

Schmitt Program on Integrative Brain
Research Symposium

Neurobiology and Neurology of Highly
Skilled Motor Performance in Musicians



University of Rochester
March 6-8, 2014

Symposium Schedule

Thursday, March 6

University of Rochester Medical Center

4:00-5:00 pm

Keynote Address
Class of '62 Auditorium

Eckart Altenmüller, MD, PhD

Institute of Music Physiology and Musicians' Medicine

Hannover University of Music, Drama, and Media

Sensory-motor learning and movement disorders in musicians

5:00-6:30 pm

Reception
Flaum Atrium

Friday, March 7

Memorial Art Gallery, M&T Ballroom - 500 University Ave

7:30-8:15 am

Breakfast, Registration, and Posters

8:15-8:30 am

Welcome

Jonathan W. Mink, MD PhD, UR School of Medicine

Gary D. Paige, MD PhD, UR School of Medicine

W. Peter Kurau, BM, MA, Eastman School of Music

8:30-9:15 am

Amy Bastian, PhD, PT

Johns Hopkins University

Understanding and Optimizing Human Motor Learning

9:20-10:05 am

Marc Schieber, MD, PhD

University of Rochester

How does the brain control the fingers? It ain't what you think.

10:05-10:20 am

Posters and Break

10:20-11:05 am

Helene Polatajko, PhD, BOT

University of Toronto

Cognitive Approach to Rehabilitation in Motor Disorders

11:10-11:55 am

Jonathan Mink, MD, PhD

University of Rochester

Basal Ganglia Mechanisms of Preventing Unwanted Movement

12:00-1:30 pm

Lunch Presentations and Posters

Rosalie Lewis, Dystonia Medical Research Foundation

Ralph Manchester, MD, Performing Arts Medical Assn.

Glen Estrin, Musicians with Dystonia

W. Peter Kurau, Eastman School of Music

1:30-2:15 pm

Richard Barbano, MD, PhD

University of Rochester

Introduction to Dystonia and its Treatment

2:20-3:05 pm

Steven Frucht, MD

Mount Sinai School of Medicine

Clinical Aspects of Dystonia in Musicians

3:10-3:25 pm

Posters and Break

3:30-4:15 pm

Joel Perlmutter, MD

Washington University

Functional Imaging of Dystonia

4:20-5:05 pm

Mark Hallett, MD

National Institute of Neurological Disorders and Stroke

Sensory Processing and Plasticity in Focal Dystonia

6:00-7:45 pm

Dinner

Max at Eastman Place – 25 Gibbs St.

8:00 pm

Performance

Billy McLaughlin

Kilbourn Hall, Eastman School of Music

26 Gibbs St.

Saturday, March 8

Kilbourn Hall, Eastman School of Music – 26 Gibbs St.

Moderator: Nicholas Goluses, DMA

8:30-9:00 am

Breakfast

9:00-9:15 am

Introduction

Nicholas Goluses, DMA

9:15-9:55 am

Psyche Loui, PhD

Wesleyan University

Action and Perception in the Musical Brain

9:55-10:55 am

Phillip Pearl, MD

Harvard University

Neurological Problems in Famous Musicians: In Words and Music

10:55-11:55 pm

Susanne Callan-Harris, PT, MS, LLCC

University Health Service, URMC

Prevention Strategies for Musicians

11:55pm

Closing Remarks

Visiting Faculty

Eckart Altenmüller, MD, PhD

Director, Institute of Music Physiology and Musicians' Medicine
Hannover University of Music, Drama, and Media



Eckart Altenmüller (b. 1955) holds a Master's degree in Classical flute, and a MD and PhD degree in Neurology and Neurophysiology. Since 1994 he has been chair and director of the Institute of Music Physiology and Musicians' Medicine where he directs an outpatient clinic for musicians. His research involves movement disorders in musicians as well as emotion and motor, auditory and sensory learning. From 2005 to 2011 he was President of the German Society of Music Physiology and Musicians' Medicine and has served as Vice-President since 2011. In the year 2013 he received the prestigious Science Award of the Country of Lower Saxony.

Amy Bastian, PhD, PT

Professor, Neuroscience and Neurology, Johns Hopkins University



Amy Bastian is a neuroscientist and physical therapist who studies the neural control of human movement. She has a special interest in cerebellar motor disorders, stroke, motor learning, and walking control. She is the Director of the Motion Analysis Laboratory at the Kennedy Krieger Institute and Professor of Neuroscience at Johns Hopkins. Her research uses computerized movement tracking techniques and novel devices to control walking and reaching movements. She studies how humans with and without neurological damage control movement and learn new patterns.

Susanne Callan-Harris, PT, MS, CLT

University Health Service, University of Rochester Medical Center



Susanne Callan-Harris holds an M.S. degree in Physical Therapy from Boston University and a B.S. in Biology from St. John Fisher College. She has been the owner of Callan-Harris Physical Therapy, P.C. since 2000. Susanne is currently the Senior Physical Therapist at University Health Services at the University of Rochester and an adjunct professor at the Eastman School of Music, where she teaches the Keys to Healthy Music Class and is an Arts Leadership Mentor. Previous clinical positions include Director of Sports Therapy at University Sports Medicine/Strong Memorial Hospital, Manager of Ergo Staff at Center for Occupational Rehabilitation, and the Chief

Physical Therapist at the Pain Treatment Center at the U of R. Susanne is an adjunct professor for Ithaca College Physical Therapy Graduate Studies and has been a clinical instructor for PT students more than 20 years.

Steven Frucht, MD

Professor of Neurology, Mount Sinai School of Medicine



Steven Frucht is Professor of Neurology and Director of the Movement Disorders Division at Mount Sinai Medical Center. In 2000, he joined with Glen Estrin and the Dystonia Medical Research Foundation to create the program entity Musicians with Dystonia, aimed at assisting musicians affected with the disorder and promoting research initiatives. He has published more than 100 peer reviewed papers, and written extensively on dystonia and focal task-specific dystonia affecting musicians. He trained as a musician at the Juilliard School's Pre-College Division and as a fellow at the Tanglewood Music Center.

Mark Hallett, MD

Chief, Laboratory of Motor Control, National Institute of Neurological Diseases and Stroke, National Institutes of Health



Mark Hallett is the Chief of the Human Motor Control Section, National Institute of Neurological Disorders and Stroke, National Institutes of Health, Bethesda, Maryland. From 1976 to 1984, he was the Chief of the Clinical Neurophysiology Laboratory at the Brigham and Women's Hospital and Associate Professor of Neurology at Harvard Medical School. Since 1984, he has been at the National Institute of Neurological Disorders and Stroke where he also served as Clinical Director of NINDS until July 2000. He is past President of the American Association of Electrodiagnostic Medicine and the Movement Disorder Society, past Vice-President of the American Academy of Neurology, and President elect of the International

Federation of Clinical Neurophysiology. He has been a member of the editorial board of *Medical Problems of Performing Artists* since 1997. A major focus of his work has been on focal dystonia of the hand including musician's dystonia.

Psyche Loui, PhD

Assistant Professor of Psychology and Neuroscience and Behavior, Wesleyan University



Psyche Loui is Assistant Professor of Psychology and Neuroscience and Behavior at Wesleyan University, and Director of the Music, Imaging, and Neural Dynamics (MIND) lab. She obtained her BS in Psychology and Music from Duke University and her PhD from University of California at Berkeley. Prior to coming to Wesleyan she was Instructor in Neurology at the Beth Israel Deaconess Medical Center and Harvard Medical School. Her main interests are in the cognitive neuroscience of music. Ongoing projects tackle problems in tone-deafness, absolute pitch, and the neural correlates of learning and creativity. Dr. Loui is a recipient of Young Investigator Awards from Templeton Foundation and European Society for Cognition of Music, and grants from the Grammy Foundation, Templeton

Foundation, and NIH. Her work has been featured in the BBC, NPR, Boston Globe, New York Times, MSNBC, Science Daily, and other news sources.

Phillip Pearl, MD
Professor of Neurology, Harvard University



Phillip Pearl is Director of Epilepsy and Clinical Neurophysiology at Boston Children's Hospital and William G. Lennox Chair and Professor of Neurology at Harvard Medical School. Originally from Baltimore, he attended Johns Hopkins University and Peabody Conservatory of Music and University of Maryland School of Medicine. He took his residency at Baylor College of Medicine in Houston and fellowship at Boston Children's Hospital, Harvard Medical School. He was Division Chief of Neurology at Children's National Medical Center and Professor of Neurology, Pediatrics, and Music at the George Washington University School of Medicine in Washington, DC, where he spent 23 years from 1990-2013, until relocating to Boston this year. Dr. Pearl is President of the Professors of Child Neurology and is on the editorial board of several professional journals including Music and Medicine. Dr. Pearl is also a member of the Longwood Symphony Orchestra.

Joel S. Perlmutter, MD
Professor of Neurology, Washington University



Joel Perlmutter received an AB in biochemistry from Princeton, an MD from University of Missouri and neurology training at Washington University. He studied Movement Disorders with David Marsden in London. He is the Elliot Stein Family Professor of Neurology, head of Movement Disorders, Professor of Radiology, Neurobiology, Occupational Therapy and Physical Therapy. His research interests include development of biomarkers for PD, investigations of pathophysiology of PD and dystonia, investigations of dementia in PD, studies of deep brain stimulation and development of neuroimaging methods. His research spans animal models and patient-oriented studies. He enjoys family, teaching and collecting garnets.

Helene J. Polatajko, PhD, OT Reg (Ont.), OT(C), FCAOT
Professor of Occupational Science and Occupational Therapy,
University of Toronto



Helene Polatajko is an internationally acclaimed researcher, educator, and practitioner. Her clinical experience is primarily in the area of pediatrics, most especially with children with learning based performance problems. She has held close to \$10,000,000 in research funding, given over 400 presentations in over 20 countries, and has over 200 publications. Her primary research interest is the role of cognition in motor-based performance. Her work in this area has led to the development of the Cognitive Orientation to daily Occupational Performance approach, which combines task-specific and cognitive-strategy-based training with collaborative client-centered practices that promote client-initiated performance problem solving. The approach has demonstrated efficacy not only for skill acquisition but also the elusive generalization and transfer of skill. Dr. Polatajko has received numerous national and international honors and awards including being inducted to the American Occupational Therapy Foundation Academy of Research, and the Canadian Academy of Health Sciences.

University of Rochester Faculty

Richard Barbano, MD, PhD

Professor of Neurology



Richard Barbano completed his training in neurology at Columbia University in New York City. He joined the faculty at the University of Rochester in 1993, originally to help with the electromyography services. He was asked to join the Botulinum Toxin Clinic at that time and eventually became director of the clinic in 1997. It was from this clinic that his interest in the dystonia grew and became a prime focus of his career. He joined the Dystonia Study Group in 2001, and served as Secretary-Treasurer from 2007-2011. He has participated in several multi-center dystonia studies and is an active participant in the Dystonia Coalition Project. He is currently Professor of Neurology at the

University of Rochester and Chief of the Movement Disorders Division.

Nicholas Goluses, BM, MM, DMA

Professor of Guitar



Nicholas Goluses BM, MM, DMA, is Professor of Guitar and Director of the guitar programs at the Eastman School of Music.

Mr. Goluses has held the Andrés Segovia Faculty Chair at the Manhattan School of Music, where he received the Doctor of Musical Arts Degree, and was the recipient of both the Pablo Casals Award “for Musical Accomplishment and Human Endeavor” and the Faculty Award of Distinguished Merit. He has appeared in solo performances, as a chamber music player, and with orchestras around the world to critical acclaim. Dedicated to music education as well as performance, Mr. Goluses is in great demand for master classes at major colleges, universities and conservatories throughout the world. His students have

won top prizes in major international guitar competitions and have been appointed to university positions throughout the world. He has won numerous awards for his teaching.

W. Peter Kurau, BM, MA

Professor of Horn



W. Peter Kurau is Professor of Horn at the Eastman School of Music and is Principal Horn in the Rochester Philharmonic Orchestra. He received his BM (music education) with high distinction and Performer’s Certificate from the Eastman School of Music, an Associateship Diploma (horn) from the Royal College of Music and a Certificate of Advanced Studies (horn) from Guildhall School of Music and Drama. He went on to obtain an MA

(music/psychoacoustics) from the University of Connecticut. He has received numerous fellowships and awards for both performance and education. He has performed around the world. He has served as Secretary/Treasurer and Vice President of the International Horn Society. He was Artistic Ambassador for United States Information Agency, performing and teaching in Serbia-Montenegro, Kazakhstan, Macedonia and Syria in 1997. He has held several faculty positions in the United States and has been in his current position since 1987.

Ralph A. Manchester, MD
Professor of Medicine
Vice Provost and Director, University Health Service



Ralph Manchester is Vice Provost and Director, University Health Service. He joined UHS as a staff physician in July, 1983. He served as chief of the UHS Medical Care Section until July 1994, when he was appointed Director of the University Health Service. He is Professor of Medicine in the UR School of Medicine and Dentistry and a Fellow in the American College of Physicians and the American College Health Association (ACHA). He received his medical degree from the University of Vermont in 1979, completed his residency at the University of Kentucky Medical Center in 1983 and is board-certified in Internal Medicine. Dr. Manchester is a past president of ACHA and the Performing Arts Medicine Association. He has a special interest in the evaluation and treatment of medical problems of musicians, and serves as Editor of *Medical Problems of Performing Artists*.

Jonathan W. Mink, MD, PhD
Professor of Neurology



Jonathan Mink is the Frederick A. Horner Endowed Professor in Child Neurology and Professor of Neurology, Neurobiology & Anatomy, Brain & Cognitive Sciences, and Pediatrics at the University of Rochester. Dr. Mink's research focuses on basal ganglia function in motor control and on dystonia and other movement disorders due to basal ganglia dysfunction. He co-chairs the Scientific Advisory Board of the Tourette Syndrome Association and sits on the Medical Advisory Board of the Batten Disease Support and Research Association. He is Associate Editor of *Neurology* and Associate Editor of Child Neurology for *Continuum*. He is a member of the NIH National Advisory Neurological Disorders and Stroke Council, the FDA Pediatric Advisory Committee, and the American Neurological Association Board.

Marc H. Schieber, MD, PhD
Professor of Neurology



Marc Schieber received his A.B. in 1974, and M.D./Ph.D. in 1982, all from Washington University in St. Louis. He currently is Professor of Neurology, of Neurobiology, and of Biomedical Engineering at the University of Rochester, and Attending Neurologist at Unity Health, Rochester, NY. His research focuses on how the nervous system controls muscles to perform dexterous finger movements. Dr. Schieber is a member of the Society for Neural Control of Movement and the Society for Neuroscience. He has received an NINDS Javits Investigator Merit Award and has served as Chair of the NIH Sensorimotor Integration Study Section.

Billy McLaughlin



Billy McLaughlin is recognized internationally as a world-class guitarist, composer and inspirational performer who has appeared on Billboard's TopTen Chart. Previously signed to Virgin Records' *Narada* label, McLaughlin has 14 CD releases, 3 National Campus Entertainer of the Year Awards*, 5 Minnesota Music Awards and his decades of national concert touring earned him the Hall of Fame Achievement Award*.

But in 1999 McLaughlin vanished from sight as his career crumbled due to a little-known neuromuscular disorder called Focal Dystonia. After suffering several years without a cure, he embarked on an unlikely attempt to regain his career by re-learning his instrument left-handed. His remarkable comeback is captured in the documentary film *Changing Keys* (airing on PBS 2010) and a concert film called *Coming Back Alive* featuring McLaughlin with string orchestra and a reunion of his longtime rock band.

Now serving as Ambassador for Awareness for the Dystonia Medical Research Foundation, McLaughlin is the winner of the 2010 Public Leadership in Neurology Award** whose previous winners include Paul Allen, Julie Andrews, Leon Fleischer and Michael J. Fox.

McLaughlin has resumed an international schedule of concert appearances and keynote speaking. He resides in his home state of Minnesota where he is proudly raising two boys.

* National Association for Campus Activities/NACA

**American Academy of Neurology/AAN

The Schmitt Foundation

The Kilian J. and Caroline F. Schmitt Foundation, in cooperation with the University of Rochester, supports a new research program for investigators interested in the nervous system and its disorders. The Program, now in its third year, is specifically targeted toward interdisciplinary research that crosses traditional boundaries. The Schmitt Program on Integrative Brain Research (SPIBR) supports new research projects, postdoctoral fellows, visiting scientists, and colloquium professors that fall within three areas of focus:

1. Learning, Plasticity, and Memory
2. The Senses and Behavior
3. The Neurobiology of Aging and Disease

Each of these topics is well represented across the neuroscience community. However, departmental, institutional, and disciplinary boundaries often prevent investigators studying the same topic at different levels of inquiry from developing collaborative or integrative research programs. The Schmitt Program is intended to catalyze and promote new directions of neuroscience research within the three target areas, and to encourage interdisciplinary and collaborative research, spanning cognitive through systems to cellular and molecular approaches. The Program is administered through the Department of Neurobiology and Anatomy.

This event is sponsored by the Schmitt Program on Integrative Brain Research, the Dystonia Medical Research Foundation, the Eastman School of Music, and a Provost's Multidisciplinary Award from the University of Rochester to (NT Goluses, WP Kurau, RA Manchester, JW Mink, and MH Schieber.

