



**THE 2017 CHITTENDEN SYMPOSIUM**  
***ASSISTIVE TECHNOLOGIES IN HEALTH***

**FRIDAY, MARCH 31, 2017**  
**8:30 AM - 4:30 PM**

**ILLINOIS BALLROOM**  
**I HOTEL AND CONFERENCE CENTER**  
**1900 SOUTH FIRST STREET**  
**CHAMPAIGN, IL 61820**

Organized by  
The Health Care Engineering Systems Center  
of the College of Engineering



Hosted by the Departments of:  
Kinesiology and Community Health  
of the College of Applied Health Sciences  
and  
Industrial and Enterprise Systems Engineering  
of the College of Engineering



On September 16, 2016, William Chittenden was inducted into the Engineering at Illinois Hall of Fame to honor his ongoing support for the development of engineering professionals through continuing education.

William and his wife Carol have been creating opportunities for Illinois students for nearly 30 years through the Chittenden Family Foundation.

To that end, they created the Carol Chittenden Scholarship, awarded annually to an undergraduate student in the Kinesiology and Community Health Department; and the William Chittenden Fellowship, awarded annually to a graduate student in ISE. They also sponsor an award for best graduate thesis relating Engineering and AHS.

Their vision has led to the annual namesake symposium sponsored by the two colleges, where the topics of aging and later-year quality of life are discussed by leading researchers in the field.



## AGENDA

- 8:30-9:00 AM      **Registration and Continental Breakfast**
- 9:00-9:30 AM      **Welcome remarks and Introductions**  
Andreas Cangellaris  
Dean, College of Engineering  
Cheryl Hanley-Maxwell  
Dean, College of Applied Health Sciences
- 9:30-10:30 AM     **Keynote**  
***Understanding Causal Pathways for Low Back Disorders***  
William Marras, PhD, CPE  
Honda Chair Professor and Director  
Spine Research Institute  
College of Engineering  
Integrated Systems Engineering  
The Ohio State University
- 10:30-10:45 AM    **Break**
- 10:45 AM-12:00 PM **Invited Talks**  
***Falls In Wheelchair Users: Predictors and Prevention***  
Jacob Sosnoff, Associate Professor  
Kinesiology and Community Health  
College of Applied Health Sciences
- Wireless Remote Elevator Project***  
Patricia Barrett Malik, Director  
Disability Resources and Educational Services  
College of Applied Health Sciences
- Soft robotic actuators for human assist applications***  
Girish Krishnan  
Assistant Professor  
Industrial and Enterprise Systems Engineering  
College of Engineering
- Development of small aerial manipulators for helping elderly with prolonged independent residence***  
Naira Hovakimyan, Professor  
Mechanical Science and Engineering  
College of Engineering
- 12:00-1:30 PM    **Lunch and Networking**

1:30-2:00 PM

**Keynote**

***Enhancing Human Ability: Impact of Advanced Assistive Technology***

Arun Jayaraman, PhD, PT

Director, Max Nader Center for Rehabilitation

Technologies & Outcomes Research

Rehabilitation Institute of Chicago

Associate Professor, Departments of

Physical Medicine & Rehabilitation and

Medical Social Sciences

Northwestern University

2:00-3:00 PM

**Poster Data Blitz**

3:00-4:30 PM

**Poster Presentations and Reception**

**Best Poster Award at 4:00 PM**



## Keynote Speaker



**William Marras, PhD, CPE**

Honda Chair Professor and Director

Spine Research Institute

College of Engineering, Department of Integrated Systems Engineering

The Ohio State University

William S. Marras holds the Honda Chair in the Department of Integrated Systems Engineering at the Ohio State University and serves as the Director of the Spine Research Institute at the Ohio State University as well as Executive Director for the Institute for Ergonomics. Dr. Marras holds joint academic appointments in the Department of Orthopaedic Surgery, the Department of Neurosurgery, and the Department of Physical Medicine & Rehabilitation. His research is centered on understanding multidimensional causal pathways for spine disorders through quantitative epidemiologic evaluations, laboratory biomechanical studies, personalized mathematical modeling, and clinical studies of the lumbar and cervical spine. His findings have been published in over 200 peer-reviewed journal articles, hundreds of refereed proceedings, and numerous books and book chapters including a book entitled “The Working Back: A Systems View.” He holds Fellow status in six professional societies including the American Society for the Advancement of Science (AAAS) and has been widely recognized for his contributions through numerous national and international awards including two Volvo Awards for Low Back Pain Research and an honorary Sc.D. degree. Professor Marras has been active in the National Research Council (NRC) having served on over a dozen boards and committees and has served as Chair of the Board on Human Systems Integration for multiple terms. He has also served as Editor-in-Chief of *Human Factors* and is currently Deputy Editor of *Spine* and is the immediate past President of the Human Factors and Ergonomics Society (the world’s largest such society). Dr. Marras is an elected member of the National Academy of Engineering (the National Academies of Science, Engineering and Medicine), recorded a TEDx talk entitled “Back Pain and your Brain” and was recently featured on NPR’s All Things Considered.



## Keynote Speaker



**Arun Jayaraman, PhD, PT**

*Director*, Max Nader Center for Rehabilitation  
Technologies & Outcomes Research  
Rehabilitation Institute of Chicago

*Associate Professor*, Departments of  
Physical Medicine & Rehabilitation  
and Medical Social Sciences  
Northwestern University

Dr. Jayaraman is the Director of the Max Näder Center for Rehabilitation Technologies & Outcomes Research and a Research Scientist at the Rehabilitation Institute of Chicago / Shirley Ryan Ability Lab. He is also an Associate Professor in the Departments of Physical Medicine & Rehabilitation, Physical Therapy & Human Movement Sciences, and Medical Social Sciences at Northwestern University, Chicago, IL. His research interests focus on developing and executing both industry-sponsored and investigator-initiated research in rehab robotics, prosthetics, orthotics, and other assistive and adaptive technologies to treat physical disability. He specifically focuses on using quantitative outcome measures (example wearable sensors, smart phones, biomarkers etc.) to improve the real-world use of rehabilitation technology. Dr. Jayaraman's work is currently funded by NIH, DOD, NIDILRR, NSF, Industry, and private foundations.



## Invited Speakers



**Jacob Sosnoff, PhD**

Associate Professor

Kinesiology and Community Health

UIUC-College of Applied Health Sciences

Professor Sosnoff's areas of interest are Motor Behavior and Control, Aging, and Perceptual-Motor Variability. His research focuses primarily on the underlying neurophysiological and behavioral factors responsible for fluctuations (i.e. variability) in performance across the lifespan. This research interest is based on the rationale that a better understanding of these mechanisms will facilitate the development of practical interventions capable of minimizing the negative aspects of the aging process.



**Patricia Barrett Malik, PhD**

Director, Disability Resources and Educational Services (DRES)

UIUC-College of Applied Health Sciences

Dr. Patricia Malik's professional life has focused on supporting people with disabilities reach their highest potential via a variety of venues. Her current position allows her to work with college students through the many transitions they experience in young adulthood, with the ultimate goal that they may independently manage the many facets of their disability leading to increased personal empowerment. Her work with the Wireless Elevator Remote Control Project brings together the finest minds on campus to solve real world problems. What started as an observed campus problem by an elevator foreman has resulted in a project that has the ability to change the vertical built environment to be more accessible for those with disabilities



## Invited Speakers



**Girish Krishnan, PhD**

Assistant Professor  
Industrial and Enterprise Systems Engineering  
UIUC-College of Engineering

Professor Krishnan's expertise is in the design of compliant mechanisms, pneumatic actuators for soft robots and in material design. He is currently working on soft robotic solutions several human assist applications including orthotics for crutches, wearable exoskeletons for industrial and hazardous material workers. He is the recipient of several awards such as 2015 NSF CAREER award, and Dean's award for excellence in advising.



**Naira Hovakimyan, PhD**

**W. Grafton and Lillian B. Wilkins** Professor  
Mechanical Science and Engineering  
UIUC-College of Engineering

Professor Hovakimyan's research interests are in the theory of robust adaptive control and estimation, control in the presence of limited information, networks of autonomous systems, game theory and applications of those in safety-critical systems of aerospace, mechanical, electrical, petroleum and biomedical engineering. She is a co-founder of IntelinAir, Inc., a company that commercializes data-drones for delivering actionable information from aerial imagery for various industries.