2019 ICG
NORTH AMERICAN SUMMER SCHOOL ON PHOTONIC MATERIALS

CO-SPONSORED WITH LAVAL UNIV, CGIF, GOMD/ACERS, NSF-DMR/CERAMICS AND ECCS/ELECTRONIC, PHOTONIC AND MATERIALS DIVISIONS

DATES - 16- 22 June 2019

- *Weekend*
  - travel from Boston after ICG Congress
    - attendee responsible for travel costs, and VISA application, if needed, to enter Canada
    - accommodation options will be available for Friday and Saturday nights
  - Sunday 6/16:
    - Attendee orientation (safety and IT protocols: **required**; check-in 2pm, orientation 3-5 pm)
    - Welcome Reception: 6:30pm
- *Weekdays*
  - M-Th, Mornings: tutorials from world leaders on fundamentals and applications of photonic materials
  - M-Th, Afternoons: hands-on lab project (assigned) and lab demonstrations
  - Friday, all day: Industry Day – next generation challenges for photonic materials, market needs for optical systems, project report presentations and feedback

LOCATION – Laval University, Centre d'Optique, Photonique et Laser (COPL), Quebec City, CANADA

PROGRAM TOPICS (Instructors, tentative)

Monday, AM - Optical Materials

- Materials for Optical Systems (intro) (Kathleen Richardson, UCF)
  - Bulk, film and fiber
  - Crystals (single/poly), glasses, semiconductors and multi-material/integration basics
  - Spectral behavior, broadband challenges, photo-induced modification (processing and measurement)
  - Scale-up manufacturing from lab-scale sizes, issues
- Optical glasses and glass-ceramics (Maria Jesus Pascual, Instituto de Ceramica y Vidrio (CSIC))
  - Passive and active media
- Transparent ceramics and optical crystals (Romain Gaume, UCF, Setsu Tanabe, Univ. Kyoto)
  - Processing fundamentals (Gaume)
  - Applications and performance of active media -lasers and scintillators (Tanabe)
- Semiconductors (Safa Kasap, Univ. Saskatchewan)
  - Processing fundamentals
  - Devices and manufacturing basics
  - Photoconductive materials

Tuesday, AM – Properties and Characterization of Photonic Materials

- Optical property characterization of materials (Thierry Cardinal, ICMCB, Univ. Bordeaux)
- Nonlinear optics basics and applications (Denise Krol, U. California)
- Spectroscopy basics and applications (Vincent Rodriquez, ISM, Univ. Bordeaux)
- Material Property integration in Optical Design (Sawyer Campbell, Penn State Univ.)

Wednesday, AM – Fibers and Fiber-based Photonic Systems

- Processing fundamentals – design strategies and fabrication methods (Younès Messaddeq, Laval)
- Tailoring optical properties – loss, scattering and implications on performance (John Ballato, Clemson University)
- Advanced design of optical fiber sensors (Martin Bernier, Laval Univ.)
- Fiber lasers and Supercontinuum sources (Réal Vallée, Laval Univ.)

Thursday, AM – Planar Photonic Materials and Systems

- Intro to integrated photonics and planar-based systems (Juejun (JJ) Hu, MIT)
  - Processing and Design fundamentals
  - Device applications and multi-material integration
  - Next-generation optical function: optical phase change materials (O-PCMs)
- Advanced materials for system applications
  - Hybrid materials – single crystals in glass, laser-written modification (Himanshu Jain, Lehigh Univ.)
  - Direct Laser Write (DLW) material modification (Lionel Canioni, ICMCB, Univ. Bordeaux)
  - Liquid crystals (Tigran Gastian, Laval University)

Friday, INDUSTRY DAY: Next Generation Market Needs and Outlook for Photonic Materials

- Overview: application and optical material needs for MIR systems – (Martin Richardson, UCF)
- Industry needs
  - Next generation challenges – material needs and drivers (Alain Chandonnet, President, INO)
  - Skill sets for next generation careers in photonics (Clara Rivero-Baleine, Lockheed Martin)
  - Advanced optical systems – materials and integration challenges for next generation systems (Jason Eichenholz, CTO Luminar)
  - Challenges of a start up (Optel President, Louis Roy)
- Student project presentations (industry judges)
- **DINNER CRUISE, Banquet**

ATTENDEES and INFORMATION

- Attendees (50 total) will be comprised of North American and INTL grad students and senior undergraduates (40) and post-doc/young professionals (10) who will lead/direct project teams
- Registration fee $300 CAD
- Travel stipends to partially offset travel costs will be provided; additional funding to cover local housing, meals of participants

APPLICATION TIMELINE

- Online application process through the American Ceramic Society (opens 12/15/18)
- APPLICATION MATERIALS:
  - Completed application
  - Letter of recommendation from faculty advisor, including participant's aptitude for the subject and confirmation of academic status
  - Research statement (example of past/present/future involvement/experience in Photonic Materials – 500 words)
- DUE DATE: February 1, 2019
- NOTIFICATION of Participants (expected by March 1, 2019)