

REVISITING AIRFLOW AND AEROSOL TRANSPORT PHENOMENA IN THE DEEP LUNGS

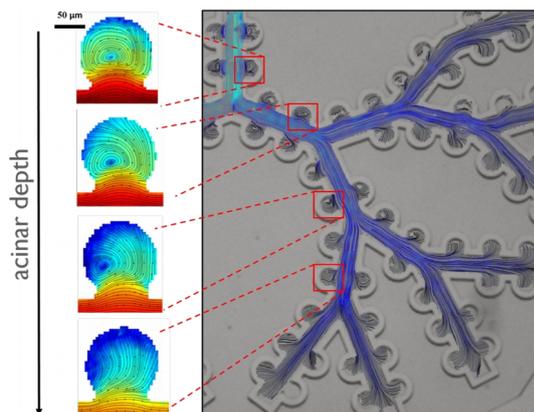
PROF JOSUÉ SZNITMAN (TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY)

WEDNESDAY 21 SEPTEMBER 2022 (4:00PM AEST)

ZOOM: [LINK ID: 861 3567 8077](#) PWD: 757954

Abstract: Mapping respiratory airflows and the transport mechanisms of inhaled aerosols characteristic of the deep regions of the lungs are of broad interest in assessing both pulmonary health risks and inhalation therapy outcomes. In the present talk, I will discuss our current understanding of such phenomena that take place within the complex anatomical environment of the deep lungs, characterized by submillimeter 3D alveolated airspaces and nominally slow resident airflows, also known as low-Reynolds-number flows. I will exemplify advances brought forward by experimental efforts, in conjunction with numerical simulations, to revisit past mechanistic theories of respiratory airflow and particle transport in the distal lung regions. Most significantly, I will highlight how microfluidics spanning the past decade have accelerated opportunities to deliver anatomically inspired in vitro solutions that capture with sufficient realism and accuracy the leading mechanisms governing both respiratory airflow and aerosol transport at true scale. Such efforts have provided previously unattainable in vitro quantifications on the local transport properties in the deep pulmonary acinar airways, with new paths to resolve mechanistic interactions between airborne particulate carriers and respiratory airflows at the pulmonary microscales.

Bio: Josué Sznitman is a Swiss, French and Israeli national. Sznitman graduated from MIT with a BSc in Mechanical Engineering (2002), followed by a Dr. Sc. (2008) from the ETH Zurich. In 2008, Sznitman joined the University of Pennsylvania as a Postdoctoral Fellow and moved to Princeton University as a Lecturer and Research Associate, appointed by the Princeton Council of Science & Technology. He joined the Technion in October 2010 as a tenure-track Assistant Professor and was promoted to Associate Professor with tenure in 2016. Sznitman's research underscores respiratory transport phenomena and pulmonary physiology, with a focus on preclinical models and drug delivery to the lungs including inhalation therapy. He is an associate editor for the *Journal of Biomechanics*, *Clinical Biomechanics* and *Frontiers in Bioengineering & Biotechnology* and also serves as a member of the Editorial Board of *Biomicrofluidics* and the *European Journal of Pharmaceutical Sciences*. Among his accolades, Sznitman was awarded the Young Investigator Award (2015) by the International Society of Aerosols in Medicine (ISAM) for a researcher under 40 and most recently the 2018 Emerging Scientist Award in Drug Delivery to the Lungs (The Aerosol Society, UK). His recent dissemination activities have included Webinars and the opportunity to deliver a TEDx Talk (2019) titled "From race cars to the lungs".



AFMSS-2022 Convenors:
Dr. Cat Vreugdenhil
(cat.vreugdenhil@unimelb.edu.au)
Dr. Vishal Chaugule
(vishal.chaugule@monash.edu)



AUSTRALASIAN
FLUID
MECHANICS
SOCIETY