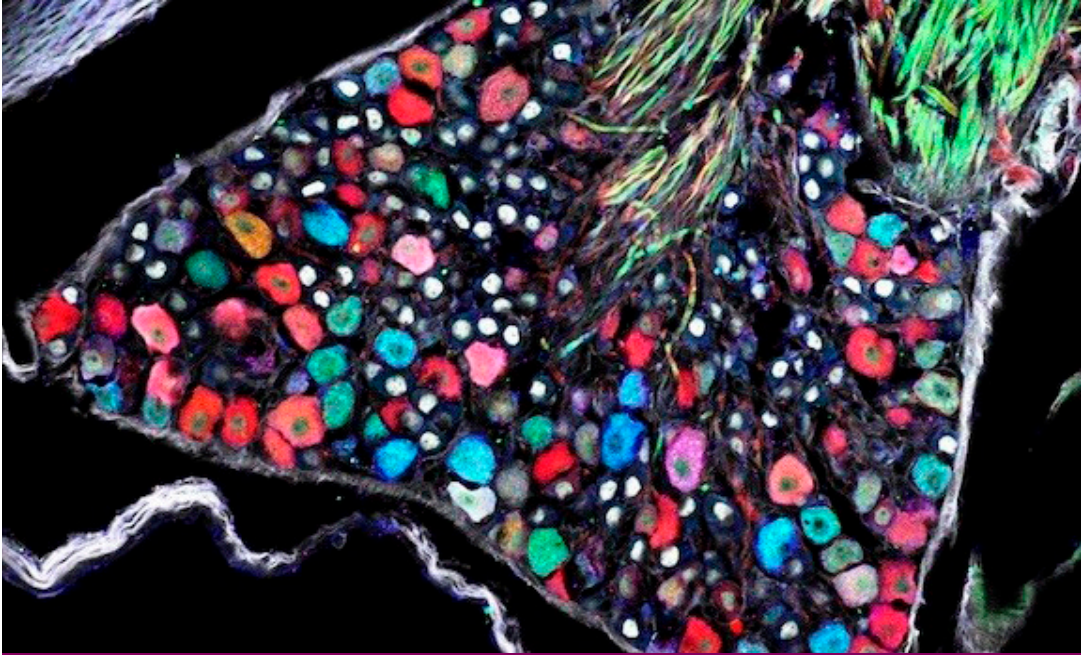


PROGRAMME FOR THE SYMPOSIUM

# Advances in Reparative Medicine



15 May 2019

Torsten N Wiesel lecture hall, BioClinicum,  
Karolinska University Hospital, Stockholm, Sweden

Ming Wai Lau Centre  
for Reparative Medicine  
劉鳴煒復修醫學中心



**Karolinska  
Institutet**

# FOREWORD

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Reparative Medicine is a rapidly expanding area both at the level of basic and translational research. This symposium “Advances in Reparative Medicine” gathers leading researchers in the field, covering areas such as the identification and characterisation of cell types / states in different tissues during development and in disease, using new technologies such as single-cell transcriptomics and carbon 14 birth dating. The symposium will highlight novel technologies in tissue repair and disease modelling such as inducible pluripotent stem cells or gene editing, and bioengineering platforms with advanced biomaterials. The symposium will also constitute a show-case for the current research on Reparative Medicine at Ming Wai Lau Centre for Reparative Medicine (MWLC) and at Karolinska Institutet at large. We would like to welcome you to a great day of scientific discussions and networking.

*Gonçalo Castelo-Branco, Christian Göritz and Sandra Ceccatelli*

# PROGRAMME

15 MAY 2019 08.30-18.00

Torsten N Wiesel lecture hall, BioClinicum, Karolinska University Hospital

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- 08.30-09.00 REGISTRATION
- 09.00-09.15 WELCOMING ADDRESS AND PRESENTATION OF MWLC  
*Sandra Ceccatelli, Director of MWLC, KI*
- 09.15-09.20 OPENING  
*Ole Petter Ottersen, President at KI*

## KEYNOTE LECTURE I

*CHAIR: Simon Elsässer, Department of Medical Biochemistry and Biophysics and MWLC, Stockholm node, KI*

- 09.20-10.05 New cells in old brains  
*Jonas Frisé, Department of Cell and Molecular Biology, KI*
- 10.05-10.30 COFFEE BREAK

## SESSION I: CELL TYPES AND CELL STATES

*CHAIRS: Gonçalo Castelo-Branco, Department of Medical Biochemistry and Biophysics and MWLC, Stockholm node, KI and Francois Lallemend, Department of Neuroscience and MWLC, Stockholm node, KI*

- 10.30-11.00 Lineage specification of skin stem cells during hair growth and wound repair  
*Maria Kasper, Department of Biosciences and Nutrition, KI*
- 11.00-11.30 Pluripotency, embryonic stem cells and regenerative medicine  
*Fredrik Lanner, Department of Clinical Science, Intervention and Technology and MWLC, Stockholm node, KI*
- 11.30-12.00 Neuronal subtype specification in the developing enteric nervous system  
*Ulrika Marklund, Department of Medical Biochemistry and Biophysics, KI*
- 12.00-13.00 LUNCH

## KEYNOTE LECTURE II

*CHAIR: Jens Hjerling-Leffler, Department of Medical Biochemistry and Biophysics, KI*

- 13.00-13.45 Myelination and myelin repair in the CNS  
*Charles ffrench-Constant, University of Edinburgh, UK*

## SESSION II: TISSUE REPAIR AND DISEASE MODELLING

*CHAIR: Lars Jakobsson, Department of Medical Biochemistry and Biophysics, KI*

- 13.45-14.15 Targeting regulatory RNAs in skin wounds: a new opportunity of healing?  
*Ning Xu Landén, Department of Medicine, Solna and MWLC, Stockholm node, KI*
- 14.15-14.45 Combinatorial genetics technology for cell engineering  
*Alan Wong, The University of Hong Kong, HK and Associate Member at MWLC*
- 14.45-15.15 Using reprogramming to model diseases of the human brain  
*Anna Falk, Department of Neuroscience, KI*
- 15.15-15.45 COFFEE BREAK

## SESSION III: BIOENGINEERING IN REPARATIVE MEDICINE

*CHAIRS: Sijie Chen, MWLC, Hong Kong node, KI and Christian Göritz, Department of Cell and Molecular Biology and MWLC, Stockholm node, KI*

- 15.45-16.15 Spatial signaling at the cell membrane  
*Ana Teixeira, Department of Medical Biochemistry and Biophysics, KI*
- 16.15-16.45 Engineering advanced biomaterials: from microarray fabrication to mRNA delivery  
*Linxian Li, MWLC, Hong Kong node, KI*
- 16.45-17.15 Clinical translation of a regeneration strategy for spinal cord injury  
*Mikael Svensson, Department of Clinical Neuroscience, KI*
- 17.15-17.45 Engineering human heart chambers and tissues for disease modelling and drug discovery  
*Ronald Li, MWLC, Hong Kong node, KI*
- 17.45-18.00 CLOSING REMARKS  
*Eero Castrén, University of Helsinki, FI, Chair of MWLC Scientific Advisory Board*



## WELCOMING SPEAKER

# SANDRA CECCATELLI

Director, Ming Wai Lau Centre for Reparative Medicine, Karolinska Institutet

Professor Sandra Ceccatelli from the Department of Neuroscience, Karolinska Institutet, Sweden was appointed Director of MWLC in 2018.

Prof Ceccatelli started her professional career in Italy where she received her MD degree and clinical specialty in Child Neuropsychiatry from the University of Milan, Italy. In 1991 she obtained a PhD degree from Karolinska Institutet (KI) under the supervision of Prof Tomas Hökfelt at the Department of Histology and Neurobiology. After a post-doctoral period at the Rockefeller University, USA in the Laboratory of Neurobiology and Behavior directed by Dr Donald Pfaff, she returned to KI and established her own research group in the Division of Toxicology directed by Prof Sten Orrenius, and in 2002 she became Professor of Neurotoxicology. In 2007 she was recruited by the KI Department of Neuroscience where she served as Head of department for six years.

Prof Ceccatelli is a member of various boards and committees of national and international funding agencies. She served as Director of the Strategic Program in Neuroscience (StratNeuro) that was established as a joint effort between KI, Umeå University and the KTH Royal Institute of Technology. Prof Ceccatelli's research is based on the idea that diseases should be understood in a life-long perspective, as processes that start during development and manifest later in life. Her research explores the link between early-life adverse events and changes in the programming during critical period of neurodevelopment, with special focus on the mechanisms that trigger alterations in neural cell differentiation and neurodevelopmental disorders.

Prof Ceccatelli has published more than 150 papers in peer reviewed international journals, several review articles, book chapters and scientific opinions.

[ki.se/en/neuro/ceccatelli-laboratory](http://ki.se/en/neuro/ceccatelli-laboratory)



## OPENING SPEAKER

# OLE PETTER OTTERSEN

President, Karolinska Institutet

Professor Ole Petter Ottersen has been President of Karolinska Institutet, Sweden since August 2017, and previously served as President of the University of Oslo, Norway (2009-2017). As a neuroscientist, physician and academic leader, Prof Ottersen has held numerous positions of trust. Between 2013 and 2015, he was Head of the Norwegian Association of Higher Education Institutions and of the Nordic University Association.

Prof Ottersen served as Chairman of the board for Norway's National Program for Functional Genomics (2003-2007), as director of Norway's Centre of Excellence in Molecular Biology and Neuroscience (2002-2009) and as coordinator of the Nordic Centre of Excellence in Molecular Medicine (2005-2009). He has also coordinated two projects under the EU Framework Program and was the panel leader for European Research Council Advanced Grants (2008-2012). He is currently the panel leader for ERC Synergy Grants.

In recent years, Prof Ottersen has been engaged in global health – much inspired by his experiences as Chair of the Lancet-University of Oslo Commission on Global Governance for Health (2011-2014). The Commission examined the political determinants of health and produced the 2014 report, “The Political Origins of Health Inequity: Prospects for Change” that preceded the publication of UN's Agenda 2030. He currently serves as a board member of the African Population and Health Research Center (APHRC) based in Nairobi, Kenya.

Between 2006 and 2009, Prof Ottersen was Chief Editor of *Neuroscience*, the official journal of the International Brain Research Organization, and has also served on numerous boards and prize committees, including the Kavli Prize Committee in Neuroscience and the Thon Foundation Advisory Board.

At the University of Oslo, Norway, Prof Ottersen was Dean of Science within the medical faculty (2000-2002) and has taught medical students, physiotherapists and postgraduate students since 1976.

[ki.se/en/about/president-ole-petter-ottersen](https://ki.se/en/about/president-ole-petter-ottersen)



## JONAS FRISÉN

Department of Cell and Molecular Biology,  
Karolinska Institutet

### “New cells in old brains”

Professor Jonas Frisé received his MD (1991) and PhD (1993) degrees from Karolinska Institutet, Sweden. He was a Postdoctoral Fellow in Dr Mariano Barbacid's laboratory in Princeton, USA, 1995-1997. He is the Tobias Foundation Professor of Stem Cell Research at Karolinska Institutet since 2001. A main interest of Prof Jonas Frisé's research group is cellular plasticity in the central nervous system, in both the healthy and pathological situation. Studies in experimental animals have delineated how neural stem cells, progenitor cells and differentiated cells collaborate to form scar tissue and contribute to repair mechanisms after brain and spinal cord injuries. Efforts to modulate these processes are assessed for the potential to improve functional recovery after nervous system injury.

### Selected publications

Yeung, M.S.Y., Djelloul, M., Steiner, E., Bernard, S., Salehpour, M., Possnert, G., Lou Brundin, L. and Jonas Frisé, J. (2019) Oligodendrocyte generation dynamics in multiple sclerosis. *Nature*, 566: 538-542.

Magnusson, J.P., Göritz, C., Tatarishvili, J., Dias, D.O., Smith, E.M.K., Lindvall, O., Kokaia, Z. and Frisé, J. (2014) A latent neurogenic program in astrocytes regulated by Notch signaling in the mouse. *Science*, 346: 237-241.

Ernst, A., Alkass, K., Bernard, S., Salehpour, M., Perl, S., Tisdale, J., Possnert, G., Druid, H. and Frisé, J. (2014) Neurogenesis in the striatum of the adult human brain. *Cell*, 156: 1072-1083.

[frisenlab.org](http://frisenlab.org)



## MARIA KASPER

Department of Biosciences and Nutrition,  
Karolinska Institutet

### “Lineage specification of skin stem cells during hair growth and wound repair”

Dr Maria Kasper is an Associate Professor in skin stem cell biology at Karolinska Institutet, Sweden. She received her PhD at the University of Salzburg, Austria in human genetics and molecular tumor biology and established her own lab in 2013. Dr Kasper and her team focus on investigating stem cell dynamics, lineage specification and niche-signal influences in skin, during health, repair and disease. Her lab pioneered the use of single-cell transcriptomics in skin, and her collective contributions in skin biology received already high international recognition, such as the LEO Foundation GOLD Award 2017 and IID Raising STAR Lecture 2018.

#### Selected publications

Joost S, Zeisel A, Jacob T, Sun X, La Manno G, Lönnerberg P, Linnarsson S, Kasper M. Single-Cell Transcriptomics Reveals that Differentiation and Spatial Signatures Shape Epidermal and Hair Follicle Heterogeneity. *Cell Syst.* 2016 Sep 28;3(3):221-237.e9.

Joost S, Jacob T, Sun X, Annusver K, La Manno G, Sur I, Kasper M. Single-Cell Transcriptomics of Traced Epidermal and Hair Follicle Stem Cells Reveals Rapid Adaptations during Wound Healing. *Cell Rep.* 2018 Oct 16;25(3):585-597.e7.

Mok KW, Saxena N, Heitman N, Grisanti L, Srivastava D, Muraro MJ, Jacob T, Sennett R, Wang Z, Su Y, Yang LM, Ma'ayan A, Ornitz DM, Kasper M, Rendl M. Dermal Condensate Niche Fate Specification Occurs Prior to Formation and Is Placode Progenitor Dependent. *Dev Cell.* 2019 Jan 7;48(1):32-48.e5.

[kasperlab.org](http://kasperlab.org)





## FREDRIK LANNER

Department of Clinical Science, Intervention and Technology, Division of Obstetrics and Gynecology, K57, Karolinska University Hospital and Ming Wai Lau Centre for Reporative Medicine, Stockholm node, Karolinska Institutet

### “Pluripotency, embryonic stem cells and regenerative medicine”

Dr Fredrik Lanner works to understand how the first cell types are specified and how pluripotency is controlled in the human embryo. Dr Lanner undertook his PhD thesis at the Karolinska Institutet, Sweden in 2008 followed by postdoctoral research in Janet Rossant's laboratory at The Hospital for Sick Children, Toronto, Canada. In Toronto, he studied the role of FGF signaling in the early mouse embryo and embryonic stem cells. Having returned to Karolinska Institutet, he started his independent research lab in 2013 with the aim of translating knowledge established in the mouse to the human embryo. The lab has so far established a transcriptional road map of lineage specification and identified a distinct X-chromosome dosage compensation process that operates in the human embryo and naïve stem cells (Petropoulos et al., Cell 2016). Through a proteomic approach the lab has undertaken a comprehensive screen identifying cell surface markers that distinguish naïve and primed pluripotent stem cells (Collier et al., Cell Stem Cell 2017). Currently the lab is mapping the second week of human development and identifying the transition from naïve to primed pluripotency in vivo. Furthermore the laboratory has establishing clinically compliant ES cells within the Karolinska Hospital GMP facility and works towards stem cell based treatment of age-related macular degeneration (Plaza-Reyes et al., Stem Cell Report 2016) and diabetes. Within this work the lab strives to find approaches to address rejection following allogeneic transplantations.

### Selected publications

Plaza Reyes A, Petrus-Reurer S, Antonsson L, Stenfelt S, Bartuma H, Panula S, Mader T, Douagi I, André H, Hovatta O, Lanner F, Kvanta A. Xeno-free and defined human embryonic stem cell-derived retinal pigment epithelial cells functionally integrate in a large-eyed preclinical model. *Stem Cell Reports*. 2016;6(1):9-17.

Petropoulos S, Edsgård D, Reinius B, Deng Q, Panula SP, Codeluppi S, Reyes AP, Linnarsson S, Sandberg R, Lanner F. Single-cell RNA-seq reveals lineage and X-chromosome dynamics in human preimplantation embryos. *Cell*. 2016;167(1):285.

Collier AJ, Panula SP, Schell JP, Chovanec P, Plaza Reyes A, Petropoulos S, Corcoran AE, Walker R, Douagi I, Lanner F, Rugg-Gunn PJ. Comprehensive Cell Surface Protein Profiling Identifies Specific Markers of Human Naive and Primed Pluripotent States. *Cell Stem Cell*. 2017;20(6):874-890.e7.

[ki.se/en/people/frelan](https://ki.se/en/people/frelan)



## ULRIKA MARKLUND

Department of Medical Biochemistry and Biophysics,  
Karolinska Institutet

### “Neuronal subtype specification in the developing enteric nervous system”

Dr Ulrika Marklund is an Associate Professor at the Department of Medical Biochemistry and Biophysics, Karolinska Institutet, Sweden. She obtained her PhD at Karolinska Institutet exploring neuronal identity acquisition in the developing CNS. As Postdoctoral Fellow at the National Institute for Medical Research in London, UK she initiated her work on the developing enteric nervous system of the gastrointestinal tract. Since starting her own lab in 2013 she has focused on identifying gene regulatory networks and signaling mechanisms that control diversification of enteric stem cells into the distinct enteric neuronal subtypes. Her research group also investigates the various physiological function of enteric neuron subtypes in the adult context. The ultimate goal is to recapitulate fate determination events in the purpose of disease modeling and cell-based therapy of gut neuropathies.

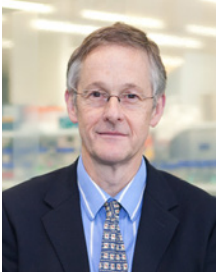
#### Selected publications

Zeisel A\*, Hochgerner H\*, Lönnerberg P, Johnsson A, Memic F, van der Zwan J, Häring M, Braun E, Borm L, La Manno G, Codeluppi S, Furlan A, Skene N, Harris KD, Hjerling-Leffler J, Arenas E, Ernfors P, Marklund U, & Linnarsson S. Molecular architecture of the mouse nervous system. *Cell* (IF: 31.398) 2018 Aug 9, 174(4):999-1014.

Memic F\*, Knoflach V\*, Morarach K, Sadler R, Laranjeira C, Hjerling-Leffler J, Sundström E, Pachnis V, Marklund U. Transcription and Signaling Regulators in Developing Neuronal Subtypes of Mouse and Human Enteric Nervous System. *Gastroenterology* (IF: 20.77) 2018 Jan 154:624-636.

Memic F, Knoflach V, Sadler R, Tegerstedt G, Sundström E, Guillemot F, Pachnis V and Marklund U. *Ascl1* is required for the development of specific neuronal subtypes in the enteric nervous system. *Journal of Neuroscience* (IF: 5.988) 2016 April 36 (15) 4339-50.

[ki.se/en/mbb/ulrika-marklund-group](http://ki.se/en/mbb/ulrika-marklund-group)



## CHARLES FFRENCH-CONSTANT

University of Edinburgh

### “Myelination and myelin repair in the CNS”

Professor Charles Ffrench-Constant is a clinician scientist who graduated with a MA in Physiology from the University of Cambridge, UK and an MB, BChir in Medicine from Middlesex Hospital, London in 1980. He gained a MRCP in Internal Medicine in 1984 following training at the Hammersmith / University College Hospitals in 1984 and received a PhD in Neuroscience from UCL in 1986. He worked as a Postdoctoral Fellow at MIT, Boston from 1987-1989 and in Zoology, Cambridge from 1989-1991, before being awarded a Junior Group Leader position in the Wellcome / CRC Institute at Cambridge from 1991-1996. He became a University Lecturer / Consultant at Addenbrookes Hospital, Cambridge in 1996, and was elected to the Chair of Neurological Genetics in 1999. He moved to the University of Edinburgh in 2007, becoming Director of the MRC Centre for Regenerative Medicine from 2010-2015 during which time he led both the successful 2013 Centre renewal application and in 2014 a £11M bid to the UK Research Partnership Investment Fund bid for a new building to create an adjacent Centre for Tissue Repair. His work, funded by Wellcome Trust fellowship, programme and Investigator awards over 25 years, explores developmental and regenerative biology to develop new treatments for diseases of the CNS. He chaired the Wellcome Trust Molecular and Cellular Neuroscience panel from 2013-2017 and co-chaired the 2016 Myelin Gordon Research Conference. He is currently the Dean of Research for the College of Medicine and Veterinary Medicine at the University of Edinburgh, and Director of the Wellcome 4yr PhD programme in Translational Neuroscience.

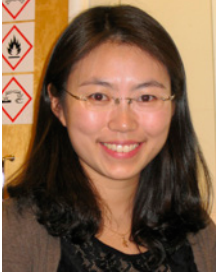
### Selected publications

Jäkel S, Agirre E, Mendanha Falcão A, van Bruggen D, Lee KW, Knuesel I, Malhotra D, Ffrench-Constant C, Williams A, Castelo-Branco G. Altered human oligodendrocyte heterogeneity in multiple sclerosis. *Nature*. 2019 Feb;566(7745):543-547.

Bechler ME, Byrne L, Ffrench-Constant C. CNS Myelin Sheath Lengths Are an Intrinsic Property of Oligodendrocytes. *Curr Biol*. 2015 Sep 21;25(18):2411-2416.

Miron VE, Boyd A, Zhao JW, Yuen TJ, Ruckh JM, Shadrach JL, van Wijngaarden P, Wagers AJ, Williams A, Franklin RJM, Ffrench-Constant C. M2 microglia and macrophages drive oligodendrocyte differentiation during CNS remyelination. *Nat Neurosci*. 2013 Sep;16(9):1211-1218.

[crm.ed.ac.uk/research/group/myelination-and-repair-cns](http://crm.ed.ac.uk/research/group/myelination-and-repair-cns)



## NING XU LANDÉN

Dermatology and Venereology Unit, Department of Medicine, Solna and Ming Wai Lau Centre for Reparative Medicine, Stockholm node, Karolinska Institutet

**“Targeting regulatory RNAs in skin wounds: a new opportunity of healing?”**

Dr Ning Xu Landén received her Bachelor in Medicine from Peking University, China in 2003 and PhD in Medical virology from Uppsala University, Sweden in 2008. She worked as a Postdoctoral Fellow in Prof Mona Ståhle’s group at Karolinska Institutet, Sweden from 2009-2013. She started her own research group focusing on skin wound healing in 2014 and is entitled as Associate Professor at Department of Medicine, Karolinska Institutet since 2017.

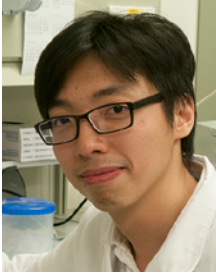
### Selected publications

Herter EK, Li D, Toma MA, Vij M, Li X, Visscher D, Wang A, Chu T, Sommar P, Blomqvist L, Berglund D, Ståhle M, Wikstrom JD, Xu Landén N#. WAKMAR2, A Long Noncoding RNA Downregulated in Human Chronic Wounds, Modulates Keratinocyte Motility and Production of Inflammatory Chemokines, *J Invest Dermatol*. 2018. (#corresponding author)

Li X\*, Li D\*, Wang A, Chu T, Lohcharoenkal W, Zheng X, Grünler J, Narayanan S, Eliasson S, Herter E, Wang Y, Ma Y, Ehrström M, Eidsmo L, Pivarcsi A, Sonkoly E, Catrina S, Ståhle M, Xu Landén N#. MicroRNA-132 with therapeutic potential in chronic wounds. *J Invest Dermatol*. 2017 PMID: 28807666. (\*Equal contribution, #corresponding author)

Li, D.\*, Wang, A.\*, Liu, X., Meisgen, F., Grunler, J., Botusan, I.R., Narayanan, S., Erikci, E., Li, X., Blomqvist, L., Du, L., Pivarcsi, A., Sonkoly, E., Chowdhury, K., Catrina, S., Ståhle, M., Landén, N.X.#. (2015) MicroRNA-132 enhances transition from inflammation to proliferation during wound healing. *Journal of Clinical Investigation* 2015 PMID: 26121747. (\*Equal contribution, #corresponding author)

xulandenlab.com



## ALAN WONG

School of Biomedical Sciences, Department of Electrical and Electronic Engineering, The University of Hong Kong and Associate Member at Ming Wai Lau Centre for Reparative Medicine, Karolinska Institutet

### **"Combinatorial genetics technology for cell engineering"**

Dr Alan Siu-lun Wong is an Assistant Professor of the School of Biomedical Sciences at the University of Hong Kong (HKU). He is also jointly appointed at the Department of Electrical and Electronic Engineering of HKU. Before he joined HKU, he obtained his BSc and MPhil degrees in Biochemistry and Molecular Biotechnology from the Chinese University of Hong Kong in 2005 and 2007 respectively, and completed his PhD in Biochemistry at the Hong Kong University of Science and Technology in 2011. He joined the Synthetic Biology Group at Massachusetts Institute of Technology from 2012-2016 for postdoctoral training. Dr Wong was awarded with the Croucher Foundation Studentship (2008), the Butterfield-Croucher Award (2008), the Croucher Foundation Fellowship (2012), the Hong Kong Institution of Science Young Scientist Award in life science (2011), and the RGC Early Career Award (2016). Dr Wong's current research focuses on developing and applying cutting-edge technologies for studying complex disease biology and devise new therapeutic strategies. His research takes an integrative approach leveraging on various techniques in synthetic biology, CRISPR-based genome engineering, high-throughput sequencing, molecular biology, and genetics to decode the complex genetic bases of human diseases, as well as rationally design and engineer genetic circuits for providing new biomedical and biotechnological solutions.

### **Selected publications**

Wong, S.L.A., Choi, C.G.G., Lu, T.K. Deciphering combinatorial genetics. *Annual Review of Genetics* 50, 515-538 (2016).

Wong, S.L.A.\*, Choi, C.G.G.\*, Cui, C.H.\*, Pregernig, G., Milani, P., Adam, M., Perli, S.D., Kazer, S.W., Gaillard, A., Hermann, M., Shalek, A.K., Fraenkel, E., Lu, T.K. Multiplexed barcoded CRISPR-Cas9 screening enabled by CombiGEM. *Proceedings of National Academy of Sciences* 113(9), 2544-2549 (2016) (\*Equal contributions).

Wong, S.L.A., Choi, C.G.G., Cheng, A.A., Purcell, O., Lu, T.K. Massively parallel high-order combinatorial genetics in human cells. *Nature Biotechnology* 33(9), 952-961 (2015).

[sbms.hku.hk/staff/alan-siu-lun-wong](http://sbms.hku.hk/staff/alan-siu-lun-wong)



## ANNA FALK

Department of Neuroscience, Karolinska Institutet

### “Using reprogramming to model diseases of the human brain”

Dr Anna Falk, Associate Professor at the Department of Neuroscience, Karolinska Institutet, Sweden has a research group of PhD students and Postdocs. In addition she is the Scientific director of the iPS Core facility at Karolinska Institutet, with one facility manager and two research assistants. Dr Falk has long experience in the field of stem cells in general and neural stem cells in specific, all through her career as PhD student, Postdoc at Cambridge University and now for the last six years as an independent group leader. The Falk lab is deriving patient-specific iPS cells as a starting material for building cellular models in 2D and 3D (organoids) of the human neural system. The development of protocols for deriving authentic and relevant cell types for studies of a particular disease is the first very important step for a faithful model. The Falk lab has developed cellular models for a variety of neurodevelopmental and psychiatric disorders, like autism, Lissencephaly, Schizophrenia, intellectual disabilities and have successfully used them to uncover previously unknown mechanisms causing disease phenotypes, as example see Uhlin et al 2017, Shahsavani et al 2017, Lundin et al 2018.

#### Selected publications

Lundin A, Delsing L, Clausen M, Ricchiuto P, Sanchez J, Sabirsh A, Ding M, Synnergren J, Zetterberg H, Brolén G, Hicks R, Herland A, Falk A. Human iPS-Derived Astroglia from a Stable Neural Precursor State Show Improved Functionality Compared with Conventional Astrocytic Models. *Stem Cell Reports*. 2018 Mar 13;10(3):1030-1045.

Shahsavani M, Pronk RJ, Falk R, Lam M, Moslem M, Linker SB, Salma J, Day K, Schuster J, Anderlid BM, Dahl N, Gage FH, Falk A. An in vitro model of lissencephaly: expanding the role of DCX during neurogenesis. *Mol Psychiatry*. 2017 Sep 19.

Uhlin E, Rönnholm H, Day K, Kele M, Tammimies K, Bölte S, Falk A. Derivation of human iPS cell lines from monozygotic twins in defined and xeno free conditions. *Stem Cell Res*. 2017 Jan;18:22-25.

[ki.se/en/neuro/falk-laboratory](http://ki.se/en/neuro/falk-laboratory)



## ANA TEIXEIRA

Division of Biomaterials, Department of Medical Biochemistry and Biophysics, Karolinska Institutet

### “Spatial signaling at the cell membrane”

Dr Ana Teixeira received a PhD in Chemical and Biological Engineering in 2003 from the University of Wisconsin-Madison, USA. After postdoctoral studies at Karolinska Institutet, Sweden, she became an Assistant Professor at the Department of Neuroscience in 2009 and at the Department of Cell and Molecular Biology from 2010 to 2014. From 2015, she has been Senior Researcher at the Department of Medical Biochemistry and Biophysics. Dr Ana Teixeira's research group investigates the roles of spatial organization in biological systems by combining biophysics, nanotechnology and cell biology. She has been awarded a European Research Council Consolidator Grant (ERC CoG) and a Human Frontier Science Program (HFSP) Young Investigator Grant (international collaboration grant).

### Selected publications

Hoffecker, I., Chen, S., Gådin, A., Bosco, A., Teixeira, A.I., and Högberg, B. Solution-controlled conformational switching of an anchored wireframe DNA nanostructure. *Small*. 2018; 15(1):1803628.

Mills, R., Taylor-Weiner, H., Correia, J.C., Agudelo, L.Z., Allodi, I., Kolonelou, C., Martinez-Redondo, V., Ferreira, D.M.S., Nichterwitz, S., Comley, L.H., Lundin, V., Hedlund, E., Ruas, J.L., and Teixeira, A.I. Neurturin is a PGC-1alpha1 controlled myokine that promotes motor neuron recruitment and neuromuscular junction formation. *Molecular Metabolism*. 2018; 7:12-22.

Shaw, A.\*, Lundin, V.\*, Petrova, K., Fordos, F., Benson, E., Al-Amin, A., Herland, A., Blokzijl, A., Hogberg, B.#, and Teixeira, A.I.# Spatial control of membrane receptor function using ligand nano-callipers. *Nature Methods*. 2014; 11(8):841-846. (\*Equal contribution, #corresponding authors)

[ki.se/en/mbb/ana-teixeira-group](http://ki.se/en/mbb/ana-teixeira-group)



## LINXIAN LI

Ming Wai Lau Centre for Reparative Medicine,  
Hong Kong node, Karolinska Institutet

### **“Engineering advanced biomaterials: from microarray fabrication to mRNA delivery”**

Dr Linxian Li is a biomedical engineer with interdisciplinary expertise in organic chemistry, materials science, and biomedical engineering. After obtaining his PhD degree at Heidelberg University, Germany, he pursued postdoctoral research with Prof Robert S. Langer at Massachusetts Institute of Technology, USA. Committed to translate new materials for medical use, he focuses on developing biomaterials to deliver RNA therapeutics and engineering biointerfaces to control cell fate. His work has resulted in over 20 publications including papers, patents and patent applications. These patents have been licensed to chemical and biotechnology companies, and several products that have been commercialized. Dr Li is named to the list of Innovators Under 35 China 2017 by MIT Technology Review.

### **Selected publications**

Xin Du, Junsheng Li, Alexander Welle, Linxian Li#, Wenqian Feng, Pavel A. Levkin#. Reversible and rewritable surface functionalization and patterning via photodynamic disulfide Exchange. *Advanced Materials*. 2015, 27:4997-5001. (#Co-corresponding authors)

Wenqian Feng\*, Linxian Li\*, Chengwu Yang, Alexander Welle, Oliver Trapp, Pavel A. Levkin. UV-induced tetrazole-thiol reaction for polymer conjugation and surface functionalization. *Angewandte Chemie International Edition*. 2015, 54: 8732-8735. (\*Equal contribution)

Linxian Li\*, Junsheng Li\*, Xin Du, Alexander Welle, Michael Grunze, Oliver Trapp, Pavel A. Levkin. Direct UV-induced functionalization of surface hydroxyl groups by thiol-ol chemistry. *Angewandte Chemie International Edition*. 2014, 53:3835-3839. (\*Equal contribution)

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## MIKAEL SVENSSON

Department of Clinical Neuroscience and Neurosurgery,  
Karolinska Institutet and Karolinska University Hospital

### “Clinical translation of a regeneration strategy for spinal cord injury”

Dr Mikael Svensson is Professor of Neurosurgery at Karolinska Institutet and Karolinska University Hospital, Sweden holding the Herbert Olivecrona chair. He has expertise in neurovascular, skull base and spine procedures and has performed more than 3000 brain and spine surgeries. From 2000 to 2005 he was in charge of the spine program at Karolinska. Between 2009 to 2017 he was the head of the cerebrovascular program and has international renowned expertise in intracerebral aneurysm and AVM surgery. He served as the Chairman of the department of neurosurgery between 2006 to 2011 and between 2017 to 2019. His top priority is to provide safe microsurgery, in a team-based and compassionate approach to patient care.

#### Selected publications

Hakim, R., R. Covacu, V. Zachariadis, A. Frostell, S. Sankavaram, M. Svensson, and L. Brundin, Syngeneic, in contrast to allogeneic, mesenchymal stem cells have superior therapeutic potential following spinal cord injury. *J Neuroimmunol*, 2019. 328: 5-19.

Frostell, A., P. Mattsson, and M. Svensson, Guiding Device for Precision Grafting of Peripheral Nerves in Complete Thoracic Spinal Cord Injury: Design and Sizing for Clinical Trial. *Front Neurol*, 2018. 9: 356.

Frostell, A., P. Mattsson, J.K. Persson, B. Hedman, J. Nordblom, A. Lindenryd, K. Trok, L. Brundin, and M. Svensson, Neurophysiological evaluation of segmental motor neuron function of the thoracic cord in chronic SCI. *Spinal Cord*, 2012. 50(4): 315-319

[ki.se/en/cns/mikael-a-svenssons-research-group](https://ki.se/en/cns/mikael-a-svenssons-research-group)



## RONALD LI

Ming Wai Lau Centre for Reparative Medicine,  
Hong Kong node, Karolinska Institutet

### **“Engineering human heart chambers and tissues for disease modelling and drug discovery”**

Professor Ronald Li is the Director of Ming Wai Lau Centre for Reparative Medicine, Karolinska Institutet (KI), Hong Kong, with a professorial cross appointment at Dr Li Dak-Sum Research Centre, The University of Hong Kong. Prof Li is also the CEO and Founder of Novoheart, an academic stem cell biotech spin-out that focuses on cardiac tissue engineering for drug discovery and regenerative therapies. Prof Li holds a PhD in Cardiology / Physiology at the University of Toronto, Canada. He joined Johns Hopkins University School of Medicine in 1998 for postdoctoral training, and later promoted to Assistant Professor of Cardiology, and Assistant Professor of Cellular & Molecular Medicine. Prof Li was recruited as Associate Professor at the University of California, Davis in 2006 where he founded the Human Embryonic Stem Cell Consortium. He later joined the Cardiovascular Research Center of Icahn School of Medicine at Mount Sinai as Professor and Co-Director of the Section of Cardiovascular Cell & Tissue Engineering. During 2010-2015, Prof Li was the Founding Director of the Stem Cell & Regenerative Medicine Consortium and S Y and H Y Cheng Endowed Professor in Stem Cell Biology and Regenerative Medicine of The University of Hong Kong. With over 150 publications, Prof Li's group focuses on human heart engineering, and was the first in the world to generate genetically engineered human heart cells and, more recently, to construct the first human stem cell-based “mini-heart”. Prof Li serves as a panel member or reviewer of major funding bodies such as the NIH, AHA, Association Française contre les Myopathies, United States-Israel Binational Science Foundation, Research Grants Council (Hong Kong), Stem Cell Consortium, A\*STAR / Biopolis (Singapore), Wellcome Trust and MRC (UK), etc. On the translational and entrepreneurial end, his inventions have led to several start-ups in the United States and Hong Kong.

### **Selected publications**

Li, R.A., Keung, W., Cashman, T.J., Backeris, P.C., Johnson, B., Bardot, E.S., Wong, A.O., Chan, P.K., Chan, C.W. and Costa K.D. 2018. Bioengineering an electro-mechanically functional miniature ventricular heart chamber from human pluripotent stem cells. *Biomaterials*. 163:116-127.

Lee, E.K., Tran, D.D., Keung, W., Chan, P.K., Wong, G.K., Chan, C.W., Costa, K.D., Li, R.A., Khine, M. 2017. Machine learning of human pluripotent stem cell-derived engineered cardiac tissue contractility for automated drug classification. *Stem Cell Rep.* 9(5):1560-1572.

Shum AM, Che H, Wong AO, Zhang C, Wu H, Chan CW, Costa K, Khine M, Kong CW, Li RA. A Micropatterned Human Pluripotent Stem Cell-Based Ventricular Cardiac Anisotropic Sheet for Visualizing Drug-Induced Arrhythmogenicity. *Adv Mater.* 2017 Jan;29(1).

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## CLOSING SPEAKER

# EERO CASTRÉN

Neuroscience Center / HiLIFE, University of Helsinki, Finland, and Chair of MWLC Scientific Advisory Board

Professor Eero Castrén is currently Academy Professor at the Neuroscience Center, University of Helsinki, Finland.

Prof Castrén received MD and PhD degrees in Finland and has been working at the National Institute of Mental Health, Bethesda, USA, Max Planck Institute for Psychiatry, Martinsried, Germany and Department of Neuroscience and Psychiatry, Columbia University, New York, USA and Universities of Kuopio and Helsinki in Finland.

Prof Castrén's research has focused on the effects of neurotrophic factors, particularly the brain-derived neurotrophic factor BDNF and its receptor on the adult brain and their role in neuronal plasticity and in the mechanism of action of drugs acting on the central nervous system. His research has revealed a critical role of experience-dependent neuronal plasticity in the mechanism of antidepressant drug action.

Prof Castrén was a Director of Neuroscience Center in 2013-2017 and held an ERC Advanced Grant in 2013-2018. He is currently Secretary General of the Federation of European Neuroscience Societies (FENS).

[tuhat.helsinki.fi/portal/en/person/ehcastre](http://tuhat.helsinki.fi/portal/en/person/ehcastre)



SESSION CHAIR

## SIMON ELSÄSSER

Department of Medical Biochemistry and Biophysics and Ming Wai Lau Centre for Reparative Medicine, Stockholm node, Karolinska Institutet

Dr Simon Elsässer is an Associate Professor at the Department of Medical Biochemistry and Biophysics, Karolinska Institutet, Sweden. He received his doctoral degree from The Rockefeller University in New York, USA and has been a junior research fellow at Cambridge University/MRC Laboratory of Molecular Biology, UK before joining Karolinska Institutet. His research focuses on the molecular underpinnings of stem cell pluripotency, on the epigenetic and proteome level. He uses synthetic biology approaches to engineer proteins and control cellular processes.

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SESSION CHAIR

## GONÇALO CASTELO-BRANCO

Department of Medical Biochemistry and Biophysics and Ming Wai Lau Centre for Reparative Medicine, Stockholm node, Karolinska Institutet

Dr Gonçalo Castelo-Branco is an Associate Professor of Neurobiology at the Department of Medical Biochemistry and Biophysics, Karolinska Institutet, Sweden. His research group is interested in the molecular mechanisms defining the transcriptomic and epigenomic states of oligodendrocyte lineage cells in development and disease, at a population and single-cell level. His group is particularly focused on how interplay between transcription factors, non-coding RNAs and chromatin modifying enzymes contributes to the transition between epigenetic states in oligodendrocytes, with the aim to design epigenetic based-therapies to induce regeneration (remyelination) in demyelinating diseases, such as multiple sclerosis.

[ki.se/en/mbb/goncalo-castelo-branco-group](https://ki.se/en/mbb/goncalo-castelo-branco-group)



SESSION CHAIR

## FRANCOIS LALLEMEND

Department of Neuroscience and Ming Wai Lau  
Centre for Reparative Medicine, Stockholm node,  
Karolinska Institutet

Dr Francois Lallemand is an Associate Professor at the Department of Neuroscience, Karolinska Institutet, Sweden. His research group is interested in understanding the molecular principles underlying the neuronal specification and neural circuit formation in the peripheral nervous system. His group particularly focuses on the integration of sensory neurons into functional circuits involved in the control of motor behavior and in hearing process. Research in his lab concentrates both on early development aspects and circuit mapping and function in adult.

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SESSION CHAIR

## JENS HJERLING-LEFFLER

Department of Medical Biochemistry and Biophysics,  
Karolinska Institutet

Dr Jens Hjerling-Leffler is a group leader at the Department of Medical Biochemistry and Biophysics, Karolinska Institutet, Sweden. His group's research is focused on how functional neuronal identity is regulated during postnatal and adolescent brain maturation and different brain states from a molecular and network point of view. The laboratory applies methods such as advanced mouse genetics, human genetics, single-cell transcriptomics and electrophysiology to analyse the role of distinct neuronal cell classes as well as to increase understanding of genetically complex disorders and traits including Schizophrenia.

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SESSION CHAIR

## LARS JAKOBSSON

Department of Medical Biochemistry and Biophysics,  
Karolinska Institutet

Dr Lars Jakobsson is an Associate Professor of vascular biology at the Department of Medical Biochemistry and Biophysics (MBB), Karolinska Institutet (KI), Sweden. He acquired his PhD in molecular medicine in the lab of Lena Claesson-Welsh at Uppsala University, Sweden, in 2007. He then joined the lab of Holger Gerhardt at London Research Institute - Cancer Research UK, as a Postdoctoral EMBO Fellow. In 2010 he moved to KI and the lab of Christer Betsholtz, and shortly thereafter acquired a position as Assistant Professor, supported by the William K. Bowes Jr. Foundation and KI. Since 2011 his research group has been active within the division of vascular biology at MBB. In 2017 Dr Jakobsson was appointed Associate Professor at MBB, KI, where he is group leader and teacher in medical school. He has made important contributions to the understanding of blood vessel formation (angiogenesis) with discoveries of regulatory functions of extracellular matrix – growth factor interactions, characterisation of endothelial cell behaviour in sprouting angiogenesis and the impact of differential gene expression thereon. His recent work sheds new light on mechanisms of vascular malformation, with respect to cell signalling and shear stress-instructed cell behaviour, that provide an avenue for improved therapy of human disease. In addition, the Jakobsson lab has described mechanisms and functional relevance of smooth muscle cell recruitment to the lymphatic vasculature. His work has direct implication on vascular-related diseases such as cancer, stroke, diabetes complications and vascular anomalies.

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SESSION CHAIR

## SIJIE CHEN

Ming Wai Lau Centre for Reparative Medicine,  
Hong Kong node, Karolinska Institutet

Dr Sijie Chen is an Assistant Professor at Ming Wai Lau Centre for Reparative Medicine, Karolinska Institutet, Hong Kong since 2017. She obtained her PhD from Hong Kong University of Science and Technology, HK in 2013. She received the Endeavour fellowship and worked as an Endeavour Fellow in University of Melbourne, Australia and a visiting scientist in Walter and Eliza Hall Institute of Medical Research (WEHI), Australia in 2015. Thereafter, she joined Karolinska Institutet in Sweden as a Postdoctoral Fellow. Her current research interests focus on the development of new luminescent materials and techniques for biological research.

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SESSION CHAIR

## CHRISTIAN GÖRITZ

Department of Cell and Molecular Biology and  
Ming Wai Lau Centre for Reparative Medicine,  
Stockholm node, Karolinska Institutet

Dr Christian Göritz is an Associate Professor heading a research team at the Department of Cell and Molecular Biology at Karolinska Institutet, Sweden. He is also a member of the Ming Wai Lau Centre for Reparative Medicine, where he is serving as Fellow Coordinator. Christian Göritz studied Biochemistry at the Free University of Berlin, Germany. He performed his PhD studies in Strasbourg, France, in a joint Max Planck / CNRS research environment in the field of Neuroscience. For his postdoctoral training, he joined the lab of Prof Jonas Frisén at the Karolinska Institutet, Sweden. With his research group, Dr Göritz investigates the mechanisms that mediate scarring and repair of the central nervous system. He discovered a new type of cells that are associated with blood vessels, named type A pericytes. These cells are the main source of fibrotic scar tissue after spinal cord injury. By comparing several different models of injury and disease, the Göritz team is intending to uncover common mechanisms of scarring and fibrosis with the goal to identify new targets for the treatment of central nervous system lesions. He has been awarded with an ERC starting grant and a Wallenberg Academy and Hållsten Academy fellowship.

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## Scientific Organisers

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Gonçalo Castelo-Branco  
Christian Göritz  
Sandra Ceccatelli

## Ming Wai Lau Centre for Reparative Medicine

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Ming Wai Lau Centre for Reparative Medicine (MWLC) was inaugurated in October 2016 in Hong Kong and became operational during spring 2017. It is Karolinska Institutet's first overseas establishment, with two nodes operating in parallel in Hong Kong and Stockholm. The Hong Kong node is located in Hong Kong Science Park with a team of around 35 members under four Principal Investigators. The Stockholm node consists of six scientific teams led by Lau Fellows who are recipients of the Lau grant. MWLC also has eight associate members from several universities in Hong Kong.

MWLC's vision is to advance knowledge about life and strive towards better health for all by conducting cutting-edge research in reparative medicine and related subjects with a focus on the nervous system, heart and skin. A key component of MWLC's research is related to the development of front-line technologies applicable to imaging and tracing, drug delivery and tissue engineering, to be used in various domains of reparative medicine.

[ki.se/mwlc](http://ki.se/mwlc)

*Cover photo taken by Haohao Wu, Lallemand lab, Karolinska Institutet.*

Ming Wai Lau Centre  
for Reparative Medicine  
劉鳴煒復修醫學中心



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