

Michael D. Fayer - Curriculum Vitae

Education

University of California at Berkeley, 1969-1974, Ph.D. - 1974

University of California at Berkeley, 1965-1969 - B. S. 1969
Undergraduate National Science Foundation Fellow
Phi Beta Kappa

Academic Positions

David Mulvane Ehrsam and Edward Curtis Franklin Professor of Chemistry
Stanford University, 2000 - on

Professor of Chemistry
Stanford University, 1984 - 2000

Associate Professor of Chemistry
Stanford University, 1980 - 1984

Assistant Professor of Chemistry
Stanford University, 1974 - 1980

Honors and Affiliations

National Academy of Sciences (since 2007)

American Academy of Arts and Sciences (since 1999)

Ahmed Zewail Award in Ultrafast Science and Technology – American Chemical Society (Selected 2013)

Arthur L. Schawlow Prize in Laser Science – American Physical Society (2012)

Ellis R. Lippincott Award – Optical Society of America (2009)

E. Bright Wilson Award for Spectroscopy – American Chemical Society (2007)

Earl K. Plyler Prize for Molecular Spectroscopy – American Physical Society (2000)

Optical Society of America Fellow (since 2009)

Royal Society of Chemistry Fellow (since 2008)

Guggenheim Foundation Fellow (1983)

American Physical Society Fellow (since 1982)

Camille & Henry Dreyfus Foundation Fellow (1977)

Alfred P. Sloan Foundation Fellow (1977)

Stanford University Dean's Award for Distinguished Teaching (1986)

American Chemical Society

American Optical Society

American Physical Society

Biophysical Society

Royal Society of Chemistry

Sigma Xi

William D. Harkins Memorial Lecture, University of Chicago, Chicago, IL, 2013

Harry Emmett Gunning Lecturer, University of Alberta, Edmonton, Canada, 2012

Plenary Lecturer, New Directions in Microscopy and Ultrafast Spectroscopy Conference,

Duke University, Durham, NC, 2009

Clifford B. Purves Lecturer, McGill University, Montreal, Canada, 2009

Centenary Lecturer, Indian Institute of Science, Bangalore, India, 2008

Research Frontiers Lecturer, University of Iowa, 2007

George W. Raiziss Lecturer, University of Pennsylvania, 2006

Distinguished Speaker, Joint College Colloquium, University of Arkansas
at Little Rock, 2004

Brian Bent Memorial Lecturer, Columbia University, 2004

Samuel M. McElvain Lecturer, University of Wisconsin at Madison, 2004

Plenary Lecturer, 13th International Conference on Photochemical

Conversion and Storage of Solar Energy, Snowmass, CO, 2000

H. Willard Davis Lecturer, University of South Carolina, 1998

Closs Memorial Lecturer, University of Chicago, 1994

Moses Gomberg Lecturer, University of Michigan at Ann Arbor, 1992

William Albert Noyes Lecturer, University of Texas at Austin, 1990

Arthur D. Little Lecturer, Massachusetts Institute of Technology, 1980

Professor of Physics, University of Grenoble, Grenoble France, 1982

Editorial Board, Journal of Chemical Physics, 1987-1990

Advisory Board, Journal of Physical Chemistry, 1986-1989

Associate Editor, Journal of Luminescence 1988-present

Advisory Editor, Chemical Physics, 1985-present

Advisory Editor, Chemical Physics Letters, 1984-2006

Chairman Awards Committee, Earl K. Plyler Prize for Molecular Spectroscopy, 2006

Chairman, 7th International Conference on Unconventional Photoactive Systems

Stanford University, 1995

Chairman, Fourth International Conference on Dynamical Processes,

Stanford University, 1983

Principal Research Interests

Dynamics and intermolecular interactions of molecules in liquids, liquids in nanoscopic environments, room temperature ionic organic liquids, supercooled liquids, and liquid crystals. Solute-solvent dynamics and interactions such as complex formation and dissociation and isomerization. Dynamics of biological model membranes. Water at protein and membrane surfaces and the role of nanoscopic confinement on protein dynamics. Proton transfer in water and other liquids and in nanoscopic systems. Development and application of ultrafast 2D infrared vibrational spectroscopy and other ultrafast infrared optical methods and associated theory as general probes of structural dynamics in complex molecular systems. Development and application of ultrafast visible and UV spectroscopy to the study of dynamics in complex molecular systems. Statistical mechanics theory of molecular systems and experimental observables.

Major Awards

Ahmed Zewail Award in Ultrafast Science and Technology – American Chemical Society (Selected 2013)

Citation

"For the development of coherent infrared spectroscopy and its applications to measurements of ultrafast dynamics in complex molecular systems."

Publications – Academic year 2012– 2013

417. "Fast Dynamics of HP35 for Folded and Urea-unfolded Conditions," Jean K. Chung, Megan C. Thielges, Stephen R. Lynch, Michael D. Fayer J. Phys. Chem. B 116, 11024-11031 (2012).
418. "Excitation Transfer Induced Spectral Diffusion and the Influence of Structural Spectral Diffusion," Daniel E. Rosenfeld and Michael D. Fayer J. Chem. Phys. 137, 064109 (2012).
419. "Dynamics of Functionalized Surface Molecular Monolayers Studied with Ultrafast Infrared Spectroscopy," Daniel E. Rosenfeld, Jun Nishida, Chang Yan, Zsolt Gengeliczki, Brian J. Smith, and Michael D. Fayer J. Chem. Phys. C 116, 23428-23440 (2012).
420. "Comparisons of 2D IR Measured Spectral Diffusion in Rotating Frames Using Pulse Shaping and in the Stationary Frame Using the Standard Method," S. K. Karthick Kumar, A. Tamimi, and M. D. Fayer J. Chem. Phys. 137, 184201 (2012).
421. "Water Dynamics in Divalent and Monovalent Concentrated Salt Solutions," Chiara H. Giammanco, Daryl B. Wong, and Michael D. Fayer J. Phys. Chem. B 116, 13781-13792 (2012).
422. "The Dynamics of Isolated Water Molecules in a Sea of Ions in a Room Temperature Ionic Liquid," Daryl B. Wong, Chiara H. Giammanco, Emily E. Fenn, Michael D. Fayer J. Phys. Chem. B 117, 623-635 (2013).
423. "Theoretical Examination of Picosecond Phenol Migration Dynamics in Phenylacetylene Solution," Lucas Kocia, Steve M. Young, Yana A. Kholod, Mark S. Gordon, Michael D. Fayer, and Andrew M. Rappe J. Chem. Phys. accepted (2013).
424. "Structural Dynamics at Monolayer-Liquid Interfaces Probed by 2D IR Spectroscopy," Daniel E. Rosenfeld, Jun Nishida, Chang Yan, S. K. Karthick Kumar, Amr Tamimi, and Michael D. Fayer J. Phys. Chem. C 117, 1409-1420 (2013).
425. "Dynamics in the Interior of AOT Lamellae Investigated with 2D IR Spectroscopy," S. K. Karthick Kumar, A. Tamimi, and Michael D. Fayer J. Am. Chem. Soc. 135, 5118-5126 (2013).
426. "Ultrafast Structural Dynamics inside Planer Phospholipid Multibilayer Model Cell Membranes Measured with 2D IR Spectroscopy," Oksana Kel, Amr Tamimi, Megan C. Thielges, and Michael D. Fayer J. Am. Chem. Soc. 135, 11063-11074 (2013).

427. "The Influence of Lithium Cations on Dynamics and Structure of Room Temperature Ionic Liquids," Christian Lawler and M. D. Fayer J. Phys. Chem. B accepted (2013).
428. "Dynamics in the Isotropic Phase of Nematogens Using 2D IR Vibrational Echo Measurements on Natural Abundance ^{13}C N and Extended Lifetime Probes," Kathleen P. Sokolowsky and Michael D. Fayer J. Phys. Chem. B submitted (2013).
429. "Orientational Dynamics in a Lyotropic Room Temperature Ionic Liquid," Adam L. Sturlaugson, Aaron A. Arima, Heather E. Bailey, and Michael D. Fayer J. Phys. Chem. B submitted (2013).

Books Published – 2012 - 2013

"Ultrafast Infrared Vibrational Spectroscopy," Edited – Michael D. Fayer, CRC Press, Taylor & Francis Group, Boca Raton, London, New York (2013).

The Japanese translation version of, "Absolutely Small – How Quantum Mechanics Explains Our Everyday World," Michael D. Fayer, AMACOM, New York (2010). Translation and publication in Japanese by UNI Agency, Inc. Tokyo (2013).

University Committees and Administrative Duties - Academic Year 2012 - 2013

Chairman – Graduate Admissions Committee, Department of Chemistry
Member – Chemistry Department Awards Committee

Service to Journals and Professional Organizations - Academic Year - 2012 - 2013

1. Associate Editor, Journal of Luminescence
2. Advisory Editor, Chemical Physics

Research Proposals

Department of Energy - pending

II. Teaching & Advising

A. Courses

1. Chemistry 271 - Advanced Physical Chemistry/Graduate Quantum Mechanics Part of regular teaching load

Fall Quarter, 2012-2013. Enrollment – 29 (on end quarter report). This course consists of two lectures per week. Each lecture is one hour and thirty minutes. The class is composed of ~50% Chemistry graduate students, ~30% Chemical Engineering graduate students, and the remaining 20% are graduate students in Materials Science, Electrical Engineering, Biology, Earth Sciences, Mechanical Engineering, and Chemistry undergraduates. This course is a sophisticated first graduate level course in quantum mechanics. The book was Elements of Quantum Mechanics, M. D. Fayer, Oxford University Press,

2001. The course is presented as a power point slide show. All of the power point slides are put on the web ahead of time for the students to download and bring to class. The course is fast moving but geared to bring students at all levels along. It is popular with current students, and numerous students have told me in subsequent years that they found the course very valuable and a memorable experience.

2. Chemistry 176 – Physical Chemistry Lab II Part of regular teaching load

Winter Quarter, 2012-2013. Enrollment – 10 (on end quarter report). This is a physical chemistry laboratory course consisting of labs five days a week and one lecture per week. The students learn modern spectroscopic methods in the context of investigating important aspects of chemical processes molecular physical phenomena. The students gain an understanding of a wide variety of instrumental methods.

3. Chemistry 200 (Section 10) - Research/Advanced Work Part of regular teaching load

Fall Quarter, 2012-2013. Enrollment - 5.

Winter Quarter, 2012-2013. Enrollment - 5.

Spring Quarter, 2012-2013. Enrollment - 5.

Summer Quarter, 2012-2013. Enrollment - 7.

4. Chemistry 301 (Section 10) - Research Part of regular teaching load

Fall Quarter, 2012-2013. Enrollment - 4.

Winter Quarter, 2012-2013. Enrollment - 3.

Spring Quarter, 2012-2013. Enrollment - 4.

Summer Quarter, 2012-2013. Enrollment - 6.

5. Chemistry 802 (Section 10) - TGR Dissertation Part of regular teaching load

Fall Quarter, 2012-2013. Enrollment - 5.

Winter Quarter, 2012-2013. Enrollment - 4.

Spring Quarter, 2012-2013. Enrollment - 5.

Summer Quarter, 2012-2013. Enrollment - 4.

Courses **Chemistry 200, 301, and 802** constitute the courses I taught that represent a major component of my teaching of graduate students and the vast majority of the graduate education that the students in these courses receive at Stanford. In addition to the graduate students enrolled in these courses, I also taught a postdoctoral student. Post docs are students enrolled at Stanford. Although I spend a considerable amount of time teaching post docs, they do not appear as enrolled in any courses. During the 2012-2013 academic year, I had a research group of 13 people, 12 graduate students and 1 postdoctoral student. The majority of my time is spent in instruction of these students. Graduate and postdoctoral students are usually taken to be “doing research.” However, doing research is a misnomer for being taught how to do research. Particularly during their first 3 or 4 years of research, graduate students are performing directed activities that train them in laboratory and theoretical methods, and most important, how to think. Frequently, there is the mistaken impression that Stanford Chemistry professors spend most of our time doing research and little time teaching. This misperception caused by teaching often being defined as classroom teaching. The result is an inaccurate perception of the nature of the teaching I actually do. One of my important functions is to train the next generation of top scientists.

Producing top scientists doesn't happen in some magical manner. It happens because I spend vast amounts of time teaching my graduate students and post docs.

III. Work in Progress

Proposal submitted to the Department of Energy – status: pending