

Light-Driven Synthesis and Modulation of Functional Materials

Organizers: Kevin McPeak and Ji-Young Kim

August 25-26, 2026

McCormick Place Convention Center W182

Tuesday AM

Synthesis & Patterning

J. Kim, K. M. McPeak, *Organizers, Presiding*

8:00 AM. Opening Remarks.

8:05 AM. Pulsed laser grafting of freestanding nanoparticle–support composites.

A.M. Mueller

8:35 AM. Investigating pulse laser synthesized Pd nanoparticles on carbon for dehydrogenation reactions. **K.N. Alhassan**, H.G. Qureshi, Y. Xu, K.M. McPeak

8:50 AM. Atomistic modeling of laser spallation and phase explosion: Validation of computational predictions by time-resolved optical and X-ray probing. C. Chen, A.S. Valavanis, **L. Zhigilei**

9:20 AM. Laser-synthesized copper phyllosilicate electrocatalysts for CO₂ reduction enhance selectivity to multi-carbon products. **K. Tibbetts**

9:50 AM. Laser-driven formation of electrocatalysts for sustainable hydrogen production and selective chemical conversion. **M. Choi**

10:20 AM. Intermission.

10:30 AM. Volumetric patterning of thick gel films via super-resolution interference lithography. **C. Ullal**

11:00 AM. Formation of silicon nitride by high-fluence femtosecond laser treatment. **A.T. Sheardy**, B. Santa, S. Neretina, J.T. Krantz, M. Zhukovskyi, E.C. Kinzel, K. Matouš, A. Mukasyan

11:15 AM. Projector-induced waveguide encoded lattices (ProWELs) with optical functionality: From enhanced fields of view (FOV) to 3D data encoding. **K. STEGMAN**, D. Srdic, F. Mahmood, K. Saravanamuttu

11:30 AM. Predicting photodynamics and light-responsive binding of photoswitchable ligands by multiscale simulation. **A. Bakhtiari**

11:45 AM. Poly(dopamine) films as a photoresist alternative for high resolution, high contrast, conformal lithography. **H. Robinson**, E. Kunkel

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NP Synth, Patterning

J. Kim, K. M. McPeak, *Organizers, Presiding*

8:00 AM. Complex chiral nanostructures. **N. Kotov**

8:30 AM. Light-driven carbon dots synthesis mediated by 2D transition metal dichalcogenides. **J. Li**

8:45 AM. AI-guided experimentation and deep learning with in situ diagnostics for pulsed laser deposition. **S.B. Harris**, A. Haque, R. López Fajardo, F. Bao, P.T. Gemperline, R. Comes, K. Xiao, R. Vasudevan

9:15 AM. Harnessing photocatalytic nanoparticles for light-modulated functional materials. **Y. Yin**

10:00 AM. Direct laser synthesis and patterning of nano/microscale metals and oxides from liquid precursors. **L.D. Zarzar**

10:15 AM. Intermission.

10:30 AM. Controlled CPL-induced growth of chiral silver Nanohelicoids on polyelectrolyte-modified interfaces. **H. Jung**, J. Kim

10:45 AM. High-Q-factor chiral metasurfaces for twist control of electrons and photons. **F. Pan**, T.F. Heinz, F. Liu, Z. Deng, J. Dionne

11:00 AM. Light-driven modulation of metasurfaces. **H. Chen**

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Wednesday PM

Light Induced Chemistry

J. Kim, K. M. McPeak, *Organizers, Presiding*

2:00 PM. Recent developments in nonphotochemical laser-induced nucleation (NPLIN).
B.A. Garetz, K.F. Ndukwe-Ajala, R.L. Hartman

2:30 PM. Light-driven modulation of reaction pathways in electrochemical CO₂ reduction via plasmonic nanostructures. **S. Zhou**, C.J. Murphy

2:45 PM. Weakly absorbing, highly active unconventional excited-state pathways in earth-abundant photocatalysts. **A. El-Zohry**

3:00 PM. Meta-stable phases induced by laser irradiation. **A. Borenstein**

3:30 PM. Ultrafast control of ordering and symmetry of polar supercrystals. **V. Stoica**

4:00 PM. Intermission.

4:20 PM. Optical modification, patterning and functionalization of graphene by two-photon oxidation. **M. Pettersson**

4:50 PM. Evaluating molecular switches as intercalants to mediate spacing of quantum materials. **A.M. Koval**, T. Schutt, J. Garcia-Alvarez, M.K. Shukla

5:05 PM. Laser-driven carbon adsorption and oxidation on nickel nanoparticles.
Y.G. Yingling, T. Itina

5:35 PM. Magnetic field effects on the cysteine bond-forming signal transduction mechanism of a common photoactive flavoprotein. **W.S. Salvia**, J. Straub, S. Han

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Thursday AM

Non. Equilibrium

J. Kim, K. M. McPeak, *Organizers, Presiding*

8:00 AM. Controlling polaritonic contributions to material properties. **M.T. Sheldon**

8:30 AM. Atomic layer engineering of optically driven phases in correlated quantum materials. **A.S. Disa**

9:00 AM. Mechanistic principles of cavity enhanced energy flow in materials and molecules. **A. Mandal**

9:15 AM. Structured light-driven ferroic topological states under extreme optical excitation. **E. Fohntung**

9:45 AM. Intermission.

10:05 AM. Selective control of nonequilibrium multiferroic dynamics with tunable strain. **A. Zong**

10:35 AM. Local fields as a probe for non-adiabatic carrier-phonon dynamics. S. Neb, D. Shin, F. Burri, M. Hollm, E. de Vos, D.A. Kuznetsov, C.R. Müller, A. Fedorov, S.A. Sato, A. Rubio, U. Keller, **L. Gallmann**

11:05 AM. Photoinduced orbital polarization and Jahn-Teller dynamics in RNiO₃. **S. Rajpurohit**

11:20 AM. Broken symmetries and tailored flows: Controlling electrical currents with light. **J. Pettine**, P. Padmanabhan, J.B. Maier, R. Prasankumar, A.J. Taylor, S. Lin, N. Gedik, H. Chen

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