Chemformation

The Newsletter of the MIT Department of Chemistry
Volume 28, Number 9, Wednesday, November 9, 2011

THE DEPARTMENT LOSES A BELOVED COLLEAGUE

Robert Silbey, Class of 1942 Professor of Chemistry, and former MIT dean of science, dies at 71.

'Excellent teacher' spent 45 years as faculty member, administrator.

By Anne Trafton, MIT News Office

Robert J. Silbey, Class of 1942 Professor of Chemistry, who served as dean of MIT's School of Science from 2000 to 2007, died Thursday, Oct. 27, after a battle with cancer. He was 71.

Silbey was known for his leadership and political acumen as dean, his commitment to enhancing MIT's education and research, and his work in condensed phase theory and quantum biology, fields that he helped to pioneer.

"Bob Silbey was a total citizen of MIT," said Charles Vest, president of MIT from 1990 to 2004. "He was a first-rate scientist, an excellent teacher, a skillful administrator and a caring steward of the MIT student experience. As chemistry department head and dean of science, he built bridges across disciplines and brought a strong sense of humanity as well as a great sense of humor to his work. Although he never sought the limelight, he has left a big legacy at the Institute and will be greatly missed."

Silbey joined the MIT faculty in 1966, becoming head of the chemistry department in 1990 and director of the Center for Materials Science and Engineering in 1998. He took over as interim dean in February 2000 and was named permanent dean the following year.

Robert Brown, who appointed Silbey dean while serving as MIT's provost, said Silbey was "one of the most talented

academic leaders I have ever had the honor of working with. He led by example through his own dedication to teaching, research and the success of MIT's students, and he had the unique ability to work calmly through the most difficult issues and get agreement from strong-willed colleagues on a way forward."

Brown, now president of Boston University, added that Silbey also "brought a sense of optimism and a little levity to the difficult day-to-day work of deans and provosts."

"His way of bringing people together through his humorous stories made him beloved by his colleagues," said Sylvia Ceyer, the John C. Sheehan Professor of Chemistry and chair of the Department of Chemistry. "He was a generous colleague, personally and scientifically, giving of his time, energy and brilliant mind to us."

An advocate for excellence in teaching, Silbey supported innovative approaches to undergraduate education such as the Technology Enhanced Active

A Peek Inside!

Chemformation is published by Liz McGrath. The next issue will be produced in December 2011. Please convey items of interest (or mailing list changes) to Liz McGrath, Communications and Development Coordinator, Dept. of Chemistry, MIT, 18-388, Cambridge, MA 02139, 617/253-4080; 617/258-7500 (fax); e-mail: *emg@ mit.edu*. Current and back issues can be accessed on the Chemistry Dept. Web site http://web.mit.edu/chemistry/

Learning program, which changed the way freshman physics is taught. He also oversaw the construction of the Brain and Cognitive Sciences Complex, and during his tenure as dean, four Nobel Prizes were awarded to School of Science faculty members.

Another of Silbey's priorities was improving the experiences of women and underrepresented minorities on the faculty.

"In producing the historic report, 'A Study on the Status of Women Faculty in Science at MIT,'" Ceyer said, "Silbey played the critical role in obtaining the empirical data substantiating the women's concerns and beginning the process of amelioration."

Catherine Drennan, a professor of chemistry, said Silbey offered critical support in creating a welcoming environment for female and minority students.

"He was always seeking new opportunities to make MIT and the field of science better for everybody," Drennan said. He enthusiastically began a new collaboration between chemistry and biological engineering in the teaching of thermodynamics.

Photo / Donna Coveney

A Symposium organised by Silbey's former graduate students and postdoctoral scholars was held in June 2005 to celebrate Bob's 65th Birthday

Silbey was known as a caring mentor, and many of his students have gone on to positions of leadership in academia.

"After his remarkable service as dean, Bob Silbey continued to serve the Institute in extraordinary ways," said MIT President Susan Hockfield. "He saw, in many dimensions, how MIT could grow stronger, and he committed himself to making that vision real, with brilliance, pragmatism and always his light touch."

Photo / Donna Coveney

Bob and Susan Silbey pictured at Bob's 65th Birthday Symposium

Silbey was a consummate teacher who received almost every teaching award MIT bestows, including the School of Science Teaching Award, the Graduate Student Council Award for Teaching and the Baker Award for Undergraduate Teaching (voted by the undergraduates). In 1996, he was named a Margaret MacVicar Faculty Fellow, an honor that recognizes outstanding classroom teaching at MIT.

Drennan, who co-taught freshman chemistry with Silbey many years ago, said it was impossible to improve on his lectures. "He commanded that room with his voice, his presentation and his personality," she recalled.

A former undergraduate in Silbey's thermodynamics class, Justin Cohen '03, wrote, "I still fondly look back on that class, and I can honestly say that although I may have forgotten quite a bit of material, I still remember the joy, energy and excitement that all of us felt when Professor Silbey was teaching … his energy, passion and friendliness made you feel as though you had known him forever."

Silbey made fundamental contributions to the theories of spectroscopy, energy transfer and nonlinear optical properties of glasses, solids and polymers. In the 1980s, Silbey showed how the high conductivity of conjugated polymers arose from chain distortion induced by excitations. This work provided the first quantum calculations of the soliton, polaron and bipolaron entities that dominate polymers' conductivity. His work also provided the first quantum method capable of predicting the redox potentials of these polymers, ex-

Photo / Liz McGrath

Five former chairs of chemistry pictured at the Welch Foundation luncheon in honor of JoAnne Stubbe and Christopher Walsh on May 13, 2010: L-R: Professors Timothy M. Swager, Christopher T. Walsh, James L. Kinsey, Robert J. Silbey, Stephen J. Lippard

plaining a large amount of existing experimental data in hole burning, photon echo and single molecule spectroscopies, thereby spurring many new experiments.

"It is well known among the scientific community that Silbey was an experimentalist's theorist," Ceyer said.

Most recently, Silbey's research focused on energy transfer and quantum dynamics in the context of photosynthesis — the process that plants use to convert the sun's energy into sugar. His work was particularly relevant to the first step of photosynthesis, which involves the capture of photons by light-harvesting pigments and the subsequent transfer of the photon's energy to structures within plant cells that convert it to chemical energy.

To predict how fast excitation energy could be transferred, Silbey developed a wide range of theoretical methods that have now become the standard techniques for studying photosynthetic energy transfer. One example is the variational polaron transformation, which describes how quantum friction can slow down the motion of excitation energy. A paper by Silbey and Robert Harris of the University of California at Berkeley on this approach, one of most cited in physical chemistry, is a classic, according to Jianshu Cao, MIT professor of chemistry.

"With this and other powerful tools, Bob Silbey and his team predicted the dynamics of energy excitations in conjugated polymers and other organic molecules important for solar cells," Cao said. "These studies laid a solid foundation for the current investigation of quantum biology."

Born in Brooklyn, N.Y., Silbey received a bachelor of science from Brooklyn College in 1961 and a PhD in theoretical physical chemistry from the University of Chicago in 1965. He then worked as a postdoctoral fellow at the University of Wisconsin for a year before joining the MIT faculty in 1966.

He was a fellow of the National Academy of Sciences, the American Academy of Arts and Sciences, the American Association for the Advancement of Science and the American Physical Society. He was awarded the Max Planck Research Award of the Humboldt Foundation, and was a Dreyfus Foundation Teacher Scholar, Sloan Foundation Fellow and a Guggenheim Foundation Fellow. He also received, among other awards, honorary degrees from his alma mater, CUNY Brooklyn College, and École Normale Supérieure in Cachan, France.

Silbey is survived by his wife, Susan, the Leon and Anne Goldberg Professor of Sociology and Anthropology at MIT; daughters Jessica and Anna; sons-in-law Keith Dresser and Jeffrey Thompson; brother Joel and sister-in-law Rosemary; sister-in-law and brother-in-law Alma and Dick Merians; nieces Victoria Silbey

and Diane Merians; nephews David Silbey and Roger Merians; and four grandchildren: Charlotte Silbey Dresser, Harper Silbey Dresser, Henry Hardy Thompson-Silbey and Oliver Harold Thompson-Silbey.

A Robert J. Silbey Memorial Fund has been established at MIT in his memory. Donations can be sent to the MIT provost's office. A memorial celebration will occur in early 2012.

Further reflections submitted by faculty:

"Bob and I taught 5.11 together, as the freshman course was then enumerated, in the late '80s, and it was through this experience that I first came to know and love his deep chemical insight, wit, and personal charm. Although we never published together, we discussed science a lot and I have emails in which we promised each other to get that joint paper out some day. Bob made us laugh during tense moments in departmental meetings and during our joint tenure on Science Council, he as Dean (my boss) and I as Department Head. Bob was important glue - he was one of the reasons why I always considered MIT to be my true home, despite tempting opportunities elsewhere. Maya Angelou said "...people will forget what you said, people will forget what you did, but people will never forget how you made them feel." Bob made us feel good about life, about the world, about others - I miss him dearly."
--Stephen J. Lippard

"I knew Bob Silbey since his arrival at MIT in 1965. We immediately became good friends. Our offices were right next to each other in Building 4 and we exchanged all sorts of conversation ranging from science to personal matters, and when his children came to visit they used to play in my (bigger) office instead of his. Bob was a sterling collaborator, scientist, and colleague. In fact, we were just writing a paper together when the worst of his illness stuck. That paper will appear in Physical Review E in the near future. During Bob's last months he and I had a collaborator here (Professor Alberto Suarez from the University of Madrid) as a postdoc. He was invaluable. Without his help, the manuscript could not have been written in Bob's last days."
--Irwin Oppenheim

"Bob was the ultimate father figure of the department. Whenever there was a difficult situation that the rest of us couldn't see our way through, we would call on Bob. His wisdom was unparalleled and his integrity beyond reproach. Bob could bring any meeting to the proper resolution rapidly and we relied on him often. Simply put, he was our greatest leader."
--Timothy M. Swager

"It is tremendously sad that Bob Silbey is no longer with us. I would often go to Bob's office, seek his advice, discuss science, and enjoy one of his many jokes. It became a part of my life at MIT. Bob represented the best of a scientist, a mentor, and a colleague, and indeed the best of MIT. As time passes, I take comfort that I have had the privilege to know this wonderful man, to work with him, to laugh with him, and to share moments of joys with him. I will miss his radiant smiles and loud laughter, and will always remember him fondly."
--Jianshu Cao

"Bob Silbey was a great scientist, leader and man. He displayed a remarkable sense of calm and a tremendous sense of humor. I often sought his advice and benefited greatly from his suggestions. I will remember Bob for his generosity, wonderful voice, great jokes, and his wisdom."
-- Stephen L. Buchwald

"It is difficult to express the range of emotions that come from Bob's passing, because he meant much to me as a leader, teacher, scholar, scientist, confidant, and mentor. It's tremendously sad to lose him, but reflecting on what he meant to us leaves one with warmth. There is no question that Bob had a tremendous impact on all facets of my professional career, but at the end of the day I miss him because he was a mensch. I don't remember the exact words, but Bob once said to me that science, like life, is about relationships. That was how he lived. He was the best of men."
-- Andrei Tokmakoff
"When I arrived at MIT in 1975 one of the first events I can remember is an informal barbeque at Bob's house

to which he and Chris Walsh invited Nancy and myself; it probably was the fall of '75. It was a friendly gesture to extend to a new member of the department, and much appreciated. The friendship between Bob and Susan and Nancy and I continued over the years. Although we were virtually at opposite ends of the chemical research spectrum Bob and I seemed to find some common ground periodically. In looking through my publication list I was somewhat surprised to find that we are authors together on eight publications between 1990 and 1999. We even shared for a few years a grant that I wrote. Bob was always available to chat about some problem in the department that was bothering me. I valued his wise counsel. I also would drop in unexpectedly now and then for no reason other than the fact I was passing his door. Bob always had at least a few minutes, if not more, for conversation. When I was considering who to invite to the Nobel ceremonies and celebrations besides family, I immediately thought of Bob and Susan. Bob was Dean of Science at the time. I saw him as my MIT administrative representative. But mainly I simply wanted Bob and Susan, friends for thirty years, to be there. It was a wonderful weekend - the "small" dinner for friends and family on Friday in the fish restaurant, the large, lavish, formal Nobel banquet on Saturday; it was all good. We have all lost a great friend and a wonderful human being."
-- Richard R. Schrock

"Bob Silbey was a great teacher. First of all, he was wired for sound. He could create a theatrical sigh during a boring movie in a dark movie theater that would produce uproarious applause from the audience. His off-scale enthusiasm for everything was exceeded only by his curiosity. And he had the unique gift of being able to transfer that curiosity to his students, defined in the broadest sense, ranging from freshmen to his senior colleagues. Frequently, I would ask for his insights into a current research problem. If it took him as long as fifteen minutes to solve the problem, then I knew it had the weight and significance of a full Silbey-worthy PhD project. I still smile when I remember his lecture on buffers in 5.11. It was not a subject that he could animate with his usual enthusiasm, joy, and insight. But even in this pedagogical strait, his joy in teaching carried the day!"
-- Robert W. Field

"Bob was the singular leader among the physical chemists for many years. There were several key occasions during my first few years here when he provided deft guidance - often in the form of nothing more than an offhand, but by no means accidental, comment - that helped steer me toward tenure. There were many more times when he helped resolve problems among us or, more often, when he anticipated and averted them before they even arose explicitly. We regarded him and used him as our local sage, joking about (but relying on) his Solomonic wisdom in dealing with departmental issues in between relying on his help with scientific issues. I hope the harmony among us that he continually promoted can be maintained. I have a publication in preparation that is a collaborative effort including Bob Silbey and a member of his research group as well as Moungi, me, and Prof. Vladimir Bulovic (MIT EECS) and members of all of our research groups. It is an excellent illustration of Bob's extensive collaborations with experimentalists like the three of us. Theoretical guidance of experimental work was a hallmark of Bob's approach."**-- Keith A. Nelson**

"Bob played a central and extremely important role in the committee that wrote the 1996 report to the then Dean of the School of Science Robert Birgeneau, focused on the status of women faculty in the School of Science. This committee identified factors affecting the status of women and took note of the very small number of woman faculty at the time (22 women vs 250 men). Eventually in 1999, a summary "MIT report on Women in Science" was published and the rest is history. I was a member of the original committee and having Bob on the original committee was essential to obtaining information from the administration, that eventually led to many changes that have been implemented over the past 15 years. MIT has truly been a leader in creating a work place that is supportive of women faculty and Silbey was a major player in this effort on campus. Over the years I have found MIT a very challenging place and Bob with his amazing wit and sensitivity helped me to put life into perspective when he was chair of our department. I am forever grateful for this advice and allowing me to bring my dog Zyme to work. When she chases the laser pointer at my group meetings, I remember Bob's advice about focusing on all the wonderful things about MIT's environment.

Finally, while I never taught with Bob, I attended a number of his freshman lectures and was in awe of his command of his audience. I believe that teaching is a faculty members greatest contribution and Bob was master of how to teach effectively. I am also grateful for his willingness to cross department boundary lines to teach essential physical chemical principles. I for one want to thank him for his amazing service to this Institute."
-- JoAnne Stubbe

"Bob Silbey was a good man who chose an intellectual life. He should be a model for us all. First, and foremost Bob was devoted to Susan, Jessica, and Anna and more recently to his grandchildren who were a source of enormous joy. All who had the fortune of knowing him recognized his unusual intellect not just in science, but in the broadest range of thought. His contributions to the Institute as a teacher without peer, a department chairman, and dean shaped MIT over three decades. He was my friend, whose counsel I valued and whose company I enjoyed. I will miss him sorely."
-- John M. Deutch

"I first met Bob Silbey in 1970 when I arrived as a postdoctoral fellow in John Waugh's laboratory. At the time he was a young Assistant Professor, and I was introduced to him as a person who knew something about essentially everything. In the intervening 40 years we had many conversations about many subjects. He was a person to whom everyone turned when they had a question about science, politics, or any other subject -- everything from quantum mechanical ladder operators to dealing with the MIT administration, of which he was an important part. He first told me of his illness on a visit to my office at the Francis Bitter Magnet Lab about three years ago. I remember this moment well because I was stunned by the prospect of losing such a vital friend and colleague. We will dearly miss his intellect, his boundless sense of humor, and his infinite wisdom."
-- Robert G. Griffin

"Bob Silbey's loss is extremely sad to me as a member of the MIT community, the Chemistry department, and personally. I taught with Bob 5.60 for many years. He was an amazing teacher, an inspiration. I treasured going to his lectures. He owned the classroom with his explanations, his stories, his charm and sense of humor. The students mastered the material effortlessly! Bob was also an inspiration for his broad knowledge of science, his wide ranging interests and his keen sense for high quality science. Bob was a pioneer in many areas of theoretical chemistry. So many times when my students came to me with a theory question, the answer was in a paper Bob had written years ago. He was extremely approachable, and I would then send my students his way for answers. Bob was also an inspiration as an administrator in the way he seemed to deal with difficult situations in an effortless, easy manner. I will miss his pearls of wisdom and sanity. Finally Bob was a friend to so many around MIT and the worldwide scientific community. He leaves behind a gaping hole. He was a friend and mentor, I will miss him deeply."
-- Moungi G. Bawendi

TOKMAKOFF RECEIVES PLYLER PRIZE

Professor Andrei Tokmakoff is the recipient of the 2012 Earle K. Plyler Prize for Molecular Spectroscopy. Professor Tokmakoff receives the prize for his pioneering work in the development and application of two-dimensional infrared spectroscopy.

WAUGH HONORED AT WELCH AWARD CEREMONY

"I have had the special joy of helping pioneer an entirely new area of science and creating a collection of tools and techniques that other researchers continue to extend and build upon."
-- John S. Waugh

Buz Marvins, Kaye-Marvins Photography

Professor John S. Waugh is presented with the 2011 Welch Award by the Chairman of The Welch Foundation, Mr. Ernest Cockrell.

Professor John S. Waugh was presented with the $300,000 Welch Award in Chemistry at a black-tie dinner in Houston, Texas, on October 24, 2011, to honor his contributions to basic research that benefits humankind. Dr. Waugh's theoretical and experimental breakthroughs revolutionized the field of nuclear magnetic resonance spectroscopy, one of science's most powerful and widely used research tools. Many of the past half century's discoveries in chemistry, physics, biology and materials science flow in part from his pioneering work. The Houston-based Welch Foundation, one of the oldest and largest sources of private funding for basic research in chemistry, annually bestows the prestigious award.

"Dr. Waugh discovered how to use NMR to study solids, creating a collection of tools that allows researchers to view the structures and properties of proteins, membranes, viruses and many other critical components of life," said Ernest H. Cockrell, chair of The Welch Foundation. "Ultimately, new applications in fields as diverse as medicine and batteries can trace their way back to the research techniques he initiated."

"NMR spectroscopy, thanks to Dr. Waugh's insights, continues to profoundly influence the way we do science today," said James L. Kinsey, chair of The Welch Foundation's Scientific Advisory Board. "He took what was a very useful tool for studying small molecules in solution, and greatly expanded its possible applications to a range of solid materials that can't be studied effectively by any other method. His contributions have been absolutely fundamental to many past and current additions to our scientific understanding."

"It is wonderful to be recognized by The Welch Foundation for doing what I love," Dr. Waugh said. "When I started out in NMR so many years ago, little did I know that I would still be writing and thinking about it more than a half century later. I have had the special joy of helping pioneer an entirely new area of science and creating a collection of tools and techniques that other researchers continue to extend and build upon. I am pleased that my contributions continue to aid the work of scientists in so many fields as they add to our understanding of the world."

To view the video tribute to this amazing scientist: click here

Doing Our Part to Protect the Environment!

Mercury and mercury compounds are a significant environmental contaminant. They have the potential to bioaccumulate through the food chain and can be very toxic to humans. The primary source of exposure to mercury for humans is through eating fish. When a larger fish consumes a smaller fish, it also consumes and retains that smaller fish's mercury load. This process continues up the food chain and mercury levels become more concentrated until that perfectly grilled Tuna steak ends up on our dinner plate. Mercury can also be absorbed into our bodies by eating vegetables that have been treated with pesticides and fertilizers containing mercury. Mercury's toxicity has been associated with a whole host of medical maladies including brain, liver, kidney, and central nervous system damage.

Jim Doughty who helped to organize the event.

Mercury is also very difficult to remove once it has entered into a water supply. Consequently, the Massachusetts Water and Resource Authority (MWRA) does not allow the discharge of mercury into our laboratory sink drains. The enforcement limits are very strict because mercury disposed of in this manner will make its way into the environment. The primary point of entry to the environment for mercury that made its way into a sink drain would be through the management of sludge (the semi-solid component of sewage), and to a lesser extent, through the discharge of the treated liquid effluent into Boston Harbor. Sludge is the primary reservoir for this and other heavy metals. The primary method MWRA uses for effective management of sludge is to process it into a fertilizer. After 1991 the MWRA began the process of converting sludge into fertilizer pellets that are approximately 60% organic matter. These pellets also contain many important nutrients such nitrogen, phosphorus, calcium, sulfur, and iron which make them ideal for this purpose. This fertilizer, which meets strict regulatory standards for heavy metal content, is marketed by local fertilizer companies and is used by professional landscapers, golf courses, and even sold at local nurseries.

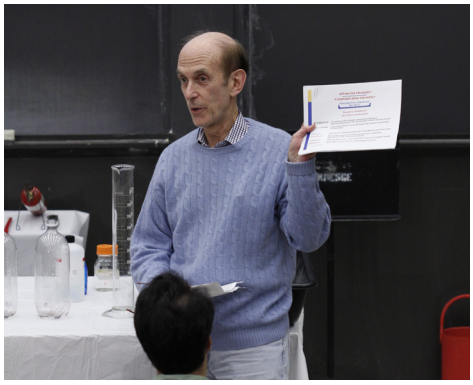
Containers of elemental mercury. The mercury will be recycled.

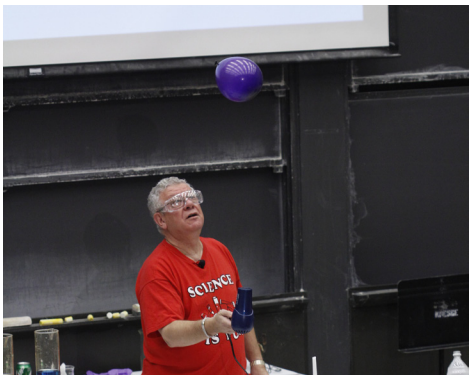
The Department of Chemistry recognizes that although we have thousands, perhaps tens of thousands of different chemicals on hand, mercury represents a unique environmental concern. In an effort to ensure we are doing our part to help keep mercury out of the environment, the department, in conjunction with MIT's Environment, Health and Safety (EHS) Office organized a "mercury disposal day" on October 15th. Lab groups were given the option to voluntarily dispose of mercury and mercury containing devices such as manometers, thermometers, McLeod Gauges, and mercury bubblers that were no longer needed. In an effort to support our effort, the EHS Office graciously agreed to assume the significant disposal cost. The department is pleased to report that mercury disposal day turned into a whopping success with over 60 lbs. of mercury collected!

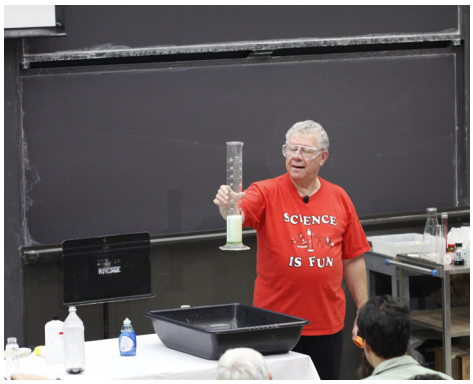
Mercury bubblers which have become largely obsolete

If anyone did not get the opportunity to take advantage of this free disposal service, or for information on mercury alternatives, please contact Jim Doughty (x-46132, *jdoughty@mit.edu)*.

On Sunday, November 6, 2011 the students of 5.112 were treated to a very special lecture. Professor Bassam Shakhashiri, president elect of the American Chemical Society presented his famous "Chemistry Is Fun" demonstrations (http://scifun.chem.wisc.edu/). Professor Shakhashiri was introduced to the students of 5.112 and to visitors by Professor Stephen Lippard, Arthur Amos Noyes Professor of Chemistry. Dr. Patti Christie, Lecturer in the Experimental Study Group, also welcomed the professor to MIT.







Photography / George Zaidan

LEHN VISITS FOR ELI LECTURE IN ORGANIC CHEMISTRY

Pictured L-R: Professor Alex Rich, Department of Biology, Professor Jean-Marie Lehn, and Professor Tim Swager

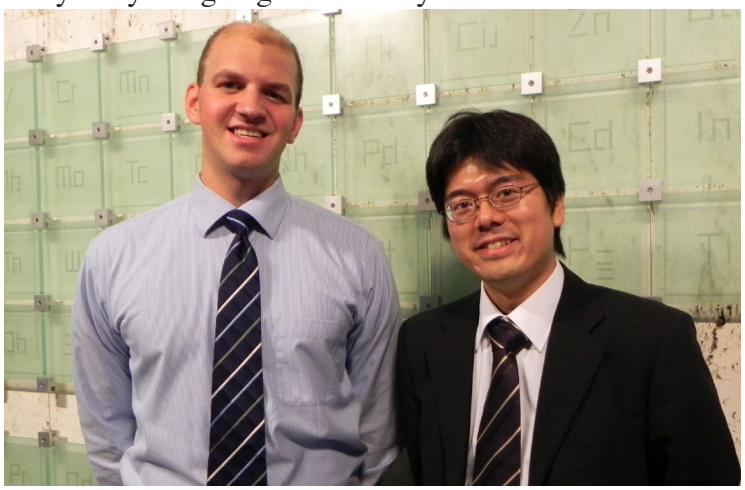
Professor Jean-Marie Lehn, Université de Strasbourg, visited the department on Thursday, October 13, to give the *Eli Lilly Lecture in Organic Chemistry*. His lecture *was* entitled "Perspectives in Chemistry: From Supramolecular Chemistry towards Adaptive Chemistry"

Professor Lehn received the 1987 Nobel Prize in Chemistry jointly with the late Professor Donald J. Cram, (University of California, LA) and the late Dr. Charles J. Pedersen, (DuPont) "for their development and use of molecules with structure-specific interactions of high selectivity".

The event was hosted by Professor Timothy Swager. Professor Alex Rich, William Thompson Sedgwick Professor of Biophysics, a long-time friend of the speaker joined members of the department for the lecture.

MERCK-BANYU LECTURE

Professor Shigeki Matsunaga, University of Tokyo, deliverED the Merck-Banyu Lecture in Organic Chemistry on Thursday, October 27, 2011. His lecture was entitled "Hetero- and Homo-dinuclear Schiff Base Complexes as Cooperative Asymmetric Catalysts." Professor Matsunaga has developed multimetallic asymmetric catalysis by designing chiral catalysts with two or more metal



L-R: Jonathan Weis and Professor Shigeki Matsunaga

centers with different properties; one metal center functions as a Lewis acid to activate an electrophile, and the other metal interacts with a nucleophile to control its orientation. This innovation is different from traditional catalyst design, and has opened up new possibilities in asymmetric synthesis. Jonathan Weis, a second year grad student in the Swager lab. hosted the event.

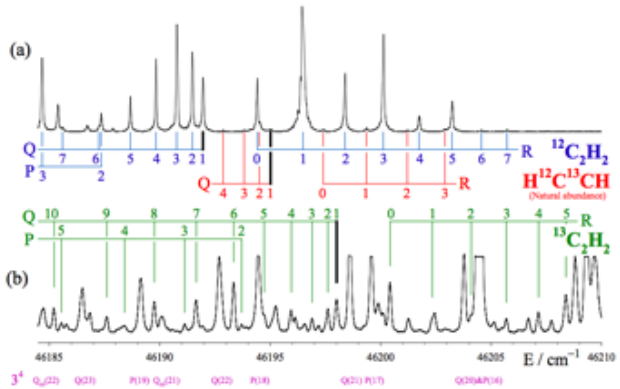
DAVISON LECTURE IN INORGANIC CHEMISTRY

L-R: Professors Fraser Armstrong and Stephen Lippard

Professor Fraser Armstrong, University of Oxford, visited the department November 1-2 to deliver the Davison Lectures in Inorganic Chemistry. Professor Stephen Lippard hosted the visit. Professor Armstrong's research interests are in biological chemistry, bioenergetics and in the mechanisms and exploitation of enzymes related to energy production. His first lecture was entitled "Chemical Mechanisms of Biological Hydrogen". In his second lecture he spoke about "Enzymes as electrocatalysts."

Visit the Chemistry Department Events Calendar, by clicking here, to see all upcoming seminars and events.

Recent Publications



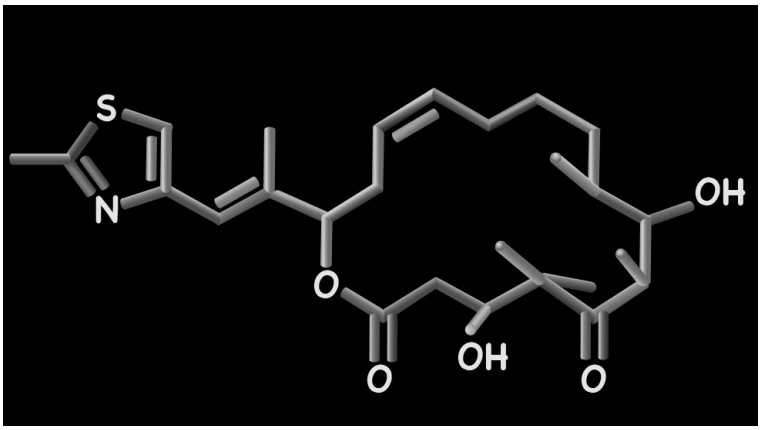
Cis-trans isomerization in the S_1 state of acetylene: Identification of cis-well vibrational levels

The Field group recently observed a new cis-bent isomer of the first singlet electronically excited state of acetylene, reported in Merer et al., *J. Chem. Phys.* 134 (24), 244310 (2011). This work represents the first high resolution spectroscopic study of cis-trans isomerization in an electronically excited state. Analysis of the unusual spectra was aided by theoretical calculations in Baraban et al., *J. Chem. Phys.* 134 (24), 244311 (2011).

Making a Nobel-winning chemistry reaction even better

Schrock group: New catalyst offers greater control over the synthesis of organic cyclic compounds, including potential cancer drugs.

In 2005, Professor Richard Schrock won the Nobel Prize in chemistry for developing catalysts for a reaction that is widely used to produce pharmaceuticals, fuels and other synthetic chemicals. That reaction, known as olefin metathesis, involves breaking and making double bonds between carbon atoms to produce new types of carbon-carbon double bonds.
Read more >>



CAMPUS WINTER CLOTHING TO BENEFIT CASPAR EMERGENCY SERVICES CENTER

The MIT Office of Government and Community Relations, Community Giving at MIT, and MIT Department of Facilities are sponsoring a Campus Winter Clothing Drive to benefit CASPAR Emergency Services Center. The drive will take place from Friday, November 4 through Friday, November 18.

CASPAR is in need of gently used items such as: winter coats, fleece jackets, and down vests, jeans for men and women, sweaters for men and women, sweatshirts and hoodies, warm hats and gloves, men's belts, business attire, new white tube socks, and new underwear for men and women.

Please drop off the clothing items in collection bins located at: W98 Lobby, Copy Tech (11-004), Community Services Office (E19-432), Environmental Programs Office (N52-496), and MIT Investment Management Company. Should you have any questions, please contact Anya Bear at 617-253-1989 or at aabear@mit.edu.

On October 31 -- Halloween -- Chemistry Headquarters invited everyone to drop by for Treats without Tricks!

Sarah Mohr and Justin Mohr (Fu postdoc) and their two children, Marie, 2 years, and Natalie, 2 months, dropped by for some fun, and candy!

DCIF devils, Deborah Bass and Anne Rachupka join in the fun.

DEPARTMENT OF CHEMISTRY HOLIDAY PARTY!

Department of Chemistry

By Invitation Only

Holiday Party

Friday, December 16, 2011

Morss Hall

Walker Building

4:00 PM- 7:30 PM

Music, Karaoke, Speed Pass Drawing and Prizes

HHMI JANELIA JUNIOR FELLOWS PROGRAM

Junior fellows at Janelia Farm are postdoctoral fellows who develop their own research programs and work with minimal direct advising. They are appointed for a period of up to three years with a possible two year renewal. Junior fellows are mentored by two or more people. Mentors may be Janelia Farm lab heads, visiting scientists from other institutions and members of project teams. Junior fellows control a budget, which supports their own salary and benefits, lab supplies, and travel expenses. They work in their mentors' lab and office space. Junior fellows do not recruit or supervise staff.

The junior fellow position is intended for individuals at an early career stage and/or people who have specific research plans but value the guidance and collaboration of more experienced mentors. While Junior Fellows may co-author papers with their mentors, this is not assumed and they may publish as sole authors. We intend that co-authorship should only follow from active collaboration.

The next application deadline is December 1, 2011. Apply here

SCHLUMBERGER FOUNDATION 2012-2013 FACULTY FOR THE FUTURE FELLOWSHIPS

The Schlumberger Foundation, a philanthropic program of oilfield services provider Schlumberger, is accepting applications for the 2012-13 Faculty for the Future fellowships. The Faculty for the Future program was launched by the Schlumberger Foundation in 2004 to award fellowships to women from developing economies. The fellowships fund PhD or post-doctoral studies in the physical sciences and related disciplines at top universities abroad.

Each year the program has grown steadily and today has become a powerful community standing at 194 pioneering women scientists from 54 countries.

Ultimately grant recipients are expected to contribute to the socio-economic development of their home countries and regions by strengthening the faculties in their home universities, pursuing relevant research, or using their specific expertise to address policy issues. The end goal is to attract and retain more young women in the sciences.

Complete program information and sample application are available at the Schlumberger Web site:
http://www.facultyforthefuture.net/

ROWLAND JUNIOR FELLOWS PROGRAM

The Rowland Junior Fellows are selected to perform independent experimental research for five years, with full institutional support and access to the Institute's outstanding technical and scientific resources. The number of Rowland Junior Fellows will equal about ten, with on average two new appointments each year. Candidates in all the natural sciences (physics, chemistry, biology,...) as well as in engineering will be considered, with special attention given to interdisciplinary work and to the development of new experimental methods.

To Apply

Applicants should submit a curriculum vitae and a one-page research proposal, and have three letters of reference sent to:

Dr. Michael Burns
Rowland Junior Fellows Program
Rowland Institute at Harvard
100 Edwin Land Blvd.
Cambridge, MA 02142

The application deadline is November 30th each year for an appointment starting September of the following year. Questions about the program should be directed to rjf@rowland.harvard.edu .

FORD FOUNDATION FELLOWSHIP PROGRAMS

Through its Fellowship Programs, the Ford Foundation seeks to increase the diversity of the nation's college and university faculties by increasing their ethnic and racial diversity, to maximize the educational benefits of diversity, and to increase the number of professors who can and will use diversity as a resource for enriching the education of all students.

Eligibility to apply for a Ford fellowship is limited to:
All citizens or nationals of the United States regardless of race, national origin, religion, gender, age, disability, or sexual orientation. Individuals with evidence of superior academic achievement (such as grade point average, class rank, honors or other designations), Individuals committed to a career in teaching and research at the college or university level.

For information regarding level-specific eligibility requirements, stipends, and other program information for each of the three levels of the Fellowship program, please access the fact sheet for the program level of your interest,
predoctoral, dissertation or postdoctoral.
For application and deadline dates, vist:
http://sites.nationalacademies.org/PGA/FordFellowships/index.htm

L'ORÉAL USA FELLOWSHIPS KEY FACTS AND APPLICATION INFORMATION

The **L'Oréal USA Fellowships For Women In Science** is a national awards program that annually recognizes and rewards five U.S.-based women postdoctoral researchers at the beginning of their scientific careers who are pursuing careers in the life and physical/material sciences, as well as mathematics, engineering and computer science. Recipients receive up to $60,000 each that they must apply towards their postdoctoral research.

Now entering its ninth cycle, this national program annually recognizes, rewards and provides support to five women postdoctoral researchers in the U.S. who are pursuing careers in the life and physical/material sciences, as well as mathematics, engineering and computer science.

Since its inception in 2003, the **L'Oréal USA Fellowships For Women In Science** program has awarded 40 fellowships to women scientists across the U.S. Each year, the program attracts a number of talented applicants from diverse scientific fields, representing some of the nation's leading academic institutions and laboratories. The Award selection process includes a two stage review process, including a first round review by an interdisciplinary panel of 26 scientists and engineers and a distinguished jury of eminent scientists and engineers reviews the top applications and selects the **L'Oréal USA Fellowships For Women In Science** recipients.

The recipients of the **L'Oréal USA Fellowships For Women in Science** program participate in a week of events that include an awards ceremony, professional development workshops, media training and networking opportunities. In 2012, these workshops, which are facilitated by the program's partner, **American Association for the Advancement of Science (AAAS)**, will encompass job search techniques, interviewing skills, budget development for grant requests, and strategies for submissions to peer-reviewed publication.

The **L'Oréal USA Fellowships For Women in Science** program is open only to women postdoctoral researchers. Applications will be accepted starting October 18, 2011. Application process closes December 15, 2011. Candidates interested in applying may visit the **L'Oréal USA Fellowships For Women in Science** website at **http://www.lorealusa.com/forwomeninscience**. All applications must be submitted online by December 15, 2011. Transcripts must be postmarked no later than December 15, 2011.

November Meeting
The 918th Meeting
of the
Northeastern Section
of the
American Chemical Society

ACS Chemistry for Life®

Northeastern Section
of the
American Chemical Society

Presentation of the

James Flack Norris Award for Outstanding Achievement in Teaching Chemistry

to

Peter Mahaffy, PhD

Professor of Chemistry
and

Presentation of the Arno Heyn Book Prize

Thursday – November 10th, 2011

AstraZeneca
35 Gatehouse Drive
Waltham, MA 02451

4:30 p.m. Board Meeting
5:30 p.m. Social Hour
6:30 p.m. Dinner
7:30 p.m. Award Meeting: Patrick Gordon, NESACS Chair, Presiding

Presentation of the Arno Heyn Book Prize
Vivian Walworth, Chair, Board of Publications, NESACS

Reflections on James Flack Norris

Introduction of the Norris Award Winner:
Margaret-Ann Armour, University of Alberta, Edmonton, Alberta,Canada

Presentation of the Norris Award:
Kathleen Browne, Chair Norris Committee, NESACS

Norris Award Address: *Should Atoms Come First? Teaching Chemistry from Rich Contexts.*
Peter Mahaffy, PhD
Professor of Chemistry
The King's University College
Edmonton, Alberta, Canada

Please specify if you prefer a vegetarian entree

Dinner reservations **MUST** be made ***no later than NOON on October 21st.*** Please call Anna Singer at **781-272-1966**, (between the hours of 9am and 9pm) or respond by email (preferred) to secretary@nesacs.org**.** Reservations not canceled at least 24 hours in advance will be invoiced and must be paid. Members, $30.00; Non-members, $35.00; Retirees, $20.00; Students, $10.00. Anyone who needs handicapped services, please call a few days in advance so that suitable arrangements can be made.

Directions to AstraZeneca, 35 Gatehouse Drive
<http://www.astrazeneca-us.com/research-and-development/north-american-randd-sites/?itemId=1423316>

The committee members will mentor and guide participants to develop their business plans so that they may make a pitch to a panel of Venture Capitalists, Angel investors in a closed door session in San Diego. Please note that the deadline for the intent to submit a business plan has been extended for your convenience to November 12 by noon. Please do not hesitate to contact Dr. Mukund Chorghade (Chorghade@comcast.net) if you have any questions.

ACS Committee on Science Business Plan Competition

The ACS Committee on Science has organized a business plan competition for start-ups or expansion of existing small businesses with high growth potential. The proposed start-up company must be scalable with potential to attract debt or equity financing.

These businesses must be located within the United States of America and owned by a US citizen or a permanent resident in the US.

The competition will take place in two rounds. The first round requires an abridged Business Plan of no more than five pages describing the opportunity by covering the following information:

- Executive Summary
- Business Description: Describe the product, service, or business model, IP protection strategy
- Market Analysis - Market size, market potential, customer profile, and market positioning
- Marketing Plan - Pricing, promotion, and distribution channels, how will the business achieve sales and significant profits
- Financial Analysis: Revenue model, cash flow, income statement, balance sheet
- Management Team - Experience, qualifications of key people
- Must include the projected number of jobs created

If you are interested in participating, please drop an e-mail to Dr. Mukund Chorghade at chorghade@gmail.com or contact by phone at 508-308-3891by September 15, 2011. The deadline for submitting your abridged Business Plan is December 1, 2011.

Upon evaluation of the abridged Business Plan invited applicants will be selected by a team of judges to submit comprehensive business plans (no more than 25 pages including supplemental materials) and orally present their plans at the spring 2012 ACS meeting in San Diego. The comprehensive business plan must include the following:

- Executive Summary
- Description of the product, service, or business model
- Intellectual property protection strategy
- Market Analysis
- Operational Plan
- Opportunities, risks and contingency plans
- Implementation Plans
- Financial Analysis: Income statement, balance sheet and cash flow
- Supplemental attachments including support data and resumes of the members of the management and technical teams

Angel investors and Venture Capital firms will be present at the presentations to identify viable business opportunity for potential financing. Invited applicants will be mentored and guided to facilitate their success at this meeting.

Entries will be disqualified if:

- They are received after the deadline for submission
- They are incomplete
- The proposal is for a subsidiary for a larger business
- There are possible legal challenges with the business, product, service or concept
- The idea, product, or service cannot be legally protected for growth
- The business idea is not scalable

To help entrepreneurs prepare for this competition a session is devoted to educating entrepreneurs on IP protection, Business Plan development and funding options at the Denver meeting by the Committee on Science.

For additional information you may view the ACS Denver meeting Technical Program or contact Dr. Mukund Chorghade at **chorghade@gmail.com** or Dr. Sadiq Shah at sadiq.shah@csuci.edu

UNCF/MERCK SCIENCE INITIATIVE

Science Scholarships, Internships and Fellowships

The UNCF/Merck Science Initiative is an innovative approach that creates opportunities in the biological, chemical and engineering sciences for African American students throughout the country.

UNDERGRADUATE

Science Research Scholarship/Internship Awards

- **Scholarships up to $25,000**
- **Internships with stipends of more than $5,000**
- Mentoring and networking opportunities
- Eligibility: College juniors, science or engineering majors, 3.3 GPA

GRADUATE

Science Research Dissertation Fellowships

- **Fellowships up to $53,500**
- Mentoring and networking opportunities
- Eligibility: Ph.D. or equivalent degree candidates engaged in dissertation research in the biological, chemical or engineering fields

POSTDOCTORAL

Science Research Fellowships

- **Fellowships up to $92,000**
- Mentoring and networking opportunities
- Eligibility: Ph.D. or equivalent degree recipients in the biological or chemical research fields

Apply on-line at **umsi.uncf.org**

Submit by December 1, 2011

UNCF A mind is a terrible thing to waste®

MERCK *Be well*

MERCK COMPANY FOUNDATION

General Eligibility Requirements: Must be African American and a U.S. citizen or a permanent resident.

T 703 205 3400 • F 703 205 3550 • E uncfmerck@uncf.org

AstraZeneca Distinguished Graduate Chemistry Symposium

November 18, 2011

AstraZeneca R&D Boston, 35 Gatehouse Drive, Waltham, MA 02451

We are pleased to announce the 4th annual AstraZeneca Distinguished Graduate Chemistry Symposium, to be held on Friday, November 18, 2011.

At this event, you will hear from recipients of AstraZeneca's chemistry fellowships as well as AstraZeneca scientists, who will speak about drug discovery as it relates to specific projects. This will be a great opportunity to interact with our colleagues from many scientific disciplines.

2010-2011 AZDG Fellowship Award Recipients

Name	Group	University
Chunhui (Christina) Dai	Stephenson	Boston University
Thomas Willumstad	Danheiser	MIT
Fang Gao	Hoveyda	Boston College
Ping Zhang	Morken	Boston College
Peter Wright	Myers	Harvard University

If you are a chemistry graduate student or post-doc and would like to attend this event, RSVP to Liz McGrath at emg@MIT.edu. **Space is limited so attendance will be on a first-come first-serve basis**.

AstraZeneca
RESEARCH & DEVELOPMENT

Details on all positions are on file and can be obtained from Liz McGrath, Room 18-388

Institution/Company	#	Level of Hire	Area	Tenure Track
University of California, San Diego	4	Open Rank	Physical Chemistry, Organic/Inorganic, Quantitative Biology, Chemical Biology	Yes
Taiwan University	2-4	Open Rank	All areas of chemistry	Un-known
Linden Hall School, PA	1	High School Teacher	High-school-level Chemistry, Honors Chemistry, and AP Chemistry	N/A
Indiana University Bloom-ington	1	Assistant Prof.	Biochemistry	Yes
Franklin W. Olin College of Eng.	mul-tiple	Assistant Prof.	Applications from individuals with expertise in Engineering, Chemistry, Computer Science, De-sign, Entrepreneurship, and Mathematics	Un-known
Oklahoma State University	1	.	Head, Department of Biochemistry and Mol. Biology	Un-known
Southern teachers job listing	>1		www.southernteachers.com	
Science Faculty Jobs	>1		ScienceFacultyJobs.com.	
Academic Keys	>1		Academic Positions in Chemistry www.academickeys.com	

SHUTTLE SERVICE FOR THANKSGIVING BREAK

The Parking and Transportation Office will once again provide shuttle service to Logan Airport for the Thanksgiving Break. Shuttles will be available on Tuesday, November 22 and Wednesday, November 23. Advance reservations are required.

Please visit the Parking and Transportation Office web site reservation page airport shuttle reservation form to reserve a seat. The shuttle fee is $10.00. All reservations will be processed via the web site and the shuttle fee will be billed to student bursar accounts or via employee payroll deductions. Shuttles will depart from the Kresge parking lot at the scheduled time and will not wait for late arriving passengers. Normal trip time from MIT to Logan Airport is about a half-hour, but please allow up to one hour for this trip. Traffic, construction and Airport Security delays should be expected.

ZIMRIDE

Need a ride home or to the airport for Thanksgiving? MIT's rideshare partner Zimride makes it easy to catch a lift or fill the empty seats in your car.

Post a ride: http://zimride.mit.edu

Add your ride between now and Thanksgiving Day and be automatically entered to win an iPad! After posting, Zimride will match you up with others heading the same way.