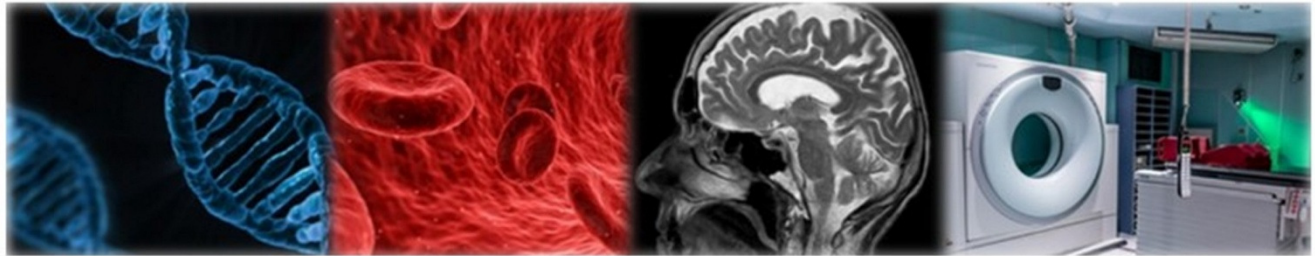


Division of Physics in Medicine and Biology Canadian Association of Physicists



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Message from the DPMB Executives

Dear members and friends of DPMB,

Warm greetings from the 2018-2019 DPMB executive team! Following our very first DPMB newsletter published last November, in the current issue of the DPMB newsletter, we would like to highlight the exciting DPMB program we have planned for the upcoming CAP Congress at Simon Fraser University, June 3-7, 2019.

We are excited to announce that Dr. Na Ji from the University of California, Berkeley, will give the plenary talk entitled “Imaging the brain at high spatiotemporal resolution” in the morning on June 3. Her talk will be jointly sponsored by DPMB and Nikon Instruments, and this will open the DPMB sessions at the 2019 CAP congress.

Following the successful DPMB 101 session in the 2018 CAP Congress, which provided introductory talks to promote concepts used in biophysics and medical physics, we will again organize a “Physics in Medicine and Biology 101” session in the 2019 CAP congress. This session is planned as the first DPMB technical session on June 3 after Dr. Ji’s plenary talk. This year, the 101 session welcomes Dr. Ian V. Ross (Nikon Instruments Inc.), who will tell us various applications of modern optical microscopy in Biology, and Dr. Cornelia Hoehr (TRIUMF), who will introduce cyclotrons for medicine.

Joint with DAMOPC, we have planned a thematic session on “Emerging investigators in bioimaging and medical applications of optics” in the afternoon of June 3. The three invited speakers are Dr. Ali Hatef (Nipissing University), Dr. Ozzy Mermut (York University) and Dr. Michèle Desjardins (Institut National de la Recherche Scientifique, Centre Energie, Matériaux, et Telecommunications). Another event to highlight is the very first joint session by DPMB, DCMMP and the Biophysical Society of Canada (BSC). This year’s topic is on membrane biophysics, which will include a number of invited talks and contributed talks in two 90min sessions on June 6.

In addition, three thematic sessions in medical physics are planned for June 4 and 5, and a session on molecular motors is planned for June 5, which together will include another seven invited speakers. In total, we have so far received more than 40 abstract submissions to DPMB. As usual, the DPMB sessions will include student competitions, and this year the DPMB student prizes are sponsored by the journal Micromachines. We also encourage your participation in the DPMB business meeting and social event (i.e. DPMB Get-Together) during the congress.

More details of the DPMB program including the sessions and speakers information can be found in the later sections of this newsletter, and also on the congress website (<https://www.cap.ca/congress-conference/congress-2019/>) and the DPMB division website (<http://dpmb.physics.umanitoba.ca/cap%202019.html>). Please keep checking back for updated information of the DPMB program at the congress.

In closing, we want to sincerely thank all the colleagues, friends and sponsors for their support of the DPMB program in the upcoming CAP Congress! We look forward to seeing many of you at the congress!



Chair
Francis Lin
Univ. of Manitoba



Vice Chair
Emily Heath
Carleton Univ.



Treasurer
Melanie Campbell
Univ. of Waterloo



Past Chair
Luc Beaulieu
Université Laval

DPMB Program at the 2019 CAP Congress

DPMB events (tentative schedule)

June 3, Monday

DPMB Plenary Speaker Session (9:30-10:15am)

Dr. Na Ji, UC Berkeley

Title of the talk: Imaging the brain at high spatiotemporal resolution

Chair: Francis Lin

Location: TBD

M1-6: Physics in Medicine and Biology "101" (10:45am-12:15pm)

Dr. Ian V. Ross (Nikon Instruments Inc.)

Title of the talk: *Applications of Modern Optical Microscopy in Biology*

Dr. Cornelia Hoehr (TRIUMF)

Title of the talk: *Cyclotrons for Medicine*

Chair: Francis Lin and Emily Heath

Location: TBD

DPMB Business Meeting (12:15-1:15pm)

Chair: Francis Lin

Location: TBD

M2-4: Emerging investigators in bioimaging and medical applications of optics (joint with DAMOPC)(1:15-2:45pm)

Chair: Francis Lin and Melanie Campbell

Location: TBD

June 4, Tuesday

T1-8: Topics in medical physics and biophysics (8:30-10:15am)

Chair: Francis Lin and Emily Heath

Location: TBD

T2-8: Magnetic Resonance Imaging (10:45am-12:15pm)

Chair: Emily Heath and Luc Beaulieu

Location: TBD

T3-9: Radiation Therapy (1:15-2:45pm)

Chair: Emily Heath and Luc Beaulieu

Location: TBD

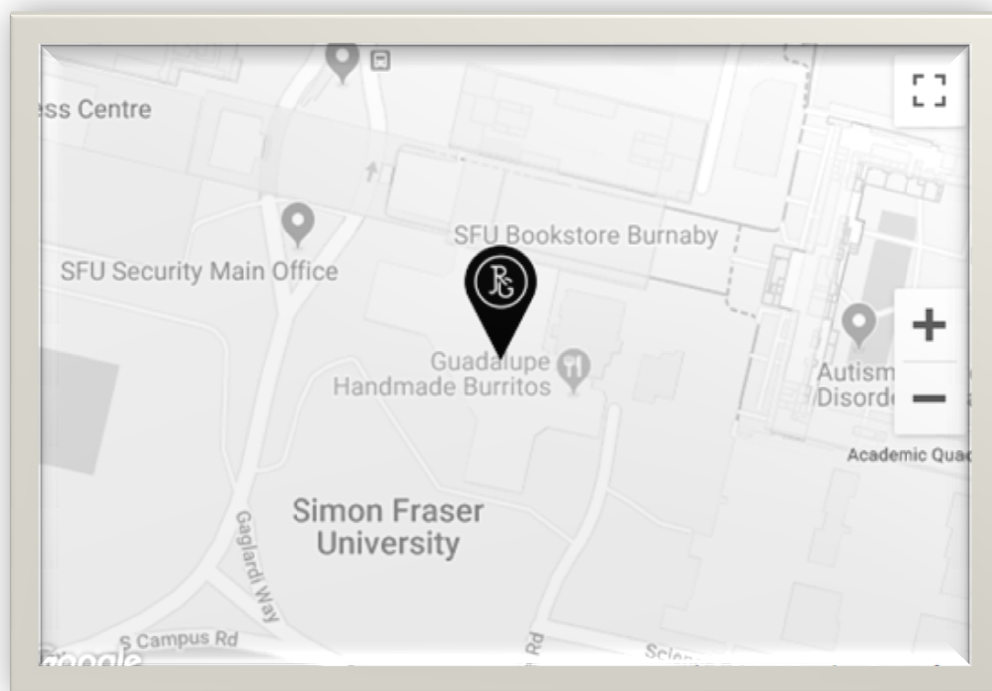
DPMB Get-Together (3:15-4:45pm)

Chair: Francis Lin

Location: Study Public House in Maggie Benston Centre, 8888 University Drive

<https://www.jrghospitality.ca/establishment/the-study/>**Directions:**

When approaching SFU on Gagliardi Way, go straight through the intersection with lights, right at the roundabout and left at the fork which will lead to an underpass. Turn right to enter the Convocation Mall Visitor Parking. The entrance is located under the underpass. Proceed to the top floor for visitors or after 4:30pm the reserved lot is available. Follow the signs to the Maggie Benston Center entrance which is a large set of glass doors and go up the stairway on the left which leads to Higher Grounds Coffee Shop. The Study Public House entrance is located inside the coffee shop. Reservation made under Francis at 3:15pm.

**DPMB Poster session (4:45-6:45pm)**

Location: TBD

June 5, Wednesday**W1-3: Topics in Medical Physics (10:45am-12:15pm)**

Chair: Emily Health and Luc Beaulieu

Location: TBD

W2-3: Molecular Motors (1:15-2:45pm)

Chair: Nancy Forde

Location: TBD

June 6, Thursday**R1-1: Membrane Biophysics, Part I (joint with DCMMP and Biophysical Society of Canada) (10:45am-12:15pm)**

Chair: Zoya Leonenko and Maikel Rheinstadter

Location: TBD

R2-2: Membrane Biophysics, Part II (joint with DCMMP and Biophysical Society of Canada) (1:15-2:45pm)

Chair: Zoya Leonenko and Maikel Rheinstadter

Location: TBD

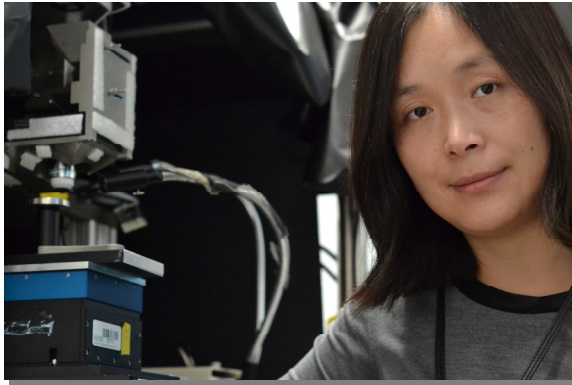
CAP Best Student Presentations Final Competition (3:15-5:15pm)

Location: TBD

Student Awards Ceremony (6:00-6:45pm)

Location: TBD

DPMB Plenary Speaker



Dr. Na Ji, UC Berkeley

Bio: Na Ji studied chemistry and physics as an undergraduate in the University of Science and Technology of China and later a graduate student at the University of California, Berkeley. In 2006, she moved to Janelia Research Campus, Howard Hughes Medical Institute, and worked with Eric Betzig on improving the speed and resolution of in vivo brain imaging. She became a group leader at Janelia in 2011. In 2017, she moved to the Department of Physics and Department of Molecular & Cell Biology at the University of California, Berkeley as the Luis Alvarez Memorial Chair in Experimental Physics. She is also affiliated with the Bioengineering, Biophysics, and Vision Science Graduate Programs, Helen Wills Neuroscience Institute, and serves as a faculty scientist at the Lawrence Berkeley National Laboratory. In addition to imaging technology development, her lab also applies the resulting techniques to outstanding problems in neurobiology.

Title: Imaging the brain at high spatiotemporal resolution

Abstract: Physics has long employed optical methods to probe and manipulate matter on scales from the infinitesimal to the immense. To understand the brain, we need to monitor physiological processes of single synapses as well as neural activity of a large number of networked neurons. Optical microscopy has emerged as an ideal tool in this quest, as it is capable of imaging neurons distributed over millimeter dimensions with sub-micron spatial resolution. Using concepts developed in astronomy and optics, my laboratory develops next-generation microscopy methods for imaging the brain at higher resolution, greater depth, and faster speed. By shaping the wavefront of the light, we have achieved synapse-level spatial resolution through the entire depth of the primary visual cortex, optimized microendoscopes for imaging deeply buried nuclei, and developed high-speed volumetric imaging methods. I will discuss our recent advances as well as their applications to understanding neural circuits.

Invited speakers

Dr. Ali Hatef

Department of Computer Science and Mathematics, Nipissing University

Title of the talk: *Analysis of Plasmonic and Plasma Assisted Photoacoustic Response from Metallic Nanostructures Irradiated by Fast and Ultrafast Laser*

Dr. Ozzy Mermut

Department of Physics and Astronomy, York University

Title of the talk: *The optical properties of aging and diseased tissue interfaces: what are your gums and bones telling you?*

Dr. Michèle Desjardins

Institut National de la Recherche Scientifique, Centre Energie, Matériaux, et Telecommunications

Title of the talk: *Studying the brain across scales using imaging and physics*

Dr. Ian V. Ross

Nikon Instruments Inc.

Title of the talk: *Applications of Modern Optical Microscopy in Biology*

Dr. Zev Bryant

Department of Bioengineering, Stanford University

Title of the talk: *Optical control of fast and processive engineered myosins in vitro and in living cells*

Dr. Cornelia Hoehr

TRIUMF

Title of the talk: *Cyclotrons for Medicine*

Dr. Dan Xiao

Department of Physics, University of Windsor

Title of the talk: *Quantitative Magnetic Resonance Imaging*

Dr. Tony Popescu

Department of Medical Physics, BC Cancer Agency - Vancouver

Title of the talk: *Modern Applications of Monte Carlo Simulations in External Beam Radiotherapy*

Dr. Anna Celler

Department of Radiology, University of British Columbia

Title of the talk: *The role of physics in Nuclear Medicine*

Dr. Cecile Fradin

Department of Physics & Astronomy, McMaster University

Title of the talk: *Proteins drilling holes in lipid membranes: The influence of the membrane physical parameters*

Dr. Dror Warshawski

Université du Québec à Montréal

Title of the talk: *In-vivo solid-state NMR*

Dr. Peter Tieleman

Dept. of Biochemistry, University of Calgary

Title of the talk: *Computer simulations of biological membrane models: lateral structure and lipid-protein interactions*

Dr. Evgeny Pavlov

Department of Basic Sciences, New York University

Title of the talk: *Molecular composition of the mitochondrial permeability transition pore*

Dr. Sattar Taheri-Araghi

Physics and Astronomy, California State University, Northridge

Title of the talk: *Dying Escherichia coli cells absorb antimicrobial peptides, enhancing the survivability of the cell culture*

Dr. Nancy Ford

Department Oral Biological & Medical Sciences, The University of British Columbia

Title of the talk: *Optimization of dental cone beam tomography for planning dental implant treatments*

Dr. Devika Chithrani

Physics and Astronomy, University of Victoria

Title of the talk: *Road-map to the use of gold nanoparticles in cancer radiotherapy*

Dr. Michelle Hilts

Department of Medical Physics, BC Cancer Agency - Kelowna

Title of the talk: *Breast radiotherapy in a single day: innovation advancing clinical care*

Future events

- ✚ **2019 Biophysical Society of Canada Annual Meeting at Toronto** (May 28-31)
<https://biophysicalsociety.ca/bsc-annual-meetings/>
- ✚ **2019 CAP Congress at Simon Fraser University** (June 3-7)
<https://www.cap.ca/congress-conference/congress-2019/>

Acknowledgements

<https://www.bruker.com/>

<http://www.nikoninstruments.com/>



<https://www.mdpi.com/journal/micromachines>



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