Chemical imaging of optoelectronic nanomaterials:
What can you learn from a handful of photons?

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Chemical imaging of Semiconducting Nanomaterials: ... the chemical information is in the photons!
Probing exciton dissociation at the Organic/Inorganic semiconductor interface (Barnes and Emrick)

- influence of nanostructure architecture on charge-separation processes?
- spectroscopic signatures and timescales?
- Novel polarization-driven optical processes

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Quantum dot luminescence under influence of excess charge: Fluorescence and Charge-force Imaging studies

- Electro-sprayed QDs on glass surface (similar blue spectral shift)
- Determine surface charge (and QD polarizability) by measuring cantilever phase-shift vs. tip bias
Polarization-resolved Lifetime Imaging

J. Labastide, K. T. Early, M. Y. Odoi, and M. D. Barnes to be published
Barnes group:

- Ebru Yalcin (Postdoctoral Fellow)
- Boqian Yang (Postdoctoral Fellow)
- Ruthanne Hassey (Helicenes, NYU postdoc)
- Michael Odoi* (CdSe-opv, Univ. of Rochester)
- Kevin Early* (CdSe-opv)
- Austin Cyphersmith (QD polarization imaging)
- Mina Bahghar
- Joelle Labastide

• Undergraduates (current)
  - Artem Maksov
  - Jeremy Graham
  - Tim Mortsolf
  - Isaac Levine

  - Danielle Sowle
  - David Ramsdell
  - Austin Barnes

• Collaborators
  - Paul Lahti (Chemistry) - organic ‘antenna’ systems; conjugated polymers
  - Todd Emrick (PS&E) - quantum dot-organic composite nanostructures
  - “DV” Venkataraman (Chemistry) - single-molecule chiroptical phenomena
  - Tom Russell (PS&E) - optoelectronic co-polymer films