Division of Physical Chemistry
American Chemical Society

Frontiers in Coherent Nonlinear Spectroscopy and Hyperspectral Microscopy

Kenneth Knappenberger
Minjung Son
Wei Xiong
Organizers

San Diego Convention Center
see schedule for room locations

23-27 March 2025

PHYS Programs also available online:

SUNDAY MORNING

Vibrational and Electronic-Vibrational Spectroscopy
A. M. Alperstein, *Presiding* | **Room 33B**

8:00 AM. Multi-dimensional spectroscopy with quantum light. **S. Mukamel**, M. Kizmann, H. Yadalam, D. Jadoun

8:30 AM. 2D IR spectroscopy at the electrochemical interface: Electrode design and the role of the plasmon. **N. Lewis**

9:00 AM. Using two dimensional IR spectroscopy to study the structure and dynamics of molecularly heterogeneous deep eutectic solvents. **D.G. Kuroda**

9:20 AM. Phase- and amplitude-Re3solved nonlinear optics for molecular electrochemistry. **F. Geiger**

9:40 AM. Intermission.

10:00 AM. Ultrafast Raman probes of chemical reaction dynamics. **R.R. Frontiera**

10:30 AM. New sources and schemes for ultrafast coherent multidimensional spectroscopies of electronic and vibrational correlations. **J.D. Gaynor**, G. Christenson, S. Mersch, A. Seys, P. Seliya

11:00 AM. Lithium ion transport mechanisms, solvation structures, and dynamics in carbonate electrolytes: ultrafast infrared experiments. **M.D. Fayer**, J. Pan, A. Charnay, W. Zheng

SUNDAY AFTERNOON

Ultrafast Microscopy
S. Li, *Presiding* | **Room 33B**

2:00 PM. Imaging exciton transport with ultrafast microscopy in the quantum regime. **J. Peterson**, L. Huang

2:30 PM. Broadband pump-probe microscopy of organic excitonic materials. **E. Grumstrup**, S.R. Hollinbeck, K. Benton

3:00 PM. Tracking energy transport within photon conversion systems. **S.T. Roberts**

3:30 PM. Intermission.

3:50 PM. Towards two-dimensional infrared microscopy of desmin aggregation and crystallin protein protective chaperone activity. **A.M. Alperstein**

4:20 PM. Vibrational anharmonicity and energy relaxation in nanoscale acoustic resonators. **G.V. Hartland**, C. Wright

4:50 PM. Ultrafast X-ray imaging of coherently controlled molecular dynamics in real-space and time. **T. Hopper**, A. Natan

5:10 PM. Electron beam characterization of nanomaterials: Hyperspectral electron energy loss spectroscopy. **J.P. Camden**

MONDAY MORNING

Multidimensional Spectroscopy
J. D. Gaynor, *Presiding* | **Room 33B**

8:00 AM. Mapping energy transfer in photosystem I mutants with two-dimensional electronic spectroscopy. **J.M. Anna**, C. Li, Y. Mazor

8:30 AM. Many-body quantum dynamics of exciton polaritons in the strong light-matter coupling regime. **C. Silva**

9:00 AM. Exploring pigment-protein interactions in de novo maquettes using super-broadband two-dimensional electronic spectroscopy. C. Gajo, C. Jordan, J.R. Anderson, **T. Oliver**

9:20 AM. Functional connectivity of red chlorophyll sites in cyanobacterial photosystem I revealed by fluence-dependent transient absorption. S. Sohail, S. Sohoni, P. Ting, L. Fantz, S. Abdulhadi, C. MacGregor-Chatwin, A. Hitchcock, C. Hunter, G.S. Engel, **S.C. Massey**

9:40 AM. Intermission.

10:00 AM. Interaction-dependent secondary structures and dynamics of arginine-rich peptides in biomolecular condensates. **C. Baiz**

10:30 AM. Unveiling quantum-classical interactions: A mode-specific analysis of molecular vibrations and their environmental coupling. **M. Bonn**, P. Seliya, M. Grechko

10:50 AM. Transient 2D IR: Mapping structure and dynamics with site-specific vibrational probe pairs. **M.J. Tucker**

WEDNESDAY MORNING

Raman and Sum-Frequency Generation Imaging

S. A. Lee, *Presiding* | **Hall F, Room 4**

8:00 AM. Functional bond-selective microscopy for subcellular Bioanalysis at the single molecule level. **L. Wei**

8:30 AM. Sum frequency generation microscopy of electrified interfaces. **S. Baldelli**, S. Ortiz

9:00 AM. Stimulated Raman scattering imaging: the next frontier of light microscopy. **W. Min**

9:30 AM. IR-vis hyperspectral imaging by fluorescence-detected mid-infrared photothermal spectroscopy. **G.J. Simpson**

9:50 AM. Intermission.

10:10 AM. Ultrasensitive stimulated Raman scattering imaging techniques: development and applications. **L. Shi**

10:30 AM. Revealing in operando electrolyte structures and dynamics with 2D IR Microscopy. **A.T. Krummel**

11:00 AM. Label-free identification of tumor tissues by coherent nonlinear vibrational mode imaging. **J. Ren**, B. Yang, C. Yu, W. Xiong

11:20 AM. Nonlinear vibrational microscopes for Life Science. **Y. Zhu**, J. Cheng

WEDNESDAY AFTERNOON

Ultrafast Spectroscopy of Molecular and Photonic Structures
N. Lewis, *Presiding* | **Hall F, Room 4**

2:00 PM. Sum frequency generation (SFG) spectroscopy study of nano-to-meso scale structures of crystalline biopolymers in natural materials. **S.H. Kim**

2:30 PM. Experimentally measuring the role of ultrafast ion-phonon and ion-electron correlations in solid-state li ion conductors. **S.K. Cushing**

2:50 PM. Pulse shaping in the deep ultraviolet for 2D spectroscopy and time-resolved experiments. J. Codere, B. Pearson, B. Kaufman, M. Cohen, M. Bain, T. Weinacht, **R. Forbes**

3:10 PM. Intermission.

3:30 PM. New platforms for polariton reaction dynamics. **M.L. Weichman**

4:00 PM. Nonlinear spectroscopy of molecular polaritons: an extension of the Mukamelian framework for optical cavities. **J. Yuen Zhou**

4:20 PM. Nanoscopic vibrational dynamics of single viruses captured by ultrafast spectroscopy. **E. Harel**

4:50 PM. Ultrafast structural relaxation and coherent excitation of triplet pairs. **A. Musser**

THURSDAY MORNING

Near-Field Spectroscopy
M. L. Weichman, *Presiding* | **Hall G/H, Room 10**

8:00 AM. Atomic force microscopy-based two-dimensional infrared nano-spectroscopy. **X. Xu**, Q. Xie

8:30 AM. Revealing and modeling the spectral signature of strong-light matter coupling to optical surface waves in the near-field regime. **A. Jones**, R. Emmanuele, O. Hirschmann, S. Syed, W. Korte-Kamp, A. Piryatinski, W. Xiong

9:00 AM. Vibrational characterization and manipulation of signal molecules in a tunable nano-chemical environment. **S. Li**

9:30 AM. Quantifying femtosecond emission lifetimes from individual emitters. **S.A. Lee**, C.T. Kuhs, N. Ghorai, E.K. Searles, T. Lian, C.F. Landes, S. Link

10:00 AM. Intermission.

10:20 AM. Vibrational imaging of biological structures with sum-frequency generation microscopy. **Y.Y. Luna Palacious**, S. Khandani, E. Potma

10:50 AM. Mapping ultrafast dynamics and symmetry in monolayer $MoSe_2$ with time-resolved anisotropic solid-state high harmonic generation spectroscopy. **J.A. Spies**, B.R. Nebgen, A. Jimenez Galan, S. Prasad, A. Cate, A. Elhadi, M.W. Zuerch

11:10 AM. Spectroscopic signatures of physico-chemical organization in biomolecular condensates. **J. von Hofe**, S. Saurabh

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