allows prospective students and their parents the opportunity to see departmental facilities and equipment, and to ask current students questions about the TCNJ chemistry program and TCNJ in general. GSE also participated in community outreach; last spring, GSE hosted a canned food drive to donate to the local Trenton Area Soup Kitchen.

Next year GSE plans to participate in a more hands-on community outreach through participation in SCA's *Connect Program*, where TCNJ students present their research to local high school students, and pursue new service opportunities, such as book drives.

Class of 2016 Graduates

Courtney Amster
William Buchbinder
Kendall Ciriaco
Daniel Curran
David Crowell
Andrew Csimbok
Gerald Decker
Bishoy Fanous
Kayla Gentile
Andrew Glass
Matthew Gole
Alec Grossman
Amit Gupta
Heba Jafri
Andrew Kimball
Daniel King
Susan Knox
Catherine Lee
Evan Li
Daniela Mallack
Kelly McHugh
Maria Minor
Joy Mohnot
McKenzie Montana
Catherine Morgan
Dylan Nguyen
Priti Patel
Nader Refai
Andrew Ruff
William Sabbers
Allison Zumwalde

Courtney Amster

Chemistry, ACS-Certified with Forensics Specialization (Criminology Minor)

Dean's List (Spring 2013, Fall 2014, Spring 2014, Fall 2014, Spring 2015, Fall 2015); Gamma Sigma Epsilon (2015); Alpha Phi Sigma (2016); Northeastern Chemical Association Scholarship (2015). Chemistry Independent Research with Dr. Allison (Fall 2014, Spring 2015, Fall 2015, Spring 2016); Summer REU at Rutgers University (2015). TCNJ Women's Club Basketball (2012-2015); Student Anti-Violence Education (peer educator, 2014-2016); Alpha Phi Omega (2013-2016, VP of Fundraising 2015, Alumni Chair Spring 2016); TCNJ Student Chemists Association (2012-2016). Maymester in London, England Exploring London through Art and Chemistry; J-Term/Havana, Cuba/Landmarks: Explorations in Art. *Will pursue a PhD in Chemistry with a Forensic track at Florida International University in Miami, FL.*

William Flanagan Buchbinder

Chemistry, ACS-Certified

TCNJ Chemistry Department, Outstanding Freshman (May 2013); TCNJ Chemistry Department, Outstanding Sophomore (September 2014); American Chemical Society's Undergraduate Award in Analytical Chemistry (May 2014); Phi Beta Kappa Honors Society (April 2015); Phi Kappa Phi Honors Society (April 2015); TCNJ Merit Scholarship (August 2012-Present); TCNJ Honors Program (August 2012-Present); Deans List (December 2012-Present); TCNJ Scholar Athlete (2012-2016); GSE Chemistry Honors Society Member (2015). TCNJ Men's Varsity Tennis (2012-2016, 4-Year Starter and Captain 2016); TCNJ Student Chemists Association (2012-2016). Maymester in London, Exploring London Through the World of Art and Chemistry (Maymester); ISA Intensive Spanish Language in Malaga, Spain (J-Term). *Will pursue a DMD at The University of Pennsylvania School of Dental Medicine.*

Kendall Lee Ciriaco

Chemistry, ACS-Certified

TCNJ Persist Scholar (2012-2013). Chemistry Independent Research with Dr. Allison (Fall 2015-Spring 2016); Summer MUSE with Dr. Allison (Summer 2015). Community Standards Board (2014-2016); Residential Education Freshman Year Experience (2013-2016); Chi Upsilon Sigma National Latin Sorority (2013-2016, Secretary & Treasurer); Unified Greek Council (Spring 2016, Vice President); Pride Mentoring Program Mentor (2014-2016). Volunteered for Project Homefront in New Orleans. *Will pursue a career in Analytical Chemistry in industry before applying to graduate schools within the next two years.*

Daniel Curran

Chemistry, ACS-Certified

TCNJ Honors Program (2013-16). Chemistry Independent Research with Dr. Bunagan (Spring 2015); Chemistry Independent Research with Dr. Abourahma (Fall 2015, Spring 2016); Physics Independent Research with Dr. McGee (Fall 2015, Spring 2016). TCNJ Club Lacrosse (2013-2016); Tutor (2014-2016). *Will pursue a PhD in materials chemistry at the University of Rochester.*

David Crowell

Chemistry, ACS-Certified

Chemistry Independent Research with Dr. Hirsh (Fall 2015, Spring 2016). *Will work for a year then go to graduate school.*

Andrew Csimbok

Chemistry, ACS-Certified with Forensics Specialization (Criminology Minor)

Dean's List (Fall 2013, 2015). TCNJ Manhunt (2012-2016); Tutor (2013-2015). *Will be employed by SGS Accutest then pursue a career in Forensics.*

Gerald Edward Decker Jr

Chemistry, ACS-Certified

Chemistry Independent Research with Dr. Hirsh (Fall 2015 and Spring 2016). Alpha Phi Omega (2014-2016, Treasurer (Spring 2015 and Fall 2015). *Will pursue a PhD in Chemistry at University of Delaware and pursue a career in industry afterwards.*

Bishoy Fanous

Chemistry, ACS-Certified

NERA summer pre-med program (Summer 2013); Delta Tau Delta Fraternity. *Naval Officer in the United States Navy.*

Kayla Gentile

Chemistry, ACS-Certified (Environmental Studies Minor)

Gamma Sigma Epsilon (Fall 2015-present); Dean's List (Spring 2013, Spring 2014, Fall 2014, Spring 2015, Fall 2015). Chemistry Independent Research with Dr. Guarracino (Fall 2014, Spring 2015, Fall 2015, Spring 2016); Summer MUSE with Dr. Guarracino (Summer 2014); Summer Internship at Liquid Light (Summer 2015). TCNJ Student Chemists Association (2012-2016); Ambassador (2014-2016). *Will pursue a PhD in Chemistry at Penn State University.*

Andrew Glass

Chemistry, ACS-Certified (Mathematics Minor)

TCNJ Honors Program (2012-2016); TCNJ Merit Scholarship Recipient (awarded for 8 consecutive semesters); Phi Beta Kappa (2015); Phi Kappa Phi (2016); Gamma Sigma Epsilon (2014); Outstanding Freshman in Chemistry Award (2013); Dean's List (every semester); selected by the TCNJ chapter of Phi Kappa Phi as the school's one nominee for the Phi Kappa Phi Graduate Fellowship (2016); offered Roger Adams Fellowship from University of Illinois (2016); ACS Division of Organic Chemistry Undergraduate Award (2016). Chemistry Independent Research with Dr. Hunt (Fall 2014, Spring 2015, Fall 2015, Spring 2016); Summer MUSE with Dr. Hunt (Summer 2015). Alpha Epsilon Pi (2013-2016, President 2014-2015, Vice President 2013-2014, Assessment Packet Chairman Fall 2013); Gamma Sigma Epsilon (2014-2016, Vice President 2015-2016); TCNJ Student Chemists Association (2012-2016); Honors Program Mentor (2013-2014); general chemistry and calculus Tutor (Fall 2013); trip leader for Commencement Flowers (selling flowers all 4 years while at TCNJ). Volunteered with other AEPi members while at TCNJ. *Will pursue a PhD in Organic Chemistry at the University of Pennsylvania.*

Matthew Gole

Chemistry, ACS-Certified

American Chemical Society Undergraduate Award in Inorganic Chemistry (2015); Dean's List (all semesters); Summer Internship at BASF Catalyst Research Headquarters (2014); Chemistry Independent Research with Dr. Chan (Fall 2014, Spring 2015). Chemistry Independent Research with Dr. O'Connor (Fall 2015, Spring 2016). TCNJ Student Chemists Association (2014-2016); Volunteer Math Tutor for TEACH Program, Trenton Rescue Mission (2015-2016); Laboratory Technician, TCNJ Chemistry Stockroom (Summer 2015). *Will pursue a PhD in Materials Chemistry at University of Illinois at Urbana-Champaign.*

Alec Grossman

Chemistry, ACS-Certified

Gamma Sigma Epsilon: National Chemistry Honor Society: (inducted November 2014, elected Treasurer of the Executive Board: Fall 2015-Spring 2016); Eta Sigma Phi: National Honor Society for Latin and Classical Studies (inducted April 2014). Chemistry Independent Research with Dr. Hunt (2014-2016); Summer Undergraduate Biomedical Research Internship at Yale University School of Medicine (2015); Summer Undergraduate Biomedical Research Internship at The Pennsylvania State University, College of Medicine in Hershey, PA (2014); Clinical Researcher for a Stroke Alert Study at Pinnacle Health Hospitals (2012-2013); Certified Podiatric Medical Assistant, Harrisburg Foot & Ankle Center, Inc. (2007-2016). TCNJ Men's Varsity Tennis Team (August 2012-May 2014). Alpha Epsilon Pi Fraternity (April 2013-Present); TCNJ Student Chemists Association (August 2012-Present); Co-Executive Coordinator for TCNJam (this is a year-long fundraiser that culminates in a 12-hour dance marathon, with over $64,000 raised to support medical research and the families of children afflicted with cancer through The Andrew McDonough B+ Foundation). *Will pursue a Doctorate of Osteopathic Medicine (DO) at Lake Erie College of Osteopathic Medicine, Class of 2020.*

Amit Gupta

Chemistry, ACS-Certified (Psychology Minor)

TCNJ Honors Program (2012-2016); Dean's List (Fall 2013, Fall and Spring 2014, Fall 2015); Alpha Psi Omega Theater Honor Society (May 2014). Chemistry Independent Research with Dr. Hunt (Fall 2015, Spring 2016). Co-founder and Previous Vice President of TCNJ Lions Fencing (Spring 2012-Fall 2015); TCNJ Student Government (Senator of Science Fall 2014-Spring 2015); Member of All College Theatre (Fall 2012-Spring 2016); Delta Tau Delta Kappa Epsilon Chapter (Co-founder and Parliamentarian Fall 2014-Spring 2016); To Write Love On Her Arms University Chapter (Co-founder and Previous Treasurer Spring 2013-Spring 2015); TCNJ Table Tennis Club (Co-founder and Previous President Fall 2014-Spring 2015). Volunteered with the Animal Benefits Club. *Plans to take a gap year before re-applying to medical school to gain more experience in the field.*

Heba Jafri

Chemistry, ACS-Certified (Religion Minor)

Chemistry Independent Research with Dr. Baker (Spring 2015, Fall 2016, and Spring 2016); Summer Internship at Valley Blumenthal Cancer Center. Muslim Students' Association (2012-2016, vice president 2014-2015, president 2015-2016); Alpha Phi Omega (2012-2015); TCNJ Student Chemists Association (2012-2016). Homefront tutor, GED tutor; Volunteer at TASK, Nursing Home Bingo, Mystique; Shadowing with dermatologist, podiatrist; Medlife mission in Lima, Peru. *Will attend New York College of Podiatric Medicine.*

Andrew Kimball

Chemistry Secondary Education

Dean's List (Fall 2013, Spring 2014, Fall 2014). TCNJ Men's Varsity Soccer (2012-2015). *Plans to become a High School chemistry teacher.*

Daniel King

Chemistry, ACS-Certified

Dean's List (Spring 2013, Fall 2014); TCNJ Honors Program (2012-2016). Shadowed a sports rehab and medicine doctor (both summers of 2014 and 2015); Lion's EMS (2014-2015); Student United Way (2014-2016); Sigma Alpha Epsilon (2013-2016, held position as Scholarship Chair, Eminent Recorder, and Eminent Herald); American Medical Student Association (AMSA, 2013-2016); Water Watch (2012-2013). Extensive work through Sigma Alpha Epsilon and the B+ Foundation with pediatric cancer patients. *Plans to pursue a MD or DO degree, as well as a Navy or Air Force scholarship. Will be employed at Monmouth Medical Center in Long Branch as a Medical Scribe in the emergency room.*

Susan Knox

Chemistry, ACS-Certified (Biology Minor)

TCNJ Honors Program (2012-2016); NSF Graduate Fellowship Research Program (Honorable Mention, 2016); Phi Kappa Phi (2016); Phi Beta Kappa Honors Society (2015); Barry Goldwater Scholarship and Excellence in Education Program (Honorable Mention, 2015); TCNJ Dean's List (Fall 2012, Spring 2013, Fall 2013, Spring 2014, Fall 2014, Spring 2015, Fall 2015); Trenton ACS Scholarship for Top Junior at TCNJ (2015); TCNJ Blue and Gold Leadership Award (2015); Phi Kappa Phi Student-Faculty Research Award (2015); NJ Governor's STEM Scholar (2014-2015); National ACS Chemistry Ambassador (2014); Gamma Sigma Epsilon, Chemistry Honors Society (2014); NSF REU Chemistry Leadership Group Travel Award (2013); Golden Key International Honour Society (2013); American Institute of Chemists Student Award (Spring 2016). Chemistry Independent Research with Dr. Guarracino (Fall 2014, Spring 2015, Fall 2015, Spring 2016); Chemistry Independent Research with Dr. Baker (Spring 2015, Fall 2015, Spring 2016); Summer REU at The University of Wisconsin-Madison (2015); NJ Governor's STEM Scholar Program (Academic Year 2014-2015); Summer Internship at Johnson and Johnson (2014); Summer REU at Boise State University (2013). Gamma Sigma Epsilon (2014-2016, President 2015-2016); TCNJ Student Chemists Association (2012-2016, Vice President 2014-2016, Secretary 2013-2014); TCNJ Connect High School Outreach Program (Founder, 2014-2016); TCNJ Flute Ensemble (Flutist, 2012-2015); TCNJ Student Government (Senator of Science, 2013-2014); TCNJ Swing Dance Club (2013-2016); TCNJ Rock Climbing Club (2013-2016); The Blawenburg Band (Flutist, 2009-2016); NJ Governor's STEM Scholars Program (2014-2015). J-Term Study Abroad: TCNJ Faculty-led course to Cuba (Jan 3-21, 2015), Landmarks: Exploration in Art (Cuba). *Will pursue a PhD in Chemical Biology at Yale University.*

Catherine Lee

Chemistry, ACS-Certified

Summer MUSE with Dr. O'Connor (Summer 2014); Chemistry Independent Research with Dr. O'Connor (Fall 2014, Spring 2015, Fall 2015, Spring 2016). MEDLIFE (2012-2016, publicity chair 2014-2015, president 2015-2016); Mystique (2012-2015, Fashion Show Chair, 2013-2015); School of Science Student Advisory Board (2014-2016); Student Chemists Association (2012-2016); TCNJ EMS (2012-2016, treasurer 2014-2016); Chemistry Department Laboratory Assistant (Summer 2015); School of Science Dean's Office Office Assistant (2013-2016). *Will be attending New England College of Optometry.*

Evan Li

Chemistry, ACS-Certified

Dean's List (Spring 2014, Spring 2015, Fall 2015). Chemistry Independent Research with Dr. Bradley (Spring 2014, Fall 2014, and Spring 2015); Summer Internship at Celgene Corporation (2015). Volunteer at Robert Wood Johnson University Hospital. Study Abroad Maymester in London. *Will be taking a gap year and becoming a medical scribe at Mount Sinai while volunteering to Tutor SAT prep in under-served communities in Manhattan. Plans to pursue a medical degree.*

Daniela Mallack

Chemistry (Spanish and Business Management Minors)

Sigma Delta Pi (2015 Spanish Honors Society). Research with Dr. Bunagan (Fall 2015 and Spring 2016); SMDEP at NJMS (Summer 2014); Gateway to Dentistry (Winter 2015). TCNJ Student Chemists Association (2012-2016); TCNJ Spanish Club (Treasurer 2015); NJCF (Mentor Coordinator 2014-2015); Chemistry Department Laboratory Assistant (2014-2016); Volunteer at El Centro in Trenton (taught a computer literacy course in Spanish); Tutor for High School Chemistry; TA for Spanish Oral Proficiency Hour. Took Intermediate Oral Proficiency and Spanish Current Events. Study Abroad Summer 2013 in Madrid; Maymester: Cross Cultural Management; J-Term: Macroeconomics. *Will apply to Dental School.*

Kelly McHugh

Chemistry

Dean's List (Fall 2012, Fall 2013, Spring 2014, Fall 2014, Fall 2015). TCNJ American Medical Student Association (2013-2016, treasurer 2014-2015); Atlantis Project, Azores, Portugal. *Will work as a medical scribe at Community Medical Center for a year while applying to medical school.*

Maria Minor

Chemistry ACS-Certified (Biology and Spanish Minors)

New Jersey Institute of Chemists Student Award (Spring 2016); Phi Beta Kappa (Spring 2016); Gamma Sigma Epsilon (Fall 2014); Bonner Community Scholars Program (Fall 2012); Honors Program (Fall 2012); Israel Experience College Scholarship (Summer 2014); AmeriCorps Education Award (2013 & 2012). Chemistry Independent Research with Dr. Baker (Spring 2015, Fall 2015, Spring 2016); Trauma Informed Care Initiative at Trenton Health Team (Spring 2016); Chemistry Independent Research with Dr. Guarracino (Fall 2014, Spring 2015); Public Policy Intern at the Bonner Institute (Summer 2015). TCNJ Mixed Martial Arts & Jiu Jitsu Club (2014-2016); TCNJ Crossfit (2012-2013); TCNJ Club Volleyball - Libero (2012); Bonner Scholars Program (2012-2016); GED Instructor & Forum Planner (2012-2013); Prisoner Reentry Site Manager (2013-2014); Senior Community Engaged Learning Intern to the Director (2014-2016); Student Chemists Association (2012-2016); MEDLIFE (2012-2013). Summer Term in Madrid with TCNJ Spanish Department. *Plans to apply to medical school June 2015, and relocate to the Raleigh Durham area. Has applied to a wide range of positions including medical* scribe, *clinical study*

assistant, and NIH IRTA post-bac program. Ultimately, intends to pursue a career in translational psychiatric and neurological research possibly at the cross section of immunology.

Joy Mohnot

Chemistry ACS-Certified

Gamma Sigma Epsilon (2015-2016); Dean's List (Fall 2012, Spring 2012, Spring 2013, Fall 2015); National Defense Industrial Association ROTC Award (2016); Major General Edward Burka '52 Award (2015); Distinguished Military Graduate (2015). Chemistry Independent Research with Dr. Fazen (Spring 2016). TCNJ Army Reserve Officers' Training Corps (2013-2016, commander 2015-2016). *Will attend Basic Officer's Leadership Course for field artillery in September 2015 and will serve 4 years minimum active duty as an Army field artillery officer and 4 years reserve. Hopes to pursue medical degree after active service.*

McKenzie Montana

Chemistry

Golden Key Honor Society (2013-2016); Dean's List (Fall 2012- Fall 2014); PERSIST Scholar (2013-2016). Synergy Dance Company (2012-2016); Student Government Association (2013-2015, Senator of Science 2014-2015); Zeta Tau Alpha (2014-2016, Service Chairwoman 2014-2015). Shadowed an Orthopedic surgeon from 2013-2016; Volunteer at the Greenwood House Nursing Home 2016; Volunteer at Susan G Komen Race for a Cure, Trenton area soup kitchen, TCNJam, Relay for life, and Princeton Breast Cancer Survivor Group. *Will be taking a gap year, applying to Physician Assistant programs, shadowing, and trying to find a scribe position for the year.*

Catherine Morgan

Chemistry ACS-Certified (Sociology Double Major)

Alpha Kappa Delta Honors Society (2015); Deans List (Fall 2013, Spring 2014, Spring 2015, Fall 2015). Chemistry Independent Research with Dr. Hunt (Fall 2015, Spring 2016); Summer REU at the University of Pennsylvania (Summer 2015); Internship at the Chemical Heritage Foundation (Fall 2014, Spring 2015, Summer 2015); Summer Internship at Cerovene, Inc. (Summer 2014). Operation Smile Club (President, 2014); Colleges Against Cancer (Committee Chairperson, 2011-2014); on-campus job at TCNJ Facilities Department (2011-2016). *Hopes to work for a year. Plans to pursue further education in chemistry in the future.*

Dylan Nguyen

Chemistry ACS-Certified

TCNJ Honors Program (2012-2016); Dean's List (Fall 2012-Fall 2015); Gamma Sigma Epsilon (2014); Phi Beta Kappa (2015); Phi Kappa Phi (2016); John F. Conn Award (Gamma Sigma Epsilon, Fall 2015). MUSE with Dr. Guarracino (Summer 2014); Independent research with Dr. Guarracino (Fall 2014, Spring 2015, Fall 2015, Spring 2016;) Internship with NJ Department of Agriculture (Summer 2015). TCNJ Student Chemists Association (2012-2016, secretary 2014-2016); Gamma Sigma Epsilon (secretary 2015-2016); Percussion Ensemble (2012-2014); Patient transport volunteer at Robert Wood Johnson Hamilton. Maymester, Exploring London through the World of Art and Chemistry, Summer 2013 with Dr. Bradley and Professor Mackie. *Hopes to pursue a research assistant position, then a combined MD/PhD.*

Priti Patel

Chemistry, ACS-Certified (Classical Studies Minor)

Eta Sigma Phi (2016); Dean's List (Fall 2015). Chemistry Independent Research with Dr. Sen (Fall 2015, Spring 2016). Classical Studies Club (2014-2015). Colleges Against Cancer (2014-2015). *Hopes to go to graduate school and pursue a career in Geochemistry.*

Nader Alaaeldin Refai

Chemistry ACS-Certified

Golden Key International Honor Society (2014-2016); Gamma Sigma Epsilon Chemistry Honor Society (2015-2016); Dean's list (2012-2016). Chemistry Independent Research with Dr. Fazen (Spring 2016). TCNJ Muslim Student's Association (2012-2016); TCNJ Eurasian Middle Eastern; TCNJ Foundation for the International Relief of Children (2013-2016); TCNJ Humanitarian Engineering (2012-2014); TCNJ Union Latina (2013-2015); TCNJ Student Chemists Association (2013-2015); TCNJ Lions EMS (2012-2013); TCNJ Engineering Without Borders (2012-2014); TCNJ American Medical Student Association (2012-2014); TCNJ MEDLIFE (2012-2014); TCNJ Community Advisor (CA) for the Department of Residential Education and Housing (2014-2016). Will be taking a gap year and apply to medical school during this current cycle.

Andrew Ruff

Chemistry, ACS-Certified (Mathematics Minor)

Gonfalon Carrier at Commencement (2016); Phi Beta Kappa (2015); Outstanding Senior/Junior/Sophomore Student in Chemistry (2015, 2014, 2013); Dean's List (All Semester). Published Manuscript in *Organometallics* (Spring 2016). Chemistry Independent Research with Dr. O'Connor (Fall 2014, Fall & Spring 2015, and Spring 2016); Summer MUSE with Dr. O'Connor (Summer 2014, Summer 2015). Residential Education and Housing (CA 2014-2015, SMRO 2015-2016); Gamma Sigma Epsilon (2014-2016); Roscoe West Tutoring Center Tutor (Fall 2013-Spring 2016). *Will pursue an MD from the Perelman School of Medicine at the University of Pennsylvania.*

William A. Sabbers Jr

Chemistry ACS-Certified

Dean's List (All semesters). Chemistry Independent Research with Dr. O'Connor (Fall 2015 and Spring 2016). TCNJ Roadrunners (2012-2016, Vice President 2014, President 2015-2016); TCNJ Student Chemists Association (2014-2016). *Will pursue a PhD in Chemistry at Temple University.*

Allison Zumwalde

Chemistry, ACS-Certified (Religion Minor)

Dean's List (Spring 2015 and Fall 2015). Summer MUSE with Dr. Allison (Summer 2015); Chemistry Independent Research with Dr. Allison (Fall 2015, Spring 2016). The Order of the Nose Biting Teacups (2012-2016, secretary 2013-2016); Stitches (2012-2016, secretary, 2013-2016). *Plan to work in Forensics and further her education.*

Student Awards

The following awards were presented during the 2016 Chemistry Graduation Ceremony:

The Philip Dumas Memorial Award
For Top Overall Senior
Andrew Glass
Andrew Ruff

The Dr. Jerry Goodkin Award
For Physical Chemistry
Matthew Gole

The Howard Nechamkin Award
For Excellence in Chemistry
Dylan Nguyen

The Mabel Hores Award in Forensic Chemistry
(from the Ngai Family)
Allison Zumwalde

Excellence in Chemistry Awards
Courtney Amster
William Buchbinder
Kayla Gentile
Alec Grossman
Evan Li
Joy Mohnot
Nader Refai
William Sabbers

American Institute of Chemists Award
Susan Knox

New Jersey Institute of Chemists
Maria Minor

Department Awards

The Chemistry Department was awarded the 2015 Mildred Dahne Departmental Excellence award. The Senate committee who reviewed the applications noted that, in the area of Teaching Excellence, "It is very impressive that the program ranks within the top 4% of chemistry programs nationwide." In the area of Academic Excellence, the department was praised for the impressive ability of the faculty to acquire external funding and to publish in high-quality journals. Finally, the Senate committee noted the department's impact on the TCNJ community, citing the numerous Chemistry faculty who serve in high-profile positions around campus.

Publications 2015-16

(TCNJ Chemistry Faculty are in Bold, TCNJ Chemistry Student co-authors are underlined)

Hirsh, D.J., Schieler, B.M., Fomchenko, K., Jordan, E.T., Bidle, K.D. A liposome-encapsulated spin trap for the detection of nitric oxide. *Free Radical Biology & Medicine* 2016, *96*, 199-210.

Khani, F.; Fleming, T.; Collins, C.; Tabakin, E.; **Bradley**, L.; **Hunt**, D.A. Regioselectivity differentiation in metalations of 3,5-dichloro-tertiary versus secondary benzamides. *International Journal of Organic Chemistry* 2016, *6*, 142-146.

Ruff, A, Kirby, C., **Chan**, B.C., **O'Connor**, A.R. Base-Free Transfer Hydrogenation of Ketones Using Cp*Ir(pyridinesulfonamide)Cl Precatalysts. *Organometallics* 2016, *35*, 327-33

McGarry, K.R., McDaniel, M., **Chan**, B.C., **O'Connor**, A.R. Synthesis and characterization of (π-allyl)palladium(II) complexes containing dialkylbiaryl phosphine ligands. *Polyhedron* 2016, *114*, 101-109.

Allison, J. Physical Chemistry: A Very Short Introduction. In *Physical Chemistry*, Atkins, P., Oxford, 2015.

McGee, D.J.; Ferrie, J., Plachy, A., Joo, Y., Choi, J., Kanimozhi, C., Gopalan, P. Photo-induced refractive index and topographical surface gratings in functionalized nanocarbon solid film. *Applied Physics Letters* 2015, *107*, 181102/1-181102/5.

Guarracino, D.A. Wheel of Fortune - Cyclic Peptides Hit the Mimetic Jackpot: Current Syntheses, Uses and Roles for Cyclic Peptide Mimetics. *Current Chemical Biology* 2015, *9*, 36-52.

Baker, J.L., Furbish, J., Lindberg, G.E. Influence of the ionic liquid [C4mpy][Tf2N] on the structure of the miniprotein Trp-cage. *Journal of Molecular Graphics & Modelling* 2015, *62*, 202-212.

Farrokh, J., Campos, C., **Hunt**, D.A. A Parham cyclization approach to diaryl-fused seven-membered ring heterocyclic ketones. *Tetrahedron Letters* 2015, *56*, 5245-5247.

Sen, S.E., Wood, L., Jacob, R., Xhambazi, A., Pease, B., Jones, A., Horsfield, T., Lin, A., Cusson, M. Disruption of insect isoprenoid biosynthesis with pyridinium bisphosphonates. *Insect Biochemistry and Molecular Biology* 2015, *63*, 113-123.

Abourahma, H., Shah, D.D., Melendez, J., Johnson, E.J.; Holman, K.T. A Tale of Two Stoichiometrically Diverse Cocrystals *Crystal Growth & Design* 2015, *15*, 3101-3104.

Faculty Presentations

Chan, B, Farrell, S., Cathell, M., and Conner, D. Safe Zone Workshop Level 1. Oral presentation, 252nd ACS National Meeting, Philadelphia, PA, August 2016.

Chan, B, Farrell, S., Cathell, M., and Conner, D. Safe Zone Workshop Level 2. Oral presentation, 252nd ACS National Meeting, Philadelphia, PA, August 2016.

McGuinness, B. and Merritt, J. Illustrating medicinal chemistry through an interactive demo: The Drug Discovery Game. Poster presentation, 252nd ACS National Meeting, Philadelphia, PA, August 2016.

Guarracino, D. Peptidomimetic structure and function: Synthetic peptide macrocycles with potential as anti-thrombosis agents and short artificial peptide helices and turns. Oral presentation, 44th Middle Atlantic Regional Meeting of the American Chemical Society, Riverdale, NY, June 2016.

O'Connor, A.R. Base-free transfer hydrogenation of aldehydes and ketones using Cp*Ir(pyridinesulfonamide)Cl precatalysts. Oral presentation, 251st ACS National Meeting, San Diego, CA, March 2016.

Lindberg G.E. and **Baker** J.L. Exploring the interactions between room temperature ionic liquids and biological membranes. Oral presentation, 251st ACS National Meeting, San Diego, CA, March 2016.

Carter, E.E., **Baker** J.L., Hartzell C., and Lindberg G.E. Influence of environment and temperature on the structure of the thermophilic intrinsically disordered protein FlgM. Poster presentation, 251st ACS National Meeting, San Diego, CA, March 2016.

Baker, J.L. and Lindberg, G.E. Probing the influence of the ionic liquid [C4mpy][Tf2N] on the structure of the miniprotein Trp-cage. Oral presentation, 251st ACS National Meeting, San Diego, CA, March 2016.

Baker J.L. Probing the dynamics of the hexameric pilus retraction motor PilT with molecular dynamics simulation. Poster presentation, 601st Biophysical Society Annual Meeting, Los Angeles, CA, February 2016.

Huang, J. Simultaneous Determination of Reduced and Oxidi7-Cd Chemical Species in a Mixture Using Cyclic Voltammetry. The Eastern Analytical Symposium, Somerset, NJ, November 2015.

Baker, J.L. Biomolecules in Motion: Molecular Modeling and Simulation of Biomolecular Systems. Invited faculty research seminar. Department of Physics, The College of New Jersey, Ewing, NJ, November 2015.

Baker J.L. Biomolecules in Motion: Molecular Modeling and Simulation of Biomolecular Systems. Invited faculty research seminar. Department of Chemistry and Physics, Monmouth University, West Long Branch, NJ, November 2015.

Allison, J., Zumwalde, A., and Ciriaco, K. Handprints- What to Expect. Oral presentation, Northeast Association of Forensic Scientists, Annual Meeting, Hyannis, MA, October 2015.

Allison, J., Castor, T., and Amster, C. The Lindbergh Baby Kidnapping- Investigation of the Ransom Letters. Oral presentation, Northeast Association of Forensic Scientists, Annual Meeting, Hyannis, MA, October 2015.

Abourahma, H., Shah, D., Melendez, J., Cocuzza, D., and Johnson, E.J. Diversity and Solubility of Pyrazinamide Cocrystals. Oral presentation, 2015 American Crystallographic Association Meeting, Philadelphia, PA, July 2015.

Guarracino, D. The nature of peptidomimetic: Synthetic peptide macrocycles as potential therapeutics and artificial peptide helices. Invited speaker, 24th American Peptide Symposium, American Peptide Society, Orlando, FL, June 2015.

O'Connor, Abby R. Iridium complexes containing pyridinesulfonamide ligands. Oral presentation, 40th Northeast Regional Meeting of the American Chemical Society, Ithaca, NY, June 2015.

O'Connor, A.R., Kirby, C., and Townsend, T. Transfer hydrogenation of aldehydes using Cp*Ir(III) pyridinesulfonamide catalysts. Poster presentation, 40th Northeast Regional Meeting of the American Chemical Society, Ithaca, NY, June 2015.

Student Presentations

Grossman, A. and Hunt, D.A. Preparation and utility of highly functionalized 2-aminobenzophenones. Poster presentation, 251st ACS National Meeting, San Diego, CA, United States, March 2016.

Lee, C. and O'Connor, A.R. Norbornene polymerization initiated by cationic (π-allyl)nickell(II) complexes containing dialkylbiaryl phosphine ligands. Poster presentation, 251st ACS National Meeting, San Diego, CA, United States, March 2016.

Gole, M., Chan, B.C., and O'Connor, A.R. Evaluating the physical and catalytic properties of complexes containing quinolyl arylsulfonamide ligands. Poster presentation, 251st ACS National Meeting, San Diego, CA, United States, March 2016.

Andrews, A. and Baker, J.L. Investigation of the structure and dynamics of the type IV pilus retraction motor PilT using molecular dynamics simulation. Poster presentation, 251st ACS National Meeting, San Diego, CA, United States, March 2016.

Gentile, K., **Martin**, S., and Guarracino, D. Characterizing novel peptides as anti-thrombosis agents. Poster presentation, 251st ACS National Meeting, San Diego, CA, United States, March 2016.

Decker, G., **Nolasco**, L., **Gesuelli**, K.-A., and Hirsh, D. Characterizing divalent metal ion binding sites in graphene oxide with Mn(II) ions. Poster presentation, 251st ACS National Meeting, San Diego, CA, United States, March 2016.

Brier, T. and Baker, J. Molecular simulations of type IV pilin subunits from three organisms in a lipid bilayer. Poster presentation, 251st ACS National Meeting, San Diego, CA, United States, March 2016.

Amster, C. and Allison, J. 15 letters. Poster presentation, 251st ACS National Meeting, San Diego, CA, United States, March 2016.

Li, E. and Bradley, L. Cyclization studies of intermediates derived from aromatic silyl ketones. Poster presentation, 251st ACS National Meeting, San Diego, CA, United States, March 2016.

Glass, A. and Hunt, D. Use of 2-bromocyclohexenone as an intermediate toward the preparation of a dual Michael acceptor. Poster presentation, 251st ACS National Meeting, San Diego, CA, United States, March 2016.

Nguyen, D., **Knox**, S., and Guarracino, D. Development of stabilized cyclic peptides with potential anti-thrombosis activity. Poster presentation, 251st ACS National Meeting, San Diego, CA, United States, March 2016.

Knox, S., **Fomchenko**, K., **Nguyen**, D., Chan, B., and O'Connor, A. College of New Jersey Student Chemists Association: Connecting our members, the local community, and science. Poster presentation, 251st ACS National Meeting, San Diego, CA, United States, March 2016. [The TCNJ Student Chemist Association was recipient of the *Green Chemistry Award* and of *Student Chapter Honorable Mention* at this meeting.]

Ruff, A., Chan, B.C., and O'Connor, A.R. Catalytic transfer hydrogenation of ketones using Cp*Ir(III) pyridinesulfonamide catalysts. Poster presentation, 40th Northeast Regional Meeting of the American Chemical Society, Ithaca, NY, United States, June 2015.

Faculty Grants and Grant Proposals

Internal Grants

Support of Scholarly Activity Award (SOSA), 2014-2016

Heba Abourahma
John Allison
Stephanie Sen

Support of Scholarly Activity Award (SOSA), 2015-2017

Joseph Baker
Danielle Guarracino
Abby O'Connor

Mentored Undergraduate Summer Experience award (MUSE), 2015

Joseph Baker
Danielle Guarracino
Donald Hirsh
Stephanie Sen

School of Science Mini Grant, 2015-2016

Danielle Guarracino
Stephanie Sen

AFT Career Development Grant, 2015-2016

Heba Abourahma
Abby O'Connor

TCNJ Sabbatical 2015-2016

Benny Chan

External Grants and Proposals

Beckman Foundation

Bacteria in Motion: Probing Bacterial Filament Dynamics Using Molecular Models

Joseph L. Baker (PI)
Submitted: January 2016

3M Corporation

Exploration of the Tension Force Response and Adhesive Properties of Protein Biopolymers from Bacteria Using Molecular Modeling and Simulation Methods

Joseph L. Baker (PI)
Submitted: November 2015

NIH

Allosteric Modulations of Glutamate Transporter EAAT2 for Neuroprotection

Andreia C. Mortensen (PI), Drexel University College of Medicine, Joseph M Salvino (co-PI), Drexel University College of Medicine, Joseph L. Baker (co-PI), The College of New Jersey, Dora Schnur (co-PI,) Drexel University
Submitted: November 2015

National Science Foundation

RUI: Investigation of the Structure and Dynamics of Type IV Pilus Filaments and Associated Proteins Using All-atom and Coarse-grained Molecular Dynamics

Joseph L. Baker (PI)
Submitted: September 2015

National Science Foundation

Exploring the Molecular Origins of Room Temperature Ionic Liquid Effects on Biomolecular Systems

Gerrick Lindberg (PI), Northern Arizona University, Joseph L. Baker (co-PI)
Submitted: September 2015

Beckman Foundation

Bacteria in Motion: Probing Bacterial Filament Dynamics Using Coarse-grained Models

Joseph L. Baker (PI)
Submitted: September 2015

National Science Foundation

SI2-SSI: Swift/E: Integrating Parallel Scripted Workflow into the Scientific Software Ecosystem

Michael Wilde (PI), University of Chicago, Gerrick Lindberg (co-PI) Northern Arizona University, Joseph L. Baker (Co-PI), Martin McCullagh (co-PI), Colorado State University, Olaseni Sode (co-PI), University of Tampa
Funded: 2016-2019

National Science Foundation, Division of Undergraduate Education, IUSE

FIRSTS (Foundation for Increasing and Retaining STEM Students)

A Bridge Program to Study the Sociological Development of Science Identities

Benny C. Chan (PI), Sudhir Nayak (co-PI), J. Lynn.Gazley (co-PI), S. Monisha Pulimood (co-PI), Suriza Van der Sandt (co-PI)
Funded: 2016-2018

National Science Foundation

STEM Award, PERSIST 2.0 in Biology and Chemistry

Program to Enhance Retention of Students In Science Trajectories in Biology and Chemistry

Benny C. Chan (PI), Sudhir Nayak (co-PI), Lynn Bradley (co-PI), Don L. Lovett (Co-PI)
Funded: 2013-2019

James Weinstein Foundation in conjunction with the Marshall University School of Medicine

Development of Drugs and Novel Transport Methods Enabling Penetration of the Blood-Brain Barrier for the Treatment of Alzheimer's Disease

David Hunt (PI), James Weinstein, M.D. (co-PI), Marshall University School of Medicine, Richard D. Egleton (co-PI), Marshall University School of Medicine
Funded: 2010-2015

National Science Foundation

Collaborative Research: SusChEM: RUI: Tandem Catalysis to Convert Biomass-Derived Compounds to Petroleum-Based Fuels and Chemicals

Abby R. O'Connor, (PI), Benny C. Chan (Co-PI), Danielle L. Jacobs (co-PI), Rider University
Submitted: 2015

American Chemical Society Petroleum Research Fund

Synthesis of Cationic Nickel(II) Complexes Containing Hemilabile Arms for use as Alkene Hydrogenation Catalysts

Abby O'Connor (PI)
Funded: 2013-2015

Departmental Seminars

September 16, 2015

Jessica Hoover, Professor

Department of Chemistry, West Virginia University

Copper-Catalyzed Oxidative Decarboxylative Coupling Reactions

Decarboxylative coupling reactions are emerging as an efficient route to access a diverse array of substituted arenes from inexpensive and readily available precursors. Unfortunately, most methods require pre-functionalized aryl halide coupling partners. An oxidative transformation enabling the direct decarboxylative coupling with an arene C-H bond is an attractive alternative, but current methodologies suffer limitations of substrate scope. Copper catalysts offer an opportunity to overcome these challenges, yet there are limited examples of a Cu-catalyzed transformation of this type.

This talk will focus on our recently developed copper-catalyzed oxidative decarboxylative C-H arylation reaction to generate biaryl products. Recent work to explore the reaction mechanism and understand the substrate limitations will also be presented.

October 7, 2015

Dr. Jessica Molek

Scientific Manager, Downstream Process Development, BioPharm R&D, Glaxo Smith Kline

Industrial production of a monoclonal antibody: Perspectives from biopharmaceutical process development

Monoclonal antibodies (MAbs) are an important and growing class of therapeutic proteins. The production of these molecules is no longer limited to specialized start-ups but is embraced by the pharmaceutical industry as a standard tool within the arsenal to fight cancer, resist autoimmune diseases and treat other specific illnesses. MAb process development and production methods play a major role in the industry's ability to effectively bring products to the market rapidly and economically after a target has been identified. This lecture will provide an overview of the key elements of MAb production, including: genetically engineering cell lines to produce high levels of MAbs; designing nutritional media and optimizing bioreactor conditions that promote maximum cell growth and MAb production; scaling up bioreactor processes to pilot-scale and manufacturing-scale facilities; designing purification processes that maximize product yield while maintaining product quality; and using bio-analytical methods to characterize key product attributes.

October 20th, 2015

TCNJ-Novo Nordisk Colloquium

Dr. Todd Hobbs and Dr. Henriette Mersebach

Novo Nordisk in North America

How a Drug is Born

The first in a series of lectures to highlight the recent partnership between Novo Nordisk and TCNJ, this lecture will take the audience through the many steps required in the process of drug discovery through approval. Scientific leaders from Novo Nordisk, Inc. in Plainsboro, NJ will share their insights gathered from many years of experience in product approvals to explain how a chemical entity moves from the lab to animal and human studies, full-scale clinical testing, and finally to regulatory approval from the FDA to be marketed as a new pharmaceutical product. The speakers will also highlight the many synergies between areas of scientific study available at TCNJ and the relevance of these areas to the drug development process.

October 21, 2015

Graham Dobereiner, Professor

Department of Chemistry, Temple University

The influence of Lewis acids on organometallic chemistry

Bimetallic catalysis is an emerging research area. Novel bond activations are made possible through the collective action of two metal centers. In our group, the interactions of organometallic complexes with Lewis acids are investigated through experiment and computation. Applications in organometallic catalysis are explored.

November 4, 2015

Joselle McCracken

TCNJ Chemistry Alum, U. Illinois Urbana Champaign

Not Just Plastic: 3D Printing Hydrogels for Tissue Engineering …And Other Things I Learned in Grad School

This talk will cover how 3D printing technologies have flourished in the past decade and how diversifying printable material types is crucial for the field to remain relevant long-term. This is particularly true for tissue engineering contexts, in which it is not enough for printers to fabricate life-like replicas of organs, but necessary for them to print spatially programmatic, temporally dynamic, and biocompliant materials on which cells can attach, grow, and differentiate into functional tissues. Here, several printable hydrogel systems will be presented that are promising for these applications which use the monomer hydroxyethyl methacrylate (HEMA) in conjunction with viscosifying agents such as polymer powders and inorganic clays to fabricate scaffolds at bioactive scales. I will also discuss how these areas of my research focus emerged gradually in a semi-independent, at times chaotic, and thoroughly nonlinear way over four years in graduate school. I will talk about, in retrospect, some of the most important questions that I may or may not have asked during the graduate school application and selection process.

November 18, 2015

Marion Emmert, Assistant Professor

Worcester Polytechnic Institute

Breaking strong bonds and recovering rare earths selectively: Adventures in sustainable chemistry

Catalysis is one of the most powerful tools of green chemistry, enabling reactions with lower energy consumption and providing new pathways for bond formations. In particular, catalytically functionalizing C-H bonds (common in crude oil derived molecules) and C-O bonds (common in biomass) under mild conditions are critical reactions to enable more sustainable chemical methodologies. Our approach towards addressing these challenges focuses on establishing a mechanistic understanding in order to translate this knowledge into broadly useful protocols for organic synthesis and biomass activation. At the end of the materials lifecycle, inventing new technologies to provide sustainable sources of raw materials through recycling is another critical challenge for the movement towards a circular economy. Our efforts in this area take an approach similar to our developments in the area of catalysis: Based on understanding principles and mechanisms of materials flows, we use the principles of green chemistry to enable the design of novel, sustainable rare earth recovery technologies.

February 17, 2016

Dr. Bill Metzler

Associate Director, Lead Development, Bristol-Myers-Squibb, Emeritus

Beyond Activity Measurements: Leveraging Biophysics and Structure for Hit Identification and Prioritization

The emergence of fragment-based screening as a vehicle for identifying novel chemical leads is challenging the current paradigm for lead optimization. When dealing with molecules with the chemical simplicity of fragments, one can no longer rely solely on potency. And while ligand efficiency (the binding energy per heavy atom) is becoming increasingly popular for evaluating the quality of hits, one often requires a more detailed understanding of the molecular interactions leading to the observed potency. This presentation will describe our efforts to create a "biophysical toolbox" for evaluating and prioritizing hits. The toolbox contains methods for examining a compound's propensity to aggregate, its specificity of binding, assessment of reversibility, and thermodynamic properties. Combined with the mapping of receptor:ligand interactions at the molecular level that is afforded by structural studies, the approach provides additional information for selecting hits that are the most likely to progress at a critical point in early-phase decision, thereby facilitating the delivery of high quality leads.

April 6, 2016

Dr. Catherine Grimes

Department of Chemistry and Biochemistry, University of Delaware

Chemical Tools for Studying the Activation of the Intracellular Innate Immune Protein Nod2

Chronic inflammatory disorders, such as Inflammatory Bowel Disease, arise from an inappropriate immune response to bacteria. In order to treat these diseases, we need a better understanding of how the innate immune system senses and responds to bacteria. It has long been known that muramyl dipeptide (MDP), a fragment of bacterial cell wall (peptidoglycan), is able to generate an immune response. Recently, it has been shown that the intracellular, mammalian protein Nod2 is involved in sensing the presence of MDP in the cell, leading to activation of the synthesis of inflammatory molecules. Nod2 is an important protein to human health, as mutations in the gene have shown an increased incidence of Crohn's disease. The mechanism of activation of the Nod2 signaling pathway by MDP is not understood. For example, it is not known if MDP directly interacts with Nod2. We have taken a chemical biological approach to this problem by synthesizing tagged versions of MDP. This tool was then utilized to probe for an interaction between Nod2 and MDP. We describe the development of a variety of binding assays and present a model for Nod2 activation via MDP. Our approach has led to a deeper understanding of the biophysical mechanisms used by the innate immune system to sense bacteria.

April 12, 2016

TCNJ-Novo Nordisk Colloquium

Dr. Cory Gamble, DO, FACOI, FACE

Medical Director, Diabetes & Obesity, Novo Nordisk in North America

Overview of Incretins and the Science Behind GLP-1

In this lecture, Dr. Cory Gamble, Medical Director for Victoza®, will discuss an overview of incretins, a group of metabolic hormones that impact blood glucose levels. In particular, what are incretins, what is their history, what is the incretin effect, where are incretins produced, what do they do to insulin and glucagon? The lecture will highlight the key pathophysiological defects and challenges with Type 2 Diabetes Mellitus. Dr. Gamble will also review of the five currently available GLP-1 receptor agonists, their efficacy, as well as potential safety issues. The discussion will include information about what the future may hold for Entero-insular agonist drugs, including both dual and triple agonists.

April 20, 2016

Dr. Ian Harrison

Department of Chemistry, University of Virginia

Alkane Activation at Catalytic Metal Surfaces: Reaction Dynamics and Energy Transfer at the Gas-Surface Interface

The reactivity of light alkanes impinging on a Pt(111) single crystal metal surface is examined using effusive molecular beams and surface science techniques. Microcanonical rate theory is shown to be useful in modeling the gas-surface reactivity and energy transfer for both non-equilibrium and thermal equilibrium experiments. Dynamical biases are found to reduce the reactivity of the smallest alkanes, methane and ethane, whereas deviation from statistical reactive behavior was not discerned for larger alkanes. For methane and ethane, only the component of translational energy directed along the direction of the surface normal promotes reactivity, rotational energy is a spectator degree of freedom, and molecular vibrational energy is only 40% as efficacious in promoting reactivity as is normal translational energy. The activation energy for dissociative chemisorption of C1-C9 alkanes is found to diminish with increasing Van der Waals attraction between the alkane and surface. These findings are interesting in the context of optimizing chemical transformations involving natural gas which currently consume ~2% of world power. The talk will conclude with a description of the graduate program in Chemistry at UVa.

Submit a Class Note

Do you have any news or updates about your life that you'd like to share with your fellow alumni? Submit your news, whether it's a recent social event or activity, a personal or professional accomplishment, or a new job or promotion. We want to hear from you and share the news with fellow classmates.

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