Education and Research

The Tufts University Department of Chemistry continues its dual mission of education and research

RESEARCH
Joshua Kritzer

The last half-century has seen a revolution in how we understand and treat disease. The modern plan of attack is to understand disease at the molecular level, then judiciously target key proteins in the disease process using small-molecule drugs. However, most existing drugs target only a few types of cellular proteins such as kinases and signaling receptors. There are many diseases that could be more effectively treated by targeting other proteins. Such diseases include diabetes, infectious disease, and many currently untreatable cancers.

The Kritzer lab uses peptides (small chains of amino acids) to inhibit disease-associated proteins that would be difficult or impossible to target using traditional approaches. These molecules are an exciting and rapidly expanding area of drug development because they

Continued on page 2
The Kritzer lab uses peptides to solve vital chemical and biomedical problems. Students are trained in cross-disciplinary approaches including genetics, cell biology, organic synthesis, structural biology and biophysical chemistry.

can target protein surfaces in ways small molecules rarely do. In one project, we are exploring novel approaches for screening these compounds: we use genetics to generate large libraries of cyclic peptides in living yeast cells and to screen them for those that target specific proteins or disease processes of interest. In this manner, yeast are recruited as a virtual army of medicinal chemists capable of synthesizing and screening millions of compounds in a single week.

Discovering new bioactive peptides is only the first step, however. In several other projects, the Kritzer lab is exploring how these powerful molecules can be modified to promote greater utility as tools for biology and chemistry. We are exploring how intramolecular cross-links can be used to tune the reactivity of peptide-metal complexes to enable their use as chiral catalysts for important organic transformations. We are also exploring how larger peptides can be locked into their bioactive conformation via successive application of covalent bonds as “staples.” These bonds must be carefully designed, but when applied effectively they can make certain classes of peptides more potent, more selective, and more cell-penetrant. This strategy is being applied to inhibitors of diverse signaling proteins involved in diabetes and human cancers. Through in-lab expertise and collaborations with biomedical scientists at Tufts University School of Medicine and other institutions in the area, the Kritzer lab simultaneously explores peptide structure, function, and anti-cancer activity. This represents a cross-disciplinary effort to bring these molecules to bear on intractable human diseases.

Figure 1:

Many cellular proteins cannot be targeted by traditional drug-like molecules, but can be targeted by peptides—if they can be locked into their appropriate shapes. This figure shows the Kritzer lab’s strategy for blocking cellular proteins using modified peptides. For more details on this strategy, see Gavenonis et al., *Nature Chemical Biology* 10, 716–722.
**RESEARCH**

*Yu-Shan Lin*

Understanding how the primary amino acid sequence encodes the three-dimensional structure of a peptide or protein is a holy grail for many chemists and biologists. A major project in the Lin group aims at establishing and understanding such sequence-structure relationships of cyclic peptides using molecular dynamics simulations and enhanced sampling methods (Figure 1A). Protein-protein interactions (PPI) mediate numerous biological functions and cyclic peptides are among the most promising PPI modulators. This project is providing the capability to reliably and efficiently predict the thermodynamically stable conformation any given cyclic peptide will adopt and thereby greatly improving our ability to rationally design cyclic peptides that are potent PPI modulators. A robust capacity to target and disrupt any specific PPI will facilitate diverse mechanistic studies and advance our understanding of such important molecular interactions in biology.

In vivo, most proteins undergo co-/post-translational modifications that can affect both the folding and the native states and functions of proteins. One of the most common modifications is glycosylation. Glycans have crucial and diverse extrinsic biological functions, including roles as structural components, signaling transducers, and mediators for protein-protein interactions. Glycosylation substantively alters the molecular properties of proteins, but the likely role of glycosylation in protein folding and stability is poorly understood—in part owing to the difficulty of preparing homogeneous samples of glycoproteins. A second major research project in the Lin group is

Understanding how proteins fold into native structures based on their primary sequences has long been a research focus for chemists and molecular dynamics simulations can provide atomistic-level information on protein structure and dynamics.
to understand the effects of co-/post-translational modifications on protein folding using structural bioinformatics and molecular dynamics simulations. Ultimately, this understanding will permit the use of specific amino acid-glycan interactions to design peptides with desired structures (Figure 1B).

While simulations provide important structural and dynamics insight at the molecular level, the correctness of the computational results relies on the simulation model used and the quantity of sampling. Therefore, it is essential to evaluate whether simulations agree with experiment, especially during the development of new simulation methodology. The Lin group verifies their simulation results by comparing them to experimental measurements such as NMR chemical shifts and dipolar couplings, folding/unfolding kinetics, CD and vibrational spectroscopy. Their experimental collaborators here at Tufts and at other universities further enable them to propose and verify their theoretical predictions.

Professor Yu-Shan Lin received her B.S. degree in Chemistry from National Taiwan University in 2004. During her Ph.D. studies at the University of Wisconsin – Madison she worked with Professor Jim Skinner on understanding the structure, dynamics and vibrational spectroscopy of condensed-phase systems using molecular dynamics simulations and electronic structure calculations. After receiving her Ph.D. in 2009, she moved to Professor Vijay Pande’s lab at Stanford University. There, she utilized distributed computing and Markov state model analysis to characterize the effects of familial mutations on the structure of amyloid peptides in Alzheimer’s disease. Professor Lin joined the Department of Chemistry at Tufts University in fall 2012.

Figure 1:

(A) Molecular dynamics simulation of cyclo-(PGFVSA) using bias-exchange metadynamics. Conformational ensemble, depicted as a clustered density profile along the two largest principal components, representative structure from the most populated cluster compared to the NMR structure, and Ramachandran plots for each residue compared to the NMR values (red dots) are shown for the cyclic peptide. (B) Specific peptide-glycan interactions are used to design a beta-hairpin glycopeptide (left) and an alpha-helical glycopeptide (right).
Chemistry Degrees and Awards

Presented 2009–2010

Doctoral Degrees Awarded
Matthew Aerncke (David Walt)
“Microsphere Array Based Vapor Sensing: New Capabilities and Applications”
Ginevra Clark (Krishna Kumar)
“Interactions of fluorinated amino acids in coiled coils and beta-hairpins”
Ryan Hayman (David Walt)
“Sensitive Detection of Nucleic Acids with Bead-based Microarrays”
Toni Lamoureaux (David Lee)
“Activation of MEK 1 through chemical methods—a redox trigger for evaluating the effects of phosphorylation”
Deniz Yüksel (Krishna Kumar)
“Molecular Trojan Horses: De Novo Protein Design and Scaffolds for Tissue Engineering”
Jeffrey Wikstrom (Elena Rybak-Akimova)
“Biomimetic Dipicolylamine Nickel Complexes: Structure and Reactivity”

Master’s Degrees Awarded
Maram Alyamani Michelle Lee
Johnathon Brazell Jody Maisano
Wen Guo Patricia Hredzak

Bachelor’s Degrees Awarded
Ruthba Anam Nina Castelnuovo
Rachel Anderson Jenny Karo
Daniel Cook (Arthur Utz)
John Eaton (Jonathan Kenny)
“Chemometric Classification and Characterization of Shrimp through Multidimensional Fluorescence Spectroscopy”
Louise Galuski Alex Sun Phil Huh
Prashanth Haran Jenny Karo
Keith Hofmann
Michael Laha (E. Charles Sykes)
“Ferroelectric Assembly of 2-chloroethyl ethyl sulfide on Au (111): A Scanning Tunneling Microscopy Study”
Jaewon Lee Hayley Marcus
Yilun Li Robert Matera
Brett Lieblich
Kaitlin Minnehan (David Walt)
“Development of a Low Cost Ligation-based SNP Genotyping Assay to Trace Maternal Ancestry in Mitochondrial DNA”
Quincy Moore Sonia Petecka
Amy Ni Ryan Peterson
Kristin Olsson
Sarah Philips (David Walt)
“Development of a Ligation-based Assay to Genotype Mitochondrial SNPs to Trace Maternal Ancestry Using a Low-cost Readout”

Student Awards and Honors
Herbert Samuels
Taha Shikari
Jennifer Shusterman
Andy Siref
Allison Stevens
Rebecca Thrower
Tjani Warren
Erica Weinberg

The Benjamin G. Brown Scholarship
Jenny M. Karo

The Alex Elias Memorial Prize Scholarship
Daniel C. Cook

The R. M. Karapetoff Cobb Chemistry Fund
Diana ye Luand
Elizabeth V. Philbrick

The Durkee Scholarships
Daniel C. Cook
Kaitlin A. Minnehan
Jaewon Lee

The Margaret Durkee Angell and Henrietta Brown Durkee Scholarship Fund
Yilun Li

The N. Hobbs Knight Prize Scholarship in Physics
Keith D. Hofmann

The Max Tishler Prize Scholarship
Soshian Sarrafpour
Yevgeniy V. Serebrenik

The William Frank Wyatt Prize
Dane T. Lemberger

The Howard Sample Prize Scholarship in Physics
Davis M. Vigneault

The Elizabeth Verveer Tishler Prize in Music Performance
Matthew R. Davis

14th Annual Graduate Student Research Symposium 2nd Place:
Heather L. Tierney, graduate student

Summa Cum Laude Graduates
Nina Castelnuovo Yilun Li
Daniel C. Cook Hayley Marcus
Jaewon Lee

Magna Cum Laude Graduates
Keith Hofmann Amy Ni
Alex Sun Phil Huh Sonia A. Petecka
Jenny M. Karo Jennifer Shusterman
Kaitlin A. Minnehan

Cum Laude Graduates
Rachel Anderson Quincy Moore
John K. Eaton Jr. Sarah Philips
Prashanth H. Haran Andy Siref
Robert Matera Allison M. Stevens

Summer Scholars
John Eaton Soshian Sarrafpour
Zachary Fang Timothy Straub

Faculty Awards and Honors
Samuel Kounaves
2009 NASA Achievement Award “For outstanding performance in the planning and execution of the science for the Phoenix Mars mission”; 2009 NASA Achievement Award “For outstanding achievement in the development and operation of the Phoenix spacecraft leading to the first landing in the Martian arctic.”
Joshua Kritzer
Smith Family Award for Excellence in Biomedical Research, Smith Family Foundation
Elena Rybak-Akimova
Promoted to Professor
E. Charles Sykes
National Science Foundation CAREER Award (2009); International Union of Pure and Applied Chemistry Young Observer Award (2009)
Samuel Thomas
2010 Synthesis/Synlett Journal Award
David Walt
2010 ACS National Award for Creative Invention; Elected member of the National Academy of Engineering; Elected Fellow of the American Institute for Medical and Biological Engineering (AIMBE)

Semester Achievement Awards
FALL 2009
Faculty: Krishna Kumar
Staff: Sarah Iacobucci
Teaching Assistant: Christian Zeigler

SPRING 2010
Faculty: Joshua Kritzer
Staff: Michael Lanza
Teaching Assistant: Michael Consoletti
Chemistry Degrees and Awards

Presented 2010–2011

Doctoral Degrees Awarded
Ashleigh E. Baber (E. Charles Sykes)
“Nanoscale Studies of Molecules, Metals and Alloys”

Deni F. Del Sesto (Arthur Utz)
“The Role of Thermally Excited Vibrations in Gas-Surface Reactions: Methane on Ni (111) and Ir (111)”

Erin V. Iski (E. Charles Sykes)
“Assembly, Chirality, and Polymorphism of Large Molecules on Metal Surfaces”

Olga Makhlynets (Elena Rybak-Akimova)
“Aromatic Hydroxylation at a Non-Heme Iron Center: Insights into the Nature of the Metal-Based Oxidant”

Todd Pagano (Jonathan Kenny)
“Fluorescence Studies of Inner Filter Effects, Oxygen Quenching, and the Phenolic content of Dissolved Organic Carbon”

Diren Pamuk (Krishna Kumar)
“Design and Engineering of New Glucagon Like Peptide-1 Analogues”

Heather L. Tierney (E. Charles Sykes)
“Understanding and Controlling Rotation at the Single-Molecule Level”

Wanhua Ye (Elena Rybak-Akimova)

Master’s Degrees Awarded
Thomas A. Considine (Albert Robbat)
“On-Site Profiling and Speciation of Subsurface 1 Pollutants at Hazardous Waste Sites”

Isaac Gooshaw Robert Schuster
Albert Kennedy Wanhua Ye

Bachelor’s Degrees Awarded
Leonard Ashu
Julia Carlson
Douglas R. Cohen

Victoria Eastman (Samuel Thomas)
“The Effect of Electron Withdrawing Groups on Functional Conjugated Systems”

Zachary Fang
Scott Fredrickson
Matthew Hibert
Samuel Johnson
Daniel Chang Kim
Louis Y. Lee
Dane Lemberger
Steven Li
Kevan John Mamdouhi
Gregory Marecki
Eric A. Mehta
David S. Meyer

Aleksandar Mijailovic
Andrew Morgenthaler
Elizabeth Philbrick
Soshian Sarrafpour
Yevgeniy V. Serebrenik
Suzanne N. Shapira
Karen Shmelev
Steven Smith
Adam G. Snider
Timothy J. Straub
Davis M. Vigneault
May Kwang-Mei Wang

Student Awards and Honors
The Audrey Butvay Gruss Science Award
Elizabeth V. Philbrick, A’11

The Class of 1947 Victor Prather Prize
Soshian Sarrafpour, A’11
Suzanne N. Shapira, A’11

The R. M. Karapetoff Cobb Chemistry Fund
Anita Geverghese, A’12
Mengfei Wu, A’12

The Durkee Scholarships
Soshian Sarrafpour, A’11
Suzanne N. Shapira, A’11
Davis M. Vigneault, A’11

The Margaret Durkee Angell and Henrietta Brown Durkee Scholarship Fund
Elizabeth V. Philbrick, A’11

The Max Tishler Prize Scholarship
Adam L. Shepro, A’12
Mengfei Wu, A’12
Zachary T. Solomon, A’12
Michael C. Yi, E’12

Summa Cum Laude Graduates
Aleksandar Mijailovic
Yevgeniy V. Serebrenik
Elizabeth Philbrick
Soshian Sarrafpour

Magna Cum Laude Graduates
Douglas R. Cohen
Gregory Marecki
Suzanne N. Shapira

Cum Laude Graduates
Julia Carlson Andrew Morgenthaler
Matthew Hibert Karen Shmelev
Eric A. Mehta May Kwang-Mei Wang

Summer Scholars
Matthew Davis
Chelsea Hogan
Michael Lacy

Faculty Awards and Honors
Krishna Kumar
Award for Excellence in the Chemical Sciences (2011), Indian Society of Chemists and Biologists
E. Charles Sykes
Awarded tenure and promoted to Associate Professor, University of Minnesota, Chemistry, Dow Lecturer, 2011

Arthur Utz
Tisch Faculty Fellow

David Walt
2010 University of Michigan Distinguished Innovator Lecturer; 2010 Stony Brook University Distinguished Alumni Award

Semester Achievement Awards
FALL 2010
Faculty: Lynne Batchelder
Staff: Ashley Bens
Teaching Assistant: Robert Pavle

SPRING 2011
Faculty: Robert Dewald
Staff: James Maddox
Teaching Assistant: Amanda Kowslick
Doctoral Degrees Awarded

Victoria Campbell (Arthur Utz)  “State Resolved Measurements of Surface Temperature Dependence and Isotopically Selective Reactivity of Methane on Ni (111)”

Yulia Ivanova (Krishna Kumar)  “Exon-Coded Polypeptides as Primordial Enzymes”

Jennifer Rego (Hyunmin Yi)  “Biologically Inspired Strategy for the Assembly of Viral Building Blocks with Controlled Dimensions”

Shannon Stroble (Samuel Kounaves)  “Geochemical Analysis of Soils from Extreme Environments on Earth and Mars”


Zhao Liu (Krishna Kumar)  “Modification of the Ganglioside GM1 to Facilitate Imaging and Functional Studies”

Master’s Degrees Awarded

Alison Brandeis
Michael Consoletti
Nkengafeh Asong
Shawn Kowal

Bachelor’s Degrees Awarded

Jocelyn Wai-Pui Chan
Kristen Anne Davenport
Matthew R. Davis (Joshua Kritzer)  “Iterative Design of Cyclic and Bicyclic Peptide Inhibitors of Matrix Metalloproteinases 9 and 2”
Sabrina Mara Dorfmann
Colin William Etzel
Victoria Oluwafunmito Fashakin
Anita Geevarghese
Patric William Gibbons
Cheyenne R. Hogan
Elizabeth Grace Iuppa
Lauren Morrell Kidd
Michael M. Lacy (David Walt)  “Development of a DNA Assay Based on Digital Quantification of Single Molecules by Total Internal Reflection Fluorescence Microscopy”

Student Awards and Honors
The R. M. Karapetoff Cobb Chemistry Fund
Lianne T. Ho, A’13  Eriene-Heidi I. Sidhom, A’13

The Durkee Scholarships
Anita Geevarghese, A’12  Adam H. Trotta, A’12
Adam L. Shepro, A’12

The Margaret Durkee Angell and Henrietta Brown Durkee Scholarship Fund
Mengfei Wu, A’12

The Max Tisher Prize Scholarship
Daniel I. Kulla, A’13  Eriene-Heidi I. Sidhom, A’13
Alexandru P. Saker, A’13

The Etta and Harry Winokur Award for Outstanding Achievement in Artistic or Scholarly Work
Zachary T. Solomon, A’12

The Resumed Education for Adult Learners Prize Scholarship
Ismael F. Rivera, A’12

The Laminan Prize in Romance Languages
Sabrina M. Dorfmann, A’12

Summa Cum Laude Graduates
Anita Geevarghese  Jamie L. Thompson
Rushabh Sharad Shah  Adam H. Trotta
Adam L. Shepro  Mengfei Wu

Magna Cum Laude Graduates
Kristen A. Davenport  Syena Sarrafpour
Matthew R. Davis  Zachary T. Solomon
Patric Gibbons  Marc L. Turner
Michael M. Lacy  Gianna L. Wilkie

Cum Laude Graduates
Sabrina Mara Dorfmann  Chelsea R. Hogan
Allister F. McGuire  Carol Moraff
Ismael F. Rivera  Nitin Shrivastava

Dewald Summer Scholars
Eriene-Heidi Sidhom  Jordan Sisel

Summer Scholars
Mishan Blecher  Jeremy Nowak

Faculty Awards and Honors
Jonathan Kenny
Tisch College Faculty Fellow

Mary Jane Shultz
Elected Fellow of the American Association for the Advancement of Science

E. Charles Sykes
Camille Dreyfus Teacher Scholar
Award, The Camille and Henry Dreyfus Foundation

Semester Achievement Awards
FALL 2011  Faculty: E. Charles Sykes  Staff: Kalopy Kaliontzis  Teaching Assistant: Taryn Palluccio

SPRING 2012  Faculty: Sergiy Kryatov  Staff: Kasey Hartnett  Teaching Assistant: Tao Xu
Chemistry Degrees and Awards

Presented 2012–2013

Doctoral Degrees Awarded
Gizem Akçay (Krishna Kumar)
“Convergent Synthesis Approach for Stereospecific Preparation of Fluorinated Carbohydrates in Exploration of Cell Surface Receptor-Ligand Interactions”

Nan Chen (Jonathan Kenny)
“State-Resolved Reactivity and Bond-Selective Control of Methane on Ni (111)”

April Jewell (E. Charles Sykes)
“Atomic Diffusion and Molecular Self-assembly on Metal Surfaces”

Sreevidhya Tarakkad Krishnaji (David Kaplan)
“Sequence-Structure-Property Relationships of Recombinant Spider Silk Block Copolymers”

Subrahmanian Tarakkad Krishnaji (Krishna Kumar)
“Novel Lipidated Compounds for Delivery and Function”

Master’s Degrees Awarded
Kaitlyn Folds
Jennifer Geldart Flashman
Victoria Hansen
Wei-En Lin
Carolyn Lipovsky
Morgan Marx
Aaron Phillips
Zhongyuan Sun
Thy Vu
Tao Xu

Bachelor’s Degrees Awarded
Ankita Agarwal
Mishan Blecher
Robert Cerulli
Panharith Chum (Peter A Bullock)
“Development of a High-Throughput Assay for JC Virus Replication”

Derek DuPont
Ryan Flanagan
Keerthana Gnanaradeepan
Ian Grant
Gil Han
Lianne Ho
Daniel Kulla
Evan Lin
Bryce Meyer
Evan Murray

Jeremy Nowak (Arthur Utz)
*Methane Activation on Model Catalysts and the Effects of Vibrational Excitation on Methane Reactivity*

Jonathan Poli
Alexander Sakers (David Walt)
“Development of Droplet Microfluidics For Single Cell Genetic Analysis”

Eriene-Heidi Sidhom (Krishna Kumar)
“Synthesis of a Ganglioside GM1 Anchor for Membrane Tethered Ligands of G-Protein Coupled Receptors”

Jordan Sisel
Chad Taniguchi
Christopher Toole
Raymond Wang
Pianpian Wu
John Yu

Student Awards and Honors
The Audrey Butvay Gruss Science Award
Robert Cerulli, A’13

Constantine Ghikas Prize in Romance Languages
Ian Grant, A’13

The Durkee Scholarships
Bryce Meyer, A’13
Jeremy Nowak, A’13
Alexander Sakers, A’13
Eriene-Heidi Sidhom, A’13

The Class of 1947 Victor Prather Prize
Alexander Sakers, A’13
Eriene-Heidi Sidhom, A’13

The Margaret Durkee Angell and Henrietta Durkee Scholarship Fund
Eriene-Heidi Sidhom, A’13

The R.M. Karapetoff Cobb Chemistry Fund
Stacey Berkowitz, A’14
Yu Li, A’14

The Max Tishler Prize Scholarship
Joshua Levy, A’14
Yu Li, A’14
Max Zhukovsky, A’14

Howard Sample Prize Scholarship in Physics
Joshua Levy, A’14
Yu Li, A’14

Summa Cum Laude Graduates
Ian Grant
Jeremy Nowak
Lianne Ho
Alexander Sakers
Daniel Kulla

Magna Cum Laude Graduates
Robert Cerulli
Ryan Flanagan
Pianpian Wu

Cum Laude Graduates
Mishan Blecher
Derek DuPont
Keerthana Gnanaradeepan
Jordan Sisel

Dewald Summer Scholars
David Bass
Stacey Berkowitz

Summer Scholars
Doug Davis
Edward Rodionov
Samuel Touchette

Faculty Awards and Honors
Krishna Kumar
Elected Fellow of the American Association for the Advancement of Science

E. Charles Sykes
American Vacuum Society Peter Mark Memorial Award

Summer Scholarships
Doug Davis
Ed Rodionov
Samuel Touchette

Semester Achievement Awards
FALL 2012
Faculty: Arthur Utz
Staff: Ashley Bens
Teaching Assistant: Carolyn Lipovsky

SPRING 2013
Faculty: Samuel Thomas
Staff: David Wilbur
Teaching Assistant: Alexandra (Sasha) Zaitsev

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Chemistry Degrees and Awards

Presented 2013–2014

Doctoral Degrees Awarded

Patrick Bisson (Mary Jane Shultz)
“Hydrogen Bonding in the Prism Face of Ice—A study via Sum Frequency Vibrational Spectroscopy”

Faith Dukes (Mary Jane Shultz)
“Differing Photo-oxidation Mechanisms: Electron Transfer in Titanium Dioxide vs. Modified Titanium Dioxide”

Patricia Gumbley (Samuel Thomas)
“Photochemical Control of the Solubility and Electrostatic Properties of Polymer Materials”

Yongli Huang (Arthur U tz)
“State-Resolved Measurements of CH4 and CHD3 Dissociation on Ni (III)”

Timothy Lawton (E. Charles Sykes)
“Structure Sensitive Chemistry: From Oxidation to Surface Explosions”

Kyle McElhoney (Samuel Kounaves)
“Analysis of Martian Soil: Results and Future Directions”

Shuai Nie (David Walt)
“Saliva Diagnostics for Respiratory Diseases Using an Automated Integrated Platform”

Glen O’Neill (Samuel Kounaves)
“Development of Carbon Nanomaterial-Based Sensors for Applications in a Microfluidic Total Analysis System”

Robert Pawle (Samuel Thomas)
“Controlled photochemistry: photochemical synthesis of a photosensitizing solid state geometry of organic semiconductors with side-chain main chain interactions”

Venkata Subrama Raman (Krishna Kumar)
“Protein Design for Construction of Therapeutic Peptides”

Tuan Vu (Mary Jane Shultz)

Christina Zamora (Krishna Kumar)
“What goes on must come off! Human sialidases as regulators of orthogonal glycobiology”

Master’s Degrees Awarded

Mathew Eshelman
Michael Mattera
Rui Liang

Bachelor’s Degrees Awarded

Sama Abdul-Aziz
Tabitha Amondi (Rebecca Scheck)
“Mutations Investigation Experiment”

David Bass (Joshua Kritzer)
“Production of Lipid homing pepducins”

Stacey Berkowitz
Kevin Campbell
Justin Chang
Connor Clairmont
Courtney Connelly
Edward De Leo
Garrett Friedman
Gregory Galanti
Kevin Gao

John Lawrence III (Charles Mace)
“Building photoreactive poly(thiophene) semiconductors using polymer(electrolyte) multilayers and layer-by-layer (LBL) assembly”

Joshua Levy
Nathan Lingafelter
Yu Li
Brian Pedro (David Walt)
“Metabolic Signaling in Triple Negative Breast Cancer”

Aaron Penner
Edward Rodionov
Qiu Ruan
Samuel Touchette (Clay Bennett)
“Directing Group Free Synthesis of the S. pneumoniae Serotype 6B”

Benjamin Van Deuseen
Avesta Yaqubi
Harris Wild
Max Zhukovsky

Student Awards and Honors

The R.M. Karapetoff Cobb Chemistry Fund
Julia L. Goldberg, A’15
Sarah N. Innis-Gold, A’15
Alice A. Haouzi, A’15

The Durkee Scholarships
Joshua I. Levy, A’14
Austen Hsieh, A’14

The Margaret Durkee Angell and Henrietta Durkee Scholarship Fund
Tabitha Amonti, A’14

The Max Tishler Prize Scholarship
Julia L. Goldberg, A’15
Matthew J. Ryan, A’15

The Joseph and Sara Stone Prize
John Thomas Slakey, A’14

The Resumed Education for Adult Learners Prize Scholarship
Nicholas Eric Jonas, A’14

The Donald A. Cowdery Memorial Scholarship
Nicholas Eric Jonas, A’14

The Audrey Butvay Gruss Science Award
Alexandra Brumberg, A’15

The Class of 1947 Victor Prather Prize
Joshua Levy, A’14

Summa Cum Laude Graduates
Joshua Levy

Magna Cum Laude Graduates
Sama Abdul-Aziz
Nicholas Jonas
Connor Clairmont
Young Joo
Austin Hsieh
Edward Rodionov
John Lawrence III
Kevin Gao

Cum Laude Graduates
Stacey Berkowitz
Kevin Campbell
Edward De Leo
Garrett Friedman
Gregory Galanti
Nicholas Jonas

Dewald Summer Scholar
Francis Aapeadu-Mensah

Summer Scholars
Michael Bird
Matthew Ryan
Courtney Chiu

Faculty Awards and Honors

Samuel Kounaves
Elected Fellow of the American Association for the Advancement of Science; Promoted to Professor

Joshua Kritzer
Tufts Undergraduate Initiative in Teaching Excellence (UNITE) Award

E. Charles Sykes
Promoted to Professor

Samuel W. Thomas
Tufts Teaching with Technology Award

David Walt
American Chemical Society Division of Analytical Chemistry Spectrochemical Analysis Award 2013; Pittsburgh Analytical Chemistry Award 2013

Semester Achievement Awards

FALL 2013
Faculty: Joshua Kritzer
Staff: Larry Aulenback
Teaching Assistant: Nicole Kfoury

SPRING 2014
Faculty: E. Charles Sykes
Staff: Karen O’Hagan
Teaching Assistant: Dina Lloyd

Staff:
Teaching Assistant:
Faculty:

Chemistry Degrees and Awards

Presented 2014–2015

Doctoral Degrees Awarded

Patrick M. Antle (Albert Robbat)
“Improvements in the GC/MS Analysis of Polycyclic Aromatics in Fossil Fuels: Sampling, Separation, and Assessment”

Brandi L. Carrier (Samuel Kounaves)
“Perchlorate on Mars: Evidence, Origins, and Implications”

Celeo R. Guifarro (Elena Rybak-Akimova)

Amanda L. Kowalsick (Albert Robbat)
“Metabolomic Profiling of Natural Products”

Emily A. Lewis (E. Charles Sykes)
“A New Approach to Studying Cobalt’s Surface Using Cobalt Nanoparticles”

Colin J. Murphy (E. Charles Sykes)
“Controlling Molecular Motion, Assembly and Coupling as a Step towards Molecular Actuators”

Son H. Nguyen (Clay Bennett)

Student Awards and Honors

The Prize Scholarship of the Class of 1882
Michael J. Bird, A’16

The Fredrick Melvin Ellis Prize
Allen Lee Yau, A’15

The Karo Dean’s Award for Academic Excellence and Leadership
Adrian Devitt-Lee, A’15

The Class of 1947 Victor Prather Prize
Matthew J. Ryan, A’15

The R. M. Karapetoff Cobb Chemistry Fund
Stephanie M. Cohen, A’16 Jessica N. Spradlin, A’16

The Durkee Scholarships
Sarah N. Innes-Gold, A’15 Matthew J. Ryan, A’15

The Margaret Durkee Angell and Henrietta Brown Durkee Scholarship Fund
Julia L. Goldberg, A’15

The Max Tishler Prize Scholarship
Michael J. Bird, A’16 Jessica N. Spradlin, A’16

Summa Cum Laude Graduates
Julia L. Goldberg Cheyenne E. Martinez
Alice A. Haozui John D. Patterson
Sarah N. Innes-Gold Matthew J. Ryan
Sara J. Khostroujerdi Allen Lee Yau

Magna Cum Laude Graduates
Mark Bernardo Laura A. Washburn
Isabel A. Cuervo

Cum Laude Graduates
Laura P. Araavna Robert J. Plummer
Emi J. Komatsu Kian M. Tehranchi
Sarah A. Marakos Stephen A. Thompson

Beckman Scholars, 2015
Jessica Dabrowski

Illumina Fellows
John Paul Issa

Bachelor’s Degrees Awarded

Adam M. Jacob Joshua A. McInden
Layne M. Keating Reyna E. Niner
Sara J. Khosroowjerdi John D. Patterson
Emi J. Komatsu Kevin A. Perez
Adam J. MacNeill Robert J. Plummer
Sarah A. Marakos Zaid R. Rajaratnam
Cheyenne E. Martinez Dane S. Roberts

Student Awards and Honors

The Prize Scholarship of the Class of 1882
Michael J. Bird, A’16

The Fredrick Melvin Ellis Prize
Allen Lee Yau, A’15

The Karo Dean’s Award for Academic Excellence and Leadership
Adrian Devitt-Lee, A’15

The Class of 1947 Victor Prather Prize
Matthew J. Ryan, A’15

The R. M. Karapetoff Cobb Chemistry Fund
Stephanie M. Cohen, A’16 Jessica N. Spradlin, A’16

The Durkee Scholarships
Sarah N. Innes-Gold, A’15 Matthew J. Ryan, A’15

The Margaret Durkee Angell and Henrietta Brown Durkee Scholarship Fund
Julia L. Goldberg, A’15

The Max Tishler Prize Scholarship
Michael J. Bird, A’16 Jessica N. Spradlin, A’16

Summa Cum Laude Graduates
Julia L. Goldberg Cheyenne E. Martinez
Alice A. Haozui John D. Patterson
Sarah N. Innes-Gold Matthew J. Ryan
Sara J. Khostroujerdi Allen Lee Yau

Magna Cum Laude Graduates
Mark Bernardo Laura A. Washburn
Isabel A. Cuervo

Cum Laude Graduates
Laura P. Araavna Robert J. Plummer
Emi J. Komatsu Kian M. Tehranchi
Sarah A. Marakos Stephen A. Thompson

Beckman Scholars, 2015
Jessica Dabrowski

Illumina Fellows
John Paul Issa

Master’s Degrees Awarded

Sinem Guven Alexandra Zaitsev

Bachelor’s Degrees Awarded

Helen Achwee Isabel A. Cuervo
Laura P. Araavna Julia L. Goldberg
Thomas W. Atmer Alice A. Haozui
Mark Bernardo Andrew T. Hyde
Sarah N. Innes-Gold (Charles Mace)
“Using Buoyancy to Control the Patternning of Janus Particles at the Interface of Immiscible Liquids”

Faculty Awards and Honors

Krishna Kumar
Graduate School of Arts & Sciences Teaching and Mentoring Award

Albert Robbat
Research recognition award for Metabolomic Profiling by 2D GC/MS at the 40th International Symposium of Capillary Chromatography in Riva Del Garda, Italy

Rebecca Sheck
Smith Family Award for Excellence in Biomedical Research, Smith Family Foundation

Robert Stolow
Honored by the American Chemical Society as a 60-year member

Samuel Thomas
Awarded tenure and promoted to Associate Professor

David Walt
Honorary Doctor of Science, Stony Brook University; ACS Gustavus John Esselen Award; Named University Professor, Tufts University

Semester Achievement Awards

FALL 2014
Faculty: Charles Mace
Staff: Ashley Bens
Teaching Assistant: Eric High

SPRING 2015
Faculty: Joshua Kritzer
Staff: Kasey Shubert
Teaching Assistant: Joseph Chiarelli
Chemistry Degrees and Awards

Presented 2015–2016

Doctoral Degrees Awarded

Emel Adalgilig (Krishna Kumar)
“Discovery and Development of Antibiotics Composed of D-Amino Acids”

Amanda Aldous (Joshua Kritzer)
“Metal Binding and Catalytic Activity of Macrocyclic Peptides”

Esra Altinok (Samuel Thomas)
“Singlet Oxygen Responsive Samll Molecules and Polymers”

An-Hsiang Chu (Clay Bennett)
“Toward a User-Friendly Stereoselective Single Molecule Enzymology Using Fmefotiole Aries”

Jason Nogueira (Clay Bennett)
“Tackling the glycosylation of 2-deoxy-sugars: A reagent-controlled approach utilizing cyclopropenium cations for the □-selective glycosylations of 2-deoxy-, 2,6-dideoxy-, and 2,3,6-trideoxy-sugars”

Timothy Siegert (Joshua Kritzer)
“Identification of Loop Mediated Protein-Protein Interactions and Design of Cyclic Peptide Locked Loop Inhibitors”

Sezin Yigit (David Kaplan)
“Recombinant Fibrous Protein Production and Applications”

Master’s Degrees Awarded

Rom Baral
Danielle Bright
Brendan Duran

Bruce Bausk
Samuel Berry
Daniel Bright

Christopher Blackwood
Alexandra Brumberg

Ashley Bucklin
Ortega Jose Caballero
Peter Cavanagh

Clifford Chao
Courtney Chiu
Stephanie Cohen

Joshua Goloubovsky

Caitlin Keenan
“Developing ‘hot-loop’-inspired cyclic peptides to inhibit the oncogenic Skp2-Cks1 protein-protein interaction”

Catherine Loomis
Monil Patel

Jordin Metz
“‘The Role of Hydroxyl Radical in Ultranano TiO2 Photo-oxidation’

Matthew Moser
Kevin Nga

Marissa Rodenstein
“Synthesis of Lipidated Peptides as Potential Therapeutics”

Julia Rogers
“Computational Design of Glycopeptides and Cyclic Peptides”

Chrisanthe Salemis
Diana Sapashnik

Matthew Shackat
Jessica Spradlin

Bradley Tishman

Yili Zhao

Student Awards and Honors

The Frederick Melvin Ellis Prize
Matthew Moser, A16

The Karno Dean’s Award for Academic Excellence and Leadership
Laura Quintero, A18

The Class of 1947 Victor Prather Prize
Michael Bird, A16

The R.M. Karapetoff Cobb Chemistry Fund
Jessica Dabrowski, A17

The Durkee Scholarships
Michael Bird, A16
Joshua Goloubovsky, A16

The Margaret Durkee Angell and Henrietta Brown Durkee Scholarship Fund
Marissa Rodenstein, A16

The Max Tishler Prize Scholarship
Xizhao Chen, A17

The Boson Greek Prize
Xizhao Chen, A17

The Norbert Wiener Award in Mathematics
Adrian Devitt-Lee, A16

The Outstanding Achievement Award in the Department of Music
Kristen Hsu, A16

The Anne E. Borghesani Memorial Prize
Nicholas Roberts, A17

Summa Cum Laude Graduates
Michael Bird
Alexandra Brumberg
Stephanie Cohen
Laura Coughlin
Joshua Goloubovsky
Adam Hildebrand
Caitlin Keenan

Liang Ma

Zili Zhao

Magna Cum Laude Graduates
Daniel Brown
Ashley Bucklin
Peter Cavanagh
Clifford Chao
Courtney Chiu
Michael Curley

Dewald Summer Scholars
Nile Abularrage

Summer Scholars
Zixhao Chen
Nicholas Dechiara
Jasper Du

Kirsten Hsu

Faculty Awards and Honors
Clay Bennett
Awarded tenure and promoted to Associate Professor

Samuel Kounaves
Elected Fellow of the Royal Society of Chemistry

Joshua Kritzer
Awarded tenure and promoted to Associate Professor

Krishna Kumar
Appointed Robinson Professor of Chemistry

Yu-Shan Lin
CELT Faculty Fellow

Charles Sykes
Elected Fellow of the Royal Society of Chemistry

David Walt
Ralph N. Adams Award in Bioanalytical Chemistry

Semester Achievement Awards
FALL 2015

Faculty: Yu-Shan Lin
Staff: Lawrence Aulenback
Teaching Assistant: Marc Piquette

SPRING 2016

Faculty: Joshua Kritzer
Staff: Lawrence Aulenback
Michael Lanza
David Wilbur
Teaching Assistant: Kassandra Spiller

Teaching Assistant:

Staff:

Faculty:

Teaching Assistant:

Staff:

Faculty:

Teaching Assistant:

Staff:

Faculty:

Teaching Assistant:

Staff:
IN MEMORY

Dr. Christine Jaworek-Lopes passed away on Saturday, May 21, 2016, after a courageous 16-month battle with colon cancer. Christine was the beloved mother of Cassie (10) and Zach (9); and two step-daughters, Abby (18) and Lindsay (16); and the wife of Joshua Lopes.

Christine graduated as the salutatorian of her class at Palmer High School in Massachusetts, received a B.S. and Ph.D. from Tufts University, and was an Associate Professor of Chemistry at Emmanuel College, where she served as the Chair of the Department of Chemistry and Physics. At Tufts University and Emmanuel College, she was known for her infectious smile, her positive outlook, and her passion for teaching. Her students and colleagues at both Tufts University and Emmanuel College saw her as a mentor, supporter, teacher, and inspiration. While at Tufts, Christine received the “Teaching Assistant of the Year” award. At Emmanuel College, she was beloved by her students and they fondly called her Dr. J-Lo. Her joy of teaching was seen by students in and out of the classroom and the Chemistry Club and the Science Living-Learning Community flourished under her leadership. As Chair, she secured external funding for state-of-the-art instrumentation and faculty development. On the recommendation of her colleagues at Emmanuel College, the faculty “Excellence in Service to the Community” award was established and Christine is the first recipient. The award annually recognizes a faculty member whose actions embody a commitment to service, which Dr. Jaworek-Lopes exemplified throughout her tenure at the college. 1

Christine was an influential member of the Northeastern Section of the American Chemical Society (NESACS) where she served as a Director-at-Large, Alternate Councilor, and the National Chemistry Week (NCW) chairperson for over a decade. For NCW, Christine worked closely with the Museum of Science (MoS) in Boston and the Boston Children’s Museum, where she brought her passion for chemistry to kids by developing educational and fun hands-on activities. Under Christine’s direction, the NESACS NCW activities won several ChemLuminary awards. In 2015, Dr. Christine Jaworek-Lopes received the Henry A. Hill Award for her leadership, professionalism, and outreach in her field. Her level of dedication to bring chemistry to life and her vivid attention to detail has had, and will continue to have, a lasting impact on her many students. Recently she and a co-author completed the forthcoming textbook, Chemistry of Art: A Primer, which details the scientific principles underlying art forms ranging from photography to ceramics. 1

She was a passionate woman with a strong determination to always do everything to the best of her ability, whether as a wife, a devoted mother, daughter, sister, friend, teacher, or as a member of her community. She loved books, running, hiking, traveling, and cooking, but mostly she will be remembered as always being loving and caring. She will be greatly missed.2

IN MEMORY

Professor Dewald joined the Tufts faculty as an assistant professor of chemistry in 1965 and was promoted to full professor by 1977. Throughout those years, he led an active research program, during which he also mentored Ph.D. students and published 35 scholarly papers. “He was a man who knew how to teach and to connect with students,” Robert Jones, a graduate student in the early 1970s, said of his former professor. “He laid out the material in classic Dewald fashion; [working] the area of kinetic mechanisms with a flair of ingenuity and confidence.” After more than 25 years of research contributions, Bob shifted his attention to what many consider his greatest impact at Tufts: the education of thousands of undergraduate students in the large lecture courses, Chemistry 1 and 2. He later developed and taught an advanced introductory sequence (Chemistry 11 and 12), popular with budding science majors. Although his lectures often had 200–300 students, Bob had a reputation for knowing a great many of them, and for being readily available for private tutorials.

Bob’s lifelong interest in chemistry was sparked at Michigan State University, where as a doctoral student, he began investigating the properties of alkali metal solution in ammonia under the eminent chemist James L. Dye. Together, they went on to study in Göttingen, Germany, in the laboratory of future Nobel Laureate Manfred Eigen. While there, Bob not only conducted ground-breaking studies of the kinetics of reactions of metal-ammonia solutions, he also met his future wife Inge, who returned to the United States with him. Bob and Inge settled in Massachusetts, where they raised their two children Mark and Denise, both of whom attended Tufts.

Bob’s life would be celebrated in a service held on campus in the fall. Bob’s most enduring legacy is that of a professor who exemplified everything good in the Tufts University undergraduate teaching tradition. He will be remembered by students as a demanding but fair teacher whose courses were routinely cited as the ones at Tufts where they learned the most. Bob was known for advising students: “Sit down on a hard chair and just do it!” He was able to strike the balance between being highly supportive, while reminding students of the necessary virtues of perseverance and stamina.

When he wasn’t studying, teaching, or mentoring, Bob loved spending time in the garden, and was an expert in finding wild mushrooms. In addition to his wife and children, he was also devoted to his beloved grandchildren. He will be missed by them, as well as by his colleagues in the chemistry department and thousands of his former students, of whom he was so proud. A service celebrating Bob’s life will be held on campus in the fall.
RESEARCH

Samuel W. Thomas

The Thomas Lab: Stimuli-Responsive
Organic Materials

Stimuli-responsive materials encompass a wide variety of functional surfaces, polymers, composites, particles, etc., which show a macroscopic change in properties upon application of an external stimulus. A few examples of the many target applications of stimuli-responsive materials are chemical sensing, mechanical actuation, and targeted delivery. Researchers have designed materials that respond to a variety of stimuli, such as temperature, electrical potential, magnetic fields, chemical concentration, and light. Light has several unique characteristics that make it a particularly promising stimulus, such as control over when and where light irradiates a sample (spatiotemporal control), stoichiometry (through a combination of power and time of irradiation), and energy. Depending on its properties, light can also permeate through solid-state materials, which simplifies its delivery as a stimulus relative to more traditional chemical reagents. These features of light and its reactions with light-responsive polymers have been the cornerstone of transformative technologies such as photolithography, a key step in the fabrication of microprocessors. Recently, interest in using light to induce novel function in polymers has accelerated. The focus of our laboratory’s research is to use our grounding in physical organic chemistry to rationally design and understand the properties of new organic materials with targeted photoresponsive characteristics. More specifically, our research has focused in two areas: 1) Photochemical control of electrostatics, and 2) control of organic semiconductors.
Photochemical Control of Electrostatics

Because electrostatics are key to the intermolecular forces that dictate the behavior of molecules and collections of molecules, controlling electrostatics with light would be a powerful tool in functional materials. For example, we demonstrated that reversibly photoresponsive polymers containing photochromic spiropyran side-chains switch the sign of charge that they acquire during contact electrification (static charging) by shining light on them; before UV irradiation, the polymer develops a net negative charge upon contact with steel, whereas after UV irradiation, the polymer develops a net positive charge. This switch in sign of charging is reversed with heat or visible light. This new capability for polymers has the potential to control Coulombic forces between insulating materials in real time, and therefore has potential applications in self-assembly and anti-static materials.

Another example of photochemical control of electrostatics is the light-induced degradation of polyelectrolyte multilayer (PEM) films. We designed a cationic polymer that participated in layer-by-layer self-assembly with a commercial anionic polymer to form PEM films held together by charge-charge interactions. Our polymer was designed to eliminate the cationic side-chain upon UV irradiation and yielded a negatively charged polymer that no longer had favorable charge-charge interactions with the polyanion in the PEM film. Therefore, irradiation led to disruption of the electrostatic forces responsible for the polymer chains attraction to one another, causing the film to dissolve in irradiated areas. More recently we have demonstrated that by combining polymers with sensitivities to different wavelengths we can selectively release one guest followed by another, and also demonstrated photo-dissolvable organogels and hydrogels prepared by ring-opening metathesis polymerization.

Control of Conjugated Materials

π-Conjugated materials are an important class of semiconductors that find widespread application in sensors, transistors, and photovoltaics. Using photochemical reactions to induce useful responses in these materials in one area of recent research, we have demonstrated fluorescent response of new furan- or acene-linked conjugated polymers that show fluorescent response to photosensitized \(^{1}O_2\)-conjugated polymers to singlet oxygen, \(^{1}O_2\) which is a critical reactive oxygen species in both photodynamic therapy for cancer and in a number of harmful biological processes. Related solid-state materials are sensitive to \(^{1}O_2\) in water, while others show a thermally-reversible ratiometric fluorescent response to \(^{1}O_2\). Current efforts include building a suite of materials useful in different applications, such as quantification of low O\(_2\) concentrations in challenging environments.

A second area our lab is pursuing in light-induced control of conjugated materials is using light to alter their optical and solubility properties. Upon photochemical cleavage of nitroaromatic groups, conjugated oligomers show an increase in emission efficiency; such materials have potential as amplified photoactivatable fluorophores, in which cleavage of one fluorescence quencher could result in a dramatic increase in fluorescence quantum yield. Finally, we developed conjugated polymers with photocleavable solubilizing groups. Nearly all conjugated polymers require long alkyl side-chains to be solution processable, but these alkyl groups prevent multilayer film formation, occupy film volume with
groups that are not optoelectronically active, and promote photochemical degradation. Our polythiophene derivative with photocleavable alkyl chains behaves as a negative photoresist: it is solution processable by spin-casting, but upon irradiation becomes insoluble in toluene. More recently we have been demonstrating photolithography with conjugated polymers and thin film transistor function using related materials with optimized photocleavable groups.

In conclusion, our lab has developed a number of new materials that show useful stimuli-responsive properties. Current efforts are focused on further understanding structure-property relationships of these materials, optimization of desired responsive properties, and application development.

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Samuel Thomas has been an Assistant Professor of Chemistry at Tufts University, where his research focuses on new photoreponsive polymers, since 2009. He received a B.S. in Chemistry from the University of Rochester in 2000. After one year at Eastman Kodak, he earned his Ph.D. in 2006 under the supervision of Professor Timothy Swager at MIT. He then spent three years as a postdoctoral fellow with Professor George Whitesides at Harvard. Since starting at Tufts, Sam has received a 2009 DARPA Young Faculty Award, a 2010 Thieme Publishers Journal Award, a 2012 NSF CAREER award, and a 2013 3M Non-Tenured Faculty Award.

Figure 4 was reprinted with permission from ACS Macro Lett., 2012, 1, 825–829. Copyright 2012 American Chemical Society.

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**CHAIR’S CORNER**

Continued from page 1

fundamentally made to draw more students into Chemistry and Biochemistry earlier during their tenure at Tufts. Introductory Chemistry now ends with a few weeks of Organic Chemistry—and Carbonyl Chemistry is taught in the first semester with specialized topics reserved for the second semester. This allows pre-health students to take Biochemistry after one semester of Organic Chemistry and still understand details of metabolic cycles in molecular detail. Joshua Kritzer taught the first incarnation of Organic I and followed up with Biochemistry I and II in this revised format. The response from the students has been uniformly positive.

Renovations of the physical plant continue in the Pearson-Michael Complex. The laboratories of Professors Lin, Scheck and Mace were completely renovated and custom fitted to suit their research needs. The Analytical Chemistry teaching laboratory has recently been renovated, and Chemistry will have both a teaching and a research presence in the Science and Engineering Complex (SEC) slated for opening in 2017.

Our students have always been central to the department’s flourishing research and teaching programs. The past few years were no exception. Many of them have been awarded national and international prizes and have taken on leadership roles in the broader community. The department staff have contributed in great measure to the success of the department and continue to be the best on campus. In addition to fundamental science, the department has been a leader in transitioning technology into the real world. The success of Illumina, Inc. and the announcement of the first $1,000 genome have been enabled by the research carried out in the department.

I welcome you to come and have a look at the changes in the department and meet old friends and new members. If you wish to participate, please join the newly established alumni LinkedIn group at https://www.linkedin.com/groups/8574899. The department is poised to achieve greater success and scale new heights!
As of the Fall 2009 semester, the students enrolled in the introductory Organic Chemistry course have been performing experiments in a remodeled Organic Chemistry laboratory on the second floor of the Pearson building. The old Organic Chemistry laboratory was located on the third floor of the Pearson building. Having the remodeled Organic Laboratory on the second floor now completes the plan to have all of the teaching labs housed on the second floor of the Pearson building. This allows for more efficiency and better access to supplies, equipment, and instrumentation for all of the teaching laboratories.

A lot of time and effort went into making this space a beautiful, comfortable, energy efficient, state-of-the-art laboratory. The success of this project was a result of a concerted effort over many months with the Wise Construction Company, with Rick McLay as the project manager, and the Administration, Financial, Facilities, Chemistry, Construction, Energy, Safety, and numerous other departments at Tufts University.

The laboratory has a state-of-the-art energy-efficient HVAC system, which includes a heat recovery system. The HVAC system for the laboratory has separate zones, so that the room has maximum efficiency based upon the room occupancy and usage. For example, the intake air and exhaust air flow rate for the fume hoods goes into a low flow rate in the evenings and weekends after all occupants have left the room. The laboratory is climate controlled year-round using electronic monitors that continuously monitor the indoor and outdoor temperature and humidity.

There are 16 fume hoods in the new laboratory. Most of the hoods are Kewaunee TruView Teaching Hoods, which have glass side panels that allow for a more open teaching environment, as shown in the picture. Each hood is equipped with air, vacuum, gas, water, cup sinks, a light, metal lattice, and storage space.

Each hood is fitted with a compressed air-driven vacuum pump from PIAB Vacuum Products. These pumps are compact, highly efficient, maintenance-free, lightweight, quiet, and are energy efficient. These pumps replaced the water aspirator vacuum systems that had been used previously in the old Organic Chemistry laboratory and that used large quantities of water.

The noise level in the laboratory was also considered when designing the laboratory. The air-handling system (e.g., fans, terminal units, air-handling units) has vibration isolators, flexible ductwork connectors, and attenuation devices to minimize transmission of vibration and noise. Also, the walls are covered with sound absorbing acoustic tiles.

The laboratory is separated into two teaching sections that each hold 14 students. In each section there are eight hoods, a writing area, a presentation area, a coat and book bag storage area, and a common area for reagents, supplies, equipment, and instrumentation.

The students who have used the laboratory find the design of the room comfortable and user friendly. They enjoy having their own hood, a writing area, and state-of-the-art equipment. They are appreciative and proud of the extra effort that Tufts University put into making this laboratory highly effective and energy efficient.
September 6  Prof. Weihong Tan, University of Florida  
The Foundation of Molecular Medicine and Nanomedicine:  
A Chemical Biology Approach

September 13  Prof. Adam Willard, Massachusetts Institute of Technology  
What Can Interfacial Water Molecules Tell Us about Solute Structure?

September 20  Prof. Bradley Pentelute, Massachusetts Institute of Technology  
Precision Cellular Delivery and Discovery of Fluorine Containing  
Abiotic Macromolecules

September 27  Prof. Ke Zhang, Northeastern University  
Teaching Oligonucleotides New Tricks – A Macromolecular Approach

October 4   Prof. Marion Emmert, Worcester Polytechnic Institute  
Activating Strong Bonds and Recycling Rare Earths: Adventures in Sustainable Chemistry

October 18  Prof. Jared Lewis, University of Chicago  
Engineering Proteins for Selective Catalysis

October 27  Prof. Yves Bleriot, Universite de Poitiers  
Glycosyl Cations: From Observation to Exploration

November 1   Prof. Paul Bohn, University of Notre Dame  
Liquid-Phase Ion Traps: Bimodal Nanoarchitectures for Studies of Single Reaction Events

November 15  Prof. Will Pomerantz, University of Minnesota  
Choosing the Right Halogen: Fluorinated Bromodomains for Small Molecule Discovery

November 22  Prof. Matthieu Sologoub, Sorbonne Universites  
Cyclodextrins Selectively Modified for Bio-Inspired Applications

November 29  Prof. Phillip Christopher, University of California, Riverside  
TBA

December 6   Prof. Ross Berbeco, Brigham and Women’s Hospital  
Nanoparticles for Imaging and Dose Amplification in Radiation Therapy

All seminars are held in the Pearson Chemistry Building, 62 Talbot Ave., Rm. P106 on the Medford Campus at 4:30 PM unless otherwise noted. Refreshments will be served thirty minutes prior to the seminar in P319. For further information please contact Debbie D’Andrea at (617) 627-2649 or by email, debbie.dandrea@tufts.edu.

Visitors Are Welcome
Please complete and return this form for our alumni files, or send an email to eileen.coombes@tufts.edu. Please include news of your current activities or suggestions for the next newsletter.

Name__________________________________________

Residence Address________________________________

Address Line 2____________________________________

City, State, Zip____________________________________

Email Address_____________________________________

Phone Number_____________________________________

Degree/Year/Adviser________________________________

Business Name____________________________________

Business Address___________________________________

Address Line 2_____________________________________

City, State, Zip____________________________________

Business Phone____________________________________

Position__________________________________________

Business Email____________________________________

Name of Spouse____________________________________