POSTDOCTORAL SCHOLAR POSITIONS
THEORETICAL AND COMPUTATIONAL CHEMICAL PHYSICS

RESEARCH TOPICS:
(A) Attosecond X-ray Spectroscopy of Molecules
Developing time-dependent many-body approaches to nonlinear x-ray core-electron spectra and their description in terms of real-space and real-time wavepackets of electrons and nuclei. Computational tools will be implemented for the design and analysis of measurements involving multiple ultrafast optical and x-ray pulses.

(B) Nonlinear Spectroscopy with Quantum Optical Fields
New optical signals which use entangled photons, pulse shaping, and coherent control algorithms are designed and simulated for probing exciton dynamics in molecular aggregates and semiconductor nanostructures.

(C) Many Body Theory of Nonlinear Response in the Condensed Phase
Developing and applying time-dependent density functional, nonequilibrium Green’s Function techniques and exciton models for computing electronic excitations of molecular assemblies, energy and charge separation in photosynthetic complexes and current-carrying molecules. Connection to quantum information processing and manipulation will be explored.

(D) Computational Biophysics
Simulation of amyloid fibril structures and aggregation kinetics, lipid-protein complexes and antibody interactions and how they can be probed by novel multidimensional spectroscopy ranging from the infrared to the ultraviolet

Ph.D. is required. Salary will commensurate with experience. Send a curriculum vitae, publication list and arrange for three letters of recommendation to be sent to:

Professor Shaul Mukamel
Department of Chemistry
1102 Natural Sciences
University of California, Irvine
Irvine, CA 92697-2025
smukamel@uci.edu
949/824-7600 (phone) 949/824-4759 (fax) http://mukamel.ps.uci.edu (website)

Relevant Publications

The University of California, Irvine is an equal opportunity employer committed to excellence through diversity
The University of Freiburg, located at the centre of the scenic city of Freiburg, is a traditional yet exciting research-led academic community. This institution offers opportunities to work with leading international academics whose ideas will shape future scientific directions.

The Freiburg Institute for Advanced Studies (FRIAS) is a university research centre funded through the German Excellence Initiative.

The FRIAS School of Soft Matter Research invites applications for one post-doc position in the field of theoretical physics or chemistry, specifically ultrafast dynamics and relaxation processes of large molecules, biological complexes and semiconductors. The precise topics will depend on the candidate’s background and qualifications. Possible topics include:

Computational biophysics, in particular simulation of protein folding and aggregation kinetics, lipid-protein complexes and antibody interactions and how they can be probed by novel multidimensional spectroscopy ranging from the infrared to the ultraviolet.

The design of new nonlinear optical techniques by integration of quantum information concepts and quantum states of the radiation field for the study of energy and charge transport in photosynthetic and artificial light harvesting complexes.

Developing and applying time-dependent density functional, nonequilibrium Green’s function techniques and exciton models for computing electronic excitations of molecular assemblies, light harvesting complexes and current-carrying molecules. The interplay of photon and matter entanglement will be investigated.

Initially the position is available for one year (TV-L E13, depending on experience about € 2000 netto/month) with a possible extension to a second year subject to the availability of funds. The research will be conducted at FRIAS, combined with visits to UC Irvine, California. It will be supervised by the External Senior FRIAS Fellow Professor Shaul Mukamel from UC Irvine in collaboration with other faculty of FRIAS.

Applications should include a motivation letter, a CV, and a list of publications. Applications in PDF format should be sent via email to Dr. Britta Küst (britta.kust@frias.uni-freiburg.de), who will also provide further information on the position.