Foundations of Nonlinear Optics

August 4-5, 2015, Room 91, Rauch Business Center
Lehigh University, Bethlehem, PA

Day 1

8:00am	**Coffee&Tea + breakfast snacks** in Room 91
8:30am	**Welcome:** Ivan Biaggio, Lehigh University
	Tutorial: *Scaling in Nonlinear Optics* Mark G. Kuzyk, Washington State University

9:30am	**Session I:** *Quantum Optimization*
	        Chair: Mark G. Kuzyk, Washington State University
	• **Optimization of Optical Nonlinearities Using Quantum Graph Models**
	  Rick Lytel, First Degree Innovation & Washington State University
	• **Quantum Bounds on Hyperpolarizability for Multiple Electrons and Constraints on Ferro-Electricity**
	  Rolfe G. Petschek, Case Western Reserve University
	• **Searching for potentials which optimize the second hyperpolarizability with multiple non-interacting electrons**
	  Chris Burke, Tufts University
	• **Hyperpolarizabilities of Exotic Potentials**
	  Timothy J. Atherton, Tufts University

	Lunch Break – on site
1pm	**Tutorial:** *Application of Dalgarno Lewis Perturbation Theory to Nonlinear Optics* Sean Mossman, Washington State University

2pm	**Session II:** *Fundamental Limits and Scaling*
	        Chair: Timothy Atherton, Tufts University
	• **Molecular symmetry as a constraint preventing the many-state catastrophe of fundamental limits of the first hyperpolarizability**
	  Sheng Ting Hung, University of Leuven
	• **Beyond simple scaling: Finding the best molecular paradigms for nonlinear optics**
	  Javier Perez-Moreno, Skidmore College
	• **The Role of the Continuum in Static Nonlinear Optics**,
	  Sean Mossman, Washington State University

4:30pm	**Tutorial:** *Introduction to cavity polaritons* Kenneth D. Singer, Case Western Reserve University
	Discussion
6:30pm	**Reception in Iacocca Hall**
7:00pm	**Dinner in Iacocca Hall**
9:00pm	**Post-Dinner Event at Molly's Pub** Sponsored by the local OSA student chapter

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Day 2

8:00am	**Coffee&Tea + breakfast snacks** in Room 91
8:30am	**Tutorial:** *The units and figure of merits of third order nonlinear optics: Observations and open questions* Ivan Biaggio, Lehigh University
9:15am	**Session III:** *Scaling in Device Geometries* Chair: Ivan Biaggio, Lehigh University • **Processable organic materials with large figures-of-merit for all-optical signal processing** Joseph Perry, Georgia Tech • **Nanophotonic scaling laws & light-matter enhanced optoelectronic devices** Volker Sorger, George Washington University • **Fundamental Limits of Device Figures of Merit**, Mark G. Kuzyk, Washington State University • **Cavity Effects in Organic Molecular Materials**, Kenneth D. Singer, Case Western Reserve University
	Lunch Break – on site
1pm	**Session IV:** *Effects of Conjugation on the Nonlinear Response* Chair: Javier Perez-Moreno, Skidmore College • **Breaking Linear Conjugation in Second Order NLO Chromophores Allowed or Disallowed?** Meghana Rawal, Nanoviricides, Inc. • **Classifying local pi-conjugation effects in organic nonlinear optical materials** Jacquiline M. Cole, Cambridge University • **Exceptional Nonlinear Optical Response in Twisted Chromophores** Alexander Lou, Northwestern University
2:30pm	**Session V:** *Third-Order Nonlinear Optics* Chair: Rick Lytel, First Degree Innovation & Washington State University • **Nondegenerate Nonlinearities and 3-level models** Eric Van Stryland, *CREOL,* The College of Optics and Photonics • **Spectroscopy of the Third-Order Polarizability via DFWM, and the Exceptional Two-Photon Absorption of Some Small Molecules** Ivan Biaggio, Lehigh University
	Discussion
	Summary, conclusions, perspectives: Tim Atherton, Ivan Biaggio, and Mark Kuzyk
6:00-9:00pm	**Post-FoNLO event at Illick's Mill Park** BBQ, drinks, and .... Organized by the OSA student chapters