



# Scientific Program

17-21 September 2017  
Merton College  
Oxford, UK

18:00 **Welcome reception:** *The Chestnut Lawn, Merton College*

Monday, September 18<sup>th</sup>, 2017

8:30 **Plenary 1: Modelling lung structure-function interactions over the lifespan**  
**Merryn Tawhai (University of Auckland, New Zealand)**  
*Chair: Peter Robbins*

9:30 *Morning Coffee*

**Session 1: Rhythm and pattern generation I**

*Chair: Christopher Del Negro*

10:00 Shedding new light on respiratory rhythm generation with optogenetics; *Jeffrey C. Smith*

10:30 The triple oscillator hypothesis for the generation of breathing; *Jan-Marino Ramirez*

11:00 Cellular and molecular dissection of the preBötzinger complex; *Kevin Yackle*

11:25 The role of inhibitory microcircuits in respiratory rhythm and pattern generation; *Kaiwen Kam*

11:50 Molecular mechanisms of respiratory rhythm and pattern generation: role of sodium and mixed cationic channels; *John A. Hayes*

12:30 **Lunch Break**

**Session 2: Development**

*Chairs: Gilles Fortin and Muriel Thoby-Brisson*

13:30 Breathing and somato-visceral duality; *Jean-François Brunet*

13:55 A V0 core circuit for inspiration; *Gilles Fortin*

14:20 Genetic specification of left-right asymmetry in the diaphragm muscles and their motor innervation; *Valérie Castellani*

14:45 Genetic identification of the essential brain center for vocalization; *Carmen Birchmeier*

15:15 *Afternoon Tea*

**Session 3: Rhythm and pattern generation II**

*Chair: Jack Feldman*

15:45 Seeking the neural origins of respiratory rhythm: pacemakers, group pacemakers, and emergent network properties; *Christopher Del Negro*

16:10 State dependent modulation of expiratory activity; *Sylvia Pagliardini*

16:35 Respiratory modulation of astrocytes in the ventrolateral medulla; *Yasumasa Okada*

17:00 **Poster session I and drinks**

19:30 **Dinner**

8:30 **Plenary 2: Sensing of hypoxia in animal cells**

**Sir Peter Ratcliffe (University of Oxford, UK)**

*Chair: David Paterson*

9:30 *Morning Coffee*

**Session 4: Oxygen sensing I**

*Chair: Richard Wilson*

10:00 Cellular and systemic sensing of metabolism by the carotid body; *Prem Kumar*

10:25 Oxygen regulation of breathing through an olfactory receptor activated by lactate; *Andy Chang*

10:50 Carotid body oxygen sensing; *Keith Buckler*

11:15 Acute oxygen sensing by arterial chemoreceptors; *Jose Lopez-Barneo*

11:40 Regulation of breathing and oxygen supply by AMPK; *Mark Evans*

12:30 **Lunch Break**

**Session 5: Oxygen sensing II**

*Chair: Yasumasa Okada*

13:30 Brainstem glia and oxygen sensing; *Greg Funk*

13:55 Spinal oxygen sensors; *Richard Wilson*

14:20 Central sympathetic oxygen sensitivity; *Nephtali Marina*

14:45 Microglia, oxygen sensing and the gasp; *Fernando Peña-Ortega*

15:10 *Afternoon Tea*

**Session 6: Pons and Medulla**

*Chair: Mathias Dutschmann*

15:25 Cluster analysis of breathing modulated neuronal discharge patterns suggests distinct classes and facilitates dynamic visualizations; *Kendall Morris*

15:50 The Kölliker-Fuse nucleus is critically involved in the adaptation and coordination of breathing during orofacial behaviour; *Mathias Dutschmann*

16:15 Neurons in a subregion of the pontine medial parabrachial nucleus play a key role in the control of breathing frequency; *Edward Zuperku*

16:40 Medullary mechanisms controlling respiratory frequency; *Nathan Baertsch*

17:00 **Poster session II and drinks**

19:30 **Dinner**

8:30 **Plenary 3: Breathing comes of age**

**Jack Feldman (UCLA, USA)**

*Chair: Greg Funk*

9:30 *Morning Coffee*

**Session 7: Modelling of the respiratory networks and the lungs**

*Chairs: Jonathan Rubin and Ilya Rybak*

10:00 The role of inhibitory interactions in the brainstem respiratory circuits: insights from optogenetic studies and computational modelling; *Ilya Rybak*

10:25 Reduced modeling studies of respiratory neural dynamics; *Jonathan Rubin*

10:50 TRP channels and intracellular calcium dynamics in the pre-Bötzinger complex; *Yaroslav Molkov*

11:15 Chemoreceptor tuning of the brainstem respiratory network: Reticular loops and chains revisited; *Bruce Lindsey*

11:40 Swallow computationally modeled as a tri-level oscillator predicts interactions with breathing; *Teresa Pitts*

12:05 A model of lung inhomogeneity identifiable from gas exchange measurements at the mouth; *Peter Robbins*

12:30 **Lunch Break**

**Session 8: Central Chemoreception**

*Chair: Robert Huckstepp*

13:30 Serotonergic neuronal subtypes in the control of breathing dynamics; *Susan Dymecki*

13:55 Interactions between 5-HT neurons and retrotrapezoid neurons in central CO<sub>2</sub> chemoreception; *George Richerson*

14:20 Characterization of the retrotrapezoid nucleus by mRNA expression; *Ruth Stornetta*

14:45 Purinergic signaling in the retrotrapezoid nucleus provides specialized control of vascular tone to support the drive to breathe; *Daniel Mulkey*

15:10 Breathing control in REM sleep by central respiratory chemoreceptors; *Peter Burke*

15:30 *Afternoon Tea*

**Session 9: Breathing with neuromuscular disease: consequences and compensation**

*Chairs: Gordon Mitchell and Tracy Baker*

16:00 Respiratory control in the mdx mouse model of Duchenne muscular dystrophy; *Ken O'Halloran*

16:25 Functional recovery of breathing capacity after cervical spinal injury; *David Fuller*

16:50 Degeneration of circuits controlling accessory respiratory muscles in ALS; *Steve Crone*

17:15 Does inactivity induced respiratory motor facilitation compensate for central sleep apnea?; *Tracy Baker*

17:40 Compensatory respiratory plasticity with respiratory motor neuron death; *Gordon Mitchell*

19:30 **Conference Dinner with after dinner talks**

8:30 **Plenary 4: Intermittent Hypoxia-Induced Respiratory Motor Plasticity: Mechanisms and Applications**

**Gordon S. Mitchell (University of Florida, USA)**

*Chair: Silvia Pagliardini*

9:30 *Morning coffee*

**Session 10: Control of cerebral blood flow: Implications for respiration in health and disease**

*Chairs: Marc Poulin*

10:00 Introduction; *Marc Poulin*

10:15 Modelling of time-varying and regional cerebrovascular control mechanisms; *Georgios Mitsis*

10:45 Cerebral blood flow responses to inspiratory resistance breathing during hemorrhage'; *Caroline Rickards*

11:15 Brain mechanisms of breathlessness perception; *Kyle Pattinson*

11:45 Cerebral perturbations associated with high altitude exposure; *Samuel Verges*

12:30 **Lunch Break**

**Session 11: Systemic inflammation and the control of breathing**

*Chairs: Jyoti Watters and Paul Pilowsky*

13:30 Epigenetic re-programming of microglial inflammatory responses by chronic intermittent hypoxia; *Jyoti Watters*

13:55 Inflammation underlies ventilatory acclimatization to chronic sustained hypoxia; *Frank Powell*

14:20 Microglia and cardiorespiratory regulation; *Paul Pilowsky*

14:45 Impact of systemic inflammation on phrenic motor plasticity; *Arash Tadjalli*

15:10 IL-1 and cardiorespiratory control; *Thomas Dick*

15:35 *Afternoon tea and farewell*

- P01 Specific Removal of Connexin 26 CO<sub>2</sub> Sensitivity in Glia at the Ventral Medullary Surface and its Effect on Respiratory Chemoreception**  
Joseph Henry Pieter van de Wiel and Nicholas Dale
- P02 Evaluating the role of Atoh1-dependent brainstem neurons in respiratory control and neonatal survival**  
Meike E van der Heijden, Huda Y Zoghbi
- P03 Breathing at birth without KCC2a.**  
Muriel Thoby-Brisson, Marika Markkanen, Matti Airaksinen, Pavel Uvarov, John Simmers
- P04 Recruitment of cardiac vagal tone in a short delay during cognitive processes**  
Nozomu H. Nakamura, Masaki Fukunaga, Yoshitaka Oku
- P05 Cardiorespiratory Coupling is Conditionally Expressed in the In Situ Rodent Preparation**  
David Mark Baekey
- P06 Coordination of the respiratory motor pattern by the Kölliker-Fuse nuclei**  
Rishi Raj Dhingra, Thomas E. Dick, Stephen J. Lewis, Kostya Borovkov, Roberto F Galan, Mathias Dutschmann
- P07 General pattern of activation sequence among excitatory/inhibitory inspiratory neurons during rhythmic burst in the pre-Bötzinger complex of the mice medulla slice**  
Yoshihiko Oke, Fumikazu Miwakeich, Yoshitaka Oku, Stefanie Besser, Johannes Hirrlinger, Swen Hülsmann
- P08 Unilateral excitation of neurons in the preBotzinger complex does not alter cough phase durations in the anesthetized cat**  
Tabitha Y Shen, Ivan Poliacek, Zuzana Kotmanova, M. Nick Musselwhite, Melanie J Rose, Donald C Bolser
- P09 Codeine acts in the solitary tract nucleus to suppress cough in cats**  
Ivan Poliacek, Michal Simera, Marcel Veternik, Zuzana Kotmanova, Donald C Bolser, Jan Jakus
- P10 GABA-ergic neurotransmission in the solitary tract nucleus reduces cough in cat**  
Zuzana Kotmanova, Michal Simera, Marcel Veternik, Donald C. Bolser, Tabitha Y. Shen, Nick M. Musselwhite, Jan Jakus, Ivan Poliacek
- P11 Respiration-coupled rhythmic activity in the hypothalamus detected in the diencephalon-lower brainstem-spinal cord preparation**  
Isato Fukushi, Yosuke Kono, Shigefumi Yokota, Shuntaro Okazaki, Kotaro Takeda, Hiroshi Onimaru, Yasumasa Okada
- P12 Mafa phosphorylations controls Gad2 transcription and prevents life-threatening neonatal apneas**  
Laure Lecoïn, Alexandra Garancher, Marie-Pierre Morin-Surun, Nathalie Rocques, Pierre-Louis Ruffault, Gilles Fortin, Alain Eychene, Jean Champagnat, Celio Pouponnot

- P13 Transcriptome of neonatal preBötzing complex neurons in Dbx1 reporter mice**  
Maria Cristina D Picardo, John A Hayes, Andrew Kottick, Andrew D Halleran, Ronald D Smith, Gregory D Smith, Margaret S Saha, Christopher A Del Negro
- P14 Regulators of G-protein-signalling regulate  $\mu$ -opioid receptor-related inhibition of rhythmic breathing**  
Jamil Danaf, Hattie Liu, Gaspard Montandon, Richard Horner
- P15 Understanding the central mechanisms of neonatal apneas and breathing failure in an animal model of maternal inflammation.**  
Sanja Carina Ramirez, Jenna E. Koschnitzky, Nathan A. Baertsch, Charles V. Smith, Jan-Marino Ramirez
- P16 Blowing oscillators out of the water: Buccal ventilation in the Bullfrog**  
Mufaddal I. Baghdadwala, Richard J. A. Wilson
- P17 Projection of Phrenic Nerve Afferents to the External Cuneate Nucleus (ECN) and Area Postrema (AP) of the Rat.**  
Sabrina Chehab, Sara M.F. Turner, Jayakrishnan Nair, David D. Fuller, Paul W. Davenport
- P18 Optogenetic manipulation of preBötzing complex astrocytes modulates activity of inspiratory rhythm-generation circuits**  
Shahriar SheikhBahaei, Hidehiko Koizumi, Alexander V. Gourine, Jeffrey Smith
- P19 Effects of NLX-101, a 5-HT1A hetero-receptor biased agonist, on respiratory drive and sympatho respiratory coupling in in situ preparations of juvenile rats**  
Lucas A. E. Koolen, Ian Charles, Elizabeth Treadwell, Julian F. Paton, Daniel Zoccal, Ana P. Abdala
- P20 Non-invasive method of measuring sympathetic activity and autoregulatory responses of blood vessels to respiratory challenges in human**  
Nicholas Jendzjowsky, Craig Steinback, Robert Herman, Willis Tsai, Fiona Costello, Richard Wilson
- P21 Role of parafacial respiratory group in ventilation across sleep states**  
Annette Pisanski, Nils Koch, Xiu Ding, Silvia Pagliardini
- P22 Retinoic acid receptor alpha is required for retinoic acid dependent phrenic motor facilitation**  
Kendra M Braegelmann, Abiye Agbeh, Tracy L Baker
- P23 An ascending excitatory drive from spinal locomotor circuits modulates respiratory frequency through the Retrotrapezoid Nucleus (RTN)**  
Coralie Herent, Severine Diem, Gilles Fortin, Julien Bouvier
- P24 The generation of the sigh: A glia-driven respiratory rhythm**  
Tatiana Dashevskiy, Jacob Bloom and Jan-Marino Ramirez
- P25 Glia, bombesin and the sigh**  
Patrick S. Hosford, Egor Turovsky, Shahriar Sheikhbahaei, Jeff Smith and Alexander Gourine

- P26 Chronic intermittent hypoxia elicits tachycardia but not hypertension in the carotid body hypoxia-insensitive guinea pig**  
Eric F. Lucking, Karen M. O'Connor, Ken D. O'Halloran
- P27 Does chronic intermittent hypoxia adversely affect respiratory control in the carotid body hypoxia-insensitive guinea pig?**  
Karen M. O'Connor, Eric F. Lucking, David. P. Burns, Ger Clarke, John F. Cryan, Ken D. O'Halloran
- P28 Respiratory Control in a Rat Model of Alzheimer's Disease**  
Kevin Humphrey Murphy, David Patrick Burns, Kevin Barry-Murphy, Mark Rae, Ken O'Halloran, Eric Lucking
- P29 Inconsistent Entrainment to Diaphragm Stimulation in Severe Pompe Disease**  
Barbara Smith, Teresa Pitts
- P30 Cross-talk inhibition between competing pathways to serotonin-induced phrenic motor plasticity**  
Raphael R. Perim, Daryl P. Fields, Gordon S. Mitchell
- P31 Dose-dependent effects of Intermittent Hypoxia on Phrenic Long Term Facilitation**  
Elisa Janine Gonzalez-Rothi, Raphael Perim, Arash Tadjalli, Latoya Allen, Marissa Ciesla, Gordon Mitchell
- P32 Intermittent Hypoxia Induces Plasticity in Cervical Spinal Interneurons**  
Kristi Streeter, Michael Sunshine, Shreya Patel, Paul Reier, David Baekey, David Fuller
- P33 Phrenic afferent stimulation in the adult rat**  
Michael Daniel Sunshine, Kristi Ann Streeter, Sara M Turner, Elisa Janine Gonzalez-Rothi, David Mark Baekey, David Dwight Fuller
- P34 Cross spinal phrenic afferent projections in the adult rat**  
Sara Marie Freiberg Turner, Jayakrishnan Nair, Michael Daniel Sunshine, Kristi Ann Streeter, Cassandra M Schuster, Anna Francesa Fusco, David Dwight Fuller
- P35 Mild acute intermittent hypoxia induces respiratory recovery at different injury state following unilateral mid-cervical contusion in the rat**  
Ming-Han Wen, Kun-Ze Lee
- P36 Microglial and neurochemical mechanisms of seizure-induced central autonomic cardiorespiratory dysfunction**  
Amol Bhandare, Komal Kapoor, Kim Powell, Emma Braine, Pablo Casillas-Espinosa, Terence O'Brien, Melissa Farnham, Paul Pilowsky
- P37 Cervical hemisection increases upper airway activity in breathing and swallow**  
Alyssa Huff, Clint Greene, Kimberly Cheffer, Wilbur O'Steen, Dena Howland, Teresa Pitts
- P38 Linking inflammation and neurogenic bronchoconstriction through carotid body stimulation with lysophosphatidic acid**  
Nicholas Jendzjowsky, Arijit Roy, Richard Wilson



- P39 Spinal Oxygen Sensors (SOS): Where are they and what else do they sense?**  
Nicole Orsi Barioni, Fatemeh Derakhshan, Arijit Roy, Mufaddal Baghdadwala, Fiona McDonald, Erika Scheibli, Negar Heidari, Michael Harris, Mathias Dutschmann, Richard Wilson
- P40 Respiratory motor output in the mdx mouse model of Duchenne muscular dystrophy**  
David P. Burns, Eric F. Lucking, Glenn A. Walter, David D. Fuller, Ken D. O'Halloran
- P41 Astrocyte Kir4.1-conditional knockout mice show increased ventilation after acclimatization to chronic hypoxia.**  
Esteban A Moya, Virginia E Hawkins, Daniel K Mulkey, Frank L Powell
- P42 Sniffing glue - Astrocytes adjust respiratory behavior through the release of inflammatory modulator PGE2**  
David Forsberg, Thomas Ringstedt, Eric Herlenius
- P43 Sudden unexpected collapse of newborn infants - SUPC. Incidence, risk factors, role of perinatal transition and Prostaglandin E2**  
Eric Herlenius, Gustaf Drevion, Nicolas Pejovic, David Forsberg
- P44 The periaqueductal gray and the threat of breathlessness**  
Olivia Kate Faull, Kyle Pattinson
- P45 Microglia mediate developmental plasticity in the nucleus tractus solitarii (nTS) following neonatal lung injury**  
David G Litvin, Thomas E Dick, Corey B Smith, Frank J Jacono
- P46 Respiratory plasticity via cervical glutamatergic interneurons preserves breathing after cervical spinal cord injury**  
Kajana Satkunendrarajah, Spyridon Karadimas, Alex Ialiberte, Michael G Fehlings
- P47 Modeling biophysical property changes as a function of developmental neuronal morphology in the respiratory centers of the neonatal rat**  
Paul Allen Williams, Clarissa Dalton, Christopher Wilson
- P48 Detection and analysis of changes in arterial oxygen partial pressure with a fibre optic oxygen sensor**  
Rongsheng Chen, Federico Formenti, Hanne McPeak, Clive Hahn, Andrew Farmery
- P49 Oxygen sensitivity of astrocytes**  
Christie IN, Angelova PR, Kasymov V, Sheikhabaehi S, Turovsky E, Marina N, Korsak A, Zwicker J, Teschemacher AG, Ackland GL, Funk GD, Kasparov S, Abramov AY, Gourine AV
- P50 Involvement of orexin in the strengthening of respiratory response to metabolic acidosis by etonogestrel. A potential outcome for central hypoventilations**  
C Loiseau, B Barka, L Bodineau

# Sponsors

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# Organisers

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