University of Glasgow | School of Physics & Astronomy

NOTICE2020-webinar

Registrations are open for the NOTICE2020-webinar! Join us on **Friday 28th of August** for three excellent talks on multiphoton microscopy, protein engineering and cardiac imaging.

NOTICE (novel optical technology in cardiac electrophysiology) is a small-scale conference that aims to create a synergy between the strongest proponents of optical imaging, microscopy and manipulation technology applied to investigating the heart. For known reasons, the NOTICE2020 conference, which was planned to take place in Glasgow in August 2020, had to be postponed for one year. NOTICE-Glasgow will now take place on the 26th and 27th of August 2021. More information will be posted on our conference website (QR code).

In the meantime, to bridge the long wait, we are excited to announce the NOTICE-webinar! Join us on Friday 28th of August 2020 for three exciting talks from our North American keynote speakers:

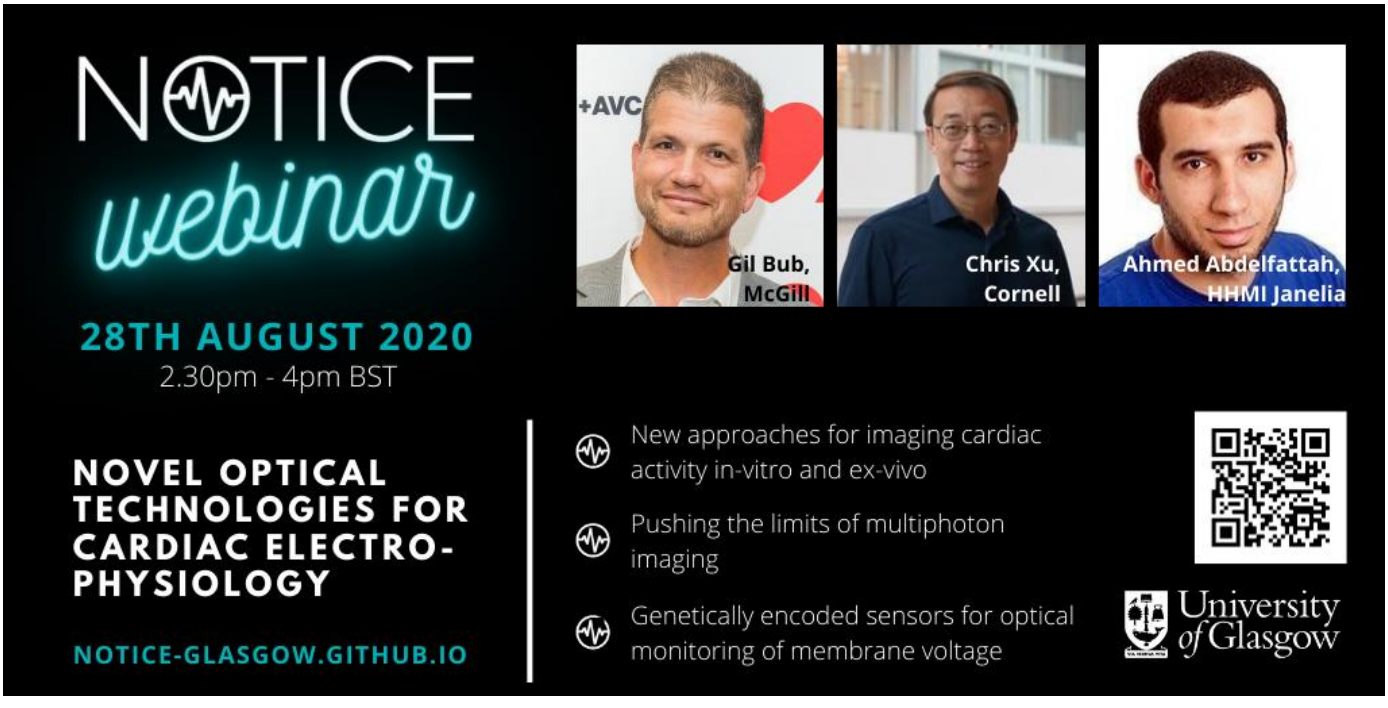
- **Chris Xu** (Cornell University): "Pushing the limits of multiphoton imaging"
- **Ahmed Abdelfattah** (HHMI Janelia Farm Research Campus): "Genetically encoded sensors for optical monitoring of membrane voltage"
- **Gil Bub** (McGill University, Montreal Canada): "New approaches for imaging cardiac activity in-vitro and ex-vivo"

The webinar is free, but you have to register your attendance on our Eventbrite page.

We look forward to seeing you there!

Caroline Müllenbroich, University of Glasgow

On behalf of the NOTICE committee



Prof Chris Xu, Cornell University, USA

"Pushing the limits of multiphoton imaging"

Over the last three decades, multiphoton imaging has become an indispensable tool for biological and biomedical research. In particular, multiphoton microscopy is the go-to technology for in vivo fluorescence imaging deep within intact tissues. In this talk, the fundamental challenges of deep tissue, high-resolution optical imaging are discussed. New technologies for in-vivo structural and functional imaging of live animal brains using long wavelength excitation and three-photon microscopy will be presented. We will illustrate the requirements for imaging the dynamic neuronal activity at the cellular level over a large area and depth in awake and behaving animals, and show applications where 3-photon microscopy outperforms conventional 2-photon microscopy in both signal strength and image contrast. Finally, we will discuss several future directions, including new laser sources, to further improve the imaging depth and speed in biological tissues. Although we focus on the applications in brains, the technology presented will likely be applicable to other biological tissues.

Ahmed Abdelfattah, PhD, HHMI Janelia Farm, USA

"Genetically encoded sensors for optical monitoring of membrane voltage"

Voltage imaging provides unparalleled spatial and temporal resolution of the brain's electrical signaling at the cellular and circuit levels. A longstanding challenge has been to develop genetically encoded voltage sensors to track membrane voltage from multiple neurons in behaving animals. However, brightness and signal to noise ratio have limited the utility of existing voltage sensors, especially in vivo. I will describe our work to engineer hybrid protein-small molecule sensors with improved brightness and photostability that allow imaging neural circuits in vivo. Using those sensors, we extend both productive imaging time and number of neurons imaged by more than 10 times in awake behaving animals.

Prof Gil Bub, McGill University, Canada

"New approaches for imaging cardiac activity in-vitro and ex-vivo"

My laboratory collaborates with several groups to develop new tools for imaging cardiac activity in a variety of preparations. In bioengineered in-vitro model systems, we have developed a new imaging modality for high-throughput capture of data from cardiac monolayers (with Dr Alex Corbet, University Of Exeter [1]) and continue to refine methods for controlling tissue using optogenetics (with Dr Emilia Encheva, George Washington University [2]) to develop new models of arrhythmias. In whole tissue, we use a system invented and constructed by Dr Leonardo Sacconi [3] to image propagation in zebra-fish heart, and work with his team on analysis and modeling of real-time control experiments in mouse heart (with Leon Glass[4]). The challenges and benefits of each approach will be discussed.

[1]http://emps.exeter.ac.uk/physics-astronomy/staff/ac734/.
[2]https://entcheva.seas.gwu.edu/
[3]http://bio.lens.unifi.it/personal-page/sacconi/
[4]https://www.medicine.mcgill.ca/physio/glasslab/