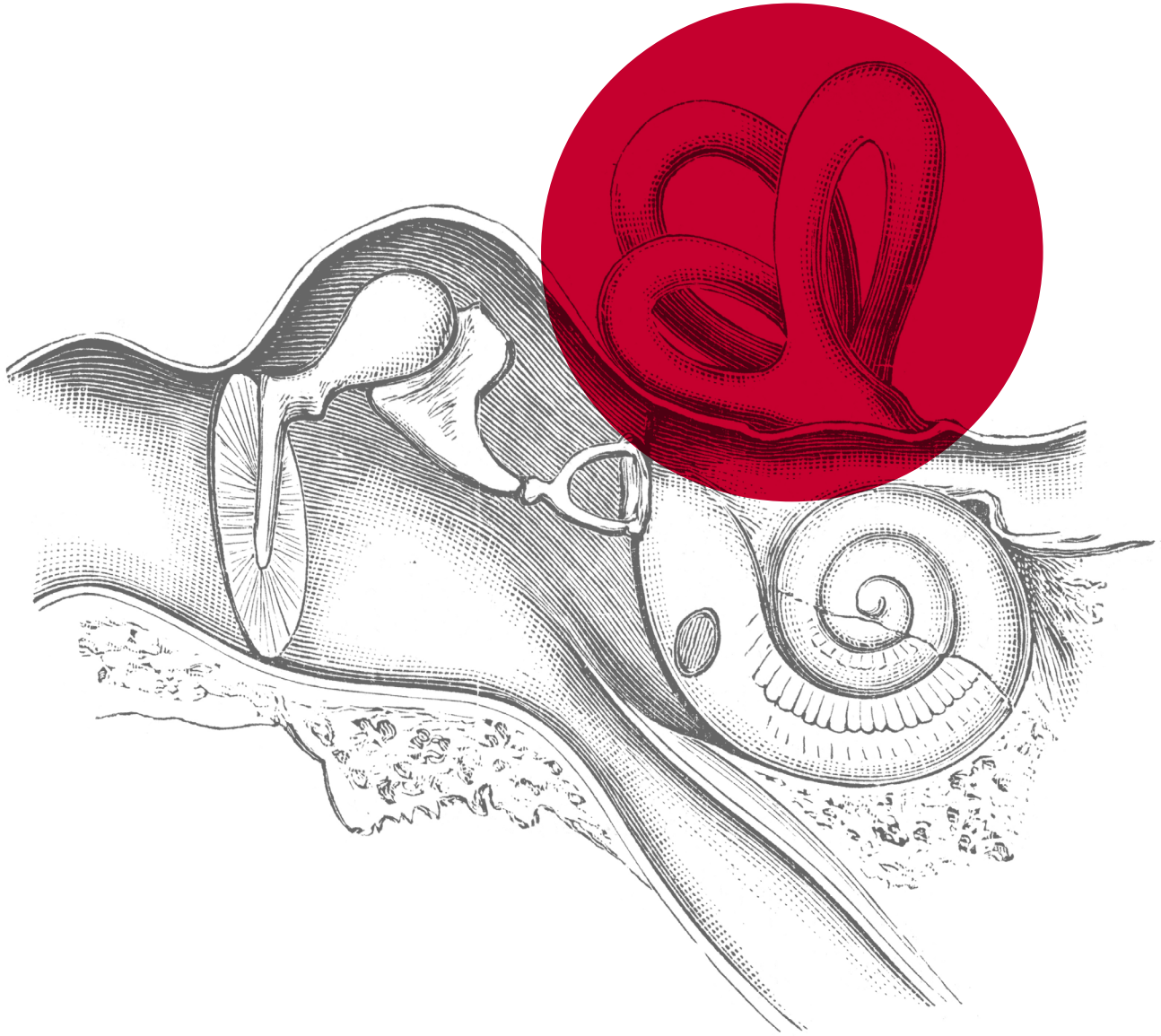


Department of Otolaryngology – Head and Neck Surgery

VESTIBULAR-ORIENTED RESEARCH MEETING



MAY 20 – 22, 2019

Marriott at the
University of Dayton
Conference Center



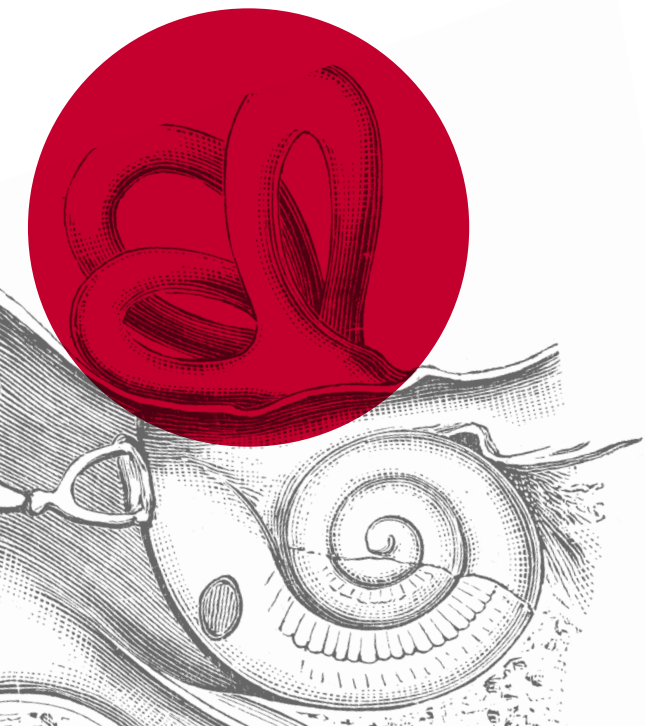
THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

ABOUT THE MEETING

The inaugural 2019 Vestibular Oriented Research Meeting was created to unite the vestibular research community, bringing together leading and aspiring researchers from around the world to share and build knowledge, unify our diverse transdisciplinary specialty and transform and improve interactions within our community as well as within independent and/or parallel disciplines.

The conference will showcase a diverse range of vestibular experts, including government- and academic-based audiologists, scientists, neuroengineers, neurologists, neuroscientists, otologists, occupational therapists and physical therapists. Content will focus on the aspects of vestibular function, including mechanisms and anatomy of the vestibular periphery; information processing; visual-vestibular integration; behavioral research, including vestibulo-ocular reflexes and balance; aging; and vestibular systems modeling and neuroengineering.

The meeting is hosted by The Ohio State University Wexner Medical Center. The Naval Medical Research Unit Dayton assisted with meeting planning under an Educational Partnership Agreement with Ohio State.



DAY 1 AGENDA

MONDAY, MAY 20

- 8:30 a.m. Introduction and Welcome – Salon E
- 8:50 a.m. Podium Session 1A – Salon E
Abstract 1
Quantifying the links between age, vestibular function, and balance
Maria Carolina Bermúdez Rey, Faisal Karmali, Torin Clark, Sinem Balta Beylergil, Daniel Merfeld
- 9:15 a.m. Abstract 2
Performance, learning, retention and training of dynamic stabilization skill with degraded gravitational cues
Vivekanand Pandey Vimal, Paul DiZio, James Lackner
- 9:35 a.m. Abstract 3
Immersive visual motion stimuli effects on cognitive performance tracking
Anil Raj, Margaret Freyaldenhoven, Sonia Yanovsky
- 9:55 a.m. Abstract 4
Keynote Address: Vestibular contribution to balance control during stance
Robert Peterka
- 10:25 a.m. Break
- 10:40 a.m. Podium Session 1B – Salon E
Abstract 5
Brainstem control of movement initiation for balance
David Ehrlich, Wenze Li, Venkata Voleti, Elizabeth Hillman, David Schoppik
- 11 a.m. Abstract 6
Frequency analyses of posturography using logarithmic translation
Takeshi Tsutsumi, Ayame Taniguchi, Takamori Takeda, Taku Ito, Yoshiyuki Kawashima
- 11:20 a.m. Abstract 7
A novel ground-based analog of spaceflight neurovestibular stimulation produces sensorimotor impairment
Jordan Dixon, Victoria Brazell, Torin Clark
- 11:40 a.m. Abstract 8
Removing vision reduces head stabilization during dynamic tasks in individuals with unilateral vestibular hypofunction
Brian Loyd, Janie Savier-Steiger, Serene Paul, Mark Lester, Peter Fino, Lee Dibble
- Noon Lunch – Tradewinds
- 1 p.m. Podium Session 1C – Salon E
Abstract 9
One-year retention of VOR gain, posture and gait after incremental VOR adaptation training in severe bilateral vestibular hypofunction: A case study
Michael Schubert, Yoav Gimmon, Kyoung Jae Kim, Americo Migliaccio
- 1:20 p.m. Abstract 10
Vestibular physical therapy in individuals with cognitive impairment: A theoretical framework
Brooke Klatt, Julie Ries, Pamela Dunlap, Susan Whitney, Yuri Agrawal

- 1:40 p.m. **Abstract 11**
The use of tablet technology for objective exercise monitoring in vestibular rehabilitation
P. Hovareshti, L. Holt, P. Gao, L. Xiao, D. Tolani, SL. Whitney
- 2 p.m. **Abstract 12**
Keynote Address: First-in-human safety and preliminary efficacy results for the labyrinth devices MVI vestibular implant
Peter Boutros, Mehdi Rahman, Nicolas Valentin, Desi Schoo, Margaret Chow, Andrianna Ayiotis, Brian Morris, Kelly Lane, Stephen Bowditch, Yoav Gimmon, Andreas Hofner, Aitor Morillo Rascon, Andreas Marx, Ross Deas, Stefan Strasser, Gene Fridman, Natan Davidovics, Dale Roberts, Abderrahmane Hedjoudje, Bryan Ward, Carolina Treviño, Michael Schubert, John Carey, Andreas Jaeger, Charles Della Santina
- 2:30 p.m. **Break**
- 2:45 p.m. **Podium Session 1D – Salon E**
Abstract 13
Using vestibular prosthesis to restore yaw rotation perception in primates with bilateral vestibular hypofunction
Kantapon Wiboonsaksakul, Charles Della Santina, Kathleen Cullen
- 3:05 p.m. **Abstract 14**
Recovery of head-trunk kinematics during functional movement tasks following unilateral vestibular differentiation
Lee Dibble, Brian Loyd, Grace Hunt, Richard Gurgel, Clough Shelton, Mark Lester, Serene Paul
- 3:25 p.m. **Abstract 15**
Gait changes during dual-task walking in individuals with and without visual vertigo
Pamela Dunlap, Ervin Sejdic, Carrie Hoppes, Kefah Alshebber, Brooke Klatt, Colleen Danaher
- 3:45 p.m. **Abstract 16**
Patient attitudes toward vestibular disorders
Whitney Chiao, Roseanne Krauter, Laura Kirk, Kristen Steenerson, Jeffrey Sharon
- 4:05 p.m. **Poster Lightning Round – Salon E**
- 4:45 p.m. **Poster Session 1 – Salon D**
- 6 p.m. **Dinner – Tradewinds**
- 7 p.m. **Mentoring**
Informal mentoring discussions will take place featuring topics such as funding, publication, getting a postdoc or job, running a lab, balancing vestibular science with other roles (e.g. clinical, parental). Participants are free to move between topics at their leisure. Open question and answer time will be available.
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DAY 2 AGENDA

TUESDAY, MAY 21

- 8 a.m. **Podium Session 2A – Salon E**
Abstract 17
Acute sports-related concussion affects central, not peripheral, vestibular function in collegiate athletes
Graham Cochrane, Jennifer Christy, Anwar Almutairi, Claudio Busetini, Dr. Eng, Mark Swanson, Katherine Weise
- 8:20 a.m. **Abstract 18**
Video ocular counter-roll (vOCR): a new clinical test of otolith-ocular function
Francesco Fornasari, Shirin Sadeghpour, Jorge Otero-Millan, David Zee, John Carey, Amir Kheradmand
- 8:40 a.m. **Abstract 19**
Evaluation of gravitational recognition in patients with spinocerebellar degeneration using the listing's plane
Takamori Takeda, Takuo Ikeda, Takeshi Tsutsumi
- 9 a.m. **Abstract 20**
Vestibular impairment predicts poorer spatial cognition and driving difficulty in patients with Alzheimer's disease
Eric Wei, Esther Oh, Aisha Harun, Yuri Agrawal
- 9:20 a.m. **Abstract 21**
Noise-induced vestibular injury and motor impairment
Courtney Stewart, David Bauer, Ariane Kanicki, Richard Altschuler, W. Michael King
- 9:40 a.m. **Abstract 22**
Acute vestibular findings in an acquired neurosensory dysfunction
Michael Hoffer, Bonnie Levin, Hilary Snapp, Jim Buskirk, Carey Balaban
- 10 a.m. **Break**
- 10:15 a.m. **Podium Session 2B – Salon E**
Abstract 23
Synaptopathic correlates of peripheral vestibular hypofunction
L. Hoffman, J. Saldate, T. Prins, F. Schweizer, M. Paulin
- 10:35 a.m. **Abstract 24**
The vertical computerized rotational head impulse test (crHIT-vertical)
Joseph Furman, Jillyn Roxberg, Ian Shirey, Alexander Kiderman
- 10:55 a.m. **Abstract 25**
A novel protocol for tolerable human acclimation to the cross-coupled illusion for artificial gravity
Kathrine Bretl, Torin Clark
- 11:15 a.m. **Abstract 26**
The scope and scale of operational performance detriments due to motion
LT Adam Biggs, Kyle Pettijohn, LT Chad Peltier, Jamie Lukos, Jacob Norris
- 11:35 a.m. **Abstract 27**
Keynote Address: Vestibular modulation of hippocampal and striatal function
Paul Smith, Martin Hitier, Yanfeng Zhang, Go Sato, Lucy Stiles, Yiwen Zheng, John Reynolds, Ruth Napper, Stephane Besnard, Alice Benoit, Bruno Philoxene, Bruno Truchet, Bruno Poucet

- 12:05 p.m. Lunch – Tradewinds
- 1:05 p.m. Podium Session 2C – Salon E
Abstract 28
The activity of the Purkinje cells in the vestibular cerebellum during active and passive self-motion
Omid Zobeiri, Kathleen Cullen
- 1:25 p.m. Abstract 29
Space and the vestibular system: What have we learned?
Laurence Young
- 1:45 p.m. Abstract 30
The role of vestibular noise in velocity storage dynamics
Benjamin Benac, Sirine Nouri, Richard Lewis, Daniel Merfeld
- 2:05 p.m. Abstract 31
Keynote Address: Neural representations of natural self-motion: Implications for perception and action
Kathleen Cullen
- 2:35 p.m. Break
- 2:50 p.m. Podium Session 2D – Salon E
Abstract 32
Perceived timing of multisensory events during self-motion
Michael Barnett-Cowan
- 3:10 p.m. Abstract 33
Comparison of vestibular perceptual thresholds in pitch versus roll tilt
Kadambari Suri, Torin Clark
- 3:30 p.m. Abstract 34
Influence of heading separation on visual and vestibular direction perception and common causation
Benjamin Crane, Raul Rodriguez
- 3:50 p.m. Abstract 35
Modeling neural adaptation of spatial orientation perception in humans to altered gravity
Jordan Dixon, Nisar Ahmed, Torin Clark
- 4:10 p.m. Abstract 36
Roll tilt self-motion direction discrimination: First evidence for perceptual learning
MP. Klaus, CG. Schöne, M. Hartmann, DM. Merfeld, MC. Schubert, FW. Mast
- 4:30 p.m. Abstract 37
Gulf war illness in U.S. veterans is associated with otolith hypofunction and decreased brain blood flow
JM. Serrador, SJ. Wood
- 5:30 p.m. Banquet Reception – Dayton Art Institute
(Busses depart hotel every 30 minutes from 5:15 to 6:15 p.m.)
- 6:30 p.m. Banquet Dinner and Program – Dayton Art Institute
(Busses depart Dayton Art Institute for hotel every 30 minutes from 8 to 9 p.m.)
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DAY 3 AGENDA

WEDNESDAY, MAY 22

- 8 a.m. Podium Session 3A – Salon E
Abstract 38
Modification of vestibular calyx membrane properties by different groups of efferents: A requirement for normal afferent function
Soroush Sadeghi
- 8:20 a.m. Abstract 39
Nav1.6 channels mediate persistent and resurgent sodium currents in vestibular calyx afferent terminals
Frances Meredith, Karen Dockstader, Alexander Arne, Katherine Rennie
- 8:40 a.m. Abstract 40
Infrared photo-sensitivity in the vestibular neuroepithelium is modulated by TRPV4
Federica Raciti, Weitao Jiang, Suhrud Rajguru
- 9 a.m. Abstract 41
Keynote Address: Vestibular sensory cell development and regeneration: The potential for recovery from hair cell and afferent loss
Jennifer Stone, Brandon Cox, Rémy Pujol, James Phillips, Ruth Anne Eatock
- 9:30 a.m. Break
- 9:45 a.m. Podium Session 3B – Salon E
Abstract 42
Using vestibular efferent synaptic mechanisms to probe efferent function
J. Chris Holt
- 10:05 a.m. Abstract 43
Additive integration of limb somatosensory inputs in the vestibular nuclei
Derek Miller, Carey Balaban, Andrew McCall
- 10:25 a.m. Abstract 44
Changes in cardiovascular function and heart rate variability during infrared stimulation of vestibular end organs
Darrian Rice, Giorgio Martinelli, Gay Holstein, Suhrud Rajguru
- 10:45 a.m. Abstract 45
Keynote Address: Vestibular control of blood pressure: Neural mechanisms and role of cognition
Bill Yates, Derek Miller, Andrew McCall
- 11:15 a.m. Survey
- 11:45 a.m. Lunch
- 1:30 p.m. Tours of NAMRU-Dayton motion facilities
(First bus loads at hotel at 12:15 p.m.; second bus loads at hotel at 1:45 p.m.)
- 2:45 p.m. Transportation to Marriott and Dayton airport
(First bus leaves NAMRU-Dayton at 2:45 p.m.; second bus leaves at 4 p.m.)
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INVITED SCIENTIFIC PRESENTERS



ROBERT PETERKA, PHD

Robert Peterka, PhD, is a research investigator at the National Center for Rehabilitative Auditory Research at the VA Portland Health Care System and associate professor in the Department of Neurology at Oregon Health & Science University in Portland. His background includes performing fundamental vestibular neurophysiology in animals, developing clinical vestibular laboratories, creating new clinical tests of vestibular function and investigating canal-otolith integration for eye movement control.

His recent work has applied engineering methods of system identification and control system modeling to characterize sensory integration mechanisms and measure sensory contributions to balance control. His current focus is on understanding the mechanisms that maintain balance during stance and gait, exploiting new methods to accurately measure how age and various neurological conditions affect these mechanisms, applying these methods to assess the effectiveness of rehabilitation and developing balance aids that improve balance during gait.



CHARLES DELLA SANTINA, MD, PhD

Charles Della Santina, MD, PhD, is a professor of Otolaryngology – Head and Neck Surgery and Biomedical Engineering at the Johns Hopkins University School of Medicine, where he specializes in otology and neurotology and directs the Vestibular NeuroEngineering Lab vestibular implant program and the Listening Center cochlear implant program.

He earned his PhD in bioengineering at the University of California at Berkeley, where his work focused on developing and applying micromachined silicon devices for interfacing to the auditory/vestibular nerve. He completed his medical degree at the University of California at San Francisco and residency in otolaryngology – head and neck surgery at Johns Hopkins before joining the faculty there in 2002.

INVITED SCIENTIFIC PRESENTERS, CONTINUED



KATHLEEN CULLEN, PHD

Kathleen Cullen, PhD, is a professor in the Department of Biomedical Engineering and co-director of the Center for Hearing and Balance at Johns Hopkins University. She is also affiliated with the departments of Neuroscience and Otolaryngology, and is on the board of the Kavli Neuroscience Discovery Institute.

Dr. Cullen's research is aimed at understanding how the brain creates neural representations of our motion to ensure the maintenance of balance, posture and accurate perceptual stability during everyday activities. She also studies neuronal activity and behavior before and after vestibular loss, and evaluates treatments (e.g., neuroprosthetic devices) designed to restore vestibular function and motor performance in patients.

Dr. Cullen has served on numerous editorial boards (e.g., *Scientific Reports*, *Neuroscience*, *Journal of Neuroscience*, *Journal of Neurophysiology*, *Journal of the Association for Research in Otolaryngology*), as well as on the Scientific Advisory Board of the National Space Biomedical Research Institute, which works with NASA to identify health risks in extended space flight. She was honored with the Halpike-Nylen medal of the Barany Society for "outstanding contributions to basic vestibular science" and is vice president and program chair of the Society for the Neural Control of Movement.

She has published more than 120 articles, book chapters and patent applications and given 160+ national and international invited lectures.



PAUL SMITH, PHD

Paul Smith, PhD, completed his PhD in vestibular neuroscience under the supervision of Ian Curthoys at the University of Sydney in 1987. In 1997 he became an associate professor in the Department of Pharmacology and Toxicology, School of Biomedical Sciences, University of Otago Medical School, where he was made a full professor in 1999.

In 2004 he returned to Massey University as a part-time extramural student to re-train in statistics, graduating in 2013 with a Master of Applied Statistics degree. In 2014, Dr. Smith was awarded a DSc by the University of Otago.

Dr. Smith has published three books and more than 300 scientific papers and book chapters. He is on the editorial boards of *Frontiers in Neurology (Neuro-otology)*, *the Journal of Vestibular Research and Auris, Nasus, Larynx*. Dr. Smith's main research interests lie in the effects of vestibular dysfunction and stimulation on higher cognitive function, especially the hippocampus, but also cognitive-motor interaction in the striatum, as well as the mechanisms of tinnitus. He is also interested in the application of multivariate and dating mining analyses to vestibular research.

INVITED SCIENTIFIC PRESENTERS, CONTINUED



JENNIFER STONE, PHD

Jennifer Stone, PhD, is a research professor and director of Research in the Department of Otolaryngology - Head and Neck Surgery at the University of Washington. Her research is focused on ways to improve biological therapies for inner ear hair cell damage, with the long-term goal of developing new treatments for individuals with hearing and balance dysfunction. Her group examines the cellular and molecular mechanisms underlying hair cell development and regeneration in auditory and vestibular systems in birds and mammals.

Dr. Stone received her PhD in anatomy and neurobiology from Boston University School of Medicine and completed postdoctoral training at the University of Washington.



BILL YATES, PHD

Bill Yates, PhD, is a professor of Otolaryngology and Neuroscience at the University of Pittsburgh and is also editor-in-chief of the *Journal of Neurophysiology*. Dr. Yates' research is focused on vestibular influences on autonomic regulation. His work has established that, in addition to stabilizing eye position and body posture during movement, the vestibular system contributes to regulating sympathetic nervous system activity to counteract the effects of gravity on the distribution of blood in the body. His laboratory also studies the neural basis of nausea and vomiting, particularly that resulting

from vestibular stimulation (motion sickness).

Dr. Yates authored more than 120 manuscripts related to his research.

SPECIAL THANKS

The Department of Otolaryngology – Head and Neck Surgery at The Ohio State University Wexner Medical Center thanks the following for their support of the 2019 Vestibular Oriented Research Meeting:

EDUCATIONAL PARTNERSHIP AGREEMENT

Naval Medical Research Unit Dayton



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