NRS Advanced Technologies Symposium 2024

Speaker Information

Prof. Clare Lloyd, Imperial College, London

Mapping the pulmonary immune landscape in health and disease

I am a Professor of Respiratory Immunology and Head of the Division of Respiratory Sciences at the National Heart and Lung Institute, Imperial College, London. I obtained BSc and PhD degrees in Immunology at Kings College London and undertook Postdoctoral research at Guys Hospital London and Harvard Medical School, Boston. I worked in a Biotech company in Cambridge USA before returning to the England to start my own lab. I held four consecutive Senior Fellowships from the Wellcome Trust and am currently a Wellcome Investigator. I am an elected Fellow of the Academy of Medical Sciences.

I am Vice Dean for Institutional Affairs where I am responsible for Equality & Diversity and career development across the Faculty of Medicine at Imperial.

My lab explores the interactions between resident lung cells and immune cells during development and resolution of pulmonary inflammation. We are a multidisciplinary group of immunologists, cell biologists and clinicians who aim to understand the molecular mechanisms underlying common lung diseases, including asthma and fibrotic lung diseases. We employ a mixture of in vivo mouse models and in vitro culture systems using cells from patients to investigate the mechanisms underlying the pulmonary immune response to inhaled allergens pathogens and pollutants. A particular focus is the understanding of how the immune system senses the inhaled environment, examining how these stimuli influences development of pulmonary inflammation and tissue remodelling across the life course, using imaging, cell biology and transcriptomics.

Prof. Craig Wheelock, Karolinska Institute (KI), Stockholm

Metabolomics and mass spectrometry imaging - a combined approach to investigate lipid mediators in the airways

Craig Wheelock is Head of the Unit of Integrative Metabolomics in the Institute of Environmental Medicine at the Karolinska Institute (KI), where he serves as director of the Integrative Molecular Phenotyping Laboratory and the small molecule mass spectrometry core facility (KI-SMMS). He is also a Distinguished Visiting Professor of Metabolomics at Gunma University, Japan. Following pre- and post-doctoral work on lipid mediators at the University of California Davis, he conducted post-doctoral studies at the KEGG laboratory in Kyoto University. In 2006, he was awarded a Marie Curie Fellowship to relocate to the KI. Research in his group focuses on molecular phenotyping of respiratory disease, with a particular interest in investigating the role of lipid mediators in pulmonary physiology. Recent efforts have centered on understanding the role of lipid mediators derived from 18-carbon containing dietary fatty acids (e.*g.,* linoleic and alpha-linolenic acid) in lung disease. These so-called octadecanoids represent a new sub-class of bioactive lipids that are potentially involved in gut-lung crosstalk. The

overarching aim of the Wheelock lab is to identify personalized molecular profiles that can be associated with an individual's lifestyle, environmental exposure, and susceptibility to asthma.

Professor Wheelock has held several positions of trust. He was a member of the European Respiratory Society (ERS) Science Events Working Group from 2016-2019 and served on the ERS Advocacy Council as the Director of Scientific Relations with the EU from 2020-2023. He currently serves on the ERS Advocacy Council as the ERS-member of the Board of Directors of the Biomedical Alliance in Europe. He was a Board Member of the International Metabolomics Society from 2016-2020, a founding Board Member of the Nordic Metabolomics Society from 2017-2021, and currently serves on the Metabolomic Epidemiology Task Group. He has served as co-Chair of the Genome Medicine Sweden Coordinating Group for Complex Diseases since 2022 and on the Swedish Fulbright Commission since 2023. He is also a member of the editorial board of the European Respiratory Journal and the American Journal for Respiratory and Critical Care Medicine. When not balancing his time between Sweden and Japan, he enjoys teaching his kids to kayak and paddling SUP with his dog.

Dr. Ruth Olmer, German Center for Lung Research (DZL), Hannover

Utilizing iPSC derived airway epithelium for modelling respiratory diseases

Ruth Olmer, studied biotechnology and focused during her PhD on scalable expansion and differentiation of human induced pluripotent stem cells. At present she is group leader at the Leibniz Research Laboratories for Biotechnology and Artificial Organs (LEBAO) and Principle Investigator in the German Center for Lung Research (DZL). Research of R. Olmer focuses on induced pluripotent stem cells and their differentiation into vascular and respiratory lineages, development of iPSC-based cellular therapies, as well as disease modelling and drug development in the respiratory field. E.g. in vitro models of genetic diseases like cystic fibrosis, primary ciliary dyskinesia as well as pulmonary hypertension are focus of her work.

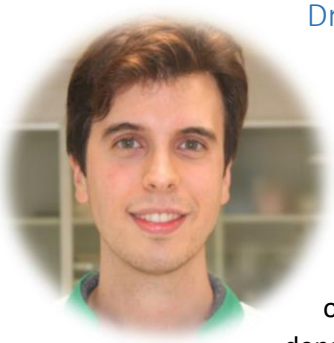
For CF she was significantly involved in utilizing epithelila cells derived from iPSC carrying the CFTR F508del mutation to perform a high throughput screening to identify new CFTR modulators. In addition, the group was recently able to show that iPSC-derived airway epithelium in ALI culture is suitable for studying the effects of mutations in genes for the structure and function of airway motile cilia. Structural defects were detected using transmission electron microscopy. Functional effects of the mutations were examined using analyzes of cilia beat frequency and directed particle transport.

Dr. Ralph Stadhouders, Erasmus MC, Rotterdam

Epigenetic control of immune responses

Dr. Ralph Stadhouders is a molecular biologist and immunologist working at the Erasmus MC in Rotterdam, the Netherlands. He obtained his PhD with Prof. Frank Grosveld at the Erasmus MC, after which he moved to the Centre for Genomic Regulation in Barcelona for postdoctoral training with Dr. Thomas Graf. In 2017 he returned to the Erasmus MC to establish his own research line in molecular immunology at the Pulmonary Medicine department. His laboratory is focused on obtaining a better understanding of how immune cell activity is

controlled at a molecular level, with an emphasis placed on identifying mechanisms and cell subsets associated with severe asthma or failing anti-tumour immunity. His group also has a special interest in the non-coding part of our genome, and how it contributes to shaping the identity and responsive potential of immune cells. Dr. Stadhouders' laboratory has recently received support from the Dutch Research Council (ZonMW VIDI), the Dutch Lung Foundation (Longfonds) and the Dutch Cancer Society (KWF).



Dr. Alejandro Rodriguez Ruiz, Leiden University Medical Center, Leiden

Towards modelling emphysema using hiPSC-derived alveolar epithelial cells.

Alejandro Rodriguez Ruiz completed his PhD in the department of Molecular Epidemiology at the LUMC by using human induced pluripotent stem cells (hiPSCs) derived models of cartilage and bone osteoarthritis. Currently, he works as a postdoctoral researcher at the department of PulmoScience within the Precision Medicine for more oxygen (P4O2) consortium. His research is focused towards stablishing a scalable hiPSC-derived source of alveolar and endothelial cells for disease modeling of the alveolar compartment. Additionally, he uses organ-on-chip technology to simulate physiological breezing and study environmental and genetically induced triggers in emphysema development.

Shahriyar Shahbazi Khamas, Amsterdam UMC, Amsterdam

Breath beyond boundaries: leveraging exhaled metabolites in asthma and therapeutic drug monitoring

Shahriyar, Pharm.D., is currently pursuing his Ph.D. in the pulmonary medicine department at the Amsterdam UMC, location AMC. His research focuses on the application of exhaled metabolites and microbiome composition in pulmonary diseases especially in asthma with the aims to enhance prognosis, and prediction of asthma attacks. Shahriyar is involved in different (inter)national consortia and projects, particularly focused on precision medicine. Within the ONELAB Consortium (Orchestrating next-generation mobile modular laboratories for pandemic monitoring preparedness), he contributes in developing a standardized biomarker assessment framework for lower respiratory tract infections in a pandemic situation and defining the essential methodologies for GC-MS analysis of exhaled breath. Furthermore, he has secured a grant for his MONITOR project, which investigates metabolites emitted from medications. This project runs in tandem with his DOPIA project, which examines medication traces in exhaled breath as a potential method for therapeutic drug monitoring.

Dr. Maaike de Vries, University Medical Center Groningen, Groningen

Epigenetic clock – Fact or fiction? Exploring its potential in COPD

Maaike de Vries obtained her PhD in 2015 on the role of the survival kinase Pim1 on the airway epithelium exposed to environmental triggers. After her PhD, she shifted her research towards human population studies, focusing on elucidating the etiology of COPD with a specific interested on the individual susceptibility and contribution of both (epi)genetic and environmental factors in the development of COPD. As translational researcher at the department of Epidemiology, she integrates (epi)genome-wide identification approaches in human population studies with functional studies, aiming to find novel approaches to treat or prevent COPD in the near future.

Dr. Wilco Nijenhuis, University Utrecht, Utrecht

From nose to nanoscopy: 3D imaging of human airway epithelia

As a senior scientist in the Kapitein lab at the Division of Cell Biology, Neurobiology, and Biophysics at Utrecht University, my work revolves around studying the architecture and dynamics of polarized cells: specifically, how they acquire and maintain their complex forms. Initially focusing on neurons, our lab employs advanced light microscopy techniques, including various forms of super-resolution microscopy, in combination with cellular engineering and active control strategies such as optogenetics. These methodologies enable us to delve into and influence intracellular transport, cellular architecture, and cellular functionality. More recently, our research has expanded to include airway epithelial cells, utilizing innovative imaging methods like expansion microscopy and lattice light-sheet imaging to visualize fundamental cellular processes in 3D. I completed my PhD in mitotic signal transduction under the guidance of Geert Kops at the University Medical Center Utrecht.