

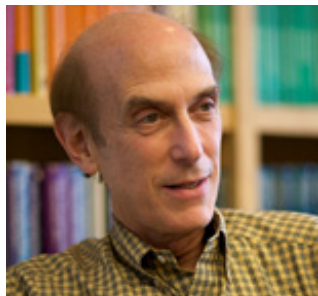


# Chemformation

The Newsletter of the MIT Department of Chemistry  
Volume 29, Number 1, Wednesday, January 11, 2012

## Happy New Year!

### LIPPARD TO RECEIVE FREDERICKSON PRIZE



Stephen J. Lippard, Arthur Amos Noyes Professor of Chemistry, has been selected to receive the 2012 Christopher J. Frederickson Prize for Research in the Neurobiology of Zinc. The Prize is awarded for the scientist who has broken the most important new ground in zinc neurobiology in the last three years. Professor Lippard receives the prize jointly with [James O. McNamara](#), M.D, and the Carl R. Deane Professor at Duke University, with whom he co-authored a paper entitled, "Vesicular Zinc Promotes Presynaptic and Inhibits Postsynaptic Long-Term Potentiation of Mossy Fiber-CA3 Synapse," in *Neuron*, Volume 71, Issue 6, 1116-1126, 22 September 2011.

Professors Lippard and McNamara will be presented with their prize by Dr. Frederickson himself at the 3rd International Society for Zinc Biology Conference in Melbourne, Australia in January 2012. The executive committee of the IZSB honors Dr. Frederickson for his lifetime research in the field of zinc neurobiology, and his seminal contributions to the foundation of the field.

### 16TH ANNUAL BRUKER / MIT SYMPOSIUM

The 16th Bruker/MIT Symposium entitled *Metal Organic Frameworks* will be held on Saturday, February 18, 2012 (with a half-day workshop on Friday, February 17). The speaker line up is stellar: Mircea Dincă, (MIT), Jeff Long, (UC Berkeley), George Whitesides, (Harvard), Omar Yaghi, (UCAL), as well as Roger Durst and Chuck Campana (both Bruker-AXS).

More information about the Symposium can be found here:

<http://web.mit.edu/x-ray/bmit11.html>

<http://web.mit.edu/x-ray/bmit-schedule.html>

The refinement workshop entitled, "Refinement of Solvent Disorder," on Friday will be taught by Chuck Campana, (Bruker-AXS), Peter Mueller, (MIT) and Michael Takase, (Yale). It will be a hands-on experience, participants should bring their own laptops. The number of participants for the workshop is limited to

thirty. More information about the workshop can be found here: *Please note the workshop is full. Contact Peter Mueller ([pmueller@mit.edu](mailto:pmueller@mit.edu)) to be put on a waiting list.*

As in previous years there will be a \$500 poster prize generously sponsored by Bruker-AXS.

For Online Registration follow the links or [click here](#):

<http://web.mit.edu/x-ray/bmit-rsvp.html>

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We encourage alumni to keep in touch with the Department by submitting a bio and photo or news items to Liz McGrath, [emg@mit.edu](mailto:emg@mit.edu).

### Donald R. Wiles, PhD '53



Professor Emeritus Donald Wiles, Carleton University, carried out his PhD studies in Nuclear Chemistry under Professor Charles Coryell. Having been a radiochemist for many years, he worked for several years in the area of nuclear fission chemistry--mostly fission yield measurement. When he joined the faculty at Carleton in 1959 he continued his work on corrosion and dissolution chemistry, mostly in the form of electron exchange kinetics in solution, which he had started at the University of British Columbia. At that same time he turned his attention to hot atom chemistry, both of ionic compounds and metal-organic compounds. Particularly in the latter area his work became prominent world-wide. On reaching what he perceived to be impenetrable barriers, both in the experimental study and the theoretical interpretation of solid state hot atom chemistry, he changed his attention to measurement of environmental radioactivity - particularly that of the heavy natural decay products of uranium.

Professor Wiles was recently awarded a Doctor of Laws, *honoris causa*, by the Carleton University. To view the award ceremony, click [here](#).

A centennial symposium to honor Glenn T. Seaborg and Charles D. Coryell, is currently scheduled for August 19-23, 2012 in Philadelphia. The symposium is being organized by Walter Loveland of the ACS Nuclear Division.

### Paula J. Olsiewski, PhD '79

The article, "Reflections on the journey: six short stories," submitted to *Chemformation* by chemistry alumna, Dr. Olsiewski, was published in *Chemistry Central Journal* in November 2011. It is part of the series "Women in chemistry: In celebration of the International Year of Chemistry." Four of the six authors were graduate students in the Department of Chemistry at MIT.



One of the goals of the 2011 International Year of Chemistry is to celebrate the contributions of women to science. A question that has been frequently asked in this regard is... Why is it necessary to highlight women in the "age of equality"? The reasons are varied but the facts are that many women scientists worked in obscurity throughout the 19th and even well into the 20th century, sometimes publishing anonymously to be heard. This celebration of Women in Science is one way to recognize both the resiliency and passion of these women. As part of this celebration, Chemistry Central Journal's Thematic Series of "Women in Chemistry" includes this article describing the path several women took as they pursued chemistry careers spanning the latter part of the 20th century and into the early 21st century. Sharon Haynie, Nancy Jones, Cheryl Martin, Paula Olsiewski, Mary Roberts and Amber Hinkle each have a unique story of their personal journey from childhood to adulthood. To read the article, visit: <http://journal.chemistrycentral.com/content/5/1/69>

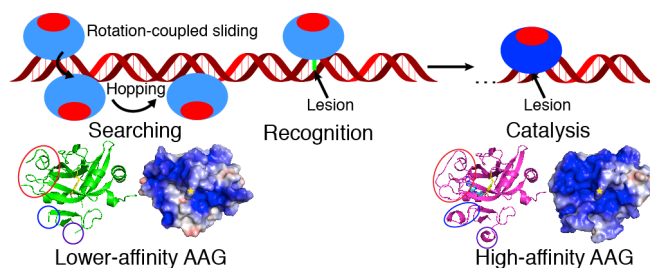
Today MIT has a woman president, woman chair of the Chemistry Department, tenured women faculty members, and in AY 2010-11, 1,948 female undergraduates (45%) and 1,957 female graduate students (31%).

## Searching for DNA lesions: Structural evidence for lower and higher-affinity DNA binding conformations of human alkyladenine DNA glycosylase (AAG)

Jeremy W. Setser, Gondichatnahalli M. Lingaraju, C. Ainsley Davis, Leona D. Samson, Catherine L. Drennan

*Biochemistry*, doi: 10.1021/bi201484k  
published online December 13, 2011

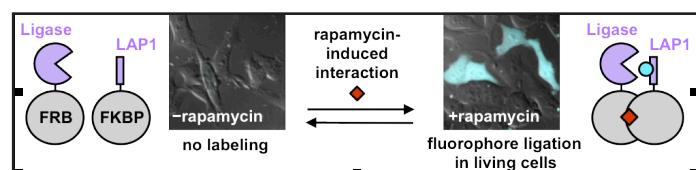
To efficiently repair DNA, human alkyladenine DNA glycosylase (AAG) must search the million-fold excess of unmodified DNA bases to find a handful of DNA lesions. Such a search can be facilitated by the ability of glycosylases, like AAG, to interact with DNA using two affinities: a lower-affinity interaction in a searching process, and a higher-affinity interaction for catalytic repair. The Drennan Lab, in collaboration with the lab of Prof. Leona Samson in Biological Engineering, has solved a crystal structure of this human DNA repair protein that allows us to investigate, for the first time, a lower-affinity depiction of this enzyme. By combining this new insight with existing biochemical and structural data, we are able to consider the big picture question of how DNA binding proteins find their binding sites in the vast expanse of the genome.



## Imaging Protein-Protein Interactions inside Living Cells via Interaction-Dependent Fluorophore Ligation.

Slavoff SA, Liu DS, Cohen JD, Ting AY.  
*J Am Chem Soc.* 2011;133(49):19769-76.

The Ting Lab recently developed ID-PRIME, or Interaction-Dependent PRobe Incorporation Mediated by Enzymes, a new imaging-based reporter of protein-protein interactions in living cells. The coumarin ligase enzyme LplA is fused to a protein of interest, and LplA's peptide substrate, LAP, is fused to its interaction partner. Only if the proteins interact do LplA and LAP associate, resulting in coumarin labeling and blue cellular fluorescence. The system is engineered to provide low background in the absence of an interaction and has advantages over existing methods including a short labeling time.



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### A glow of recognition

New detectors developed at MIT could provide easy visual identification of toxins or pathogens.

The Dincă Lab has developed a new way of revealing the presence of specific chemicals — whether toxins, disease markers, pathogens or explosives. The system visually signals the presence of a target chemical by emitting a fluorescent glow. The approach combines fluorescent molecules with an open scaffolding called a metal-organic framework (MOF). This structure provides lots of open space for target molecules to occupy, bringing them into close proximity with fluorescent molecules that react to their presence. Click [here](#) to learn more.

## Named Speakers

### ITAMI TO DELIVER NOVARTIS LECTURE IN ORGANIC CHEMISTRY



The 2012 *Novartis Lecture in Organic Chemistry* will be delivered by Professor Kenichiro Itami from the Nagoya University in Japan. The lecture will take place on Thursday, February, 2, at 4:00 pm in 6-120. It will be preceded by refreshments in the lobby of Building 18.

“Challenges in Arene-Assembling Chemistry” is the title of Professor’s talk.

Research in the Itami lab is on the development of new synthetic methods, strategies, and concepts to solve challenging synthetic problems for realizing ideal chemical synthesis and for generating as-yet unexplored molecules of significant interest.

Representative projects include (1) ideal chemical synthesis through C-H bond transformation, (2) rapid synthesis of pharmaceutically relevant molecules and natural products, (3) synthesis and properties of optoelectronic materials, and (4) controlled bottom-up synthesis of structurally uniform nanocarbons such as carbon nanotubes, graphenes, and fullerenes. During the last four years, Professor Itami has delivered 70 invited lectures. The accomplishments of his research group have been highlighted more than 60 times in various newspapers, media, and journals during the last five years.

### ABBOTT LECTURE IN ORGANIC CHEMISTRY



Gary A. Molander

The Abbott Lecture in Organic Chemistry will take place in 6-120 at 4:00 pm on Thursday, February 9. There will be refreshments in the lobby beforehand.

This year’s speakers are Gary A. Molander, Hirschmann-Makineni Professor of Chemistry at the University of Pennsylvania, and Dr. Michael J. Rozema, Abbott Laboratories.

Professor Molander’s talk is entitled “New Routes to Organoborons and Useful Reactivities” and Dr. Rozema will speak on “ABT-869: Process Development of a VEGF Inhibitor for the Treatment of Cancer.”



Michael J. Rozema

## Upcoming Seminars

Visit the *Chemistry Department Events Calendar*, by [clicking here](#), to see upcoming seminars.