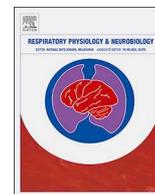


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# Respiratory Physiology & Neurobiology

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Proceedings of the 14th Oxford Conference on Modelling and Control of Breathing (September 2017, Oxford, United Kingdom)—Special issue of respiratory physiology and neurobiology



The Oxford Conference series was born of humble beginnings, following a chance meeting between a physiologist and mathematician. Dan Cunningham, the physiologist, was seated together with the mathematician, Ryszard Herczynski, during a dinner at the Polish National Academy of Sciences in 1971. At the time, Cunningham was finding some difficulty with quantitatively expressing the pattern of breathing and described the issue to Herczynski. With only a napkin and pen, the two began to formulate a solution to the problem based on Cunningham's description of the data and Herczynski's mathematical insight. Subsequently, they both wondered how much more could be achieved by bringing together interested parties from both fields, and the idea of a conference on the mathematical modelling of the respiratory system was born.

It would not be until 1978 that their idea would be realised at the meeting hosted by the University Laboratory of Physiology, Queen's College at Oxford University and organised by Dan Cunningham, Ebbe Petersen, Ewart Carson and David Murray-Smith. Unfortunately, though a co-organiser, Herczynski was unable to attend. This first conference was a resounding success with 90 delegates attending from 10 countries. At the meeting, attendees received a prologue on the physiological and mathematical principles of breathing written by the organising committee. This was memorably printed in a book with a yellow cover, spawning the endearing nickname; "The yellow book conference". In this special edition, we honour the origins of this meeting, with the colours of our cover, yellow with Oxford blue.

Subsequently, the triennial conference has become the premier meeting for the researchers working in the field of respiratory control. It has visited 7 countries on 4 continents. In September 2017, it was brought home to the inspiring setting of Oxford University for the first time in 40 years. Organised by Alexander Gourine (UCL), David Paterson (Oxford University), Robert Huckstepp (University of

Warwick), and Patrick Hosford (QMUL), the 14th Oxford Conference on Modelling and Control of Breathing was held in the TS Eliot Theatre at Merton College. Owing to the 124 conference attendees who produced 55 talks and 50 posters, the conference was an unmitigated success.

Respiratory Physiology and Neurobiology not only provided sponsorship for the conference, but once again have kindly agreed to publish the conference proceedings of this auspicious event. In these pages, you will find 20 articles covering a range of respiratory and respiratory-related topics. This special edition begins by looking at the modulation of the respiratory network by glial cells (Camacho-Hernández et al., 2019; Forsberg and Herlenius, 2019) whose roles in the control of breathing seem to be increasingly appreciated year on year, and now include long-term facilitation in the preBötzinger Complex. Continuing to delve deeper into the role of plasticity in respiratory control the issue includes several manuscripts describing the effects of spinal cord injury on this phenomenon (Ghali et al., 2019; Perim and Mitchell, 2019; Seven and Mitchell, 2019). There is then a series of articles focussing on motoneurone function in both health (Williams et al., 2019) and disease (O'Halloran and Burns, 2019; Seven and Mitchell, 2019), and touching on the neurodegenerative theme, a paper describing complex breathing phenotypes in a model of dementia (Lucking et al., 2019). This issue then moves onto to the new insights on the intimate interactions between breathing and autonomic control (Kakall et al., 2019; Nakamura et al., 2019), as well as control of cerebral blood flow (Rickards, 2019). The next series of papers cover the regulation of blood gases (Evans, 2019; Gao et al., 2019; Holmes et al., 2019; Kakall et al., 2019), and how low partial pressure of oxygen influences physiological responses such as swallowing (Huff et al., 2019). The issue concludes with papers describing central patterning of the respiratory output (Fortuna et al., 2019; Pisanski and Pagliardina, 2019; Young et al., 2019; Zuperku et al., 2019) and how it is controlled by inhibitory networks (Fortuna et al., 2019; Zuperku et al., 2019), affected by lung injury (Young et al., 2019), and modified by hypothalamic mechanisms (Fukushi et al., 2019).

We only hope that you enjoy reading the proceedings of the conference, as much as we enjoyed being there, and that we will see you at the 15<sup>th</sup> Oxford Conference hosted by Professor Yasumasa Okada of The Murayama Medical Center, Tokyo, Japan in 2020.

## Acknowledgements

We would like to acknowledge the contribution of our sponsors, CWE, CED, Thorlabs, Baker Ruskin, Red Box Direct, DSI, The Physiological Society, and Respiratory Physiology and Neurobiology, whose generous support made the conference possible. We would also

<https://doi.org/10.1016/j.resp.2019.05.014>

Available online 26 May 2019

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like to thank the conference team at Merton College for all of their help in the smooth running of the meeting. Of course, we must also thank Mathias Dutschmann and the team from Respiratory Physiology and Neurobiology for all of their help in producing this special issue.

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