# 44th National Organic Chemistry Symposium



# University of Maryland College Park, Maryland June 28 - July 2, 2015







# 44<sup>th</sup> National Organic Symposium

University of Maryland College Park, Maryland USA June 28-July 2, 2015

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# Welcome

On behalf of the Executive Committee of the Division of Organic Chemistry of the American Chemical Society and the Department of Chemistry at the University of Maryland, College Park, we welcome you to the 44<sup>th</sup> National Organic Chemistry Symposium (NOS). The goal of this biennial event is to present a roster of distinguished speakers that represent the breadth and creative advances of organic chemistry worldwide.

The first National Organic Chemistry Symposium was held December 1925 in Rochester NY under the auspices of the Rochester Section of the Division of Organic Chemistry. Subsequent meetings were held every two years until WWII. The symposia resumed in 1947 in Boston and have been held biennially since. The National Organic Chemistry Symposium is the premier event sponsored by the Division of Organic Chemistry. In 1959, the Roger Adams Award was established and the Roger Adams Award Address has become a key focus of the symposium. This 44th National Organic Chemistry Symposium consists of 14 invited speakers, the 2015 Roger Adams Awardee Larry Overman, and hundreds of posters. The lectures will be presented during morning and evening sessions at the Clarice Smith Performing Arts Center on the campus of the University of Maryland. The poster sessions will take place in the evenings from approximately 8:00 pm-11pm in the Clarice Smith Performing Arts Center, Sunday through Wednesday. The Symposium Banquet on Wednesday evening is open to all registered attendees and guests.

The University of Maryland lies in a historically rich area of the United States. The organizers have arranged several tours to these locations as well as a variety of social activities on campus. The Metro also provides good access to explore on your own and bus runs daily from the Stamp Student Union on campus to the College Park Metro Station.p In addition, we are continuing the recent tradition of an Undergraduate Context Session to define the setting of some of the lectures – all are weclome to attend. We are also adding Career Panels (Predominantly Undergraduate Institutions, Industry & Government) to this meeting for those seeking career advice.

We thank our Sponsors and our Exhibitors for providing financial support for the Symposium. We also thank the University of Maryland Conference Management group and our volunteers, including our student volunteers, for assisting with the organization of this event. Finally, thank <u>you</u> for attending and being a part of the 44th National Organic Chemistry Symposium.

Marisa Kozlowski 44<sup>th</sup> NOS Executive Officer University of Pennsylvania

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University of Maryland, College Park

# Schedule

### **SUNDAY, JUNE 28**

8:30 AM – 4:30 PM Journal of Organic Chemistry Symposium Stamp Student Union

This event is separate, but held in conjunction with the NOS. Separate registration is required.

#### All NOS Lectures Will Be In:

Dekelboum Concert Hall in the Clarice Smith Performing Arts Center Posters, Mixers, and Exhibits are in the Grand & Upper Pavilions of the Clarice Smith Performing Arts Center

The intersection of Stadium Drive and Route 193 (University Blvd), College Park, MD 20742 Clarice Smith Performing Arts Center (For Google Maps) Latitude & Longitude: 38.990777, -76.950611 (For GPS)

3:00 PM - 11:00 PM	Registration	Grand & Upper
8:00 PM - 11:00 PM	Reception and Poster Session, Exhibitor Booths	Grand & Upper Pavilions
	MONDAY, JUNE 29	
7:30 AM - Noon	Registration	Grand & Upper Pavilions
8:30 AM - 9:00 AM	<b>Opening Remarks</b> Prof. Marisa Kozlowski, University of Pennsylvania,	Dekelboum Hall Conference Chair
9.00 AM - 10.00 AM	Prof. Lyle Isaacs, University of Maryland at Col Session Chair: Erin Pelkey, Hobart and Willian David MacMillan, Princeton University	lege Park n Smith Colleges
10:00 AM - 10:30 AM	Break	Grand & Upper Pavilions

10:30 AM- 11:30 AM Matthew Gaunt, University of Cambridge		
Afternoon 11:45 AM – 6:00 PM 1:00 PM – 4:00 PM	Free Time Buses to Downtown Washington DC, Tickets to Monument (box lunch on bus; must sign up) Pick-Up Locations = Clarice Smith Performing Prince Frederick (University Housing) Sports Activities (frisbee, soccer, volleyball)	Washington Arts Center and then La Plata Beach
6:45 PM – 7:45PM 7:45 PM – 8:45 PM	Session Chair: Frances Blase, Haverford Col Mo Movassaghi, Massachusetts Institute of Te Scott Miller, Yale University	lege echnology
8:45 PM – 11:30 PM	Mixer Poster Session, Exhibitor Booths TUESDAY, JUNE 30	Grand & Upper Pavilions
7:00 AM – 7:40 AM	Fun Run	Prince Frederick Hall, College Park Marriott
9:00 AM - 10:00 AM 10:00 AM - 10:30 AM 10:30 AM- 11:30 AM 11:30 AM- 12:30 PM	Session Chair: Danielle Jacobs, Rider Universi Jeff Bode, ETH Zürich Break Abigail Doyle, Princeton University Kuiling Ding, Shanghai Institute of Organic Ch	sity Grand & Upper Pavilions nemistry
Afternoon 1:00 PM – 6:00 PM 2:00 PM – 5:00 PM	Free Time Bus to Annapolis, MD (must sign up) Pick-Up Locations = Clarice Smith Performing Prince Frederick (University Housing) Softball	Arts Center and then Engineering Softball Field
5:30 PM – 6:30 PM	Undergraduate Context Session pizza and soda will be provided	Rm 1407 Chemistry (Bldg 091)
7:00 PM – 7:15 PM 7:15 PM – 8:15 PM	Session Chair: Donna Huryn, Chair ACS Division Presentation of the Roger Adams Award 2015 Roger Adams Award Lecture Larry Overman, University of California at Irvin	of Organic Chemistry Dekelboum Hall Dekelboum Hall ne
8:15 PM – 11:00 PM	Mixer and Poster Session, Exhibitor Booths	Grand & Upper Pavilions

## WEDNESDAY, JULY 1

**Session Chair:** Valentin Rodionov, King Abdullah University of Science and Technology

8:30 AM - 9:30 AM 9:30 AM - 10:00 AM	<b>Eric Anslyn</b> , University of Texas at Austin Break	Grand & Upper Pavilions
10:00 AM - 11:00 AM 11:00 AM - 12:00 PM	Mark Ondari, The Dow Chemical Company Kenichiro Itami, Nagoya University	
Afternoon 1:30 PM – 5:00 PM	Free Time Bus to Goddard Space Center (must sign up) Pick-Up Location = Stamp Student Union	
2:30 PM – 3:30 PM	PUI Academic Career Panel: Megan Jacobson, College of Southern Idaho Katie Garber, St. Norbert College Rita Majerle, Hamline University	Rm 1407 Chemistry (Bldg 091)
3:30 PM – 4:30 PM	Industry Career Panel: TBA	Rm 1407 Chemistry (Bldg 091)
5:00 PM - 7:00 PM	Banquet	Stamp Grand Ballroom
7:15 PM - 8:15 PM	<b>Session Chair:</b> Jason Hein, University of Calif <b>Kendall Houk</b> , University of California at Los A	ornia at Merced Angeles
8:15 PM – 11:00 PM	Mixer and Poster Session, Exhibitor Booths	Grand & Upper Pavilions
	THURSDAY, JULY 2	
8:30 AM – 9:30 AM 9:30 AM - 10:00 AM	<b>Session Chair:</b> Kay Brummond, University of <b>Gary Molander</b> , University of Pennsylvania Break	Pittsburgh Grand & Upper
10:00 AM - 11:00 AM 11:00 AM - Noon Noon – 12:15 PM	Wendy Young, Genentech Anna Mapp, University of Michigan at Ann Arb Closing Remarks	or

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## The Roger Adams Award in Organic Chemistry

The Roger Adams Award in Organic Chemistry is sponsored jointly by the American Chemical Society, Organic Reactions, Inc., and Organic Syntheses, Inc. The award recognizes the distinguished career of Roger Adams, who played a vital role in each of these three organizations. He was Chairman of the Board of Directors as well as President of the American Chemical Society, and he co-founded Organic Syntheses and Organic Reactions.

The award was established in 1959 and is made biennially to an individual, without regard to nationality, for outstanding contributions to research in organic chemistry. The award consists of a gold medal, a sterling silver replica of the medal, and an honorarium of twenty-five thousands dollars. It is presented at the biennial National Organic Chemistry Symposium of the Division of Organic Chemistry of the American Chemical Society. The awardee is a featured lecturer in the program of the symposium.

The recipient of this year's Roger Adams Award is Professor Larry Overman of University of California, Irvine in recognition of outstanding contributions to research in organic chemistry. Professor Overman's Award Address, titled *Construction of Quaternary Carbon Stereocenters: A Continuing Challenge*, will be delivered on Tuesday evening.



Roger Adams Awardee

Professor Larry Overman Department of Chemistry University of California, Irvine 4042A Frederick Reines Hall Irvine, CA 92697 USA http://faculty.sites.uci.edu/overman

Presenting Tuesday June 30, 7:00 p.m.



Professor Eric Anslyn University of Texas, Austin Austin, Texas, USA

Supramolecular Methods for the Rapid Determination of Enantiomeric Excess

Presenting Wednesday, July 1, 8:30 a.m.



Professor Jeffrey W. Bode ETH Zürich Zürich, Switzerland

Cross Coupling 2.0

Presenting Tuesday, June 30, 9 a.m.



Kuiling Ding Shanghai Institute of Organic Chemistry Shanghai, China

Cooperative Catalysis in Asymmetric Synthesis and CO<sub>2</sub> Transformation

Presenting Tuesday, June 30, 11:30 a.m.



Abigail Doyle Princeton University Princeton, New Jersey, USA

New Ni-Catalyzed C(sp<sup>3</sup>) Cross-Coupling Reactions

Presenting Tuesday, June 30, 10:30 a.m.



Matthew Gaunt University of Cambridge Cambridge, England

Palladium catalyzed C–H Activation of Aliphatic Amines

Presenting Monday, June 29, 10:30 a.m.



Kenichiro Itami Nagoya University Chikusa, Nagoya, Japan

Materials- and Biology-Oriented C-H Activation

Presenting Wednesday, July 1, 11 a.m.



Kendall Houk University of California, L.A. Los Angeles, California, USA

Cycloadditions: Reactivity Models, Dynamics and Mechanisms

Presenting Wednesday, July 1, 7:15 p.m.



David MacMillan Princeton University Princeton, New Jersey, USA

The Discovery and Invention of New Chemical Reactions Using Photoredox Catalysis

Presenting Monday, June 29, 9 a.m.



Anna Mapp University of Michigan Ann Arbor, Michigan, USA

Targeting Conformationally Dynamic Proteins with Natural and Unnatural Products

Presenting Thursday, July 2, 11 a.m.



Scott J. Miller Yale University New Haven, Connecticut, USA

Searching for Selective Reactions on Complex Molecular Scaffolds

Presenting Monday, June 29, 7:45 p.m.



Gary A. Molander University of Pennsylvania Philadelphia, Pennsylvania, USA

Single Electron Transfer Transmetalation – A Novel Mechanistic Paradigm for Cross-Coupling

Presenting Thursday, July 2, 8:30 a.m.



Mohammad Movassaghi MIT Cambridge, Massachusetts, USA

Complex Alkaloid Total Synthesis

Presenting Monday, June 29, 6:45 p.m.



Mark E. Ondari The Dow Chemical Company Midland, Michigan, USA

Small Molecule Organic Light Emitting Diodes

Presenting Wednesday, July 1, 10 a.m.



Wendy Young Genentech San Francisco, California, USA

Discovery and Optimization of BTK Inhibitors

Presenting Thursday, July 2, 10 a.m.

#### Supramolecular Methods for the Rapid Determination of Enantiomeric Excess

Eric V. Anslyn

Department of Chemistry, The University of Texas, 100 East 24<sup>th</sup> St. A1590, Austin TX 78712 <u>anslyn@austin.utexas.edu</u> <u>http://anslyn.cm.utexas.edu/research/new.html</u>

The need for increasingly user-friendly and rapid assays for ee has arisen due to the advent of parallel synthesis protocols for asymmetric reaction discovery and optimization. Many studies require hundreds to thousands of assays per day. A primary goal of our group is to design and implement high-throughput screening (HTS) assays for enantiomeric excess (ee) in catalytic asymmetric reaction screening. Our approach to the HTS of ee combines supramolecular chemistry with chemometrics. We create very simple synthetic receptors that are targeted to classes of chiral functional groups, and record absorbance or circular dichroism spectra for diastereomeric or enantiomeric complex formation. The absorbance changes are created via enantioselective indicator displacement assays, while the CD spectral changes arise from multi-component assembles which form upon addition of the chiral analytes. LDA, PCA, or ANN interprets the optical data. The analysis is performed in microtiter plates where the ee values, as well as concentration (reaction yield), of 96 crude reaction mixtures can be read within 10 minutes to 2 hrs depending upon the particular assay. While the common errors for the assays are around 3-5%, new approaches lower the errors to below 1%. In addition, recent technical advances using a specialized CD spectropolarimeter drop the analysis time for 96 samples below 5 minutes while retaining accuracy. Assays for diols, amines, carboxylic acids, ketones, and alcohols have been created. Examples of each along with practical applications will be discussed.

#### **Cross Coupling 2.0**

**Jeffrey Bode** 

Laboratorium für Organische Chemie, ETH Zürich, Zürich, Switzerland; Institute of Transformative Biomolecules (ITbM), Nagoya University, Nagoya, Japan

> bode@org.chem.ethz.ch http://www.bode.ethz.ch

The rise of cross coupling methodologies has transformed the practice and development of organic synthesis. Despite phenomenal advances, there are still many classes of molecules that are not amenable to simple disconnections by cross-coupling approaches. Our group is currently developing several new forms of cross coupling chemistry, including new approaches to the one step synthesis of saturated N-heterocycles and cross-coupling approaches to the synthesis of proteins and protein–protein conjugates.



#### Cooperative Catalysis in Asymmetric Synthesis and CO<sub>2</sub> Transformation

#### **Kuiling Ding**

State Key Laboratory of Organometallic Chemistry, Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences, 345 Lingling Lu, Shanghai 200032, P. R. China kding@mail.sioc.ac.cn http://sourcedb.sioc.cas.cn/cn/expert/jg/200906/t20090621 1750792.html

The concept of "cooperative catalysis" has been recognized as one of the most powerful approaches for stimulating innovations of the processes in pharmaceutical, material and chemical industries.<sup>[1]</sup> In this talk, several case studies in our lab on the design of highly efficient molecular catalysts and the development of new sustainable process on the basis of "cooperative catalysis" will be presented, including an integrated Salen/M catalyst for asymmetric cyanation of aldehydes,<sup>[2]</sup> a bifunctional SKP/Pd catalyst for asymmetric allylic amination of MBH adducts,<sup>[3]</sup> and a new process from CO<sub>2</sub> to methanol via a hydrogenation of ethylene carbonate under mild conditions.<sup>[4]</sup>



Scheme 1. Case representation of cooperative catalysis.

#### References

- For a review, see: M. Kanai, in Organic Chemistry: Breakthroughs and Perspectives (eds. K. Ding and L.-X. Dai), Wiley-VCH, 2012, pp385-401; for the comments by T. Ikariya, T. Ooi, K. Ding, and D. Milstein, respectively, see: in Organic Chemistry: Breakthroughs and Perspectives (eds. K. Ding and L.-X. Dai), Wiley-VCH, 2012, pp401-412.
- 2. Z. P. Zhang, R. Z. Zhang, K. Ding, *Angew. Chem. Int. Ed*, **2010**, *49*, 6746, and a highlight article by M. North, *Angew. Chem. Int. Ed*. **2010**, *49*, 8079.
- SKP/Pd and the related chemistry: see: a) Z. Han, Z. Wang, X. Zhang, K. Ding, Angew Chem. Int. Ed. 2009, 48, 5345; b) X. Wang, Z. Han, Z. Wang, K. Ding, Angew. Chem. Int. Ed. 2012, 51, 936. c) X. Wang, F. Meng, Y. Wang, Z. Han, Y. Chen, L. Liu, Z. Wang, K. Ding, Angew Chem. Int. Ed. 2012, 51, 9276. c) X. Wang, P. Guo, X.B. Wang, F. Meng, Z. Wang, K. Ding, J. Am. Chem. Soc. 2014, 136, 405.
- For a leading reference, see : a) E. Balaraman, C. Gunanathan, J. Zhang, L. J.W. Shimon, D. Milstein, *Nat. Chem.* 2011, *3*, 609 ; for a review, see: b) B. Zhao, Z. Han, K. Ding, *Angew. Chem. Int. Ed.* 2013, *52*, 4744. For recent examples, see: c) Z. Han, L. Rong, J. Wu, Z. Wang, K. Ding, *Angew. Chem. Int. Ed.* 2012, *51*, 13041; d) L. Zhang, Z. Han, X. Zhao, Z. Wang and K. Ding, *Angew. Chem. Int. Ed.* 2015, *54*, 6186.

### New Ni-Catalyzed C(sp<sup>3</sup>) Cross-Coupling Reactions

Abigail Doyle

Department of Chemistry, Princeton University, Princeton, NJ, USA agdoyle@princeton.edu http://chemists.princeton.edu/doylelab/

Transition metal-catalyzed cross coupling has revolutionized the way that chemists assemble carboncarbon (C–C) bonds, including  $C(sp^3)$ –C bonds. These reactions typically involve Ni-catalyzed bond formation between alkyl halides and organometallic reagents. Our laboratory is interested in developing new activation mechanisms such that (1) more abundant and stable functional groups can be used for alkyl cross coupling and (2) the field can deliver more heteroatom- and stereochemically-rich products of value to practitioners of organic synthesis. This lecture will describe some of our recent progress in this area, including concurrent studies to improve the operational convenience and scope of Ni catalysis via the identification of new Ni pre-catalysts and ligands.



#### Palladium catalyzed C-H Activation of Aliphatic Amines

#### **Matthew Gaunt**

Department of Chemistry, University of Cambridge <u>mjg32@cam.ac.uk</u> <u>http://www-gaunt.ch.cam.ac.uk/index.shtml</u>

The development of new chemical transformations based on catalytic functionalization of unactivated C-H bonds have the potential to simplify the synthesis of complex molecules dramatically. Transition metal catalysis has emerged as a powerful tool with which to convert these unreactive bonds into carbon-carbon and carbon-heteroatom bonds, but the selective transformation of aliphatic C-H bonds is still a challenge. The most successful approaches involve a 'directing group', which positions the metal catalyst near a particular C-H bond, so that the C-H functionalization step occurs via cyclometallation. Most directed aliphatic C-H activation processes proceed through a five-memberedring cyclometallated intermediate. Considering the number of new reactions that have arisen from such intermediates, it seems likely that identification of distinct cyclometallation pathways would lead to the development of other useful chemical transformations. This lecture describes our work towards the discovery and development of palladium-catalysed C-H bond activation mode that proceeds through a four-membered ring cyclopalladation pathway. The chemistry described here leads to the selective transformation of a methyl group that is adjacent to an unprotected secondary amine into synthetically versatile nitrogen heterocycles. Also described is the evolution of this strategy into a general C-H functionalization platform that could simplify the synthesis of aliphatic primary and secondary amines, a class of small molecules that are particularly important features of many important molecules of function.

#### **Cycloadditions: Reactivity Models, Dynamics and Mechanisms**

K. N. Houk

Department of Chemistry and Biochemistry, University of California Los Angeles, California, 90095-1569 <u>houk@chem.ucla.edu</u> http://www.chem.ucla.edu/houk/

My early infatuation with cycloadditions has turned into a lifelong relationship that has become especially intense through developments in my group in the last few years. These are the subject of my talk. Fifty years ago, R. B. Woodward said to me: "Roald Hoffmann and I have predicted that the [6+4] cycloaddition should occur.<sup>1</sup> Why not look for one? The reaction of cycloheptatriene and cyclopentadiene would be a good place to start." My quest as a graduate student to explore new cycloadditions has since evolved into an adventure to understand these incredibly useful reactions in ever more exquisite detail. Our progress has been made possible in large part by the extraordinary increases in computational power engineered since the beginning of my academic career, not to mention my extraordinarily good fortune in attracting amazingly brilliant coworkers!

My lecture starts with Diels, Alder, Huisgen, and Bartlett, but mostly emphasizes the discoveries made by my extraordinary group of coworkers in the last decade.



The formulation of a Diels-Alder reaction by Diels and Alder in 1928,<sup>2</sup> shown above on the left, was in the first German journal that R. B. Woodward read as a young boy. Nowadays, we draw things differently, and quantum mechanics can even be used to compute and visualize transition states for very complex reactions, such as those that Nature uses to biosynthesize secondary metabolites. A transition structure for a cycloaddition step in the spinosyn A biosynthesis is shown above, on the right.<sup>3</sup>

I begin the lecture with an overview of the uses of cycloadditions in many areas of chemistry. I will then describe the distortion/interaction model of bimolecular chemical reactivity<sup>4</sup> that provides a comprehensive model to explain reactivities and is especially useful when combined with frontier molecular orbital theory to understand interaction energies. My talk will then turn to the molecular dynamics (MD) simulations of cycloaddition pathways, using quantum mechanical calculations to propagate trajectories.<sup>5</sup> MD allows us to have a direct look at molecules as they undergo reactions, if only theoretically. We elucidate time-resolved mechanistic details and obtain a wealth of information about geometry changes and energy redistributions as reactions occur.

For example, in the parent Diels-Alder process shown below (a), the transition state should not be considered the saddle point on the surface (b), but it is instead the family of structures on the dividing surface sampled by reacting molecules (c). The many trajectories that can occur (d) add up to a more accurate representation of how the reaction occurs in reality.



MD simulations of a number of different cycloadditions will be shown, including 1,3-dipolar cycloadditions, carbene and 2+2 cycloadditions, and a Diels-Alder reaction in water. Finally, I describe dynamic criteria of mechanisms, a time-resolved definition that complements the classic definitions that are based on potential energy surfaces and the presence or absence of intermediates.

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2. Diels, O.; Alder, K. Justus Liebig's Annalen der Chemie 1928, 460: 98-122.

3. Chen, Z.; Patel, A.; Gutierrez, O.; Houk, K. N.; Liu. H.-W.; Singleton, D. A. in preparation.

4. Ess, D. H.; Houk, K. N. J. Am. Chem. Soc., 2007, 129, 10646-10647 and subsequent articles, plus those on the equivalent Activation Strain Model by F. Matthias Bickelhaupt. 5. Black, K.; Liu, P.; Xu, L.; Doubleday, C.; Houk, K. N. Proc. Natl. Acad. Sci. USA, 2012, 109, 12860-12865 and references therein.

#### Materials- and Biology-Oriented C-H Activation

#### **Kenichiro Itami**

Institute of Transformative Bio-Molecules, Nagoya University JST-ERATO, Itami Molecular Nanocarbon Project. Chikusa, Nagoya 464-8602, Japan itami@chem.nagoya-u.ac.jp http://www.itbm.nagoya-u.ac.jp/en/members/k-itami/

The work of our group has focused on catalyst-enabling synthetic chemistry with broad directions, including applications in pharmaceuticals, plant/animal chemical biology,  $\pi$ -conjugated materials, and molecular nanocarbons. In this talk, we will describe the overview and some of our recently developed C-H activation catalysts. We have shown that the C-H activation can streamline the synthesis of pharmaceutically relevant molecules and natural products. In this talk, we will also demonstrate the power of C-H activation in the discovery of new small molecules that can control plant growth and mammalian biological clocks. We have also shown that the site-selective  $\pi$ -extension by C-H activation is an ideal methodology for preparing organic  $\pi$ -materials and molecular nanocarbons. In this talk, the controlled synthesis of nanographenes and the discovery of three-dimensional warped nanographenes enabled by C-H activation will be also described.



#### References

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- 5. A. D. Yamaguchi et al. J. Am. Chem. Soc. 2015, 137, 644.
- 6. S. Suzuki et al., Nature Chem. 2015, 7, 227.
- 7. K. Ozaki et al. Nature Commun. 2015, 6, 6251.
- 8. T. Kawakami et al. J. Am. Chem. Soc. 2015, 137, 2460.
- 9. Y. Saito et al. J. Am. Chem. Soc. 2015, 137, 5193.

- 10. T. Oshima *et al. Angew. Chem. Int. Ed.* **2015**, *54*, 7193.11. K. Muto *et al. Nature Commun.* **2015**, *6*, in press.

#### The Discovery and Invention of New Chemical Reactions Using Photoredox Catalysis

#### David W. C. MacMillan

Merck Center for Catalysis, Princeton University, Princeton, NJ 08544 dmacmill@princeton.edu http://www.princeton.edu/chemistry/macmillan/

**Abstract.** This lecture will discuss the advent and development of new concepts in chemical synthesis, specifically the application of visible light photoredox catalysis to the discovery or invention of new chemical transformations. We will also discuss a new approach to "synergistic catalysis" wherein multiple yet separate catalytic cycles can be aligned to generate activated intermediates that rapidly combine with each other, thereby allowing new approaches to enantioselective C–C and C-heteroatom bond formation.

This lecture will explore a strategy the discovery of chemical reactions using photoredox catalysis. Moreover, we will further describe how mechanistic understanding of these discovered processes has led to the design of new yet fundamental chemical transformations that we hope will be broadly adopted. In particular (i) a new catalysis activation mode that allows for the direct functionalization of ketones and aldehydes at the b-carbon position, (ii) a new synergistic catalysis approach to C–H bond functionalization, and (iii) the development of decarboxylative coupling reactions that interface with organometallic catalysis.

#### **Targeting Conformationally Dynamic Proteins with Natural and Unnatural Products**

#### Anna Mapp

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Within the chemical space of protein-protein interactions (PPIs), transient, modest affinity PPIs play a central role in a variety of cellular functions, including protein folding and transcription. Additionally, mis-regulation of this class of PPIs is at the heart of diseases ranging from cancer to neurodegenerative disorders. Despite their importance and their prevalence, transient and modest affinity PPIs are often classified as 'undruggable', with few successful strategies for small molecule modulator discovery. The challenge is multi-variable: the binding partners often have significant disorder and are thus difficult to characterize structurally alone or in complex; the surface area of the area of the interactions are considerably larger than typical protein-ligand interactions and the strengths of the interactions are modest. We will discuss two emergent strategies for the discovery of small molecule modulators of PPIs that play a key role in transcription, strategies that have produced molecules with unique potency and specificity profiles. In the first instance, small molecule co-chaperones have been discovered through the Tethering screening strategy, leading to covalent ligands that facilitate structural characterization of dynamic proteins by X-ray crystallography. Additionally, the ligands modulate the assembly state of the transcriptional coactivator target for functional applications. In the second strategy, an iterative screening method of a unique collection of natural products extracts housed at the University of Michigan has lead to coactivator inhibitors with excellent potency and high specificity for their targets.

#### **Searching for Selective Reactions on Complex Molecular Scaffolds**

#### Scott J. Miller

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Complexity is a relative term that is often used to describe features of molecules that contain multiple functional groups or which exhibit difficult-to-control dynamics. As such, the discovery of catalysts that perform selective reactions on complex substrates presents a myriad of challenges. Certain natural products may be archetypical of complex scaffolds that present challenges for the development of selective reactions. More generally, natural products have provided perennial inspiration for the development of synthetic methods. In parallel, enzymes have provided an analogous platform for the study of catalysis and the conception of new catalysts. This lecture will recount an interplay of experiments stimulated by these two major classes of naturally occurring substances - natural products and enzymes - as we have endeavored to discover catalysts that mediate selective bond-forming reactions on complex molecules. Specifically, the discovery and use of peptides as catalysts for a variety of asymmetric bond formations will be presented. Likewise, applications of these catalysts to the selective modification of complex molecules, including biologically active natural products, will be described. A particular emphasis will be placed on reactions that present unusual stereochemical An analysis of catalyst types that may be brought to bear on complex molecular challenges. environments will also be included.



#### Single Electron Transfer Transmetalation – A Novel Mechanistic Paradigm for Cross-Coupling

#### **Gary Molander**

Roy and Diana Vagelos Laboratories, Department of Chemistry, University of Pennsylvania, 231 S. 34<sup>th</sup> Street, Philadelphia, PA 19104-6323 gmolandr@sas.upenn.edu <u>http://molandergroup.chem.upenn.edu/</u>

In the archetypal palladium-catalyzed Suzuki cross-coupling reactions, a three step catalytic cycle mechanistically based on 2-electron processes is employed: oxidative addition of a halide at  $Pd^{0}$ , transmetalation of an organoboron nucleophile with an organopalladium(II) species, and reductive elimination, which releases the coupled product and regenerates the  $Pd^{0}$  catalyst. Although such methods are highly effective for  $C_{sp2}$ - $C_{sp2}$  coupling, extension to 2° and 3°  $C_{sp3}$ -hybridized organoborons has proven challenging owing primarily to lower rates of transmetalation, which is rate limiting in alkylboron Suzuki protocols operating under the traditional mechanistic manifold.

To date, strategies aimed at facilitating the transmetalation of  $C_{sp3}$  Suzuki reactions employ excess aqueous base, high temperature, or addition of stoichiometric Cu or Ag salts, thereby eliminating virtually all of the advantages of using organoborons in cross-coupling. Often, the only viable alternative is to abandon the Suzuki approach and utilize more reactive organometallic reagents. The latter not only lack bench stability and severely limit functional group tolerability, but are not configurationally stable and/or are challenging to access in enantiopure form.

The limitations of the transmetalation in the more desirable Suzuki couplings are inherent to the mechanism of this process at the most fundamental level, and thus predispose  $C_{sp3}$ -hybridized alkylborons for failure. Described is a novel single electron mechanistic paradigm for cross-coupling that avoids this problem. Thus, dual catalytic cycles are established: a photoredox catalytic cycle, generating radicals from nucleophilic organoborons, and a cross-coupling catalytic cycle that funnels these radicals into a base metal catalytic cycle that effects the cross-coupling.



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#### **Complex Alkaloid Total Synthesis**

Mo Movassaghi Massachusetts Institute of Technology movassag@mit.edu <u>http://web.mit.edu/movassag/www/</u>

Several representative enantioselective alkaloid total syntheses and related methodologies will be discussed. Of particular interest to these programs is the development of unifying synthetic strategies guided by biogenetic considerations for each alkaloid family of interest. These syntheses feature new stereo- and chemoselective reactions that enable maximum use of the inherent chemistry of intricate intermediates. Examples detailing strategic C-H functionalization in complex settings will be discussed.

#### **Small Molecule Organic Light Emitting Diodes**

#### Mark Ondari

The Dow Chemical Company ondari@dow.com http://www.dow.com

Small molecule organic light emitting diodes (OLEDs) are finding increasing applications in nextgeneration flat panel displays like smart phones, TVs and flexible displays. This interest is, in part, due to the advantages offered by the OLEDs self-emitting technology, such as low power consumption and high contrast ratio compared to liquid crystal displays (LCDs), and, in part, due to structural properties of OLED materials that make them amenable to rational and systematic modifications to tune their emission spectra as desired. However, the luminous efficiency and lifetime of OLED devices are often lower compared LCDs. These issues are especially more pronounced in low-wavelength/high-energy deep-blue fluorescent/phosphorescent OLEDs. To provide technical solutions to these challenges, researchers from the Dow Chemical Company's Core R&D have partnered with the Dow Advanced Displays business team to develop efficient small molecule OLED (SMOLEDs) as well as to gain indepth understanding of the mechanisms of device failure. This talk will introduce the basics of the OLED technology with regard to charge generation, transport and recombination, followed by a discussion on how (the often overlooked) low-level impurities could have deleterious effect on the performance of OLED devices. Examples will be provided to illustrate how we often use impurity considerations to design small molecule OLED targets and/or shape their synthetic routes.

#### **Construction of Quaternary Carbon Stereocenters: A Continuing Challenge**

Larry E. Overman

Department of Chemistry, University of California at Irvine, Irvine, CA 92697-2025 leoverma@uci.edu <u>http://faculty.sites.uci.edu/overman/</u>

When the target of a chemical synthesis endeavor contains one or more stereogenic quaternary carbons, how to assemble these quaternary stereocenters becomes a central component of synthesis planning and execution. Many factors contribute to this challenge: steric hindrance, the need generally to forge such carbon centers by C–C bond formation, and the inability to directly invert quaternary carbons. Beginning with my first publication as a graduate student,<sup>1</sup> this challenge is one that I and my co-workers have addressed on many occasions throughout my scientific career.

The lecture will begin with a brief survey of our past involvement in this area, and some observations on the remarkable progress recorded by synthetic organic chemists during the past 50 years in constructing stereogenic quaternary carbons.<sup>2</sup> The majority of the lecture will focus on one still challenging problem: joining polyfunctional organic fragments by forming both a s-bond between two sp<sup>3</sup>-hybridized carbons and a new quaternary stereocenter. The bond depicted in red in the molecules shown below illustrates this challenge. The utility of nucleophilic carbon radicals to forge such bonds will be highlighted in the lecture, as will the new opportunities in planning syntheses of molecules containing quaternary carbons that are now possible.<sup>3</sup>



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#### **Discovery and Optimization of BTK Inhibitors**

Wendy Young, Ph.D. Vice President, Discovery Chemistry Genentech, South San Francisco, CA young.wendy@gene.com www.gene.com

Bruton's tyrosine kinase (Btk) plays a critical role in the development, differentiation and proliferation of B-lineage cells, making it an attractive target for the treatment of immunological disorders such as [rheumatoid arthritis (RA), lupus, multiple sclerosis (MS)]<sup>1-4</sup> as well as B-cell malignancies.<sup>5</sup> It has been reported that 1 in 150,000 males is born with a deficiency in the Btk gene,<sup>6</sup> a condition called X-linked agammaglobulinemia (XLA), manifested by lack of immunoglobulins and B cells and first reported by Ogden Bruton in 1952.7-8 А related but less severe X-linked immunodeficiency (*xid*) in mice is also known.<sup>9-10</sup> Importantly, these *xid* mice are resistant to acquiring lupus<sup>11</sup> and collagen induced arthritis.<sup>12</sup> In addition to B cells, Btk also plays an important role in myeloid cell inflammatory cytokine production.<sup>2-4</sup> Thus, there have been significant efforts from the pharmaceutical community with the goal of identifying Btk inhibitors for clinical development.<sup>13-16</sup> Of these, the most advanced compound in oncology indications is Imbruvica®,<sup>17-18</sup> which was recently approved for the treatment of mantle cell lymphoma (MCL) and chronic lymphocytic leukemia (CLL)<sup>19</sup> and remains under evaluation in additional indications.<sup>20</sup> As of yet, there are no BTK inhibitors that have made it to advanced clinical trials in non-oncology indications, likely due to the need for high safety and tolerability.

At Genentech, we have developed a series of highly novel, selective and reversible pyridone BTK inhibitors. Compounds have excellent drug-like properties with good oral bioavailability and low/moderate clearances in preclinical species (mouse, rat, dog, cyno). Our analogs are differentiated from clinical competitors in that they are exquisitely selective and non-covalent which offers a lower tox risk profile for a chronic high bar safety indication, such as RA or Lupus. Additionally, compounds in this chemical series, were found to be highly active against C481S BTK mutant which has been identified in patients that have relapsed on Imbruvica®. SAR, crystal structures, DMPK, efficacy data, and synthetic methods from examples of this pyridone series will be described.

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Listed below are the advanced graduate students who were awarded Division of Organic Chemistry Graduate Fellowships in the past two years. All of these students are presenting a poster at the symposium. Also listed are the names of their institution, faculty research advisor, and the company that sponsored the specific award. The Division of Organic Chemistry is pleased to honor these extraordinary students and to gratefully acknowledge the substantial financial support provided by their generous sponsors.



Fellowship Winners 2013-14

Alan H. Cherney Sponsor: Amgen Calif. Inst. of Tech. Advisor: Sarah Reisman

Patrick Fier Sponsor: Organic Syn. Fellowship Univ. of Calif., Berkeley Advisor: John Hartwig

James Payne Sponsor: Nelson Leonard Fellowship University of Chicago Advisor: Jared C. Lewis

Cale D. Weatherly Sponsor: Boerhinger Ingelheim University of Wisconsin Advisor: Jennifer M. Schomaker



Fellowship Winners 2014-15

Liana Hie Sponsor: Amgen Univ. of Calif., L.A. Advisor: Neil Garg

**Gregory Lackner** Sponsor: Org. React. & Org. Syn. Univ. of Calif., Irvine Advisor: Larry Overman

Caitlin McMahon Sponsor: Boehringer Ingelheim Univ. of N. Carolina, Chapel Hill Advisor: Erik Alexanian



Eduardo Mercado-Marin Sponsor: Organic Syntheses University of California, Berkeley Advisor: Richmond Sarpong

Robert Newberry Sponsor: Nelson Leonard Fellowship University of Wisconsin-Madison Advisor: Ron Raines



#### **Travel Awardees**

Steven Banik Sponsor: DOC-NOS Travel Award Harvard *Advisor: Eric Jacobsen* 

Kaitlyn Crawford Sponsor: DOC-NOS Travel Award University of Maryland, College Park *Advisor: Larry Sita* 

Evan Darzi Sponsor: DOC-NOS Travel Award University of Oregon *Advisor: Ramesh Jasti* 

John Issa Sponsor: DOC-NOS Travel Award Tufts University Advisor: Clay Bennett

#### Travel Awardees Continued



Andrew Neel Sponsor: DOC-NOS Travel Award University of California, Berkeley *Advisor: Dean Toste* 

Nicole Serio Sponsor: DOC-NOS Travel Award University of Rhode Island *Advisor: Mindy Levine* 

Andy Thomas Sponsor: DOC-NOS Travel Award University of Illinois at Urbana Champaign *Advisor: Scott Denmark* 

Kanny Wan Sponsor: DOC-NOS Travel Award Scripps Research Institute *Advisor: Ryan Shenvi* 

#### **Travel Awardees Continued**



Alex Zhukhovitskiy Sponsor: DOC-NOS Travel Award Massachusetts Institute of Technology *Advisor: Jeremiah Johnson* 

Alina Borovika Sponsor: DOC-NOS Travel Award University of Michigan *Advisor: Pavel Nagorny* 

Philip Milner Sponsor: DOC-NOS Travel Award Massachusetts Institute of Technology *Advisor: Stephen Buchwald* 

Robert J. Sharpe Sponsor: DOC-NOS Travel Award North Carolina at Chapel Hill *Advisor: Jeffrey Johnson* 

# 44<sup>th</sup> National Organic Symposium Poster Sessions

University of Maryland, College Park Clarice Smith Performing Arts Center Grand and Upper Pavilions

#### Poster prizes were awarded each night from our sponsors Thieme (Sunday night) and Organic Letters (Monday-Wednesday nights).

#### Sunday, June 28

S-34. Andrew J. Neel. Mechanistic Studies in Chiral Anion CatalysisS-62. Gregory L. Lackner. Forming Quaternary Carbons Using Photoredox Catalysis and Applications to the T

#### Monday, June 29

M-57. John C. Tellis. Single-Electron Transmetalation: Enabling C(sp<sup>°</sup>) Cross-Coupling via Photoredox/Nickel M-67. Pablo J. Cabrera. Direct Synthesis of C4-Aryl Piperidines via Palladium-Catalyzed C–H Functionalizati

#### Tuesday, June 30

T-5. **Zhongxing Jiang.** Design and Synthesis of Novel Fluorinated Dendrimers for Highly Sensitive F MRI. T-63. **Michelle Y. Cortes.** Synthesis and Radiolabeling of Pyrimidine- based COX-2 Ligands as Candidate Probe Emission Tomography.

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#### Wednesday, July 1

W-13. Kevin B. Smith. Alkene Carboboration Enabled by Copper/Palladium Synergistic Catalysis.

W-31. Sydonie D. Schimler. Copper-Mediated Functionalization of Aryl Trifluoroborates.

W-50. Herdeline Ann Ardoña. Self-Assembling Bioelectronic Peptide Hydrogels.

SUN	SUNDAY, JUNE 28			
Q 1	Squaramide-Catalyzed Asymmetric Domino	Suruchi Mahajan,* Pankaj Chauhan,	RWTH Aachen	
3-1	1,4-/1,2-Addition Reactions	Gerhard Raabe, Dieter Enders	University	
S-2	Asymmetric Synthesis of Cyclohexane Derivatives Bearing Six Stereocenters via One- pot Organocatalytic 1,4-/1,6-/1,2-Addition Reactions	Pankaj Chauhan,* Suruchi Mahajan, Gerhard Raabe, Dieter Enders	RWTH Aachen University	
S-3	Multi-Catalyst Screening for the Asymmetric Morita-Baylis-Hillman Reaction by Mass Spectrometric Monitoring of the Back Reaction	Patrick Isenegger*, Andreas Pfaltz	University of Basel	
S-4	Rhodium Catalyzed Amination of (±)- Fluoromethylated Allylic Trichloroacetimidates	Michael Edward Vinyard*, Edo Mwenda, Hien M. Nguyen	University of Iowa	
S-5	Enantioselective Organocatalytic Formal Synthesis of Catharanthine	Simon J. Kim,* Robert A. Batey	University of Toronto	
S-6	Selective Rearrangement Reactions of Oxiran- 2-ylmethyl Tetrahydroisoqunilines	Zoltán Mucsi*, Ervin Kovács, Balázs Huszka, Ferenc Faigl, Miklós Nyerges	Budapest University of Technology and Economics	
S-7	Asymmetric Organocatalytic Chlorofunctionalization of Terminal Allenes	Nastaran Salehi Marzijarani,* Arvind Jaganathan, Bardia Soltanzadeh, Babak Borhan	Michigan State University	
S-8	Intramolecular Oxygen Transfer to the Pendant Alkene of a C-Vinyl Galactoside	Ernest G. Nolen*, Vivian C. Ezeh, Danielle LaPaglia	Colgate University	
S-9	Stereo- and Regioselective Synthesis of Aminoglycosides	Alina Borovika*, Pavel Nagorny	University of Michigan	
S-10	High-throughput Experimentation as an Enabling Tool for the Rapid Discovery and Development of an Enantioselective Synthesis	Kevin Belyk,* Hongming Li, Jinjung Yin, Qinghao Chen, Allen Hyde, Yi-Ning Ji- Chen, Matthew Tudge, Louis-Charles	Merck & Co., Inc.	

	of Chiral Hemiaminals	Campeau, Kevin Campos	
S-11	A Catalytic, Enantioselective Formal Synthesis of (+)-Dichroanone and (+)-Taiwaniaquinone H	Samantha E. Shockley,* Jeffrey C. Holder, Brian M. Stoltz	California Institute of Technology
S-12	Dihalogenation of substituted alkenes	Bardia Soltanzadeh, Arvind Jaganathan, Babak Borhan	Michigan State University
S-15	Asymmetric Chlorination/Phenol Cyclization for the Synthesis of Chromane Derivatives	Amir Khojastehnezhad,* Nastaran Salehi Marzijarani, Babak Borhan, Arvind Jaganathan	Michigan State University
S-16	Regioselective Amination of Polyols Using Borrowing-Hydrogen Methodology	Kostiantyn Marichev,* James M. Takacs	University of Nebraska-Lincoln
S-17	Nickel-Catalyzed Asymmetric Reductive Cross- Coupling Between Vinyl and Benzyl Electrophiles	Alan H. Cherney,* Sarah E. Reisman	California Institute of Technology
S-18	Mechanistic Investigations on the Intermolecular (4+3) Cycloadditions of Enantiomerically-Enriched Epoxy Enolsilanes	Pak Lam Ng,* Sarah Lam, Brian Lo, Pauline Chiu	The University of Hong Kong
S-19	Stereoselective Synthesis of the Bicyclo[2.2.2]diazaoctane Family	Jacob Robins*, Kyujin Kim*, Jonathan Scheerer	College of William and Mary
S-20	Dinitrogen Extrusion from Enoldiazo Compounds Under Thermal Conditions: Donor- Acceptor Cyclopropene Formation	Yongming Deng,* Changcheng Jing, Michael, P. Doyle	University of Texas at San Antonio
S-21	Enantioselective Arylation of Pyridinium lons	J. Patrick Lutz,* Stephen T. Chau, Abigail G. Doyle	Princeton University
S-22	Enantioselective, Copper(I)-Catalyzed Alkynylation of Oxocarbenium Ions to set Diaryl, Tetrasubstituted Stereocenters	Srimoyee Dasgupta,* Thomas Rivas, Jixin Liu, Clarissa Shoffler, Mary P. Watson	University of Delaware
S-23	Enantioselective Cycloadditions Through Catalyst Control and Chirality Transfer	Michael Conner*, Yao Xu, M. Kevin Brown	Indiana University
S-24	Enantioselective Synthesis of Cyclobutanes via Chiral Transfer [2+2] Cycloadditions	Brittany P. Witherspoon*, M. Kevin Brown	Indiana University
S-25	Study of Enantiomeric and Regioselective Arylation of Protected Olefinic Alcohols via Heck-Matsuda Reaction	Carlise Frota,* Carlos Roque Duarte Correia	Universidade Estadual de Campinas
S-26	Toward an Improved Synthesis and Chiral Resolution of Homobenzotetramisole (HBTM)	Jacob Lewis, Matthew T. Berry, Daniel Romo, Jason E. Hein	University of California, Merced; Texas A&M University
S-27	Stereoselective Heck-Matsuda Desymmetrization of meso cis-4-Cyclopenten- 1,3-diol	Rafaela C. Carmona*; Carlos Roque D. Correia	State University of Campinas
S-28	Inherently Chiral Calixarenes: Synthesis and Application	Simon A. Herbert, Dominic C. Castell, Laura J. van Laeren, Gareth E. Arnott*	Stellenbosch University
S-29	Enantioselective Alkynylations of Iminium Ions to Deliver alpha-Diaryl, Tetrasubstituted Amines	Srimoyee Dasgupta, Jixin Liu*, Mary P. Watson	University of Delaware
S-30	The Synthesis of a Diverse Oxindole Library and Counterion Effects in the Catalytic Stereoselective Synthesis of 2,3'-Pyrrolidinyl Spirooxindoles	Jacob P. MacDonald*, Benjamin H. Shupe, Joseph J. Badillo, Annaliese K. Franz	University of California at Davis
S-31	Heck-Matsuda Arylation: Stereo- and Enantioselective Synthesis of 2,3- Substituted- Dihydrobenzofurans	Allan R. Silva,* Nelson C. Martins,Carlos Roque D. Correia	State University of Campinas
S-32	Metalloalkyl Radical-mediated Reactions via Metalloradical Catalysis	Xin Cui,* Xue Xu, Courtney Smith, Li-Mei Jin, X. Peter Zhang	University of South Florida
S-33	Asymmetric Cyclopropanation of Conjugated Cyanosulfones Using a Novel Cupreine Organocatalyst: Rapid Access to delta-Amino Acids	Lewis S. Aitken,* Lisa E. Hammond, Kenneth Shankland, Geoffrey D. Brown, Sundaram Rajkumar, Alexander J. A. Cobb	School of Food, Chemistry and Pharmacy, University of Reading
S-34	Mechanistic Studies in Chiral Anion Catalysis	Andrew J. Neel*, Anat Milo, Matthew S. Sigman, F. Dean Toste	University of California at Berkeley; University of Utah
S-35	Total Synthesis of Isofagomine	Alexander W. Rand, Jeffrey S. Cannon*	Occidental College
S-36	Enantioselective Deprotonation-Substitution of	Michiko Sasaki,* Yuri Kotomori, Kei Takeda	Hiroshima University

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S-37	alpha-Chelating Group-Substituted Nitriles Catalytic Enantioselective [2+2] Cycloadditions between Allenoates and Alkenes	Yao Xu,* Michael L. Conner, M. Kevin Brown	Indiana University Bloomington
S-38	Cooperativity of Silyl triflates and Squaramide Organocatalysts in Asymmetric (4+3) Cycloadditions: Enhanced Lewis Acidity and Enantioselectivity Through Anion-Binding	Steven M. Banik,* Anna Levina, Eric N. Jacobsen	Harvard University
S-39	Asymmetric Synthesis of Biologically Active Endoperoxides using Organocatalysis	Cameron Pombert, Mahmoud Abdel, Mohammed Farhan, Harsh Sharma, Rushad Marfatia, David M. Rubush*	Benedictine University
S-40	A DYKAT Approach to the Asymmetric Pauson- Khand reaction of Allenol Acetates	Lauren Parrette, Kay Brummond, Gang Lu, Peng Liu	University of Pittsburgh
S-41	Total Synthesis of 7-Hydroxy-Murrayazolinine, Murrayamine-D and Mahanine, via meta-Nitro Group Activated Pyran Annulation	Yong Liu*, Shujie Hou, Yali Kong, Milton L. Brown	Georgetown University
S-43	Synthetic studies towards Iheyamines A and B	Ashley Lindsay,* Dr Jonathan Sperry	The University of Auckland
S-44	Expedient Synthesis of the Endiandric Acid Tetracyclic Scaffolds through Iterative Cross- Coupling	Eun Bin Go,* David A. Vosburg	Harvey Mudd College
S-45	On the Way to Palhinine A	Dominik T. Gaugele*, Martin E. Maier	University of Tübingen
S-46	On the Way to Leiodermatolide	Anita Reiss*, Martin E. Maier	University of Tübingen
S-47	Synthesis of the Acylphloroglucinols Rhodomyrtone and Rhodomyrtosone B	Marius Morkunas,* Martin E. Maier	University of Tübingen
S-48	On the Way to Tulearin A	Petra Brozik,* Martin E. Maier	University of Tübingen
S-49	The Diels-Alder cycloaddition of pyrazinone intermediates: synthesis of the [2.2.2]- diazabicyclic skeleton and 2-pyridone alkaloid core from a common intermediate	Jonathan R. Scheerer*, Alex Chinn, Kaila Margrey, Jacob Robins, Kyu Kim, John Woo, Amy Hazzard, Katherine Nenniger, Erin Morris	College of William & Mary
S-50	An Approach Towards The Total Synthesis of 7- epi-Clusianone	Shubhankar Dutta*, Suresh Jayasekara, Robert B. Grossman	University of Kentucky
S-51	The First Total Synthesis and Structural Reassignment of Lyngbyaloside C	Chia-Fu Chang, Richard E. Taylor*	University of Notre Dame
S-52	Towards a Total Synthesis of Fijiolide A	Christoph Heinz,* Nicolai Cramer	Ecole Polytechnique Fédérale de Lausanne, Switzerland
S-53	Stereoselective Desymmetrization as a Powerful Tool in Organic Synthesis: The Total Synthesis of Pactamycin and Paspaline	Robert J. Sharpe,* Justin T. Malinowski, Federico Sorana, Jeffrey S. Johnson	University of North Carolina at Chapel Hill
S-54	A Generalized Total Synthesis of the Sarpagine Alkaloids	Sebastian Krüger,* Tanja Gaich	Leibniz University of Hannover
S-55	Total Synthesis of (–)-Leuconoxine and Novel Indolophanes via Witkop Photocyclization	Magnus Pfaffenbach,* Tanja Gaich	Leibniz University of Hannover
S-56	Development of an Improved Synthesis of the Anti-Migraine Drug Olcegepant	Matthew M. Bowler*, Randi Manchak, John Z. Thomas, Joaquin E. Ramos, Melanie Goldstein, Stephen A. Habay*	Salisbury University
S-57	Study Toward Total Synthesis of Chaetoglobin A	Houng Kang*, Carilyn Torruellas, Marisa C. Kozlowski	University of Pennsylvania
S-58	Studies Toward the Total Synthesis of the Anachelin H.	Andrés Garzon-Posse*, Diego Gamba- Sanchez	Universidad de los Andes
S-59	Toward the Total Synthesis of Obtusin	Hadi Gholami*, Kumar D. Ashtekar, Lindsey Kiiskila, Babak Borhan	Michigan State University
S-60	Total Synthesis of (-)-Nodulisporic Acid D	Yike Zou,* Jason E. Melvin, Stephen S. Gonzales, Matthew J. Spafford, Amos B. Smith, III	University of Pennsylvania
S-61	Towards the Anti-MRSA Natural Product Dolabellane Alcohol	Michael B. Reardon,* Peter G. Baumgartel, Charles E. Jakobsche	Clark University
S-62	Forming Quaternary Carbons Using Photoredox	Gregory L. Lackner,* Kyle W. Quasdorf,	University of

	Catalysis and Applications to the Total	Gerald Pratsch, Daniel S. Muller, Nicholas	California at Irvine
	Synthesis of Terpene Natural Products	L. Untiedt, Larry E. Overman	
S-63	Hippolachnin A	Christopher M. Rasik*, M. Kevin Brown	Indiana University
S-64	Late-Stage Oxidation of the Cyanthiwigin Natural Product Core	Kelly E. Kim,* Ashley M. Adams, Justin Du Bois, Brian M. Stoltz	California Institute of Technology; Stanford University
S-65	Bottom-Up Synthesis of Small Carbon Nanotube Fragments	Matthew Ross Golder,* Ramesh Jasti	University of Oregon
S-66	Total Synthesis of (±)-Hippolachnin A	Monica E. McCallum,* Prof. John L. Wood	Baylor University
S-67	Efforts Toward a Ring Fragmentation/1,3- Dipolarcycloaddition Route to Aspidospermine	Geoffrey Giampa, Matthias Brewer*	University of Vermont
S-68	Total Synthesis of Aignopsanes, A Class of Sesquiterpenes	Cédric Bürki,* Josep Bonjoch, Ben Bradshaw, Giorgio Villa, Philippe Renaud	University of Bern
S-69	Photoredox Catalysis in Total Synthesis: Efforts Towards the Chromodorolides	Daniel J. Tao, Larry E. Overman	University of California at Irvine
	Application of Eurotionalized Organozine	Tyler I. Fulten * Branden N. Nelson *	
S-70	Reagents for the Synthesis of Complex Sesquiterpenes	Phebe L. Alley, Adriana M. Ackerman, Michael R. Krout	Bucknell University
0 = 1	Biomimetic Total Syntheses of (-)-Leucoridines	Praveen Kokkonda, Keaon Brown, Steven	Temple University;
S-71	A and C from the Dimerization of (-)-	E. Wheeler, Shivalah Vaddypally, Michael	Texas A & M
S-72	Concise Syntheses of Sungucine, Isosungucine, and Strychnogucine B from Strychnine	Senzhi Zhao,* Christiana Teijaro, Heng Chen, Gopal Sirasani, Shivaiah Vaddypally, Michael J. Zdilla, Rodrigo B. Andrade	Temple University
S-73	A Unified Approach Toward Prenylated Indole Alkaloid Natural Products	Eduardo V. Mercado-Marin*, Pablo Garcia- Reynaga, Richmond Sarpong	University of California at Berkeley
S-74	Application of the Tsuji-Trost Variant of Winstein-Masaume Spirocyclization for the Synthesis of the Lycopodium Alkaloid Magellanine	Erin C. Realini,* Matthew G. Donahue	University of Southern Mississippi
S-75	Total Synthesis of the Proposed Structure of Ardimerin	Kevin Ng and Thomas Minehan*	California State University, Northridge
S-76	Efficient Asymmetric Total Synthesis of Uncialamycin and Analogs	Debashis Mandal, Min Lu, Prof. K. C. Nicolaou	Harvard University; Rice University
S-77	A Bioinspired Total Synthesis of Alsmaphorazine B and Related Alkaloids	Allen Y. Hong,* Christopher D. Vanderwal	University of California at Irvine
S-78	Toward a Total Synthesis of Tetrapetalone A	Heemal H. Dhanjee*, Yutaka Kobayashi, Travis C. McMahon, Jonas F. Buergler, Matthew W. Haley, Jennifer M. Howell, John L. Wood	Baylor University
MON	IDAY JUNE 29		
	Synthesis of 9-Benzvl-N-alkvl-9H-purin-6-amine		<b>D</b> (( <b>C</b> ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) )
M-1	Derivatives Designed as Ligands of the Histamine H4 Receptor	Christian Espinosa-Bustos,* Cristian O. Salas.	Pontificia Universidad Catálica de Chile
M-2	Novel Synthesis of Propargylamines and Tricyclic fused Heterocycles via Three Component Coupling (TCC) Reaction under Solvent free and Catalyst free Protocols	Shakil N. Afraj,* Chinpiao Chen	National Dong Hwa University
M-3	A Facile Synthesis of 3-Hydroxymethylcoumarin and Coumarin-3-Carbaldehyde Using Baylis- Hillman Approach	Omobolanle Janet Jesumoroti,* Temitope Olomola, Rosalyn Klein, Perry Kaye	Rhodes University
M-4	Synthesis of Phenanthroline and Phenanthrene Oxazoles	David L. Sellers*, Lars Kohler, Evan Alkema, Elke Schoffers	Western Michigan University
M-5	Iterative Metal-Mediated Approaches to Chemoselective Minor-Actinide Complexants	Serene Tai, Evan J. Dover, Sydney V. Marchi, Jessie D. Carrick*	Tennessee Technological University
M-6	Synthesis of 3,4-Disubstituted Pyrroline Nitroxides with Ethynyl Functional Group	Györgyi Úr, Tamás Kalai,* Mária Balog, Gergely Gulyás-Fekete, Kálmán Hideg	University of Pécs, Hungary

M-7	New Methods for the Synthesis of N-Substituted 2-Pyridones	Carolyn E. Anderson*	Calvin College
M-8	Efforts Towards the Synthesis of beta- and gamma-Amino Acids Containing N-Alkyl Pyridones	Brian J. Heidmann,* Joy P. Christopher, Carolyn E. Anderson	Calvin College
M-9	Exploration into Rotationally Restricted N-Alkyl 2-Quinolones	Andrea N. Bootsma,* Carolyn E. Anderson	Calvin College
M-10	Microwave Assisted Gold(I)-Catalyzed Rearrangement of N-Propargyloxypyridines	Connor P. Reidy,* Carolyn E. Anderson	Calvin College
M-11	Diversity Oriented Synthesis of an Alkaloid-like Library via Cyclotrimerization of Easily Accessible Aminonitriles	Alex D. Bates*, Natasha M. Chang, Graham J. Haun, James A. Santos, Christopher W. Livesey, Carly B. Stein	Rowan University
M-12	Diastereoselective Dipolar Cycloaddtions for the Synthesis of Imidazoline and Imidazolidine Pharmacophores	Alexander W. Beebe,* Emma F. Dohmeier, Donald C. Seaman, Christopher A. Castro, Gustavo Moura-Letts	Rowan University
M-13	Microwave Assisted Synthesis of Some Novel Chroman-4-Ones and Their Antimicrobial Activity	Vummenthala Prabhakar Reddy,* Dongamanti Ashok	Department Of Chemistry, Osmania University
M-14	Synthesis of 6-Hydroxy-2H-pyran-3(6H)-ones Through a Novel Morita-Baylis-Hillman Reaction/Achmatowicz Rearrangement Sequence	Bruno B. Guidotti*, Fernando Coelho	University of Campinas, Brazil
M-15	Synthesis of New Imidazo[1,5-a]indol-3-ones with Dyrk1a Kinase Activity	Zoltán Mucsi,* Tibor Novák, András Kotchy, Mike F. Burbridge, Jean-Claude Ortuno, Francisco H. Cruzalegui, Nicholas Foloppe, Miklós Nyerges	Servier Research Institute of Medicinal Chemistry
M-16	C8-Site-Selective C-H Functionalization of Quinolines	David E. Stephens*, Johant Lakey-Beitia, Abdurrahman C. Atesin, Tulay A. Atesin, Gabriel Chavez, Carla Ilie, Hadi D. Arman, Oleg V. Larionov	University of Texas at San Antonio
M-17	The lodocyclocarbamation Reaction of N-Allyl- N-arylcarbamates: Scope and Limitations	Niecia Flikweert,* Abbegail Bell, Ronald L. Blankespoor, Steven J. Brickner, Michael R. Barbachyn	Calvin College; SJ Brickner Consulting LLC
M-18	Nitrogen-Containing Heterocycles as Platforms for Undergraduate Engagement: Synthesis and Biochemical Studies of Complex beta- Carbolines	Seann P. Mulcahy*, Jonathan Varelas, Michael O'Donnell, Satyam Khanal, Chad Roggero, Jennifer Giulietti	Providence College
M-19	Ibrance® (Palbociclib) Commercial Manufacturing Process Development	Shengquan Duan*	Pfizer, Inc.
M-20	Preparation of Strained Heterocycles Towards the Synthesis of Laureoxolane	Kendricks S. Lao,* Patrick A. Smith, Amy R. Howell	University of Connecticut
M-21	Access to Sterically Demanding Halopyridines via the Ciamician-Dennstedt Rearrangement	Jenny S. Martinez,* Justin T. Mohr	University of Illinois at Chicago
M-22	Syntheses of Tetraalkyl Bacteriochlorin	Shaofei Zhang,* Han-Je Kim, Jonathan S. Lindsey	North Carolina State University
M-23	Bringing Graphene Down to Size	Harold Banks*	U.S. Army Edgwood Chemical Biological Center
M-24	An Approach to 1,3-Bis-benzyne Products	Rick Betori, Johnathan Tadlock, Charles M. Garner*	Baylor University
M-25	Diastereoselective Synthesis of Novel and Enantiopure Pyrano[3,2,c]tetrahydroquinolines and carbohydrate derived quinolines	Henok Kinfe*, Paseka Moshapo	University of Johannesburg, South Africa
M-26	An Improved Synthesis of Obatoclax Mesylate	Daniel V. Levy,* Joseph A. Sclafani, Vikram C. Purohit, Daniel B. Patience, Linli He	Teva Pharmaceuticals
M-27	Oxidation of Benzyl Alcohol to Benzaldehyde with Pyridiniums	Anton Jensen,* John Moore, MaryEllen Kimble	Central Michigan University
M-28	Boronic AcidSynthesis of Intermediates to Obtain Derivatives of Suberoylanilide Hydroxamic Acid	Emily Berenson*	Rhodes College
M-29	Total Synthesis of Peramine	Matthew Nelli *, Dr. Jonathan Scheerer	College of William & Mary

M-30	Single-step Synthesis of 5,6,7,8- Tetrahydroindolizines via Annulation of 2- Formylpiperidine and 1,3-Dicarbonyl Compounds	Simona S. Capomolla, Ngiap-Kie Lim,* Haiming Zhang	Genentech Inc
M-31	Synthetic Routes to Indole-fused Thiopyrans	Mukund Jha*	Nipissing University, Canada
M-32	Functionalized Polyaryl Synthesis via Aryne Intermediates	Milad Mesgar,* Olafs Daugulis	University of Houston
M-33	Substituted 6,6a-Dihydroisoindolo[2,1- a]quinolin-11(5H)-ones via N-Acyliminium lons	Zainab AlJaroudi, Ting-Yi Chou, Prabhu P. Mohapatra, Melissa O'Brien, T. Stanley Cameron, Amitabh Jha*	Acadia University, Canada
M-34	Ring and Side-Chain Lithiation and Substitution of Substituted Pyridines	Mohammed B. Alshammari,* Gamal A. El- Hiti and Keith Smith	Prince Sattam Bin Abdulaziz University
M-35	Synthesis of Xanthene Consisting Novel Phthalocyanine Derivatives	Pelin Ulukan, Volkan Kumbaraci, Hande Gunduz*, Okan Sirkecioglu	Istanbul Technical University
M-36	The Diverse Reactivity of 1-Aza-2-azoniaallene salts Leads to a Wide Range of Nitrogen Heterocycles	Matthias Brewer,* Nezar Al-Bataineh, Daniel Bercovici, Ram Dhakal, Muhammad Irfan Javed, Jodi Ogilvie, Ramya Srinivasan	University of Vermont
M-37	Selective Oxidative Homo- and Cross-Coupling of Phenols with Aerobic Catalyst	Young Eun Lee,* Trung Cao, Carilyn Torruellas	University of Pennsylvania
M-38	Porous Graphene E-Stilbene: A Novel Graphene Analog for Gas Separation	Frances Rose Blase,* Alexandra John, Michael P. Gould, Minh Hoang, Robert Broadrup	Haverford College
M-39	Intramolecular [4+4] Photocycloadditions of 2- Pyridone/Silyl Enolynes: Efficacious Synthesis of Highly Functionalized Cyclooctanoids	Brenden P. Derstine,* Scott McN. Sieburth	Temple University
M-40	New Routes to 6-6-5 Ring-Fused Lactone Intermediates	Zhijian Liu,* Mark McLauglin	Merck & Co., Inc.
M-41	Oxidative 1,2 and 1,4-Diamination of Pi- systems Using Simple Urea Derivatives	Devendar Anumandla,* Christopher R. Carson, Ryan Little Field, Christopher S. Jeffrey	University of Nevada, Reno
M-42	Enyne-2-pyrone [4+4] Photocycloaddition as a Route to Cyclooctanoid Natural Products	Buddha B. Khatri,* Scott McN. Sieburth	Temple University
M-43	Progress Toward the Total Synthesis of Plumisclerin A and a New Approach Toward the Synthesis of Substituted Pyridines	Michael S. Holzwarth,* Justin A. Hilf, Scott D. Rychnovsky	University of California at Irvine
M-44	Synthesis of Xanthene Consisting Novel Phthalocyanine Derivatives	Pelin Ulukan, Volkan Kumbaraci, Hande Gunduz*, Okan Sirkecioglu	Istanbul Technical University
M-45	Synthesis of Indolyl-substituted 3-Pyrrolin-2- ones from Tetramic Acids	Nathanyal J. Truax,* Fernando Banales Mejia, Deborah O. Kwansare, Maeve H. Kean, Erin T. Pelkey	Hobart and William Smith Colleges
M-46	Synthesis of Novel Triazole-containing Fluorophores and Colorimetric Anion Sensors	Ronald Brisbois,* Steven Larson, Lucas Erickson, Hannah Haley	Macalester College
M-47	New Approach to 7- and 14- Membered Cyclic (Thio)semicarbazones	Pavel A. Solovyev*, Anastasia A. Fesenko, Lyudmila A. Trafimova, Anatoly D. Shutalev	Moscow State University of Fine Chemical Technologies
M-48	Novel Approach for the Synthesis of Complex Polyisoxazoles from Easily Accessible Isoxazoles	Joseph R. Lizza,* Safaa Nazer, Adriana Gambino, Gustavo Moura-Letts	Rowan University
M-49	Dearomative (3+2) Cycloadditions of Aza- oxyallyl Cation Intermediates and Indoles	Arjun Acharya,* Christopher S. Jeffrey	University of Nevada, Reno
M-50	Catalyst-free Generation of Sulfides Utilizing Trichloroacetimidates	Brian C. Duffy*, Kyle T. Howard, John D. Chisholm	Syracuse University
M-51	N-Heterocyclic Carbene-Catalyzed Hydroacylation and Subsequent Enantioselective alpha-Arylation	James Walker*, Avipsa Ghosh, Levi Stanley	Iowa State University
M-52	Developing a Synthetic Toolkit for Catalyst- Directed C-H Functionalization	David Nagib*	Ohio State University
M-53	The Synthesis of a Novel Gold Cleavable Protecting Group	Caitlin Lacker,* Michael Gesinski	Southwestern University
M-54	Chemistry in Water: Radical Coupling	Alexandra M. Duell, Kevin M. Klusmeier,	Mount St. Joseph

	Reactions of Ketones Using Fenton's Reagent	Richard P. Hotz*, Allan R. Pinhas	University; University of Cincinnati
M-55	Methylation of Oxygen Nucleophiles with Safe, Stable Reagents	David J. Gorin,* Yuan Ji, Jessica Sweeney, Clare Jacobson, Noelia Martinez-Munoz, KC Chen, Jillian Zoglio, Yingchuan Zhu	Smith College
M-56	Building Strain with Palladium Catalyzed Oxidative Homocoupling of Aryl Boronates	Evan Darzi,* Ramesh Jasti	University of Oregon
M-57	Single-Electron Transmetalation: Enabling C(sp3) Cross-Coupling via Photoredox/Nickel Dual Catalysis	John C. Tellis,* David N. Primer, Yohei Yamashita, Javad Amani, Osvaldo Gutierrez, Marisa C. Kozlowski, Gary A. Molander	University of Pennsylvania
M-58	Cu(I)-catalyzed Synthesis of N-Tosyl-4- iminoquinolizines	André K. Isaacs, Luke T. Lauchert*	College of the Holy Cross
M-59	High electron transfer efficiency promoted by two dimensional inorganic electride in transfer hydrogenation of alkynes and alkenes	Sun Min Kim,* Ye Ji Kim, Eun Jin Cho, Hideo Hosono, Jung Woon Yang, Sung Wng Kim	University of Sungkyunkwan
M-60	Oxalates as Activating Groups for Alcohols in Photoredox Catalysis	Christopher Jamison,* Yuriy Slutskyy, Chris Nawrat, David MacMillan, Larry Overman	University of California at Irvine
M-61	Synergetic Organocatalysis of Mukaiyama-type Aldol Reactions by Nitro Compounds and Thiourea Derivatives	Konstantin V. Bukhryakov,* Victor V. Desyatkin, Valentin O. Rodionov	King Abdullah University of Science and Technology (KAUST)
M-62	Dynamic Kinetic Resolutions of Stereolabile Carbonyls	C. Guy Goodman,* Jeffrey S. Johnson	University of North Carolina at Chapel Hill
M-63	Transition Metals Enabling gamma- Functionalization of Enones via Silyl Dienol Ethers	Xiaoguang Liu*, Xiaohong Chen, Justin T. Mohr	University of Illinois at Chicago
M-64	Inter- and intramolecular Decarboxylation of Bis-allylic Esters Lacking Anion-Stabilizing Groups	F. Dempsey Hyatt, Mitchell P. Croatt	University of North Carolina at Greensboro
M-65	New Opportunities for Ketone-Knoevenagel Adducts	Alexander J. Grenning*	University of Florida
M-66	Lewis Acid Mediated Rauhut-Currier Reaction	Andrew Krasley,* William P. Malachowski	Bryn Mawr College
M-67	Direct Synthesis of C4-Aryl Piperidines via Palladium-Catalyzed C–H Functionalization	Pablo J. Cabrera,* Joseph J. Topczewski, Melanie S. Sanford	University of Michigan
M-68	Enantioselective Synthesis of alpha-Quaternary Mannich Adducts by Palladium-Catalyzed Allylic Alkylation: Total Synthesis of (+)-Sibirinine	Beau P. Pritchett,* Yoshitaka Numajiri, Koji Chiyoda, Brian M. Stoltz	California Institute of Technology
M-69	Study of the Pummerer Type Reaction Toward the Synthesis of Dihydroisoquinolinonic Compounds	Andrea Ojeda,* Diego Gamba	Universidad de los Andes
M-70	Lewis Acid Catalyzed Displacement of C3a- Trichloroacetimidate Pyrroloindolines	Arijit A Adhikari,* John D Chisholm	Syracuse University
M-71	Synthesis of Indoles, Benzofurans, and Related Heterocycles via an Acetylene-Activated SNAr/Intramolecular Cyclization Cascade Sequence in Water or DMSO	Reuben Hudson, Nicholas P. Bizier, Kristin N. Esdale, Jeffrey L. Katz*	Colby College, Daemen College
M-72	Alkylsulfonylation of (Hetero)Aromatic Boronic Acids with Alkyl Halides and Potassium Metabisulfite	Andre Shavnya,* Kevin D. Hesp, Vincent Mascitti, Aaron C. Smith	Pfizer, Inc.
M-73	Copper-catalyzed Alkylation of Nitroalkanes with Alpha-bromonitriles; Facile Synthesis of Beta-cyanonitroalkanes	Kirk W. Shimkin,* Peter G. Gildner, Donald A. Watson	University of Delaware
M-74	Orthogonal Reactivity of the Fluorosulfate Functional Group	Samantha S. Brown*, Blessing H. Cao, K. Barry Sharpless, Jason E. Hein	University of California at Merced; The Scripps Research Institute
M-75	N-Heterocyclic Carbene-Catalyzed N-Acylation of Electron-Poor N-Nucleophiles	Matthew T Berry*, Disnay Castrejon, Ruben Vargas, Jason E. Hein	University of California at Merced
M-76	Titanium-Mediated Synthesis of Cyclobutanols	James Alleyn, Simon Gersib, Michael R. Gesinski*	Southwestern University

M-77	Carbon-Carbon Single Bond Activation and Cross-Coupling with Michael Acceptors	Kathryn N. Trentadue*, Caroline E. Gregerson, Erik J. T. Phipps, Janelle K. Kirsch, Jeffrey B. Johnson	Hope College
M-78	Incorporation of Boronic Acids in Cross- Coupling Reactions Proceeding through C-C Activation	Stanna K. Dorn,* Joseph M. Dennis, Chad T. Compagner, Jeffrey B. Johnson	Hope College
M-79	Process Development of an Aniline Boc Protection	Jianxin Han*	Celgene Corporation
M-80	Constructing Quaternary Carbons from Phthalimidoyloxy Radical Precursors Using Visible-Light Photocatalysis	Gerald Pratsch,* Gregory L. Lackner, Kyle W. Quasdorf, Larry E. Overman	University of California at Irvine
M-81	Copper Catalyzed C-H Etherification with Acyl- Protected Phenols	Tolani Kuam Salvador, Charles Haden Arnett, Timothy H. Warren*	Purdue University; Georgetown Uninversity
M-82	DATNBI: An RDX Replacement	Edward D. Cooke*, Dr. Alexander J. Paraskos, Dr. Kelley C. Caflin	U.S. Army Armament Research, Development and Engineering Center (ARDEC)
M-83	Cobalt-catalyzed Intramolecular Arrylation of 2- Bromoaldimines via Directed C-H Bond Functionalization: Synthesis of Phenanthridine Skeleton	Abdolreza Hajipour,* Zahra Khorsandi	University of Wisconsin Madison and Isfahan University of Technology

### TUESDAY, JUNE 30

T-1	Progress Toward the Total Synthesis of Yaku'amide A	Shi Luo*, Steven L. Castle, Daniel H. Ess, Zhiwei Ma, Jintao Jiang, Yu Cai	Brigham Young University
T-2	BBB-Permeable Trehalose Derivatives as Potential Therapeutic Agents for Huntington's Disease	Jungkyun Im*, Sung-Kee Chung	Soonchunhyang University
T-3	Hydrazide Glycosylation: Rate Enhancements and Novel Applications	Joseph M. Langenhan,* Nick Chock, Calvin Leonen, Sean Ryan, Steven L. Loskot	Seattle University
T-4	Synthesis, Biological Activity and Molecular Modeling Studies of (5Z)-5-Pentacosenoic and 5-Pentacosynoic Acids as Novel HIV-1 Reverse Transcriptase Inhibitors	Néstor M. Carballeira*, Lizabeth Giménez Moreira, Elsie A. Orellano, Karolyna Rosado, Rafael V.C. Guido, Adriano D. Andricopulo	University of Puerto Rico, Rio Piedras campus
T-5	Design and Synthesis of Novel Fluorinated Dendrimers for Highly Sensitive <sup>19</sup> F MRI	Zhongxing Jiang,* Weijiang Yu, Shaowei Bo	Wuhan University
Т-6	Total Synthesis and Stereochemical Assignment of Promysalin, a Species-Specific Biofilm Promotor	Kyle W. Knouse*, Andrew D. Steele, Colleen E. Keohane, William M. Wuest	Temple University
T-7	Synthesis and Biological Evaluation of New Paramagnetic Curcumin Analogs	TamÃis KÃilai,* M. Lakshmi Kuppusamy, Esha Madan, BalÃizs BognÃir, MÃiria Balog, József JekÅ ', Periannann Kuppusamy, KÃilmÃin Hideg	University of Pécs, Hungary,
T-8	Synthesis and Biological Evaluation of Aryl- substituted 3-Pyrrolin-2-ones, Benzo[a]carbazoles, and Indolo[2,3- a]carbazoles	Erin T. Pelkey,* Patricia Mowery, Carly E. Rolph, Namita Neerukonda, Nathanyal J. Truax, Maeve H. Kean, Courtney L. Franceschi, Fernando Banales Mejia, Deborah O. Kwansare	Hobart and William Smith Colleges
T-9	Uncovering Small Molecule Inhibitors for the WNV NS2B-NS3 protease	Julianne Truong*, Catherine Nguyen, Nicholas Salzameda	California State University at Fullerton
T-10	Synthesis of a Novel Universal Fluorescent Nucleoside	Lindsey Davis,* Jade Izaguirre, Ashley Carter	Berry College
T-11	The Synthesis and Study of 2nd Generation Sulfonamide Hydroxamic Acid Inhibitors for the Botulinum Neurotoxin A Light Chain	Tanner Bingham, Issac Vargas, Nicholas Salzameda*	California State University at Fullerton
T-12	Synthesis of GPR55 Agonists	Christopher Cook*, Lara Fakhouri, Dow P.	University of North

		Hurst, Lawrence Barak, Mary E. Abood, Patricia H. Reggio, Mitchell P. Croatt.	Carolina at Greensboro; Temple University School of Medicine; Duke Center of Excellence
T-13	Multivalent Display on Synthetic PNA Scaffolds	Kara George Rosenker, Andrew Dix, Daniel Appella	National Institutes of Health
T-14	Center for Innovation in Drug Discovery Collaborative Programs: Utility of Capsazepine Analogues to Treat Oral Squamous Cell Carcinoma	Francisco X. Ruiz II,* Jorge J. De La Chapa, Jack Hua, Wes Mitchell, Cara B. Gonzales, Stanton McHardy	University of Texas at San Antonio
T-15	Discovery of Novel Small Molecule Inhibitors of Oncoprotein EYA2 for Breast and Ovarian Cancers	Bismarck Campos*, Stanton F. Mchardy, Dana Molleur, Analyssa Dominguez, Li Rong, Bin Yuan	University of Texas at San Antonio
T-16	Synthesis and Biological Evaluation of Calothrixins and its Analogs	Su Xu, Tripti Singh, Nirzari Gupta, Santosh K. Katiyar, Sadanandan E. Velu*	Birmingham Veterans Affairs Medical Center, Comprehensive Cancer Center, University of Alabama
T-17	Use of Single-Cell Imaging to Study MDR1 Inhibitors In Vitro and In Vivo	Melissa M. Sprachman*, Ashley M. Laughney, Rainer H. Kohler, Eunha Kim, Miles A. Miller, Ralph Weissleder	Massachusetts General Hospital; Harvard Medical School
T-18	A Fragment-Based Approach Toward Developing Small Molecule Inhibitors of Ubc9, the SUMO-Conjugating E2 Enzyme	Samuel Dahlhauser,* George Lountos, Will Hewitt, Lindsey Saunders, Megan Peach, Danielle Needle, Joseph E. Tropea, David Waugh, John S. Schneekloth, Jr.	National Cancer Institute, National Institutes of Health; Leidos Biomedical Research, Inc.
T-19	Preparation and Deuterium Labeling of Intermediates of Loline Biosynthesis Route	Minakshi Bhardwaj*, Juan Pan, Robert B. Grossman, Christopher L. Schardl	University of Kentucky
T-20	Acyclic Cucurbit[n]uril-type Molecular Container Enables Systemic Delivery of Effective Doses of Albendazole for Treatment of SK-OV-3 Xenograft Tumors	Gaya Hettiarachchi, Soumen K. Samanta,* Shane Falcinelli, Ben Zhang, Lyle Isaacs, Volker Briken	University of Maryland
T-21	Discovery of Novel Natural Product Antibiotic Scaffolds with a Focus on Endophytic Organisms	Amber M. Kelley, Katelin M. Selner, Katie C. A. Garber*	St. Norbert College
T-22	Synthesis of Novel Aporphine-inspired Neuroreceptor Ligands	Nirav Kapadia*, Wayne W Harding	City University of New York
T-23	Synthesis and Biological Evaluation of Hydrolytically Stable Bacterial Autoinducer, Al- 1, Analogs	Xiaochu Ma*, Min Guo, Yue Zheng, Clement Opoku, Herman O. Sintim	University of Maryland at College Park
T-24	Synthesis of Fluorescent Cyclic Dinucleotides for Sensing Applications	Jie Zhou,* Benjamin T. Roembke, Yue Zheng, Herman O. Sintim	University of Maryland
T-25	Engineering Halogenases for Selective Functionalization of Bioactive Molecules	James Payne*, Mary Andorfer, Landon Durak, Kyle Kunze, Dr. Catherine Poor, Duo-Sheng Wang, Prof. Jared Lewis	University of Chicago
T-26	A New Synthetic Route to 2,3,9,10 Tetraoxygenated THPBs	Satish Gadhiya,* Wayne Harding	City University of New York
T-27	DNA-small Molecule Catalysts for Site-selective Transformations	A. Emilia Arguello*, Drew E. Colman, Jiyeon Kim, Shimu Liu, Garret Garborcauskas, Yu Zhang, David J. Gorin	Smith College
T-28	Chemoenzymatic Installation of Two Distinct N- Glycans in a Polypeptide via a Selective Protecting Group Strategy	Christian Toonstra*, Mohammed N. Amin, Lai-Xi Wang	University of Maryland
T-29	Structure Based Drug Design, Synthesis and Evaluation of New Antischistosomal Agents	Philip T. LoVerde, Timothy, J. C, Anderson, Ana Carolina Alves de Mattos, Frédéric D. Chevalier, Stacey Stahl, Winka Le Clec'H, Liping Wang, P. John Hart, Xiaohang Cao, Alexander B. Taylor, Stephen P. Holloway, Stanton McHardy, Ambrosio Lopez	University of Texas at San Antonio
T-30	Synthesis and Biological Evaluation of	Sarah M. Wells,* Kay M. Brummond	University of

	Guaianolide Analogs (Guaianologs) as Potentially Selective and Potent Kinase Inhibitors		Pittsburgh
T-31	Novel Lpxc Inhibitors with Broad-Spectrum Gram-Negative Activity	Qi Jin*, Jared T. Spletstoser, Denise Pohlhaus, Neil Pearson, Lynn McCloskey, Cindy Mininger, Geoffrey T. Quinque, Robert A. Stavenger	GlaxoSmithKline Pharmaceuticals
T-32	Extraction and Functionalization of Neurolenin A and B	Katie McGeough,* Kevin Shea	Smith College
T-33	Synthesis and Evaluation of 2,6- Dialkylcyclohexanols as Novel Anesthetics	Ho-Yu Li*, Kevin Shea	Smith College
T-34	Synthesis of Unnatural Amino Acids and their Introduction Into the Structure of Peptides with Potential Antibiotic Activity	Luke Embury,* Roberto de la Salud Bea	Rhodes College
T-35	Elucidating Diphosphoinositol Polyphosphate Signaling with Non-Hydrolyzable Analogs	Mingxuan Wu,* Dorothea Fiedler	Princeton University
T-36	Small Molecule Probes for Protein-Protein Interactions: Mimicking Beta-Sheet Motifs	Colin Robinson*, Carl Rye, Nicola Chessum, Keith Jones	Institute of Cancer Research, University of London
T-37	Tricylclic Analogues of Epidithiodioxopiperazines with Promising in vitro and in vivo Antitumor Activity	Brad M. Loertscher*, Marcus Baumann, André Dieskau, Mary C. Walton, Sangkil Nam, Claudia Kowolik, Jun Xie, David Horne, Larry E. Overman	University of California at Irvine
T-38	Bioisosteric Replacement and S.A.R. Development Yield Potent Topoisomerase I Inhibitors with Improved Safety Potential	Daniel E. Beck,* Wei Lv, Keli Agama, Christophe Marchand, Yves Pommier, Mark Cushman	Purdue University; National Cancer Institute
T-39	Design, Synthesis and Evaluation of alph,beta- Unsaturated Fosmidomycin Analogs as Antitubercular Drugs	Xu Wang,* Robert C. Brothers, Kyle T. McKay, Géraldine San Jose, Emily R. Jackson, Helena I. Boshoff, Robin D. Couch, Cynthia S. Dowd	The George Washington University
T-40	Stereoselective Addition of 2-Phenyloxazol-4-yl Trifluoromethanesulfonate to N-Sulfinyl Imines: Application to the Synthesis of the HCV Protease Inhibitor Boceprevir	William Morris*, Kiran K. Muppalla, Cameron Cowden, Richard G. Ball	Merck & Co., Inc.
T-41	Mimicry and Study of Amyloidogenic Peptides with Macrocyclic beta-Sheet Models	Katherine R. Ferrick*, Nicholas Truex, James S. Nowick	University of California at Irvine
T-42	Recent Progress Toward the Discovery and Development of Small Molecule Therapies for Viral Infections	S. Mao*, R. Arrendale, G. Bluemling, D. Culver, A. De La Rosa, T. Enkirch, T. Evers, D. B. Guthrie, M. Hager, E. Hovingh, A. Katkam, A. Kolykhalov, S. Krumm, D. Kuiper, D. Liotta, G. Lu, M. Lockwood, J. Marengo, M. Natchus, J. M. Ndungu, G. Painter, R. Pl	Emory Institute for Drug Development
T-43	Synthesis of myo-Inositol Probes to Enable Chemical Biology Studies	Tanei Ricks*, Shahrina Alam, Dr. Kathrin Tscherch, Dr. Michael Best	University of Tennessee-Knoxville
T-44	Small-Molecule Modulation of ABCC10 to Enhance Cancer Chemotherapy	Christiana Teijaro*, Surendrachary Munagala, Ekaterina V. Malofeeva, Elizabeth Hopper-Borge, Rodrigo Andrade	Temple University; Fox Chase Cancer Center
T-45	Synthesis of Beta Substituted Phosphonic Acids as Non-Mevalonate Pathway Inhibitors Targeting Mtb Dxr	R. Carl Brothers*, Richard Fisher, Brian Shear, Amanda Haymond, Chinchu Johnny, Robin D. Couch, Helena I. Boshoff, Cynthia S. Dowd	George Washington University; National Institutes of Health; George Mason University
T-46	A Novel Photoactivatable Nitric Oxide Donor Allows Subcellular Localization with Fluorescence Reporting	Sambashiva Banala,* Timothy A Brown, Luke Lavis	Janelia Research Campus, Howard Hughes Medical Institute
T-47	Small Molecule Inhibitors of the CaaX Protease Rce1 Disrupt Ras Localization	Idrees Mohammed, Shahienaz Hampton, Louise Ashall, Emily R. Hildebrandt, Robert A. Kutlik, Surya P. Manandhar, Brandon J. Floyd, Jonathan K. Dozier, Mark D. Distefano, Walter K. Schmidt, Timothy M. Dore*	New York University Abu Dhabi; University of Georgia; University of Minnesota

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T-48	Synthesis of Hydrolytically Stable Analogs of 3- Sulfonyl Coumarin Ligands of the BTB domain of Keap1; Activators of Nrf2.	Jeffrey Boehm*, Christopher Neipp, Ann Bullion, Zhou-yang Zhou, Ying Zhang, Chip Davis, Emma Marsden, Huijie Li, Peng Li, Shuping Dong, Tindy Li, Jeffrey Kerns, James F. Callahan, Ami Lakdawala Shah, Yolanda Sanchez	GlaxoSmithKline Pharmaceuticals
T-49	Design, Synthesis and Determination of Absolute Configuration of Spiro-Fused Thiadiazoline Inhibitors of the Mitotic Kinesin KSP	Angie R. Angeles,* Mansoor, U. Faruk,Liping Yang, Chaoyang Dai, Andrew Brunskill, Andrea D. Basso,Charles Lesburg, M. Arshad Siddiqui	Merck & Co., Inc.
T-50	Reagent-Controlled S <sub>N</sub> 2-Glycosylation for the Direct Synthesis of beta-Linked 2-Deoxy- Sugars	John Paul Issa,* Clay S. Bennett	Tufts University
T-51	Mechanistic Studies Toward One-Pot Total Synthesis of Discoipyrrole A	Amir Keshavarz,* Jason Hein,* John MacMillan	University of California Merced, University of Texas Southwestern
T-52	Potent Cytotoxins and HAT Hydrogenation Through the Exploration of Asmarine Alkaloids	Kanny K. Wan,* Ryan A. Shenvi	The Scripps Research Institute
T-53	Conversion of Amides to Esters by the Nickel- Catalyzed Activation of Amide C–N Bonds	Liana Hie,* Noah F. Fine Nathel, Tejas K. Shah, Emma L. Baker, Xin Hong, Peng Liu, Yun-Fang Yang, Prof. Kendall N. Houk, Prof. Neil K. Garg	University of California, Los Angeles
T-54	Synthesis of Desosamin-Modified Sugars with Hofmann Reaction	Miseon Lee*, Rodrigo B. Andrade	Temple University
T-55	Efficient Synthesis of 6-Substituted 2,8- dioxabicyclo[3.3.0]octan-3-ones Through Photoredox-Catalyzed Conjugate Additions with Applications to the Synthesis of Rearranged Spongian Diterpenes	Kyle B. Schenthal,* Michelle R. Garnsey, Larry E. Overman	University of California, Irvine
T-56	Interception of the Kulinkovich-de Meijere intermediate: Synthesis of structurally diverse amino-ketone scaffolds.	Brenden P. Derstine*, Paul B. Finn, Scott McN. Sieburth	Temple University
T-57	Lewis Acid-Catalyzed Annulation of Donor- Acceptor Cyclopropanes and Ynamides and the Development of a Dearomatization/Diels-Alder Sequence to Highly-Substituted Cyclohexanes	William D. Mackay,* Meryem Fistikci, Ryan M. Carris, Jeffrey S. Johnson	University of North Carolina at Chapel Hill
T-58	Silylation of C–H bonds in Aromatic Heterocycles by an Earth-Abundant Metal Catalyst	David P. Schuman,* Anton A. Toutov, Wen-Bo Liu, Kerry N. Betz, Alexey Fedorov, Brian M. Stoltz, Robert H. Grubbs	California Institute of Technology
T-59	Cu/Pd Synergistic Catalysis: An Approach Towards Stereospecific Cross Coupling	Kaitlyn M. Logan*, Kevin B. Smith, M. Kevin Brown	Indiana University
T-60	Domino Reactions Involving Dihydrooxazinone Precursors Affording Pyridone and Pyridine Products	Jill Williamson,* Emily Smith, Nick Angello, Jonathan R. Scheerer	The College of William & Mary
T-61	Copper-Catalyzed Alkene Difunctionalization with Electrophilic Reagents: Diamination, Aminotrifluoromethylation and Aminoazidation	Kun Shen*, Qiu Wang	Duke University
T-62	Visible Light-Mediated Metal-Free Synthesis of Vinyl Sulfones from Aryl Sulfinates	Andreas Meyer,* Stefanie Jäger, Durga Hari, Burkhard König	University of Regensburg
T-63	Synthesis and Radiolabeling of Pyrimidine- based COX-2 Ligands as Candidate Probes for Studying Brain Neuroinflammation with Positron Emission Tomography	Michelle Y. Cortes*, Prachi Singh, Cheryl L. Morse, Aneta Kowalski, Kimberly J. Jenko, Saurav Shrestha, Sami S. Zoghbi, Robert L. Gladding, Masahiro Fujita, Robert B. Innis, Victor W. Pike	Molecular Imaging Branch, National Institute of Mental Health, National Institute of Health
T-64	Recent Progress in The Imaging Probe Development Center (IPDC) at NIH: A Core Synthesis Facility to Make Imaging Probes for the NIH Intramural Community and Their Collaborators	Haitao Wu, Falguni Bhattacharyya, Burchelle Blackman, Vincent Coble, Carolyn Hitko, Kelly Lane, Chandrasekhar Mushti, Ana Opina, Natarajan Raju, Deepak Sail, Zhen-Dan Shi, Olga	Imaging Probe Development Center, National Heart, Lung, and Blood Institute, National Institutes of

		Vasalatiy, Biying Xu, Xiang Zhang, Rolf Swenson	Health, Rockville, MD
T-65	Incorporating Authentic Research in an Optional Component of the Second Semester Organic Laboratory Course	Traci L. Smith*, Jason G. Gillmore, Stephen C. Scogin	Hope College
T-66	Using Just-In Time Teaching Techniques to Encourage Big Picture Connections in First Semester Organic Chemistry	Pamela M. Lundin*	Wake Forest University
T-67	An Organic II Course-Based Research Experience: Synthesis of Neurolenin Analogs	Kevin M. Shea*	Smith College
T-68	Discovery and in vivo Profiling of Dihydrobistriazolopyrazine P2X7 Antagonists	Jessica Wall, Hong Ao, Qi Wang, Anindya Bhattacharya, Michael Letavic, Nick Carruthers, Jason Rech	Janssen Research & Development
T-69	Chemists to Aid the Community for Open Antimicrobial Drug Discovery	Karl A Hansford*, Mark A Blaskovich, Johannes Zuegg, Alysha G Elliott, Matthew A Cooper	Institute for Molecular Bioscience, University of Queensland, Australia
T-70	Monitoring Students' Acquisition of Reasoning Skills in Organic Chemistry Courses	Anne Hylden, Luis Sanchez*	Niagara University
T-71	Development of Hydroxyproline Ligation for Synthesis of Peptide	Khanh Ha,* Grant Simpson, Jay McDaniel, Charles Dennis Hall, Alan Katritzky	University of Florida
T-72	Progress Toward Controlled Disulfide Formation to Access Neuroactive Conotoxins	Thilini D. Kondasinghe,* Hasina Y. Saraha, Dripta De Joarder, Jennifer L. Stockdill	Wayne State University
T-73	Medium Sized Peptide Ring Expansion via Samarium Diiodide Carbon-Nitrogen Cleavage	Grant Simpson,* Sadra Hamedzadeh, Khanh Ha	University of Florida
T-74	Synthesis and Biological Activity of IsCT Peptide Analogs from Scorpion Venom	Adam F. Petraglia*, Roberto de la Salud Bea	Rhodes College
T-75	Design of Amino Acids for the Synthesis of Unnatural Peptides with Antibiotic Activity	Quentin M. Buck*, Adam F. Petraglia, Roberto de la Salud Bea	Rhodes College
T-76	Application of Continuous Preferential Crystallization to Efficiently Access Enantiopure Amino Acids	Celine Rougeot,* Cassandra Cave, Samantha Gaerlan, Jason E. Hein	University of California at Merced
T-77	Synthetic Route to Isovaline, a Non-Proteogenic Amino Acid	Alyssa M. Hua,* Celine Rougeot, Harmanpreet Kaur, Jason E. Hein	University of California at Merced
T-78	Effective Synthesis of 2-Fluorophenylglycine	Samantha Gaerlan,* Cassandra Cave, Céline Rougeot, Jason E. Hein	University of California at Merced
T-79	Strategies Towards a Photoinduced Native Chemical Ligation	Sebastian Dobarco*, Christian G. Bochet	University of Fribourg, Switzerland
T-80	Carbonyl Interactions in Protein Structure and Stability	Robert W. Newberry,* Ronald T. Raines	University of Wisconsin-Madison
T-81	Incorporation of Mercaptolysine to Ubiquitin as Intrinsic Spin-Label	Karina Herrera Guzman,* David Fushman	University of Maryland
T-82	Synthesis of Guaianolide Analogs with Modifications to the Lactone Ring: Effects on Reactivity	Paul A. Jackson,* Kay M. Brummond	University of Pittsburgh
T-83	Synthesis of Inhibitor Molecules of Indoleamine 2,3-Dioxygenase (IDO)	Shorouk Badir*, Dr. William P. Malachowski.	Bryn Mawr College

# WEDNESDAY, JULY 1

W-1	Direct Imidation of Alkanes Using Late Transition Metal	Tung Nguyen,* Olafs Daugulis	University of Houston
W-2	Regioselective Functionalization of Vinylogous Esters via Dienolates: gamma-Selective C– Heteroatom Bond Formation	Xiaohong Chen*, Xiaoguang Liu, Justin T. Mohr	University of Illinois at Chicago
W-3	Triple Aryne-Tetrazine Reaction Enabling Rapid Access to a New Class of Polyaromatic Heterocycles	Sung-Eun Suh*, Stephanie A. Barros, David M. Chenoweth	University of Pennsylvania
W-4	Developing Carbodicarbene-Rhodium	Matt Goldfogel,* Courtney Roberts, Desiree	University of North

	Catalysts: C-C Bond Formations via	Matias, Simon Meek	Carolina at Chapel
W-5	Orchestrated C-H Activation Reactions Using Two Directing Groups Forming Complex Pyrazoles	Tim Coon*, Weibo Yang, Shengqing Ye, Jin-Quan Yu, Dean Stamos, Dewey Fanning, Yvonne Schmidt, Paul Krenitsky	Vertex Pharmaceuticals Incorporated; The Scripps Research Institute
W-6	A Route to alpha-Substituted Phosphonoacetates: Useful Synthetic Intermediates in the Horner-Wadsworth- Emmons Olefination	Kelsey F. VanGelder,* Melinda Wang, Marisa C. Kozlowski	University of Pennsylvania
W-7	Synthetic Applications of delta-Sultones and Thiopyran-1,1-Dioxides Obtained by C-H Insertion	Duminda S. Liyanage, Christian S. Jungong, Alexei V Novikov*	University of North Dakota
W-8	Generation of Highly Electron Deficient Carbodiimides for Inter- and Intramolecular Zwitterionic 1,3-Diaza-Claisen Rearrangements	Joel Walker*, Rebecca Watson, Stevenson Flemer Jr., Yanbo Yang, Teruki Watanabe, Jose Madalengoitia	University of Vermont
W-9	Control of the Chemoselectivity in the Baylis- Hillman Reaction: Polymer-Supported Versus Homogeneous catalysts	Moshe Portnoy,* Jeny Karabline-Kuks, Ramesh Palakuri, Einav Barak-Kulbak, Amit Fallek, Natali Ashush	Tel Aviv University
W-10	Rapid conversion of nitroarenes to aniline derivatives under microwave conditions	Corey S. Keenan,* S. Shaun Murphree	Allegheny College
W-11	Dioxirane-Mediated Catalytic Hydroxylation of Aliphatic C–H Bonds	Conor J. Pierce, Michael K. Hilinski*	University of Virginia
W-12	Formation of alpha-Keto Amides from alpha- Siloxy-N-Silylketenimines via Air Oxidation	Michiko Sasaki,* Masafumi Ando, Kei Takeda	Hiroshima University
W-13	Alkene Carboboration Enabled by Copper/Palladium Synergistic Catalysis	Kevin B. Smith,* Kaitlyn M. Logan, M. Kevin Brown	Indiana University
W-14	Electrophilic Amination and Amidation of Arenes via ortho-Directed C–H Zincation	Charles E. Hendrick*, Katie J. Bitting, Qiu Wang	Duke University
W-15	Selective Suzuki-Miyaura Reactivity of 2,6- Dichloropyridine with Alkylboronic Esters	Sébastien Laulhé,* Jennifer L. Roizen	Duke University
W-16	New Methods for Allylation: Radical Decarboxylative Allylation via Dual Catalysis	Simon Lang,* Kathryn O'Nele, Jon Tunge	University of Kansas
W-17	Site Selectivity in a Rh(III)-Catalyzed C–H Functionalization: Pyridine N-Oxide vs. Pyridine Substrates	Sharon R. Neufeldt,* Gonzalo Jiménez- Osés, John R. Huckins, Oliver R. Thiel, K. N. Houk	University of California at Los Angeles; Amgen, Inc.
W-18	Environmentally Friendly Nitroarene Reductions with Bimetallic Ru-Fe nanoparticle catalysts	Jefferson Tyler,* Venkatareddy Udumula, David J. Michaelis	Brigham Young University
W-19	Ruthenium-Catalyzed Hydrogen Transfer: Pyrazoles from Diols	Daniel Schmitt,* Alexandria Taylor, Andrew Flick, Robert Kyne	Pfizer, Inc.
W-20	Hydrofunctionalization of Alkenes by Rh Carbodicarbene Complexes	Courtney Roberts,* Desiree Matias, Matthew Goldfogel, Simon Meek	University of North Carolina
W-21	The Pd-Catalyzed Fluorination of (Hetero)Aryl Triflates and Halides	Phillip J. Milner,* Hong Geun Lee, Thomas J. Maimone, Aaron C. Sather, Tom Kinzel, Yong Zhang, Mingjuan Su, Stephen L. Buchwald	Massachusetts Institute of Technology
W-22	A Domino Synthesis of Highly Substituted Quinolines	Lucas A. Zeoly, Rosimeire C. Barcelos, Manoel T. Rodrigues Jr, Ralph C. Gomes, Fernando Coelho*	Universidade de Campinas, Brazil
W-23	Efficient Pd-N-Heterocyclic Carbene Pre- Catalyst Site-Isolated in the Core of a Star Polymer	Konstantin V. Bukhryakov, Clément Mugemana, Valentin O. Rodionov*	King Abdullah University of Science and Technology (KAUST)
W-24	Palladium(II)-Catalyzed Allylic C–H Oxidation of Hindered Substrates Featuring Tunable Selectivity Over Extent of Oxidation	Nicholas R. O'Connor,* Xiangyou Xing, Brian M. Stoltz	California Institute of Technology
W-25	Unraveling the Transmetalation Event in the Suzukia ' Miyaura Reaction	Andy A. Thomas,* Scott E. Denmark	University of Illinois at Urbana Champaign
W-26	Diastereoselective Copper-Catalysed Borylative Coupling of Vinylazaarenes with Imines	Joshua J. Smith*, Daniel Best, Alan J. Nadin, Hon Wai Lam	University of Nottingham
W-27	Development of the Diastereoselective Pd- Catalyzed Aryl Cyanation Toward Complex	David A. Petrone,* Hyung Yoon, Harald Weinstabl, Mark Latuens	University of Toronto

	Nitrogen-Containing Heterocycles		
W-28	Heterogeneously Catalyzed Direct C-H Thiolation of Heteroarenes	Suhelen Vásquez-Céspedes,* Angélique Ferry, Lisa Candish, Frank Glorius	Westfälische Wilhelms-Universität Münster
W-29	Copper-Catalyzed Intermolecular and Regioselective Aminoalkoxylation of Styrenes Under Different Mechanisms	Edwin G. Perez,* Jorge Saavedra- Olavarría, Camilo Herrera	Pontifical Catholic University of Chile
W-30	Merging C-H Borylations with Organoindium Cross-Couplings: A New Route to Borylated Biaryls	Chathurika R. K. Jayasundara,* M. Montserrat Martánez, José Pérez Sestelo, Milton R. Smith, III, Robert E. Maleczka, Jr.	Michigan State University; Universidade da Coruña-Spain
W-31	Copper-Mediated Functionalization of Aryl Trifluoroborates	Sydonie D. Schimler,* Melanie S. Sanford	University of Michigan
W-32	Isolation of Unusual Palladium Complexes in the Pd-catalyzed Meisenheimer Rearrangement	Diana Yu,* Van T. Thai, Uttam K. Tambar, Jason E. Hein	University of California, Merced; University of Texas Southwestern Medical Center
W-33	Rearrangement of an Ester to a Diketone: Unexpected Gold-Catalyzed Formal [3+2+2] Cycloaddition Reaction of Propargylic Diazoesters with Unsaturated Imines	Huang Qiu,* Michael D. Mandler, Peter Y. Zavalij, Michael P. Doyle	University of Texas at San Antonio; University of Maryland at College Park
W-34	Promoting Catalysis and Expanding the Scope of Organometallic Nucleophiles for the Nickel- Mediated Decarbonylative Cross-Coupling of Substituted Phthalimides	Kimberly S. DeGlopper,* Mason C. Yoder, Megan R. Kwiatkowski, Jeffrey B. Johnson	Hope College
W-35	Aza-Piancatelli Rearrangement: A Model System for Studying Lnthanide Triflate Catalysts vs Brønsted Acids	Van T. Thai,* Diana Yu, Ryan Chung, Javier Read de Alaniz, Jason E. Hein	University of California at Merced; University of California at Santa Barbara
W-36	alpha-Arylation/Heteroarylation of Chiral alpha- Amino Radicals via Synergistic Iridium Photoredox and Nickel Cross-Coupling Catalysis	Mirna El Khatib,* Gary A. Molander	University of Pennsylvania
W-37	Cobalt(III) Catalyzed C–H Cyanation, Halogenation and Allylation	Tobias Gensch*, Suhelen Vásquez- Céspedes, Da-Gang Yu, Frank Glorius	Westfälische Wilhelms-Universität Münster, Germany
W-38	Ar-CF₃ Bond Formation at Nickel	James R, Bour,* Nicole M. Camasso, Melanie Sanford	University of Michigan
W-39	Synthesis of Novel Auxiliaries for C-H Bond Functionalization Reactions	Loary Inclan*, Olafs Daugulis	University of Houston
W-40	The Development of a Modular, Air-Stable Nickel Precatalyst	Jason D. Shields*, Erin E. Gray, Abigail G. Doyle	Princeton University
W-41	Silver(II)-Mediated Cyclopropanol Ring-Opening Reaction for the Synthesis of beta-Fluoro Ketones	Yuanlin Deng,* Nabeelah Kauser, Justin Mohr	University of Illinois at Chicago
W-42	$Pd(II)/Pd(IV)$ Couple Mediated Oxidative C-N Coupling with $H_2O_2$ as Terminal Oxidant	Elikplim Abada*, Peter Y. Zavalij, Andrei N. Vedernikov	University of Maryland at College Park
W-43	Iron-Catalyzed, Directed Csp <sup>3</sup> -H Benzylation	Brian Groendyke,* Erin Fruchey, Brendan Monks, Silas Cook	Indiana University
W-44	Mediatorless Aerobic C-C Bond formation by at Pt(II/IV) Redox Cycle	David Watts*, Peter Y. Zavalij, Andrei N. Vedernikov	University of Maryland at College Park
W-45	Metalloradical Catalysis for Stereoselective Nitrogen Transfer Reactions	Li-Mei Jin*, Xin Cui, Jingran Tao, Hongjian Lu, X. Peter Zhang	University of South Florida
W-46	Transition-Metal-Catalyzed Radical Reactions: Utilizing Alkyl Electrophiles	Caitlin M. McMahon*, Erik J. Alexanian	University of North Carolina at Chapel Hill
W-47	Copper-Catalyzed Enantioselective Diarylation of Alkenes	Wei You,* M. Kevin Brown	Indiana University, Bloomington

W-48	Aerobic Copper-Catalyzed O-Methylation with Methylboronic Acid	Noelia Martinez-Munoz,* Clare Jacobson,* KC Chen,* Yingchuan Zhu,* David J. Gorin	Smith College
W-49	Stereoselective Additions of alpha-Borylated Nucleophiles to Aldehydes	Matthew V. Joannou,* Brandon S. Moyer, Simon J. Meek	University of North Carolina at Chapel Hill
W-50	Self-Assembling Bioelectronic Peptide Hydrogels	Herdeline Ann Ardoña*, Kalpana Besar, Brian P. Ginn, Hai-Quan Mao, Howard E. Katz, John D. Tovar	Johns Hopkins University
W-51	Routes Toward the Synthesis of High Performance Thermosetting Double-Decker Silsesquioxane (DDSQ) Functionalized Oligoimides	Gayanthi Attanayake,* David Vogelsang, Beth Schoen, Andre Lee, Robert Maleczka, Jr.	Michigan State University
W-52	An Experimental and Computational Study of the Thiol-Michael Click Reaction, and Its Application to Dendrimer Synthesis	Stephen H. Frayne*, Umesh Choudhary, Brian H. Northrop	Wesleyan University
W-53	Dendrimer-Mediated Interparticle Separation and Self-Assembly in Dendronized Gold Nanoparticles Superlattices	Davit Jishkariani,* Benjamin T. Diroll, Matteo Cargnello, Dahlia R. Klein, Lawrence A. Hough, Christopher B. Murray, Bertrand Donnio	University of Pennsylvania
W-54	Pure Polyolefin Block Copolymer Thermoplastic Elastomers	Kaitlyn E. Crawford,* Wonseok Hwang, Robert M. Briber, Lawrence R. Sita	University of Maryland, College Park
W-55	Azulene-Modified Polysiloxanes for Use as Gas Chromatography Stationary Phases	Matthew T. Jackson*, Jason E. Schaffer, Charles M. Garner	Baylor University
W-56	Enhancing the Aqueous Uptake of Hydrocarbons by Encapsulation in Acyclic Cucurbit[n]uril Type of Molecular Containers	Xiaoyong Lu*, Lyle Isaacs	University of Maryland at College Park
W-57	Synthesis and Recognition Properties of Functionalized Cucurbit[8]uril Derivatives	Brittany Vinciguerra*, Peter Y. Zavalij, Lyle Isaacs	University of Maryland at College Park
W-58	Acyclic Cucurbit[n]uril-Type Molecular Containers Bind Neuromuscular Blocking Agents In Vitro and Reverse Neuromuscular Block In Vivo	Shweta Ganapati*, Matthias Eikermann, Lyle Isaacs	University of Maryland at College Park; Massachusetts General Hospital
W-59	Self Assembly of 5'-Benzoyl Modified Lipophillic Guanosine	Keith Sutyak,* Jeffery Davis	University of Maryland at College Park
W-60	Recent Advances in Guanosine-Borate Hydrogels	Taylor N. Plank*, Gretchen M. Peters, Jeffery T. Davis	University of Maryland at College Park
W-61	Array-Based Detection of Persistent Organic Pollutants Using Gamma Cyclodextrin	Nicole Serio*, Mindy Levine	University of Rhode Island
W-62	Detection of Pesticides via Fluorescence Enhancement of Nanoparticles	William Talbert*, Josh Morimoto, Mindy Levine	University of Rhode Island
W-63	Design, Synthesis, and Biological Evaluation of Helical Spiroligomers Targeting HIV-1 gp41	Jae Eun Cheong,* Christian Schafmeister	Temple University
W-64	A Single Stereodynamic Center Modulates the Rate of Self-Assembly in a Biomolecular System	Yitao Zhang*, Roy M. Malamakal, David M. Chenoweth	University of Pennsylvania
W-65	Polymer Metal-Organic Cage Gels	Aleksandr V. Zhukhovitskiy*, Mingjiang Zhong, Eric G. Keeler, Vladimir K. Michaelis, Robert G. Griffin, Adam P. Willard, Jeremiah A. Johnson	Massachusetts Institute of Technology
W-66	Mechanically Interlocked Star Polymers: Synthesis and Dynamic Properties	Brian H. Northrop,* Umesh Choudhary	Wesleyan University
W-67	Mechanistic Studies and Predictive Modelling of a Vorbrueggen Reaction	Gregory L. Beutner,* Benjamin C. Cohen, Junying Fan, Chris Sfouggatakis	Bristol-Myers Squibb
W-68	High-throughput Acquisition of Reaction Progress in a Microwave Reactor	Alyssa F. Jones*, Diana Yu, Carl A. Posadas, Greg B. Dudley, Jason E. Hein	University of California at Merced; Florida State University
W-69	Solvent-Dependent Fluorescence of Sterically	Kevin P. Schultz,* Scott Sibley, Ryan	Goucher College

	Hindered 2,3-Disubstituted Quinoxalines	Bram, Marie McConville, Jiwon Park	
W-70	Divergent Mode of Activation and Enantioselectivity in Pd-Catalyzed [3,3]- Sigmatropic Rearrangements Revealed by DFT	Osvaldo Gutierrez,* Marisa C. Kozlowski	University of Pennsylvania
W-71	Use of Biocompatible Hydrogel Beads for the Recovery and Delivery ff Antibiotics	Kwonil Ko,* Abel Navarro	City University of New York
W-72	Mechanism of Pd-Catalyzed Arylation of Enolates vs Nitronates	Sergei Tcyrulnikov,* Marisa C. Kozlowski	University of Pennsylvania
W-73	Regioselectivity in Pictet-Spengler reaction: theoretical insights.	Iriux Almodovar*, Marcos Caroli-Rezende, Bruce K. Cassels, Macarena GarcÃa- Arriagada	University of Santiago de Chile; University of Chile
W-74	Development of New, Physiologically Useful Precursors to Nitroso Carbonyl Intermediates.	Saghar Nourian*, John P. Toscano	Johns Hopkins University
W-75	Nanosecond Time-Resolved Infrared (TRIR) Studies of OxycarbonyInitrenes	Tyler A. Chavez,* Yonglin Liu, John P. Toscano	Johns Hopkins University
W-76	Mechanistic Investigation of Perfluorophenyl Azide Cycloadditions to Enols and Enolates: Origins of N2 Extrusion	Janice Lin,* Steven A. Lopez, Sheng Xie, Olof Ranstrom, Mingdi Yan, Kendall N. Houk	University of California at Los Angeles; University of Massachusetts Amherst
W-77	Investigation of the Key P450-Catalyzed Oxidative Cyclization Step in the Biosynthesis of Griseofulvin	Jessica M. Grandner,* Ralph A. Cacho, Yi Tang, K. N. Houk	University of California at Los Angeles
W-78	Coordination Variability of Copper(I) in Multidonor Heterocyclic Thioamides: Synthesis, Crystal Structures, Luminescent Properties and ESI-Mass Studies of Complexes	Amanpreet Kaur,* Tarlok S. Lobana, Alfonso Castineiras, Ray J. Butcher, Jerry P. Jasinski	Guru Nanak Dev University, Amritsar
W-79	Iron-Catalyzed Borylation and Silylation of Alkyl Electrophiles	Rachel M. Lecker*, Thomas C. Atack, Silas P. Cook	Indiana University
W-80	Novel Magnetic Lipid-Encapsulated Hydrogel Particles for CAMP Discovery	Megan Devine,* Cassie Malato, Shay Scott, Paul Russo, Barney Bishop	George Mason University
W-81	Acyclic cucurbituril dendrimers	David Sigwalt,* Mingming Zhang, Sarah Ahlbrand, Volker Briken, Lyle Isaacs	University of Maryland
W-82	Synthesis and Characterization of Nanostructure Ion-Imprinted Polymer for Selective Extraction of Lead Ions from Vegetables and Fish Samples	Akbar Bagheri*	Shahid Beheshti University, Iran

# Activities

### **Washington DC Monuments & Museums**

Monday afternoon 11:45 am - 6 pm buses to the National Mall in Washington DC. Price includes brown box lunch, transportation, and tickets to the Washington Monument. Cost \$20

Washington Monument Tickets Limited (100); visit to DC no limits

11:45 am pick up at Clarice Smith Performing Arts Center

12:00 pm pick up at Prince Frederick (dorms)

 ${\sim}1{:}00~\text{pm}$  drop off at Smithsonian National Museum of American History

5:00 pm pick up at Smithsonian National Museum of American History

~6:00 pm drop off at University of Maryland

**Sites to visit:** Smithsonian, Museum of Natural History, Air and Space, Lincoln Memorial, National Zoological Park, WW2 / Korean / Vietnam memorials, International Spy Museum, Newseum, US Botanical Garden, National Archives, Hirschhorn Museum and Sculpture Garden, Corcoran Gallery, National Postal Museum, Lincoln Memorial, Tidal Basin (Walk), Library of Congress. Links:

- National Mall: <u>http://washington.org/DC-guide-to/national-mall</u>
- Monuments and Memorials: http://washington.org/topics/monuments-memorials
- Museums: <u>http://washington.org/topics/museums</u>
- Map: <u>http://washington.org/dc-map</u>

### Annapolis

Tuesday afternoon 1-5 pm buses to Anapolis Maryland. Price includes brown box lunch, transportation, and map of the Anapolis area. \$15

1:00 pm pick up at Clarice Smith Performing Arts Center

1:15 pm pick up at Prince Frederick (dorms)

2:00 pm drop off at downtown Anapolis

5:00 pm pick up at downtown Anapolis

6:00 pm drop off at University of Maryland

### **NASA Goddard Center**

Wednesday afternoon 1:30-4:30 pm Goddard Space Center. Price includes transportation and tour. \$10 Tour: Space is Limited to 40 people; visit to center: no limits For the tour only, non-US citizens must provide full names and passport information. If you select this option, you will be contacted in advance for this information by one of the conference organizers.

1:30 pm pick up at the Stamp Student Union 2:00 pm drop off at Goddard Space Center

4:45 pm pick up at Goddard Space Center

5:00 pm drop off at University of Maryland

### **Other Options**

- Softball Game
  - Tuesday June 30, 2-5 pm
  - Chapel Field (near Route 1)
  - water and equipment provided, but bring a glove if you have one
- Volleyball, Soccer, and Frisbee
  - Monday June 29, 1-4 pm at La Plata Beach (adjacent to Eppley Rec Center)
  - Water will be provided
  - Location (map): <u>Website</u>
- Eppley Recreation Center
  - Visitors pay \$7 per day to use the facility
  - Indoor pool, weights, racquetball, squash, climbing wall, basketball courts, etc.
  - Outdoor pool: 11 am 8 pm
  - Sunday 10 am 9 pm, Monday-Friday 6 am 10 pm
  - Member services desk is open 8 am to 9 pm
  - More info: <u>Rec Center Flyer</u>
  - Location: http://crs.umd.edu/Facilities/Indoor-Facilities
- University of Maryland Golf Course
  - <u>Tee times</u> can only be reserved 5 days in advance
  - More info (rates, tee times, etc): <u>http://golf.umd.edu/</u>
- Washington D.C. (visit on your own)
  - 45 min train ride from College Park train station (see the <u>NOS Transportation page</u> and/or the <u>Washington Metro Page</u> for more details)
  - Shuttle runs from University of Maryland campus to College Park train station
  - Sites to visit: Smithsonian, Museum of Natural History, Air and Space, Lincoln Memorial, National Zoological Park, WW2 / Korean / Vietnam memorials, International Spy Museum, Newseum, US Botanical Garden, National Archives, Hirschhorn Museum and Sculpture Garden, Corcoran Gallery, National Postal Museum, Lincoln Memorial, Tidal Basin (Walk), Library of Congress.
    - National Mall: <u>http://washington.org/DC-guide-to/national-mall</u>

- Monuments and Memorials: <u>http://washington.org/topics/monuments-memorials</u>
- Museums: <u>http://washington.org/topics/museums</u>
- Map: <u>http://washington.org/dc-map</u>
- College Park Aviation Museum
  - Location: 1985 Corporal Frank Scott Drive, College Park, MD 20740
  - A 20 minute walk from the center of University of Maryland campus
  - More info: <u>http://www.collegeparkaviationmuseum.com/About\_Us.htm</u>
- Paint Branch Stream Valley Park A neighborhood park with a stream, playground, baseball field, tennis courts & hiking trails
  15 minute walk from center of University of Maryland Campus
  More info: <a href="http://www.montgomeryparks.org/parks\_facilities\_directory/paintbranchsvu6.shtm">Mon tgomery Parks Site</a>
- TerpZone
  - Brunswick Bowling Lanes (8), Gold Crown 9' Billiard Tables (10), Video Arcade Games located in the basement of the Stamp Student Union
  - More info: <u>http://thestamp.umd.edu/terpzone</u>
- Six Flags Theme Park
  - 30 min drive from University of Maryland campus
  - More info: <u>https://www.sixflags.com/america/</u>
- Monocacy National Battlefield
  - 50 min drive from University of Maryland campus
    - More info: <u>http://www.nps.gov/mono/index.htm</u>



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