

JAMES J. ABBAS, PH.D.

CONTACT INFORMATION

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Citizenship: USA

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EDUCATION

Ph.D., Biomedical Engineering, 1992.

Case Western Reserve University, Cleveland, OH

Thesis title: *Neural Network Control of Functional Neuromuscular Stimulation Systems.*

Advisor: Howard J. Chizeck, ScD

M.S., Biomedical Engineering, 1989.

Case Western Reserve University, Cleveland, OH

Thesis title: *Feedback Control of Coronal Plane Hip and Trunk Angles in Paraplegic Subjects Using Functional Neuromuscular Stimulation.*

Advisor: Howard J. Chizeck, ScD

Sc.B., Bio-electrical Engineering, 1982.

Brown University, Providence, RI

PROFESSIONAL INTERESTS

Neurorehabilitation in spinal cord injury, Parkinson's disease, cerebral palsy.

Neural interfaces for prosthetic systems and neuromuscular stimulation.

Technology for global health.

Technology to promote neural plasticity.

Adaptive biomimetic system design.

EXPERIENCE

Aug '02 - present

Director and Co-Founder.

Center for Adaptive Neural Systems

(formerly Center for Rehabilitation Neuroscience and Rehabilitation Engineering;

co-directed with Ranu Jung through 2010)

Arizona State University, Tempe, AZ.

Aug '02 - present

Associate Professor.

School of Biological and Health Systems Engineering (SBHSE)

(formerly Harrington Department of Bioengineering)

Arizona State University, Tempe, AZ.

Jan '10 - present

Member, Graduate Faculty.

Graduate Program in Mechanical Engineering

School for Engineering of Matter, Transport & Energy

Arizona State University, Tempe, AZ.

Aug '08 - present

Member, Graduate Faculty.

Interdisciplinary Graduate Program in Neuroscience

Arizona State University, Tempe, AZ.

Aug '07 - present

Member, Honors Faculty.

Barrett, The Honors College at Arizona State University, Tempe, AZ.

- Sept '12 - present **Adjunct Professor.**
Department of Physical Therapy
Arizona School of Health Sciences
A.T. Still University, Mesa, AZ.
- Aug '13 – Aug '14 **Visiting Professor.**
Medical Devices Unit, Essential Medicines and Health Products Dept.
World Health Organization
Geneva, Switzerland.
- Sept. '00 - present **Vice President and Co-Founder.**
customKYnetics, Inc., Lexington, KY.
- Aug '02 – Aug '08 **Director of Clinical Rehabilitation Engineering.**
Department of Clinical Neurobiology and Bioengineering
Banner Good Samaritan Medical Center, Phoenix, AZ.
- Aug '02 – Aug '04 **Adjunct Associate Professor.**
Center for Biomedical Engineering
University of Kentucky, Lexington, KY.
- July '00 – Aug. '02 **Associate Professor.**
Center for Biomedical Engineering
University of Kentucky, Lexington, KY.
- July '00 - Aug. '02 **Joint Appointment as Associate Professor.**
Department of Physical Medicine & Rehabilitation
University of Kentucky, Lexington, KY.
- Nov '00 - Aug. '02 **Affiliated Faculty.**
Spinal Cord and Brain Injury Research Center
University of Kentucky, Lexington, KY.
- Aug. '95 - June '00 **Assistant Professor.**
Center for Biomedical Engineering
University of Kentucky, Lexington, KY.
- Aug. '95 - June '00 **Joint Appointment as Assistant Professor.**
Department of Physical Medicine & Rehabilitation
University of Kentucky, Lexington, KY.
- Aug. '93 - Aug. '95 **Assistant Professor of Biomedical Engineering.**
Department of Mechanical Engineering
The Catholic University of America, Washington, DC.
- Sept. '92 - Aug. '93 **Adjunct Assistant Professor.**
Systems Engineering Department
Case Western Reserve University, Cleveland, OH.

- Sept. '92 - July '93 **Biomedical Engineer.**
 Research Department
 Shriners Hospital, Philadelphia, PA.
- May '86 - Aug. '92 **Biomedical Research Engineer.**
 Motion Study Laboratory
 Cleveland Veterans Administration Medical Center, Cleveland, OH.
- Oct.'85 - May '86 **Research Assistant.**
 Rehabilitation Engineering Center
 Metropolitan General Hospital, Cleveland, OH.
- July '82 - Oct. '84 United States Peace Corps.
Teacher, Marymount Secondary School, Mzuzu, Malawi.
Public Health Worker, Chitipa District Hospital, Chitipa, Malawi.

GRANTS AND FELLOWSHIPS RECEIVED

Real-Time Feedback Training to Improve Gait and Posture in People with Parkinson's Disease

ASU-Mayo Seed Grant Program 01/01/18- 12/31/18 \$50,000
 Pls: Narayanan Krishnamurthi, PhD (College of Nursing and Health
 Innovation, Center for Adaptive Neural Systems)
 Erika Driver-Dunckley, MD (Mayo Clinic Arizona)
Co-Investigators: **James J. Abbas, PhD** (Center for Adaptive Neural Systems/BME, ASU)
 Charlene Hoffman-Snyder, CNP, DNP, RN (Mayo Clinic Arizona)

Restoring sensation with a neural-enabled prosthetic hand system for home use: a first-in-human study

Defense Advanced Research Projects Agency (DARPA) BTO-HAPTIX
 W911NF-17-1-0022 02/01/17- 1/31/20; \$2,212,510
 PI: Ranu Jung, PhD (BME, Florida International University)
 co-Investigators: Kenneth Horch (BME, Florida International University)
 Wensong Wu (Math and Statistics, Florida International University)
PI on subcontract: **James J. Abbas, PhD** (Ctr. for Adaptive Neural Systems/SBHSE, ASU)
 subcontract budget: \$242,404

Sensorimotor control of grasping and manipulation through a soft-synergy prosthetic hand and peripheral neural interface system

Defense Advanced Research Projects Agency (DARPA) BTO-HAPTIX
 W911NF-17-1-0049 02/01/17- 07/31/18; \$820,086
 PI: Marco Santello, PhD (SBHSE, ASU)
Co-Investigators: **James J. Abbas, PhD** (Ctr. for Adaptive Neural Systems/SBHSE, ASU)
 Qiushi Fu, PhD (SBHSE, ASU)
 PI on subcontract: Ranu Jung, PhD (Florida International University)

Developing a powered Ankle Foot Orthosis to enhance gait performance and decrease falls following stroke.

Virginia Piper Trust 11/01/16 - 05/31/17 \$50,000
 PI: Claire Honeycutt, PhD (SBHSE, ASU)
Co-investigator: James J. Abbas, PhD (Ctr. for Adaptive Neural Systems/SBHSE, ASU)
 Co-investigator: Thomas Sugar, PhD (The Polytechnic School, ASU)
 Co-investigator: James Lynskey, PhD (Arizona School of Health Sciences)

CRCNS: Computation-Enabled Adaptive Ventilatory Control System

NSF/NIH/ANR Joint program
 NIH:R01NS086088 09/01/13- 08/30/17; \$569,613
 PI: Ranu Jung, PhD (Florida International University)
 PI: Sylvie Renaud, PhD (Universite de Bordeaux, additional €255,832)
Consultant: James J. Abbas, PhD (Ctr. for Adaptive Neural Systems/SBHSE, ASU)

Rehabilitative Technologies that Monitor Metabolic Demands of Prosthetics in Lower Extremity Amputees during Rehabilitation

Department of Defense
 W81XWH-12-C-0055 01/1/13- 12/31/15; \$129,203
 Primary contract to Barron Associates (PI: Eileen Krepkovich)
 PI on subcontract: Glenn Gaesser, PhD (School of Nutrition and Health Promotion)
Co-investigator: James J. Abbas, PhD (Ctr. for Adaptive Neural Systems/SBHSE, ASU)
 Consultant: Michael Pack, CPO (Artificial Limb Specialists)

Neural-enabled Prostheses with Sensorimotor Integration

NIH-National Institute of Biomedical Imaging and Bioengineering
 R01-EB008578 09/30/07- 06/30/16; \$3,281,759
 PI: Ranu Jung, PhD (Florida International University)
 co-Investigators: Kenneth Horch (Biomedical Engineering)
 Jorge Orbay, MD (Surgery)
 Jeffrey Fan, PhD (Electrical Engineering)
 Dennis McCarthy, PhD, OTR/L (Occupational Therapy)
PIs on subcontracts: James J. Abbas, PhD (Center for Adaptive Neural Systems/BME, ASU)
 James Patrick, Cochlear Ltd., Australia
 Harold Sears, PhD, Motion Control, Inc., Utah, USA

Effective and Reliable Peripheral Interfaces for Prosthetic Control

Defense Advanced Research Projects Agency (DARPA)
 N660001-12-C-4195 01/24/12- 01/23/15; \$705,424
 PI: Ranu Jung, PhD (Florida International University)
Consultants: James J. Abbas, PhD (Center for Adaptive Neural Systems/BME, ASU)
 Michael Pack, CPO (Artificial Limb Specialists)

Stimulation-Augmented Exercise and Neuromotor Therapy

Subcontract on Phase II SBIR to customKYnetics, Inc. from NIH-NICHD

NIH R44-HD050006 04/01/2008-03/31/2013; subcontract budget: \$88,698

PI on SBIR grant: Eric Hartman, MS (customKYnetics, Inc.)

PIs on subcontracts: **James J. Abbas, PhD** (Center for Adaptive Neural Systems/BME, ASU)
Denise Campagnolo, MD (Barrow Neurological Institute)
Edee Field-Fote, PhD, PT (Miami Project to Cure Paralysis)

Exercise Training in Parkinson's Disease: Neural and Functional Benefits

NIH R21-HD060315 09/23/2008 - 02/28/2013 \$495,525

PI: Narayanan Krishnamurthi, PhD (Center for Adaptive Neural Systems)

co-Investigators: **James J. Abbas, PhD** (Center for Adaptive Neural Systems/BME, ASU)
Wayne Willis, PhD (Kinesiology, ASU)
Holly Shill, MD (Sun Health Research Institute)
Kewei Chen, PhD (Banner Good Samaritan Medical Center)
Padma Mahant, MD (Banner Good Samaritan Medical Center)
Johan Samanta, MD (Banner Good Samaritan Medical Center)
Abraham Lieberman, MD (Barrow Neurological Institute)

Improving Orthostatic Tolerance After Spinal Cord Injury

Paralyzed Veterans of America

Award: 2546 02/01/2008 - 01/31/2011 \$150,000

PI: Narayanan Krishnamurthi, PhD (Center for Adaptive Neural Systems)

co-Investigators: **James J. Abbas, PhD** (Center for Adaptive Neural Systems/Bioeng.)
Denise Campagnolo (Center for Adaptive Neural Systems;
Barrow Neurological Institute)

Adaptive Electrical Stimulation for Locomotor Retraining

NIH-NICHD-National Center for Medical Rehabilitation Research

R01-HD049773 08/01/2005-04/30/2011; \$868,573

PI: **James J. Abbas, PhD** (Center for Adaptive Neural Systems/Bioeng.)

co-Investigator: Ranu Jung, PhD

Adaptive Stimulator for Exercise and Rehabilitation

Subcontract on Phase II SBIR to customKYnetics, Inc. from NIH-NICHD-NCMRR

R44-HD41820 07/01/04-06/30/09; subcontract budget: \$234,885

PI on SBIR grant: Eric Hartman, MS (customKYnetics, Inc.)

PI on subcontract: **James J. Abbas, PhD**

CRCNS-Modeling Neuromusculoskeletal Alterations After Spinal Cord Injury

NIH-NSF Joint Program; National Institute of Neurological Disorders & Stroke
 R01-NS10021029 7/1/05-7/31/10, \$1,314,799
 PI: R. Jung, PhD (Center for Adaptive Neural Systems/Bioeng.)
co-Investigator: **James J. Abbas, PhD** (Center for Adaptive Neural Systems/Bioeng.)
 Co-I: A. Razdan, PhD (PRISM/Computer Science)
 Sub-contract: T. Hamm, PhD (Barrow Neurological Institute)
 Sub-contract: G. Yamaguchi, PhD (E^xponent, Inc.)
 Sub-contract: V. Booth, PhD (U. Michigan, Mathematics).

Neuromorphic Control System for Powered Limb Splints

Subcontract on Phase II STTR to AdveNSys, LLC from US Army
 W911NF-05-C-0122 09/28/05-03/31/08 subcontract budget: \$225,805
 PI on STTR: R. Jung, PhD
 Co-I on STTR: V. Jung, MBA (AdveNSys, LLC)
PI on subcontract: **James J. Abbas, PhD** (Center for Adaptive Neural Systems/Bioeng.)

Catalyst- Center of Excellence for Adaptive Neuro-Biomechatronic Systems (CEANS)

National Science Foundation
 SBE-0518697 07/01/05-06/30/08; \$133,118
 PI: Ranu Jung, PhD (Center for Adaptive Neural Systems/Bioeng.)
co-Investigators: **James J. Abbas, PhD** (Center for Adaptive Neural Systems/Bioeng.)
 Carlos Castillo-Chavez (Mathematics)
 Sharon Crook (Mathematics)
 Antonio Garcia (Bioengineering)
 Lokesh Joshi (Biodesign/Bioengineering)
 Yang Kuang (Mathematics)
 Stephen Phillips (Electrical Engineering)
 Anshuman Razdan (PRISM)
 Marco Santello (Kinesiology/Bioengineering)
 Joseph Wang (Biodesign/Chem. & Materials Engineering/ Chemistry)

Force Modulation Training in Children with Cerebral Palsy

NIH- National Institute of Neurological Disorders & Stroke
 F31-NS053010 09/01/05-08/31/08; \$90,000
 PI: Andrea Downing (Center for Adaptive Neural Systems/Bioeng.)
 (Ruth Kirschstein Individual NRSA pre-doctoral fellowship)
Mentor: **James J. Abbas, PhD** (Center for Adaptive Neural Systems/Bioeng.)

Stimulation-Augmented Exercise and Neuromotor Therapy

Subcontract on Phase I SBIR to customKYNetics, Inc. from NIH-NICHD
 NIH R43-HD050006 4/1/06-10/31/07; subcontract budget: \$32,630
 PI on SBIR grant: Eric Hartman, MS (customKYNetics, Inc.)
PI on subcontract: **James J. Abbas, PhD** (Center for Adaptive Neural Systems/Bioeng.)

Neuromorphic Control System for Powered Limb Splints

Subcontract on Phase I STTR to AdveNSys, LLC from US Army
 W911NF-04-L-0071; 08/01/04-01/31/05; subcontract budget: \$31,515
 PI on STTR: Ranu Jung, PhD
 Co-Investigator: Vikram Jung, MBA (AdveNSys, LLC)
PI on subcontract: James J. Abbas, PhD (Center for Adaptive Neural Systems/Bioeng.)

A Rodent Model for Locomotor Training with FNS

NIH-NICHD-National Center for Medical Rehabilitation
 R01-HD40335 01/01/02–12/31/04; \$781,920
 PI: Ranu Jung, PhD (Center for Biomedical Engineering, U. of Kentucky)
co-Investigators: James J. Abbas, PhD (Center for Biomedical Engineering)
 Steve Scheff, PhD (Anatomy & Neurobiology)

Customized Electrical Stimulation for SCI Rehabilitation

Subcontract on Phase II SBIR grant to customKYnetics, Inc. from NIH-NICHD-NCMRR
 R44-HD39013 09/01/02–08/31/04, subcontract budget: \$65,000
 PI on SBIR grant: Eric Hartman, MS (customKYnetics, Inc.)
PI on subcontract: James J. Abbas, PhD
 co-Investigators: Susan McDowell, MD (Physical Medicine & Rehabilitation)

Electrical Stimulation for Trunk Stabilization in SCI

Subcontract on Phase I SBIR grant to customKYnetics, Inc. from NIH-NICHD-NCMRR
 R43-HD041286 04/01/02-09/30/02; \$27,000
 PI on SBIR grant: Eric Hartman, MS (customKYnetics, Inc.)
PI on subcontract: James J. Abbas, PhD
 co-Investigators: Susan McDowell, MD (Physical Medicine & Rehabilitation)

Adaptive Stimulator for Exercise and Rehabilitation

Subcontract on Phase I SBIR grant to customKYnetics, Inc. from NIH-NICHD-NCMRR
 02/01/02–07/31/02, \$17,000
PI on subcontract: James J. Abbas, PhD
 co-Investigators: Susan McDowell, MD (Physical Medicine & Rehabilitation)
 PI on SBIR grant: Eric Hartman, MS (customKYnetics, Inc.)

Preparatory Adjustments for Improved Standing with FNS

NIH-NICHD-National Center for Medical Rehabilitation
 R01-HD38570 05/01/00–04/31/04, \$588,488
PI: James J. Abbas, PhD
 co-Investigators: Jean McCrory, PhD (Kinesiology & Health Promotion)
 David Gater, MD, PhD (Physical Medicine & Rehabilitation)
 Susan McDowell, MD (Physical Medicine & Rehabilitation)
 Ronald J. Triolo, PhD (Case Western Reserve University)
 Robert F. Kirsch, PhD (Case Western Reserve University)

Recovery of Cardiovascular Control after Spinal Cord Injury

Kentucky Spinal Cord & Head Injury Research Trust, 01/01/01–12/31/04, \$279,931

PI: James J. Abbas, PhD

co-Investigators: Joyce Evans, MS (Center for Biomedical Engineering)
Charles F. Knapp, PhD (Center for Biomedical Engineering)
Robert Taylor, MD, PhD (Cardinal Hill Rehabilitation Hospital)
Susan McDowell, MD (Physical Medicine & Rehabilitation)
David Gater, MD (Physical Medicine & Rehabilitation)
David Randall, PhD (Department of Physiology)
David Brown, PhD (Center for Biomedical Engineering)

Automatic Control of Standing Balance with FNS

Subcontract on grant from NIH-National Institute for Neurological Disorders and Stroke

R01-NS-40547-01 07/01/00-06/30/03; subcontract budget: \$124,670

PI on primary: Ronald J. Triolo (Case Western Reserve University)

PI on subcontract: James J. Abbas, PhD

Implanted Neuroprostheses for Standing after SCI

Subcontract on FDA Grant, 10/1/99-09/31/02; subcontract budget: \$92,131

PI on primary: Ronald J. Triolo (Case Western Reserve University)

PI on subcontract: James J. Abbas, PhD

co-Investigators: David Gater, MD, PhD (Physical Medicine & Rehabilitation)
Susan McDowell, MD (Physical Medicine & Rehabilitation)

Individualizing the Design and Use of a FES-based Standing Neuroprosthesis

Subcontract on Department of Veterans Affairs Merit Review Grant

B2105RC, 10/1/99-09/31/02; subcontract budget: \$22,000

PI on primary: Robert F. Kirsch, PhD (Case Western Reserve University)

PI on subcontract: James J. Abbas, PhD

Effects of Phasic Neuromuscular Electrical Stimulation on Functional Recovery in Incomplete Spinal Cord Injury

Kentucky Spinal Cord and Head Injury Trust, 01/01/99-12/31/00; \$124,056

PI: James J. Abbas, PhD

co-Investigator: Susan McDowell, MD (Physical Medicine & Rehabilitation)

Customized Electrical Stimulation for SCI Rehabilitation

Subcontract on Phase I SBIR grant from National Center for Medical Rehabilitation

R43-HD39013, 09/01/00–08/31/01; subcontract budget: \$30,000

PI on subcontract: James J. Abbas, PhD

co-Investigators: David Gater, MD, PhD (Physical Medicine & Rehabilitation)

primary contract to customKYnetics, Inc:

Customized Electrical Stimulation for SCI Rehabilitation, PI: Eric Hartman

Control of Limb Position Using Functional Neuromuscular Stimulation

Whitaker Foundation, 01/01/97-06/30/00; \$208,946

PI: James J. Abbas, PhDco-Investigators: Susan McDowell, MD (Physical Medicine & Rehabilitation)
Bruce Walcott, PhD (Department of Electrical Engineering)*Electrical stimulation for enhanced functional recovery in spinal cord injury*

Paralyzed Veterans of America, Kentucky and Indiana Chapter, 06/99, \$10,000

PI: James J. Abbas, PhD*Trunk Muscle Stimulation for Seated Posture Control in Spinal Cord Injury*

Univ. of Kentucky Medical Center Research Fund, 07/01/98-06/30/99; \$14,945

PI: James J. Abbas, PhDco-Investigators: David Gater, MD, PhD (Physical Medicine & Rehabilitation)
Charles F. Knapp, PhD (Center for Biomedical Engineering)*Biomedical Engineering Approaches to Spinal Cord Injury Research (PI)*

The Whitaker Foundation, Conference Grant, 05/00-07/00; \$10,000

PI: James J. Abbas, PhDco-Investigators: Ranu Jung, PhD (Center for Biomedical Engineering)
James Geddes, PhD (Anatomy & Neurobiology)*Analog VLSI-Spinal Cord Interface for Motor Control*NIH-National Center for Research Resources
R21-RR12588 09/01/97-08/31/00; \$184,901.**PI:** Ranu Jung, PhD (Center for Biomedical Engineering)**co-Investigators:** James J. Abbas, PhD
Elizabeth Brauer, PhD (Northern Arizona University)*Standing by Functional Neuromuscular Stimulation*Subcontract on NIH Neural Prosthesis Contract,
N01-NS-6-2351 11/01/96-09/31/99, subcontract budget: \$140,636**PI on primary:** Ronald J. Triolo, PhD (Case Western Reserve University)co-Investigators: Robert F. Kirsch, PhD (Case Western Reserve University)
John A. Davis, MD (Case Western Reserve University)
James J. Abbas, PhD
Scott Delp, PhD (Northwestern University)**PI on subcontract:** James J. Abbas, PhD

co-Investigator: Susan McDowell, MD (Physical Medicine & Rehabilitation)

Metabolic Analysis in Exercise Physiology and Rehabilitation

Major Research Equipment Grant, U. of Kentucky, 1997, \$27,429

PI: J.W. Yates, PhD (Kinesiology & Health Promotion)**co-Investigators:** James J. Abbas, PhD
David Gater, MD, PhD (Physical Medicine & Rehabilitation)

Design and Assessment of Assistive Technology

Subcontract to on US Army Grant, 11/01/94-10/31/98, \$280,000

PI on subcontract: Jack Winters, PhD

co-PI: James J. Abbas, PhD

primary grant to the National Rehabilitation Hospital: *Assistive Technology Research Center*

US Army Medical Research and Materials Command, 10/94 – 10/98, \$4,000,000

PI: William Peterson (National Rehabilitation Hospital)

(this proposal was funded, but I could not participate due to my departure from Washington, DC)

Adaptive Feedforward Neural Network Control System Design

Subcontract to Catholic University on NSF Grant, 09/01/92–08/31/95; \$80,396

PI on subcontract: James J. Abbas, PhD

primary contract to Case Western Reserve University: *Neural Network Control of Oscillatory Movements of Multi-segmented Musculoskeletal Systems.*

NSF-BCS-9216697, 09/01/92–08/31/95; \$285,387

PI: Howard J. Chizeck, ScD

co-PI: James J. Abbas, PhD

The Application of Artificial Neural Networks to Control FNS-Generated Walking in Children with Spinal Cord Injuries.

Research Fellowship from Shriners Hospitals, 09/01/92–06/30/93, \$45,000

Post-doctoral research fellow: James J. Abbas, PhD

Research mentor: Ronald J. Triolo, PhD

SUMMARY OF PUBLICATIONS AND PRESENTATIONS

Peer-reviewed Publications:	42
Patents Issued:	5
Patents Pending:	4
Peer-reviewed and Invited Book Chapters:	11
Contributions to Publications of the World Health Organization:	2
Peer-reviewed Conference Papers and Abstracts:	76
Abstracts:	54
Invited Presentations and National/International Meetings	20
Invited Seminars	59

PEER-REVIEWED PUBLICATIONS (* INDICATES STUDENTS MENTORED)

1. R. Jung, J.J. Abbas, S Kuntaegowdanahalli, and A.K. Thota, "Bionic intrafascicular interfaces for recording and stimulating peripheral nerve fibers", *to appear in Bioelectronics in Medicine*, 2017.
2. A.E. Pena, S. Kuntaegowdanahalli, J.J. Abbas, J. Patrick, K.W. Horch and R. Jung, "Mechanical fatigue resistance of an implantable branched lead system for a distributed set of longitudinal intrafascicular electrodes", *to appear in J Neural Eng*, 2017.
3. O. Graudejus, T. Li, J. Cheng, N. Keiper*, R. Ponce Wong, A.B. Pak*, and J. Abbas, "The Effects of Bending on the Resistance of Elastically Stretchable Metal Conductors, and a comparison with stretching", *Appl. Phys. Lett.* **110**, 221906 (doi: 10.1063/1.4984207), 2017.
4. J.J. Abbas, B. Smith, M. Poluta, A. Velazquez-Berumen, "Improving Health Care Delivery in Low-Resource Settings with Nanotechnology: Challenges in Multiple Dimensions", *Nanobiomedicine*, Vol 4, pp. 1-14. (doi: 10.1177/1849543517701158), 2017.
5. M. Qiao, J. Abbas and D. Jindrich, "A model for differential leg joint function during human running", *Bioinspiration and Biomimetics*, Vol 12(1), (doi: 10.1088/1748-3190/aa50b0), 2017.
6. C. Howard*, C. Wallace, J. Abbas, and D. Stokic, "Residual Standard Deviation: Validation of a New Measure of Dual-Task Cost in Below-Knee Prosthesis Users", *Gait & Posture*, Vol 15, pp. 91-96, (doi:dx.doi.org/10.1016/j.gaitpost.2016.09.025), 2017.
7. N. Krishnamurthi, H. Shill, D. O'Donnell, P. Mahant, J. Samanta, A. Lieberman and J. Abbas, "Polestriding intervention improves gait and axial symptoms in mild to moderate Parkinson's disease", *Arch PM&R*, Vol. 98(4), pp. 613-621 (doi: 10.1016/j.apmr.2016.10.002), 2017.
8. A. Zbrzeski, Y. Bornat, B. Hillen, R. Siu, J. Abbas, R. Jung, and S. Renaud, "Bio-inspired Controller on an FPGA applied to Closed-loop Diaphragmatic Stimulation", *Frontiers in Neuroscience*, Vol. 10, (doi:dx.doi.org/10.3389/fnins.2016.00275), 2016.
9. J. Jellish*, J.J. Abbas, T. Ingalls, P. Mahant, J. Samanta, M.C. Ospina and N. Krishnamurthi, "A System for Real-Time Feedback to Improve Gait and Posture in Parkinson's Disease", *IEEE J Biomedical and Health Informatics*, vol.19, no.6, pp.1809-1819, doi: 10.1109/JBHI.2015.2472560, 2015.

10. B.K. Hillen, D.L. Jindrich, J.J. Abbas, G. T. Yamaguchi, and R. Jung, "Effects of Spinal Cord Injury Induced Changes in Muscle Activation on Foot Drag in a Computational Rat Ankle Model", *J Neurophys*, 2015.
11. A.K. Thota, S. Kuntaegowdanahalli, A.K. Starosciak, J.J. Abbas, J. Orbay, K.W. Horch, R. Jung, "A System and Method to Interface with Multiple Groups of Axons in Several Fascicles of Peripheral Nerves", *J. Neurosci Methods*, (doi:dx.doi.org/10.1016/j.jneumeth.2014.07.020), 2015.
12. M.N. Abdelghani, J.J. Abbas, K.W. Horch, and R. Jung, "A Functional Model and Simulation of Spinal Motor Pools and Intrafascicular Recordings of Motoneuron Activity in Peripheral Nerve", *Front. Neurosci.*, 8:371. (doi:dx.doi.org/10.3389/fnins.2014.00371), 2014.
13. B.K. Hillen, J.J. Abbas and R. Jung, "Accelerating Locomotor Recovery After Incomplete Spinal Injury" *Annals NY Acad Sciences*, Vol. 1279, pp. 164-174, 2013.
14. B.K. Hillen, G. T. Yamaguchi, J.J. Abbas and R. Jung, "Joint-specific Changes in Locomotor Complexity in the Absence of Muscle Atrophy Following Incomplete Spinal Cord Injury", doi:10.1186/1743-0003-10-97, *J NeuroEngineering and Rehabilitation*, 10:97, 2013.
15. A. Conovaloff*, N. Krishnamurthi, P. Mahant, J. Samanta, J.J. Abbas, "The Effects of Deep Brain Stimulation Amplitude on Motor Performance in Parkinson's Disease", *J Parkinson's Disease & Restless Legs Syndrome*, Vol. 2, pp. 73-83, 2012.
16. N. Krishnamurthi, S. Mulligan*, P. Mahant, J. Samanta, J.J. Abbas, "Deep Brain Stimulation Amplitude Alters Posture Shift Velocity in Parkinson's Disease", doi: 10.1007/s11571-012-9201-5, *Cognitive Neurodynamics*, 2012.
17. R.J. Triolo, S. Nogan Bailey, M.E. Miller, L.M. Rohde, J.S. Anderson, J.A. Davis, Jr., J.J. Abbas, D.R. Gater, G.P. Forrest, L.A. DiPonio, L.J. Yang, "Longitudinal Performance of a Surgically Implanted Neuroprosthesis for Lower Extremity Exercise, Standing, and Transfers after Spinal Cord Injury", *Arch PM&R*, Vol. 93(5), pp. 896-904, 2012.
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(The WHO does not list individual authors on published reports. During the time of my service at the WHO and in the years that followed, I played a major role in two projects and in developing the following reports on those projects.)

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ABSTRACTS (* INDICATES STUDENTS MENTORED)

1. A. Pena, L. Rincon-Gonzalez, J. Abbas, and R. Jung, "Effect of vibrotactile feedback and hand interface compliance on grasp force and hand opening control of a sensorized myoelectric prosthetic hand", Society for Neuroscience 44rd Annual Meeting, Washington, DC, 2017.

2. R. Siu, J. Abbas, B. Hillen, and R. Jung, "Adaptive control of ventilation through respiratory pacing following spinal cord injury", Society for Neuroscience 44rd Annual Meeting, Washington, DC, 2017.
3. M. Qiao, J. Abbas, and D. Jindrich, "Differential Leg Joint Function During Human Running", American Society of Biomechanics, 41st Annual Meeting, Boulder, CO, 2017.
4. E. Frow, J. Abbas, J. Coursen, & S. Helms Tillery, "Growing a Backbone: Developing an 'Ethics Spine' for ASU's Biomedical Engineering Curriculum", ASEE Pacific Southwest Conference, Tempe, AZ, 2017.
5. A. Pena, J. Abbas, L. Rincon-Gonzalez, D. Aguilar and R. Jung, "A sensory substitution system for providing grasping force and hand opening feedback from a sensorized myoelectric hand", Society for Neuroscience 43rd Annual Meeting, San Diego, CA, 2016.
6. i. Black, J. Abbas, A. Thota and R. Jung, "Development of a rootlet interface (RI) to localize cutaneous stimuli applied to specific regions of the rat hindlimb", Society for Neuroscience 43rd Annual Meeting, San Diego, CA, 2016.
7. R. Siu, B. Hillen, A. Thota, J. Abbas, S. Renaud, and R. Jung, "Parametrization of a closed-loop adaptive controller for respiratory pacing in a rat model", Society for Neuroscience 43rd Annual Meeting, San Diego, CA, 2016.
8. A. Pena, S. Kuntaegowdanahalli, J.J. Abbas and R. Jung, "Mechanical fatigue testing of an implantable intrafascicular electrode system" Society for Neuroscience 42st Annual Meeting, Chicago, IL, 2015.
9. L. Rincon-Gonzalez, S. Kuntaegowdanahalli, J.J. Abbas, K. Horch and R. Jung, "Experimental assessment of fitting procedures for a neural-enabled prosthetic hand system", Society for Neuroscience 42st Annual Meeting, Chicago, IL, 2015.
10. A. Thota, S. Kuntaegowdanahalli, K. Horch, J.J. Abbas and R. Jung, "Biocompatibility testing of an implantable intrafascicular electrode system in rabbits", Society for Neuroscience 42st Annual Meeting, Chicago, IL, 2015.
11. A. Thota, S. Kuntaegowdanahalli, R. Siu, J.J. Abbas and R. Jung, "Evaluation of an implantable intrafascicular electrode system in rodents", Society for Neuroscience 42st Annual Meeting, Chicago, IL, 2015.
12. B. Hillen, J. Abbas, S. Renaud, and R. Jung, "Adaptive control of ventilation: effect of initial conditions on adaptation time", Society for Neuroscience 42st Annual Meeting, Chicago, IL, 2015.
13. R. Siu, B. Hillen, S. Renaud, J.J. Abbas and R. Jung, "Neuromuscular Stimulation of Respiratory Muscles for Respiratory Pacing in the Rat Model for the Development of a Neuromorphic Respiratory Controller", Society for Neuroscience 42st Annual Meeting, Chicago, IL, 2015.
14. C. Vuong*, T. Ingalls, P. Mahant, M. C. Ospina, J. Samanta, J. J. Abbas, "Using real-time feedback to target limb placement and limb movement velocity in people with PD", Society for Neuroscience 42st Annual Meeting, New Orleans, LA, 2012.

15. M. N. Abdelghani, A. K. Starosciak, J. Abbas, K. Horch and R. Jung, "A computational model to simulate neural recordings from longitudinal intrafascicular electrodes", Society for Neuroscience 42st Annual Meeting, New Orleans, LA, 2012.
16. K. Narayanan, H. Shill, J. Stovall, O'Donnell, P. Mahant, J. Samanta, A. Lieberman, and J.J. Abbas, "Polestriding improves gait in Parkinson's disease", Society for Neuroscience 41st Annual Meeting, Washington, DC, 2011.
17. K. Narayanan, C. Williams, J. Stovall, A. Biemond, M. Raasch, and J.J. Abbas, "Electrical stimulation training improves orthostatic tolerance in spinal cord injury", Society for Neuroscience 41st Annual Meeting, Washington, DC, 2011.
18. B.K Hillen, J. Abbas, D. Jindrich, and R. Jung, "Computational model of the effects of muscle strength and activation on foot drag in the SCI rat ankle", Society for Neuroscience 38th Annual Meeting, Washington, DC, 2008.
19. N. Krishnamurthi, A. Sitek*, P. Mahant, J. Samanta, and J. J. Abbas, "Effects of Deep Brain Stimulation Amplitude on Gait in Parkinson's Disease" Society for Neuroscience 37th Annual Meeting, San Diego, CA, 2007.
20. M. Bhowmik-Stoker*, R. Herman, S. Allison, and J. J. Abbas, "Adaptive control of electrical stimulation to supplement locomotor retraining after spinal cord injury" Society for Neuroscience 37th Annual Meeting, San Diego, CA, 2007.
21. A.L. Downing*, D.R. Fay, and J.J. Abbas, "Force Coordination Training in Children with Spastic Diplegia", Society for Neuroscience 37th Annual Meeting, San Diego, CA, 2007.
22. B.K. Hillen, J.J. Abbas, G. Yamaguchi and R. Jung, "Effects of spinal cord injury on musculoskeletal parameters in the rodent.", Society for Neuroscience 37th Annual Meeting, San Diego, CA, 2007.
23. S. Allison*, M. Bhowmik*, D. Channer, R. Herman, J. J. Abbas, "Selecting suitable movement patterns for locomotor retraining using partial weight bearing therapy" Society for Neuroscience 36th Annual Meeting, Atlanta, Georgia, 2006.
24. A. J. Sitek*, J. J. Abbas, D. M. Lieberman, P. Mahant, J. Samanta, "Location and orientation of active contacts in deep brain stimulation systems", Society for Neuroscience 36th Annual Meeting, Atlanta, Georgia, 2006.
25. R. Jung, A. Belanger, T. Kanchiku, J. Lynskey, M. Mukherjee, D. Hagner, J.J. Abbas, "Hindlimb neuromuscular stimulation therapy after thoracic contusion injury promotes locomotor recovery", 11th Annual Conference of the International Functional Electrical Stimulation Society, Miyagi-Zhao, Japan, 2006.
26. T. Kanchiku, J.V. Lynskey, T. Tagachi, J.J. Abbas, R. Jung, "Rodent model for forelimb neuromuscular stimulation based movement therapy". 11th Annual Conference of the International Functional Electrical Stimulation Society, Miyagi-Zhao, Japan, 2006.
27. A. Sitek*. D. Liberman, and J.J. Abbas, "DBS Electrode Location and Clinical Outcomes in Parkinson's Disease", American Society of Stereotactic and Functional Neurosurgery, 2006, Boston, MA.
28. K. Narayanan, S. Mulligan*, P. Mahant, J. Samanta and J.J. Abbas, "Deep Brain Stimulation Effects on Posture Control in Parkinson's Disease", World Parkinson Congress, Feb., 2006,

Washington D.C. Abstract published in *Movement Disorders*, Vol. 21/Suppl. 13, 2006, Abstract No. P209, Page. S115.

29. S. Mulligan*, K. Narayanan, P. Mahant, J. Samanta and J.J. Abbas, "Effect of deep brain stimulation on posture control in Parkinson's disease", 9th International Congress of Parkinson's disease and Movement Disorders, New Orleans, LA, 2005.
30. J.V. Lynskey, A. Belanger, T. Kanchiku, G. Venkatasubramanian, M. Mukherjee, A. Thota, J. Abbas, R. Jung. "Therapeutic Neuromuscular Stimulation Therapy Improves Recovery of Locomotion after Incomplete Spinal Cord Injury in Adult Rats". 11th International Symposium on Neural Regeneration, Asilomar, CA, 2005.
31. G. Venkatasubramanian, T. Kanchiku, M. Mukherjee, J.J. Abbas, R. Jung. "Functional neuromuscular stimulation after spinal cord injury: a rodent model". 23rd Annual National Neurotrauma Society Meeting, Washington DC, Nov 10-11, 2005.
32. M. Mukherjee A. Belanger, T. Kanchiku, J. Lynskey, A. Thota, J.J. Abbas, R. Jung. "Functional neuromuscular stimulation after incomplete spinal cord injury in rodents promotes recovery of locomotion". 23rd Annual National Neurotrauma Society Meeting, Washington DC, 2005.
33. K. Kanchiku, A. Belanger, G. Venkatasubramanian, M. Mukherjee, J.V. Lynskey, A. Thota, J. Abbas, R. Jung. "Functional Neuromuscular Stimulation Therapy Promotes Recovery of Locomotion after Incomplete Spinal Cord Injury in Adult Rats". Cervical Spine Research Society 33rd Annual Meeting, San Diego, CA, 2005
34. A. Belanger, T. Kanchiku, M. Mukherjee, J. Lynskey, J.J. Abbas, R. Jung. "A Rodent Model of Functional Neuromuscular Stimulation Therapy after Incomplete Spinal Cord Injury", Society for Neuroscience Annual Meeting, Washington DC. 2005.
35. G. Venkatasubramanian, T. Kanchiku, M. Mukherjee, J.J. Abbas, R. Jung. "Functional Neuromuscular Stimulation (FNS) Assisted Locomotion in a Paraplegic Rodent", Society for Neuroscience Annual Meeting, Washington DC. 2005.
36. G. Venkatasubramanian, K. Ichihara, J.J. Abbas, R. Jung. "Functional Neuromuscular Stimulation in a Paraplegic Rodent Model: Electrode Design, Implantation and Assessment", (presentation at the 22nd National Neurotrauma Society, San Diego, CA, 2004) *J. Neurotrauma* 21(9):P225, pg. 1320 2004..
37. K. Ichihara, G. Venkatasubramanian, J.J. Abbas, R. Jung. 'Electrical stimulation paradigms to assist in locomotor training after spinal cord injury'. (presentation at the National Neurotrauma Society, Biloxi, MS, 2003), *J. Neurotrauma*, 20(10):P412 pg.1131, 2003.
38. V.Krishnamohan, J.J.Abbas, G.T.Yamaguchi, R.Jung, "Biomechanical Model of an Unloaded Rat Hindlimb", *Soc. Neurosci. Abs.*, 2003.
39. J.C. Gillette, N.E. Quick, J.J. Abbas, "Hand Support Forces When Using Functional Neuromuscular Stimulation to Assist in Standing", *Proc. ACSM*, 2003.
40. N. Ravi, V. Booth, J.J. Abbas and R. Jung, "A two-compartment vertebrate motoneuron model to investigate effects of afferent nerve stimulation", *Soc. Neurosci. Abs.*, 2002.
41. A. Thota, R. Jung and J.J. Abbas, "Adaptive control of endpoint position by weighted activation of force fields", *Annals BME Suppl.*, 2001.

42. S. Grandhe, J.J. Abbas and R. Jung. "Periodic perturbation effects on locomotor rhythm and motor pattern generation in the lamprey". *Soc. for Neuroscience Abstracts*, 26(2):834.1, 2000.
43. R. Jung, E.J. Brauer and J.J. Abbas, "A Real-time Neuromorphic Analog VLSI-Spinal Cord Interface for Rhythmic Motor Control", *Soc. for Neuroscience Abstracts*, Vol. 25, 422.3, p. 1038, 1999.
44. J.A. Riess*, Neiser, J.D.*, E. Hartman* and J.J. Abbas, "Evaluation of Input Devices for Use in Functional Neuromuscular Stimulation", *Annals BME Suppl.*, pp. S-132, 1998.
45. X. Zhang*, J.J. Abbas and R.J. Triolo, "The Effects of Co-stimulation Map Parameters on FNS System Performance", *Annals BME Suppl.*, pp. S-133, 1998.
46. P. Kataria* and J.J. Abbas, "Estimating Body Segment Orientation Using a Lightweight, Inexpensive Gyroscope", *Annals BME Suppl.*, pp. S-133, 1998.
47. E. Hartman* and J.J. Abbas, "Time Delays and Model Reference Adaptive Control in Function Neuromuscular Stimulation", *Annals BME Suppl.*, pp. S-133, 1998.
48. R. Jung, J.J. Abbas and E.J. Brauer, "Entrainment of An Analog VLSI Model of Lamprey Unit Pattern Generator", *Annals BME Suppl.*, pp. S- 99, 1998.
49. L. Knapp, J. Atchison, R. Shapiro, R. Salcido and J.J. Abbas, "Electromyographic and Kinematic Analysis of the Painful Hemiplegic Shoulder Before and After Subscapularis Motor Point Block", *Proc. AAPM&R*, (Chicago), 1996.
50. E. Stites* and J.J. Abbas, "Parameter Selection in an Adaptive Control System for Biomedical Applications", *KY Acad. Sciences*, (Frankfort, KY), 1996.
51. L. Knapp, J. Atchison, R. Shapiro, R. Salcido and J.J. Abbas, "Electromyographic and Kinematic Analysis of the Painful Hemiplegic Shoulder Before and After Subscapularis Motor Point Block", *Gait and Posture*, Vol. 4, p. 182, 1996.
52. J.J. Abbas and S.P. Jayasundera*, "Adaptive Control of Movement Using Models of Neural Circuitry", *Soc. for Neuroscience Abstracts*, p. 147, (San Diego, CA), 1995.
53. S.P. Jayasundera* and J.J. Abbas, "Adaptive Neural Network Control of a Stepping Movement in a Three Segment Model", *Proc. BMES Society Conf.*, (Phoenix, AZ), 1994.
54. J.J. Abbas and H.J. Chizeck, "Processing Skin Stretch Sensor Measurements of Hip and Trunk Angles", in *Proc. 40th ACEMB Conf.* (Niagara Falls, NY), pp. 222, 1987.

INVITED PRESENTATIONS AT NATIONAL/INTERNATIONAL MEETINGS

1. "Adaptive Neural Stimulation for Control of Respiration", to be presented in a session on "Spinal Cord Lesions and Clinical Motor Control" at Progress in Clinical Motor Control I: Neurorehabilitation, (State College, PA), July 2018
2. "Challenges for Clinical Deployment for Long-term Use of Neural Interfaces", presented at a Mini-Symposium on Challenges for Chronic Neural Prosthetics at IEEE EMBC Conf., (Chicago, IL), August, 2014.
3. "Local Production of Medical Devices in Sub-Saharan Africa: Characterizing the Landscape and Assessing Feasibility", Workshop presentation at the 2nd WHO Global Forum on Medical Devices, presented with M. Poluta, A. Sabet Sarvastani, and A. Velazquez-Berumen, (Geneva, Switzerland), November, 2013.
4. "Smart Hybrid Biosystems in Prosthetics and Rehabilitation", IEEE BioCAS 2010, (Paphos, Cyprus), November, 2010.
5. "Neural Oscillators and Cyclic Movements", Organization for Computational Neurosciences, CNS*2010, (San Antonio, TX), July, 2010.
6. "Adaptation in the FES Device and in the Nervous System", Contemporary Forums on Spinal Cord Injuries, (Boston, MA), May, 2010.
7. "Neuromorphogenic Adaptation", presented at Institute for Neuromorphic Engineering 15th Annual Workshop (Telluride, CO), July 2008.
8. "Adaptive Neural Systems", presented at the 3rd International Conference on Body Area Networks, (Tempe, AZ), March, 2008.
9. "Personalized neuromuscular electrical stimulation for exercise or neuromotor therapy", J. Abbas, 30th Annual Meeting of the Mid-Atlantic Regional Chapter of the American College of Sports Medicine (Harrisburg, PA), Nov. 2, 2007.
10. "Neuromorphic Design of Smart Prosthetic and Therapeutic Systems", presented at Institute for Neuromorphic Engineering 14th Annual Workshop (Telluride, CO), July 2007.
11. "Smart Prosthetics" presentation the Board of the National Academies and to the Beckman Center Advisory Board, (Irvine, CA), Feb. 2007.
12. "Control of movement using electrical stimulation of paralyzed muscles: a medical problem suited for a neuromorphic solution?" presented at the Institute for Neuromorphic Engineering Workshop, (Zurich, Switzerland), 2005.
13. "Functional Neuromuscular Stimulation", presented at *1st Annual Neurorehabilitation Symposium, "Clinical Advances in Neurorehabilitation Science"*, (Lexington, KY), Sept. 2001. (organized workshop and gave oral presentation for clinicians on current practice and new research in the use of electrical stimulation systems)
14. "Using Mathematical Models and Advanced Control Systems Techniques to Enhance Neuroprosthesis Function", presented with R. Riener at *6th Annual Conference of the International Functional Electrical Stimulation Society*, (Cleveland, OH), June 2001.
15. "Adaptive Algorithms to Custom-fit the Neuroprosthesis to the User", presented at the *NIPS*2000 Workshop*, (Breckenridge, CO), Dec. 2000.

16. "Neural Networks for Control of Posture and Locomotion", presented at the *American Control Conference*, (Albuquerque, NM), June, 1997.
17. "Justifying Technology in the Managed Care Environment", presented at *9th Annual Interdisciplinary Rehabilitation Conference*, (Lexington, KY), August, 1996.
18. "Application of Neural Pattern Generators for the Restoration of Motor Function using Functional Neuromuscular Stimulation", presented at *Biomechanics & Neural Control of Movement Conference* (Mt. Sterling, OH), June 1996.
19. "Functional Electrical Stimulation Ambulation Techniques", presented at *Spinal Cord Injury: Issues and Advances*, (Washington, DC), Nov. 1994.
20. "The Use of Neural Network Algorithms in Functional Neuromuscular Stimulation Control Systems", presented at *Neural Prostheses: Motor Systems IV Conference* (Mt. Sterling, OH), July 1994.

INVITED SEMINARS

1. "Advanced prostheses: Are research directions aligned with amputee preferences?", Lincoln Center for Applied Ethics, (Tempe, AZ), Sept., 2017.
2. "Problem-Based Learning", Kwame Nkrumah University of Science and Technology (KNUST), (Kumasi, Ghana), March, 2017.
3. "Adaptive closed-loop neuromotor control after spinal cord injury", The Cuban Neuroscience Center (CNEURO), (Havana, Cuba), November, 2016.
4. "Adventures in Humanitarian Engineering", (with M. Henderson and V. Pizziconi), Mandela Washington Fellows Program, Arizona State University (Tempe, AZ), July, 2016.
5. "Neurotechnology and Interactive Rehabilitation for Sensorimotor Restoration", Tel Aviv Sourasky Medical Center (Tel Aviv, Israel), May, 2016.
6. "Spinal cord injury research: Emerging technologies to promote recovery, enhance function and improve health after SCI", Barrow Spinal Cord Injury Symposium, (Phoenix, AZ), Feb., 2015.
7. "Modeling World Health Organization Prototypes to Pursue the Development and Production of a Medical Device Industry in Uganda: Identifying Challenges and Seizing Opportunities", Uganda Biomedical Braintrust Meeting, (Miami, FL), Sept., 2014.
8. "The Role of Physical Activity and the Use of Adaptive Technology in the Treatment of Non-Communicable Diseases", Indian Institute of Technology – Delhi, (New Delhi, India), March 2014.
9. "Improving access to quality healthcare using medical technology", World Health Organization, (Geneva, Switzerland), Nov. 2013.
10. "Adaptive Technology, Neural Adaptation and Rehabilitation", Institute of Biomaterials and Biomedical Engineering, University of Toronto, (Toronto, Canada), Apr. 2011.
11. "Adaptive Technology to Promote Neural Adaptation", The Miami Project, (Miami, FL), Mar. 2011.

12. "Neural Systems, Rehabilitation Engineering, and Adaptive Processes", Paradise Valley Hospital, (Phoenix, AZ), May 2010.
13. "Promoting Neural Adaptation Using Adaptive Technology", Dept. of Kinesiology, University of Maryland, (College Park, MD), Oct. 2009.
14. "Adaptive Biomimetic Technology to Promote Neural Adaptation", Biomedical Distinguished Lecture Series, National Centre for Biomedical Engineering Science, National University of Ireland, Galway, (Galway, Ireland), July, 2009.
15. "Neuromorphic Design of Adaptive Systems for Neuromotor Rehabilitation", Department of Mechanical Engineering, University of Florida, (Gainesville, FL), Feb. 2009.
16. "Personalized Technology for Neuromotor Therapy", Department of Physical Therapy, University of Florida, (Gainesville, FL), Feb. 2009.
17. "Adaptive Biomimetic Technology to Promote Neural Adaptation", Joint Basic Medical Sciences and Biomedical Informatics Departmental Seminar Series, Arizona State University, (Tempe, AZ), Oct. 2008.
18. "Promoting Neural Adaptation using Adaptive Technology", Department of Electrical Engineering, Northern Arizona University, (Flagstaff, AZ), Oct. 2008.
19. "Advances in neuromotor therapy after spinal cord injury", J. Abbas, 8th Educational Conference of the Arizona Spinal Cord Injury Association (Phoenix, AZ), Oct. 2007.
20. "Delivering Neurotechnology", presented at 'Commercializing Arizona Forum' (Phoenix, AZ), Oct. 2007.
21. "Improving neuromotor function after incomplete spinal cord injury", Neurorehabilitation Unit, Barrow Neurological Institute, (Phoenix, AZ), Sept. 2007.
22. "Parkinson's Disease: Treatment Using Deep Brain Stimulation" Arizona Grand Democrats, (Sun City, AZ), March 2007.
23. "Traumatic Spinal Cord Injury: Adaptation and Recovery" President's Community Enrichment Program, Arizona State University, (Tempe, AZ), March 2007.
24. "Adaptive Neural Systems", Arizona State University Foundation, (Tempe, AZ), Oct. 2006.
25. "Designing Adaptive Systems to Promote Adaptation in Neural Systems", The Biodesign Institute at Arizona State University, (Tempe, AZ), June 2006.
26. "Technology to Promote Adaptation in Neural Systems", Discovery Tour, The Ira A. Fulton School of Engineering, Arizona State University, (Tempe, AZ), April 2006.
27. "Neuroengineering and Neurorehabilitation", The Biodesign Institute, Arizona State University, (Tempe, AZ), Feb. 2006.
28. "Unlocking the Mysteries of the Brain" ASU Adventures in Learning Program, Arizona State University, (Tempe, AZ), November 2005. (presented with Thomas Hamm from Barrow Neurological Institute)
29. "Spinal Cord Injury Research", presented at the Annual Meeting of the Arizona Spinal Injury Association, (Phoenix, AZ), Oct. 2005.
30. "Improving Deep Brain Stimulation System Parameter Selection", Wintech, Department of Electrical Engineering, Arizona State University, (Tempe, AZ), Nov. 2005.

31. "Deep Brain Stimulation after Parkinson's Disease: Developing Strategies for Improved Clinical Outcomes", presented with N. Krishnamurthi and A. Sitek at the Biodesign Institute, Arizona State University, (Tempe, AZ), Sept. 2005.
32. "Neuroprostheses and neuromotor therapy after spinal cord injury", Neurorehabilitation Unit, Barrow Neurological Institute, (Phoenix, AZ), Feb. 2005.
33. "Neuromuscular electrical stimulation for exercise and neuromotor therapy after spinal cord injury", The NeuroInstitute, (Tempe, AZ), Feb. 2005.
34. "New Strategies for Using Electrical Stimulation in Neurorehabilitation", Barrow Neurological Institute, (Phoenix, AZ), Jan. 2004.
35. "Standing after spinal cord injury: strategies for improving functional performance", Biomedical Engineering Program, University of Arizona, (Tucson, AZ) April 2003.
36. "Posture Control in Parkinson's Disease", Department of Kinesiology, Arizona State University, (Tempe, AZ), Dec. 2003.
37. "Adaptive Control of Systems for Neurorehabilitation", Department of Mathematics and Statistics, Arizona State University, (Tempe, AZ) Nov. 2003.
38. "Standing after spinal cord injury: strategies for improving functional performance", NSF IGERT Program on Neural & Musculoskeletal Adaptation in Form & Function, Arizona State University, (Tempe, AZ) Feb. 2003.
39. "Standing after spinal cord injury: strategies for improving functional performance", Scottsdale Community College, (Tempe, AZ) Feb. 2003.
40. "Engineering a new era in medical rehabilitation", Biomedical Engineering Department Seminar, Arizona State University, (Tempe, AZ) Sept. 2002.
41. "Advances in Neurorehabilitation: Functional Electrical Stimulation for Standing, Exercise and Therapy after Spinal Cord Injury" presented at the annual research symposium at the Rehabilitation Hospital of Indiana (Indianapolis, IN), June 2002.
42. "Neural Stimulation for Motor Control" presented to the Lexington Chapter of the IEEE (Lexington, KY), May 2001.
43. "Bioengineering the Nervous System: approaches to investigate, replace and repair the injured spinal cord" presented to the KY-IN Chapter of the Paralyzed Veterans of America (Louisville, KY), Sept. 2000.
44. "Fitting the Neural Prosthesis to the User", Department of Electrical Engineering, University of Twente, (Enschede, The Netherlands), July, 2000.
45. "Fitting the Neural Prosthesis to the User", Center for Biomedical Engineering, University of Kentucky (Lexington, KY), April 1999.
46. "Customizing the FNS Control System for the User", Neural Prosthesis Seminar, FES Center, Case Western Reserve University, (Cleveland, OH), March 1999.
47. "Using Mathematics in the Rehabilitation of People with Spinal Cord Injury", presented to 1996 NSF Mathematics Research Experience for Undergraduates (REU) Program at The University of Kentucky, (Lexington, KY), July 1996.

48. "Laboratory Methods for Implementing and Evaluating Neural Control Systems", presented to 1996 NSF Mathematics Research Experience for Undergraduates (REU) Program at The University of Kentucky, (Lexington, KY), July 1996.
49. "Closed-Loop Control of FNS Walking", presented at FES Center, (Cleveland, OH), March 1995.
50. "Modulated Reflexes and Multi-joint Control of FNS Systems", presented at the Rehabilitation Engineering Center, MetroGeneral Health Center, (Cleveland, OH), March 1995.
51. "Neural Network Control of Functional Neuromuscular Stimulation Systems", presented at Center for Biomedical Engineering, University of Kentucky, (Lexington, KY), Jan. 1995.
52. "Using Neural Models in the Design of a Biomedical Engineering Control System", presented at The Mathematical Research Branch, NIH, (Bethesda, MD), Aug. 1994.
53. "Neural Network Control of Cyclic Movements Using Functional Neuromuscular Stimulation", presented at Dept. of Physiology, Howard Univ. Medical School, (Washington, DC), Feb. 1994.
54. "Control of Functional Neuromuscular Stimulation Systems", presented at Shriver Laboratory, University of Maryland at College Park, (College Park, MD), Oct. 1993.
55. "Neural Network Control of Cyclic Movements Using Functional Neuromuscular Stimulation", presented at Dept. of Mechanical Engineering, The Catholic University of America, (Washington, DC), March 1993.
56. "Neural Network Control of Cyclic Movements Using Functional Neuromuscular Stimulation", presented at Dept. of Bioengineering, Univ. of Pennsylvania, (Philadelphia, PA), October 1992.
57. "Neural Network Control of Functional Neuromuscular Stimulation Systems", presented at Dept. of Biomedical Engineering, Case Western Reserve Univ.,(Cleveland, OH), May 1992.
58. "Neural Network Control of Cyclic Movements Using Functional Neuromuscular Stimulation", presented at Dept. of Bio, Chemical and Materials Engineering, Arizona State University, (Tempe, AZ), April 1992.
59. "Feedback Control of Coronal Plane Hip and Trunk Angles Using Functional Neuromuscular Stimulation", presented at Dept. of Biomedical Engineering, Case Western Reserve University, (Cleveland, OH), Sept. 1989.

SUMMARY OF HONORS, OFFICES AND SERVICE ACTIVITIES

<p>Editorships:</p> <ul style="list-style-type: none"> • currently serving as Assoc. Editor or on Editorial Board for 4 journals • previously held 3 other editorship positions
<p>Conference Organization:</p> <ul style="list-style-type: none"> • Track Chair or Subtrack Organizer for 2 recent BMES Conferences • Program Committee Coordinator for a WHO Conference • Organizing Committee or Technical Program Committee for 3 conferences • Session Chair or Co-Chair at 9 conferences
<p>Other Honors and Offices:</p> <ul style="list-style-type: none"> • 9 other honors or offices held
<p>University Honors:</p> <ul style="list-style-type: none"> • 'Top Five Percent Faculty' in Engineering teaching award
<p>Invited Reviewer:</p> <ul style="list-style-type: none"> • Chair of 9 Funding Agency Review Panels • Member of 67 Funding Agency Review Panels; ad hoc reviews for 12 institutions • Reviewed for 20 Journals (multiple manuscripts) • Reviewed for 8 Conferences (multiple years)
<p>University Service while at ASU:</p> <ul style="list-style-type: none"> • currently Co-Chair of the Dean's Faculty Advisory Committee (the promotion and tenure committee of the largest engineering school in the US) • service on 4 different Engineering School Dean's committees • chaired 1 search committee; served on 7 others • service on the Faculty Senate • service as faculty advisor for the Student Chapter of Engineering World Health • service on unit's Personnel Committee and Safety Committee • service on committees for 2 other units (Electrical Engineering and Bioinformatics) • service on committees for 2 other institutions (Univ. of Arizona College of Medicine, Banner Good Samaritan Medical Center)
<p>University Service while at the University of Kentucky:</p> <ul style="list-style-type: none"> • Biomedical Engineering: chair or member of 5 committees • Dept. of Physical Medicine and Rehabilitation: chair or member of 8 committees • Spinal Cord and Brain Injury Research Center: member of 3 committees • service on committees or boards for 6 other units

NATIONAL/INTERNATIONAL HONORS AND OFFICES

Editorships:

Dec. '14 – present	Associate Editor, IEEE Neural Engineering Conference
April '10 – present	Associate Editor, IEEE EMBS Conference Editorial Board (CEB)
June '09 - present	Review Editor, Frontiers in Neuroengineering
June '03 - present	Editorial Board, Journal of Neuroengineering and Rehabilitation
Oct. '14 – Mar. '17	Associate Editor, International Journal of Clinical Engineering and Health Technology Assessment (CEHTA)
Sept. '99	Assistant Editor, <i>Assistive Technology</i> , Special Issue on Functional Electrical Stimulation.
June - Dec. '96	Section Co-Editor, “Section IV: Neuromechanical Interaction in Rhythmic Systems” in <u>Biomechanics and Neural Control of Movement</u> , Ed. by J.M. Winters & P.E. Crago, Springer-Verlag, 2000.

Conference organization:

Oct. '17	Respiratory Bioengineering Track Chair Biomedical Engineering Society Annual Meeting Phoenix, AZ, 2017
Oct. '14	Global Health Technologies Subtrack Organizer, Biomedical Engineering Society Annual Meeting San Antonio, TX, 2014
November '13	Programme Committee Coordinator, Local Organizing Committee Member, and Workshop Organizer (Local Production of Medical Devices) 2 nd WHO Global Forum on Medical Devices, Geneva, Switzerland
Sept. '08	Organizing Committee and Technical Program Committee, Annual Conference of the International Functional Electrical Stimulation Society (IFESS), Freiburg, Germany
Sept. '07	Session Co-Chair, Neural Stimulation and Rehabilitation Session, BMES Annual Meeting, Los Angeles, California.

- Sept. '03 Session Co-Chair,
Functional Electrical Stimulation Session,
IEEE/EMBS Conference, Cancun, Mexico.
- Jan '03 – June 03 Member, Scientific Program Committee,
Annual Conference of the Internal Functional Electrical Stimulation
Society (IFESS), Queensland, Australia.
- Oct. '02 Session Co-Chair,
Functional Electrical Stimulation Session,
Joint EMBS/BMES Conference, Houston, TX.
- June '01 Session Co-Chair,
Biomechanics, Modeling and Control Session,
Annual Conf. of Intl. Functional Electrical Stimulation Society (IFESS),
Cleveland, OH.
- July '00 – June 01 Member, Scientific Program Committee,
Annual Conference of the Internal Functional Electrical Stimulation
Society (IFESS), Cleveland, OH.
- April '00 Session Chair, Computational Models of Neural Control of
Movement: Failure and Recovery Session.
Neural Control of Movement Conference, Key West, FL
- October '98 Session Co-Chair,
Musculoskeletal Modeling Session, BMES Conference, Cleveland, OH.
- October '98 Session Co-Chair,
Measurement Devices and Control Session,
BMES Conf., Cleveland, OH.
- October '94 Session Co-Chair,
Young Investigator Symposium, Neural Prosthesis Workshop,
National Institutes of Health, Bethesda, MD.
- April '94 Session Co-Chair,
Neuromotor Control Systems Session,
13th Southern Biomedical Engineering Conference, Washington, DC.

Other Honors and Offices

- Jan '17 Selected Team Participant; National Academy of Engineering
“Workshop on Overcoming Challenges to Infusing Ethics into the
Development of Engineers”; Jan. 2017, Washington, DC.
- March '13 Senior Member,
Institute of Electrical and Electronics Engineers (IEEE)
- May '12 Thought Leader Interviewee,
Vision Task Force, American Physical Therapy Association

- Jan '02 – '12 Member, Rehabilitation Engineering Advisory Panel,
Rehabilitation Engineering Research Center on Recreational
Technologies, University of Illinois, Chicago.
- Nov '06 Selected Participant; 4th Annual National Academies Keck *Futures
Initiative* Conference on “Smart Prosthetics: Exploring Assistive
Devices for the Body and Mind”; Nov 9-12, Irvine, CA.
- Jan. '02 – Dec. 04 Treasurer, Intl. Functional Electrical Stimulation Society (IFESS)
- Sept. '00 - Sept. '03 Chair,
Special Interest Group on Functional Neuromuscular Stimulation,
RESNA.
- June '00 Invited Participant,
NIH-NINDS sponsored Workshop: "Functional and Dysfunctional
Spinal Circuitry: Role for Rehabilitation and Neural Prostheses"
UCLA, Los Angeles, CA
- Sept. '99 - Sept. '00 Chair-elect,
Special Interest Group on Functional Neuromuscular Stimulation,
RESNA.

UNIVERSITY HONORS

- 2012 “Top Five Percent Faculty”, Ira A. Fulton Schools of Engineering.
In recognition of teaching excellence.

INVITED REVIEWER

Chair, Funding Agency Review Panels:

National Institutes of Health:

National Institute for Child Health and Development, Chair, Special Emphasis Panel
(2013)

National Institute for Child Health and Development; Function, Integration and
Rehabilitation Subcommittee; National Center for Medical Rehabilitation
Research, Chair, ad hoc panel (2013a,b)

Congressionally-Directed Medical Research Program:

Panel Chair (2010, 2011, 2012, 2014a, 2014b, 2015)

Member, Funding Agency Review Panel:

National Institutes of Health:

SBIR Health Disparities (2016)

New Innovator Award Program (2014)

Rehabilitation Research Career Development Programs, National Center for Medical
Rehabilitation Research, (2012)

Musculoskeletal Rehabilitation Sciences Study Section (2012)

EUREKA Study Section (2011)

National Center for Medical Rehabilitation Research, ad hoc reviews (2010, 2011)
Function, Integration and Rehabilitation Subcommittee, National Center for Medical
Rehabilitation Research, Standing Member (2006-2010),
National Institute of Neurological Disorders & Stroke, Special Emphasis Panel (2007)
National Institute of Neurological Disorders and Stroke Initial Review Group (2006)
Clinical Neuroscience and Disease Study Section (2006 a,b)
National Center for Medical Rehabilitation Research, Special Study Section (2005-6)
Brain Disorders and Clinical Neurosciences-1, Ad-hoc member (2007; 2006;
2005a,b,c; 2004a,b,c; 2001)
Medical Rehabilitation Research Subcommittee Study Section (2002)
Human Brain Project Special Emphasis Study Section (2002)
Geriatrics and Rehabilitation Medicine Study Section (2001, 2002)
Multidisciplinary Clinical Sciences Special Emphasis Study Section (9 panel
meetings, 1995-1999).

Department of Education:

National Institute for Disability and Rehabilitation Research Rehabilitation
Engineering Research Center Panel, (2004)
National Institute for Disability and Rehabilitation Research Field Initiated Research
Review Panel Standing Member, (1999-2003)
National Institute for Disability and Rehabilitation Research Small Business
Innovation Research Review Panel, (2000-2001)

National Science Foundation:

Biomedical Engineering Career Awards Review Panel (2001)
Integrative Biology and Neuroscience, Ad-hoc Review (2001)
Biomedical Engineering Research to Aid Persons with Disabilities Panel (2000, 2001)
Instrument Development for Biological Research, Ad-hoc Review (2000)
Computational Neuroscience, Ad-hoc Reviewer (1996)
Behavioral Neuroscience. Ad-hoc Reviewer (1996)
Biological Systems Analysis & Control Panel (1995)
Biomechanics & Rehabilitation Panel (1994)

Congressionally-Directed Medical Research Program:

Peer-Reviewed Medical Research Panel (2014, 2015, 2017)

Department of Veterans Affairs, Rehabilitation Research & Development
(2003,2010,2013, 2015)

Department of Defense:

US Army MRMC (2008, 2016)

Paralyzed Veterans of America (2017)

Natural Sciences and Engineering Research Council of Canada (2017)

Innovation and Technology Commission, Government of Hong Kong (2017)

Medical Research Council, United Kingdom (2012)

Neurological Foundation of New Zealand (2009)

Canada Foundation for Innovation (2009)

Netherlands Technology Foundation (2009)

University of Wisconsin (2008)

Barrow Neurological Institute (2007a,b).
 University of Southern California.
 The National Academies (2003).

Journals:

- Bulletin of the World Health Organization
- PLOS ONE
- PLOS Computational Biology
- Journal of Neuroengineering and Rehabilitation
- IEEE Transactions on Biomedical Engineering
- IEEE Transactions on Rehabilitation Engineering
- IEEE Transactions on Systems, Man & Cybernetics
- Frontiers in Neuroscience
- Frontiers in Neuroengineering
- Annals of Biomedical Engineering
- Neuromodulation
- Scholarpedia
- Computers in Biology and Medicine
- Assistive Technology
- Intelligent Systems Engineering
- Biomedical Instrumentation and Technology
- Advances in Skin and Wound Care
- Physics in Medicine & Biology
- Journal of Rehabilitation Research and Development
- Experimental Neurology

Conferences:

- IEEE Neural Engineering Conference
- Design of Medical Devices Conference
- WHO Global Forum on Medical Devices
- Internal Functional Electrical Stimulation Society Annual Conference
- IEEE Engineering in Medicine & Biology Conference
- Biomedical Engineering Society Conference
- Canadian National Spinal Cord Injury Conference
- Rehabilitation Engineering Society of North America Conference

UNIVERSITY SERVICE

Arizona State University

2017- present	Co-Chair, Dean’s Faculty Advisory Committee, Ira A. Fulton Schools of Engineering.
2016- 2017	Member, Biomedical Device Design Search Committee, School of Biological and Health Systems Engineering
2015- 2017	Member, Dean’s Faculty Advisory Committee, Ira A. Fulton Schools of Engineering.

2015- present	Member, Dean's Limited Submissions Review Committee, Ira A. Fulton Schools of Engineering.
2014- present	Member, Grand Challenge Scholars Faculty Oversight Committee, Ira A. Fulton Schools of Engineering.
2014- present	Faculty Advisor, Student Chapter of Engineering World Health, Ira A. Fulton Schools of Engineering.
2014	Member, Personnel Committee, School of Biological and Health Systems Engineering.
2012- 2013	Faculty Advisor, Student Chapter of Engineering World Health, Ira A. Fulton Schools of Engineering.
2011- 2013	Member, Dean's Executive Committee, Ira A. Fulton Schools of Engineering.
2011- 2013	Member, Personnel Committee, School of Biological and Health Systems Engineering.
2010- 2013	Senator, Faculty Senate Representative of the School of Biological and Health Systems Engineering.
2010- 2013	External Member, Promotion and Tenure Committee, Department of Biomedical Informatics.
2009- 2013	Member, Grand Challenge Scholars Faculty Oversight Committee, Ira A. Fulton Schools of Engineering.
2009 - 2011	Member, Health Care Search Committee, Ira A. Fulton Schools of Engineering
2006-2007	Member, Biosensors Search Committee, Electrical Engineering.
2005-2006	Member, Bioengineering Dept. Chair Search Committee.
2003-2004	Chair, Neuroprosthesis Search Committee, Bioengineering.
2003-2004	Member, BioMEMS Search Committee, Bioengineering.
2003-2004	Member, Motor Control Search Committee, Bioengineering.
2003-2004	Member, Biomechanics Search Committee, Bioengineering.
2003-2007	Member, Personnel Committee, Bioengineering.
2005-2006	Member, Safety Committee, Bioengineering.

University of Arizona College of Medicine - Phoenix

2008-2010	Research Planning Committee, Neurosciences
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Banner Good Samaritan Medical Center

2007-2009	Chair, Data Safety and Monitoring Board, Memantine Effects on ALS
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University of Kentucky: Center for Biomedical Engineering

2001	Chair, Faculty Search Committee.
2001	Directed the upgrade of bioinstrumentation teaching lab facilities.

- 1997–2002 Member, Research Program Development Committee.
Participated in the planning and preparation of multi-investigator research initiatives from the Center for Biomedical Engineering.
- 1997–2002 Member, Educational Program Development Committee.
Participated in the planning of new educational initiatives to be offered by the Center for Biomedical Engineering.
- 1995–1999 Coordinator, Website Development Committee.
Initiated, developed and maintained the website for the Center.

University of Kentucky: Department of Physical Medicine & Rehabilitation

- 2001-2002 Chair, Research Committee.
- 2001-2002 Chair, Multi-disciplinary Spinal Cord Injury Research Committee.
- 2001-2002 Member, Search Committee for Endowed Chair, Department of Physical Medicine & Rehabilitation.
- 2000 Research Day Planning and Organization.
- 1997–2001 Member, Multi-disciplinary Spinal Cord Injury Research Committee.
- 1996-2001 Member, Research Committee.
- 1999 Research Day Planning and Organization.
- 1998 Research Day Planning and Organization.

University of Kentucky: Spinal Cord and Brain Injury Research Center

- 2000–2002 Member, Internal Advisory Board
- 2000–2001 Member, Conference Organizing Committee, *Clinical Advances in Neurorehabilitation Science*
- 2000 Member, Planning Committee, *KY Spinal Cord and Head Injury Research Conference*

University of Kentucky: Department of Kinesiology and Health Promotion

- 2000-2002 Member, Doctoral Program Advisory Board.

University of Kentucky: Department of Special Education and Rehabilitation Counseling

- 1995-2002 Member, Consumer Advisory Board, Technology Subcommittee.

University of Kentucky: Multi-disciplinary

- 1997 Faculty Mentor,
NSF Mathematics Research Experience for Undergraduates (REU) Program at The University of Kentucky (2 students).
- 1996 Faculty Mentor,
NSF Mathematics Research Experience for Undergraduates (REU) Program at The University of Kentucky.
- 1994 Instructor, "Engineering 2000" summer program for high school seniors, School of Engineering, The Catholic University of America.

University of Kentucky: Graduate School

2000 –2002

Member, Biomedical Sciences Panel of the Graduate Council
Committee on Fellowships and Traineeships

SUMMARY OF TEACHING AND MENTORSHIP ACTIVITIES

Teaching (at ASU, U. Kentucky, and Catholic University):

- taught 25 different courses (multiple semesters)
- lectures in 28 courses (multiple semesters; 11 in other departments; 2 in other institutions)

Students Mentored (at ASU, U. Kentucky, and Catholic University):

- primary mentor or co-mentor for:
 - 6 doctoral students (5 female biomedical engineers)
 - 20 MS Thesis Students (~ 50% female; 1 minority student)
 - 15 MS Applied Projects (1 semester project)
 - 2 post-doctoral fellows
 - 8 Undergraduate Honors Theses
 - 13 Undergraduate Research Projects
 - 2 post-baccalaureate research projects (both minority students)
 - 6 research projects for Doctorate in Physical Therapy students
 - 145 BME Capstone students mentored (3 or 4 students per project)
- served on thesis committees for:
 - 28 doctoral students (7 different departments)
 - 24 MS Thesis students
 - 7 Undergraduate Honors Theses
- awards:
 - 3 awards to mentored doctoral students
 - 2 awards to mentored undergraduate teams

COURSES TAUGHT

Arizona State University:

2002-present

The ASU Experience (ASU 101)
 Engineering Perspectives on Biological Systems (BME 111)
 Design of Experiments/Clinical Trials (BME 394, BME 361)
 Biomechanics (BME 416)
 Biomedical Instrumentation Lab (BME 423)
 Technology for Global Health (BME 494/BME 598)
 Human Systems Neuroscience (BME 556/NEU 556)
 Applied Projects (coordinator) (BME 593)
 Modeling and Simulation of Physiological Systems (BME 598)
 Neural Prostheses (BME 598)
 Introduction to Neural Engineering (BME 598)
 Neuromechanics of Balance and Gait (BME 598)

Lectures in:

Introduction to Bioengineering (BME 100, 101)
The ASU Experience (ASU 101)
Engineering Perspectives on Biological Systems (BME 111)
Grand Challenges for Engineering (FSE 150)
Perspectives on Grand Challenges for Engineering (FSE 194)
Bioengineering Product Design (BME 300)
Motor and Developmental Learning (KIN 345)
Microcomputer Applications in Bioengineering (BME 370)
Best Practices in Humanitarian Engineering (EGR 371)
Biomedical Instrumentation (BME 413)
Biomedical Engineering Capstone Design (BME 417)
Biocontrol Systems (BME 419)
Neurobiology (BIO 467)
Scientific Communications (BME 598)
Computational Neuroscience (BME 598)
Systems Neurophysiology (BME 598)
Human Systems Neuroscience (BME 598)
Advanced Physiology (BME 598)
Anatomy & Biomechanics (BME 598)
CNS Injury and Repair (Neurological Sciences Block in Med. School, U. of Arizona
Medical School in partnership with Arizona State University)
Neuromotor Assessment (Doctorate of Physical Therapy program at Franklin Pierce
University)
Human-Centered Design of Assistive and Adaptive Technology for People with
Disabilities (IGERT, BME 598)

The University of Kentucky:

1995- 2002

Biomedical Control Systems I (BME 610)
Biomedical Applications of Neural Networks (BME 699-002)
Advanced Biomedical Control Systems (BME 699-004)
Neural Networks for Biomedical Control (BME 781-004)
Measurement and Characterization of Muscle Function (BME 481-G)
Independent Work in Biology (BIO 395)
Engineering Techniques for Assessment and Treatment of Adult Neurological Disorders
(BME 781-006; team taught)
Biomedical Instrumentation (BME 530; team taught)
Foundations of Biomedical Engineering (BME 501; team taught)
Neural Engineering (EE 599; invited lectures)
Muscle Physiology (KHP 781; invited lectures)
Research Methods in Rehabilitation (Physical Medicine & Rehabilitation, invited lectures)

The Catholic University of America:

1993-1995

Neural Stimulation in Rehabilitation (BE 531)
Biological Systems & Control (BE 516)

Human Locomotion (BE 522)
Engineering Mechanics I (ENGR 201)
Modeling Neural Systems (BE 532)
Neural Control Systems (BE 732)
Nonlinear Dynamics of Physiological Systems (BE 733)

STUDENT MENTORSHIP

Awards to mentored students:

Andrea Downing, *Force Modulation Training in Children with Cerebral Palsy*, Ruth Kirschstein Individual NRSA Pre-Doctoral Fellowship, National Institute of Neurological Disorders & Stroke, 2005.

Alison Conovaloff, *Flinn Foundation Bioengineering Fellowship*, 2003; Faculty Emeriti Fellowship, 2005.

Charla Howard, American Academy of Orthotists and Prosthetists *Thranhardt Lecture Finalist*, 2013.

William Langenbach, Kirsten Jefferys, Taylor Deegan (Undergraduate Capstone Design Team): *Real-time Angle Measurement Tool for Spinal Fusion Surgery*, Gore Funding Award, 2015.

María José Quezada, Arianna Moreno, Brandon Bartels, Haley Sivertson (Undergraduate Capstone Design Team): *StepPlus*, BioAccel Solutions Challenge Award, 2017.

Primary advisor for:

GRADUATE STUDENTS

School of Biological and Health Systems Engineering (formerly Harrington Department of Bioengineering), Arizona State University:

Stefani Mulligan, MS, 2005,

Thesis title: *Effect of Deep Brain Stimulation on Postural Control in Parkinson's Disease*

Brian Glaister, MS, 2005

Thesis title: *Analysis of Prosthetic Feet in Above Knee Amputees*

Andrew Hayes, MS, 2005

Thesis title: *Effect of Wheelchair Seatback on Propulsion in Experienced Manual Wheelchair Users*

Shelly Allison, MS, 2006

Thesis title: *Adaptive Control of Locomotion During Partial Weight Bearing Therapy*

Almir Halilcevic, MS, 2006

Project title: *Evaluation of PDA Platform for Development of Closed-Loop Functional Neuromuscular Stimulation Systems*

Anjali Gupta, MS, 2006 (co-advised with Kristi Csavina, PhD)

- Thesis title: *The Effect of Screw Diameter on the Fixation of a Lateral Plateau Split Fracture*
Elliot Downing, MS, 2006 (co-advised with Neil Crawford, PhD)
Thesis title: *Subject-Specific Finite Element Modeling of the Lower Cervical Spine*
- John McCamley, MS, 2007 (co-advised with Kristi Csavina, PhD)
Thesis title: *Kinematics and Kinetics of Stair Climbing in Elderly Subjects: The Effects of Minimally Invasive Total Knee Arthroplasty*
- Kimberly Yarnall, MS 2007 (co-advised with Kristi Csavina, PhD)
Thesis title: *Functional changes in gait during level walking and stair climbing after intertrochanteric hip fractures*
- Alex Pacanowsky, MS, 2008
Thesis title: *Exercise Response to Voluntary Arm Crank Ergometry and Electrically Stimulated Leg Cycling in a Subject with Complete Tetraplegia*
- Andrea Downing, PhD, 2008
Thesis title: *Force Production and Control in Children with Cerebral Palsy*
- Alison Conovaloff, PhD, 2013
Thesis title: *The Effects of Deep Brain Stimulation Amplitude on Motor Performance in Parkinson's Disease*
- Shruthi Balasubramanian, MS, 2014
(co-advised with Narayanan Krishnamurthi, PhD)
Thesis Title: *Age-Related Changes in Balance and Gait*
- Jeremy Jellish, MS, 2014
(co-advised with Narayanan Krishnamurthi, PhD)
Thesis Title: *Real-Time Feedback to Improve Posture and Gait in Parkinson's Disease*
- Saaransh Jain, MS, 2015
(co-advised with Jeffrey LaBelle, PhD)
Thesis Title: *Development and Validation of a Novel Biomechanical Testing Setup and Procedure for Olecranon Fracture Fixation Assessment*
- Catherine Vuong Smith, PhD, 2015.
(co-advised with Todd Ingalls)
Thesis Title: *Feedback Paradigm for Rehabilitation of People with Parkinson's Disease*
- Charla Lindley, PhD, 2017.
Thesis Title: *Techniques to Assess Balance and Mobility in Lower-Limb Prosthesis Users*
- Deepika Baskaran, MS, 2017.
Thesis Title: *Real-Time Feedback Training to Improve Gait and Posture in Parkinson's Disease*
- Anna Newcomb, PhD, expected 2018.
(co-advised with Neil Crawford, PhD)

Mechanical Engineering, School of Engineering of Matter, Transport and Energy,
Arizona State University:

Bennion Cannon, PhD, expected 2018.

Postbaccalaureate Research Education Program, Arizona State University

Danielle Sampson, 2010.

Teron Lindsey, 2016.

Center for Biomedical Engineering, University of Kentucky:

JoAnne A. Riess, MS, 1997

Thesis title: *Evaluation of Adaptive Neural Network and Feedback Controllers in Cyclic Movement using Functional Neuromuscular Stimulation*

Pankaj Kataria, MS, 1999

Thesis title: *User Controlled Functional Neuromuscular Stimulation System with an Adaptive Neural Network*

Eric Hartman, MS, 2000

Thesis title: *Evaluation of a Neural Network Controller for an Antagonist Muscle System: An Approach for Control of Coronal Plane Standing Using FNS*

Xia Zhang, MS, 2000

Thesis title: *The Effects of Hip Muscle Properties and Co-stimulation on the Control of Standing Using Functional Neuromuscular Stimulation*

Junli Ou, MS, 2001

Thesis title: *Adaptive Control of Multi-segment Movements Using Functional Electrical Stimulation.*

Joseph Finley, MS, 2002

Thesis title: *Feedback Signals to Adjust and Control Standing Posture*

MS APPLIED RESEARCH PROJECT STUDENTS:

Masters in Biomedical Engineering, Arizona State University

Christopher LeBeau, 2011

Jieying Pan, 2012

Lusha Chen, 2012

David Hilgers, 2013

Diana Tran, 2016

Payton Herrera, 2016 (co-mentored with N. Krishnamurthi)

Cole Brown, 2016 (co-mentored with B. Kelly)

Alyssa Oberman, 2016 (co-mentored with J. Peles)

Raj Ahir, 2016 (co-mentored with N. Krishnamurthi)

Derek Titus, 2016 (co-mentored with B. Smith, E. Frow)

Candice Chen, 2017

Vanessa Barker, 2017 (co-mentored with B. Kelly)

Kirsten Jefferys, 2017 (co-mentored with B. Kelly)

Austin Jacobson, 2017 (co-mentored with S. Foldes)

Zachary Winters, 2017 (co-mentored with S. Foldes)

POST-DOCTORAL FELLOWS

Jason C. Gillette, PhD 1999-2002.
 Alfred Haas, PhD, 2009-2011.

UNDERGRADUATE STUDENTS

Barrett, The Honors College, Arizona State University:

Crystal Ong, Honors Thesis Mentor, 2003.
 Thesis title: *Computer/Internet Interface Device for a Person with Limited Motor Control*

Anjali Gupta, Honors Thesis Mentor, 2004
 Thesis title: *Wheelchair Mobile Arm Support for a Muscular Dystrophy Patient*

Jeremy Jellish, Honors Thesis Mentor, 2010-11
 Thesis title: *Effects of Rowing Exercise on Seated Posture Control in Persons with Spinal Cord Injury*

John Spanias, Honors Thesis Mentor, 2010-11
 Thesis title: *Stroke Rehabilitation Using Functional Electrical Stimulation: Evaluating Algorithms for Adaptive Control*

Shravan Sridhar, Honors Thesis Mentor, 2010-11
 Thesis title: *The Effects of Rowing Exercise Therapy on Shoulder Range of Motion and Steadiness in Individuals with Spinal Cord Injury*

Stuart Wentz, Honors Thesis Co-Mentor (w/ R. Jung), 2010-11
 Thesis title: *Adaptive Diaphragmatic Pacing for Respiratory Rehabilitation Therapy*

Tamara Sleem, Honors Thesis Co-Mentor (w/ T. Hamm), 2017-18
 Gabriel Kaplan, Honors Thesis Mentor, 2017-18

Harrington Department of Bioengineering, Arizona State University:

Luis Landgrave, Fulton Undergraduate Research Initiative, 2005
 Modesto Lopez, Minority Access to Research Careers Fellow, 2007-08
 Casey Weinstein, Fulton Undergraduate Research Initiative, 2014
 Adam Pak, Fulton Undergraduate Research Initiative, 2015
 Thanh Nguyen, Fulton Undergraduate Research Initiative, 2015, 2016

Harrington Department of Bioengineering, Capstone Design Project Mentor:

2003-2004:	Anjali Gupta	Karen Lewis
	Darius Sanders	Kellen Van Ausdal
2004-2005:	David Breedlove	Tyson Padgett
	Edhem Sadikovic	Kimberly Yarnall
2005-2006:	Mark Schmitz	Leela Doppalapudi
	Darjan Emkic	Luis Landgrave
	Simon Lubek	Samira Mirtalaei
	Mark Schmitz	Chi-Hui Wang
	Nikhil Sadhwani	
2006-2007:	Jaime Stovall	Noel Pense

	Kevan Bayne	Jessie Helsey
	Michael Germain	
2007-2008:	Sarah Balch	Chrissy Hobson
	Kaycee Halla	Shari Lassiter
	Michael Kubany	Matt Sondreaal
	Modesto Lopez	
2008-2009:	Jason Clark	Coleman Bessert
	Alex Sitek	Greg Walton
	Manar Shahbandar	Scott Kuhlman
2009-2010:	Osnat Artsi	Benjamin Bosch
	Alan Busovaca	Jessica Butcher
	Cammi Kellar	Corina Prieto
	Christine Randolph	Adrian Salazar
2010-2011:	Cameron Adler	Raisa Ahmad
	Megan Anderson	Nathan Bates
	Benjamin Cantrill	Tasha Chesko
	Eric Collinge	Walter Hafner
	Barry Hancher	Ashley Jaeger
	Jeremy Jellish	Christopher Kennely
	Laura Kuning	Jennifer Lehrman
	Benjamin O'Toole	Ben Teplistky
	Michael Trobiano	John Spanias
	Shravan Sridhar	
2011-2012:	Mark O'Donnell	David Medina
	Marizza Bravo	Brad Rach
2012-2013:	Joshua Hammer	Andrea McFerren
	Steven Mullane	James Bonelli
	Zoran Bundalo	David DeJeu
	David Konves	Bronwyn Bitsilly
	Emily Christman	Zachary Coovert
	Scarlett Schmale	Kyle Thomas
	Benjamin Worth	Brandon Hendrickson
	Mitzi Thelakkaden	Ranil Joshua
	Shean Howlett	Tara Wright
	Ami Thakrar	Neekta Hamidi
	Thelma Okocha	Vivek Devadas
	Victor Orioke	
2014-2015:	Rohan Kumar	Frank Petty
	Cody Lane	Sebern Sloan
	Ben Sears	Tanner Wright
	Dante Sadeghpour	Chris Baroldy
2015-2016:	Vanessa Barker	Candice Chen
	Ujwala Vaka	Joseph Del Rosario
	Scott Ashmore	Luke Lammers

	Daniel Palmer	Matsemela Moloji
	Jason Van Egmond	Jacob Schwarz
	<i>w/ B. Kelly:</i>	William Langenbach
	Kirsten Jeffreys	Taylor Deegan
	<i>w/ N. Krishnamurthi:</i>	Vivian Vuong
	Tanya Singh	Miles Parris
	<i>w/ J. Blain-Christen:</i>	Ariana Richert
	Ashley Iveny	Jesse Munoz
	Roger Rose	
2016-2017:	Quintin Woods	Alexander Bugarin
	John Sherman	Kinjal Ahir
	Matthew Devera	Sharon Gooi
	Lindsey Macias	Caitlin Byrne
	Alvaro Rascon	Daylin Morgan
	<i>w/ N. Krishnamurthi:</i>	
	María José Quezada	Arianna Moreno
	Brandon Bartels	Haley Sivertson
2017-2018:	Esteban Cruz	Dakota Graham
	John Cunningham	Shaheeda Adusei
	Ruby Afriyie Obeng	Douglas Amoo-Sargon
	Eugene Ablordeppey	Danielle Beach
	Sara Gubrud	Lauren Tuttle
	<i>w/ J. Blain-Christen:</i>	
	Ryan Giudice	Gareth Palas
	Karthik Nambiar	Mohammad Alhusayni

University of Kentucky:

Lawrence Jackson (undergraduate Kinesiology student; mentored independent research project, 2001-2002)

Julia Parakkat (undergraduate Biosystems and Agricultural Engineering student; mentored independent research project, 2001)

Lucas Kennedy (undergraduate Biology student; mentored independent research project, 2000)

Anne Schwarting (undergraduate Biology student; mentored independent research project, 1999)

Udesh deSilva (undergraduate Biology student; independent research project, 1998)

Edward C. Stites (undergraduate Math student; 1996 NSF REU program, 1997 sponsored independent research project; University of Kentucky)

Jason Neiser (undergraduate Physics student; 1997 NSF REU program).

Sarah Dean (undergrad. Math/Biomed Eng. student; 1997 NSF-REU program).

Co-mentorship of Research Projects:

Doctorate in Physical Therapy Program, Arizona School of Health Sciences

Kristen Johnson, 2009-2010 (Primary mentor: James Lynskey, PT, PhD)
Kaitlin Clark, 2009-2010 (Primary mentor: James Lynskey, PT, PhD)
Kyle Cherney, 2010-2011 (Primary mentor: James Lynskey, PT, PhD)
Shaun Rice, 2010-2011 (Primary mentor: James Lynskey, PT, PhD)
Michelle Ducy, 2012-2013 (Primary mentor: James Lynskey, PT, PhD)
Kamini Halani, 2012-2013 (Primary mentor: James Lynskey, PT, PhD)

Served on Doctoral Dissertation Committee:

Harrington Department of Bioengineering, Arizona State University:

Helen Huang, PhD, 2006 (Advisor: Jiping He, PhD)
Jacob Goble, PhD, 2007 (Advisor: Natalia Dounskia, PhD)
Joseph Graham, PhD, 2008 (Advisor: Ranu Jung, PhD)
Lubna Ahmad, PhD, 2009 (Advisor: Lokesh Joshi, PhD)
Mallika Fairchild, PhD, 2009 (Advisor: Ranu Jung, PhD)
Sivakumar Balasubramanian, PhD, 2009 (Advisor: Jiping He, PhD)
Lisa Raleigh, PhD, 2010 (Advisor: Marco Santello, PhD)
Brian Hillen, PhD, 2012 (Advisor: Ranu Jung, PhD)
Sindhu Anand, PhD, 2013 (Advisor: Jit Muthuswamy, PhD)
Aprinda Indahlastari, PhD, 2017 (Advisor: Rosalind Sadleir, PhD)
Steven Lathers, PhD, 2018 (Advisor: Jeffrey LaBelle, PhD)
Jonathan Plasencia, PhD, expected 2018 (Advisor: David Frakes, PhD)
Swathy Sampath Kumar, PhD, expected 2018 (Advisor: Jit Muthuswamy, PhD)
Saba Rezvanian, PhD, expected 2019 (Advisor: Thurmon Lockhart, PhD)
Jonathan Garich, PhD, expected 2019 (Advisor: Jennifer Blain-Christen)
Vladislav Voziyanov, PhD, expected 2019 (Advisor: Jit Muthuswamy, PhD)
Markey Olson, PhD, expected 2020 (Advisor: Thurmon Lockhart, PhD)

Mechanical Engineering, School of Engineering of Matter, Transport and Energy,
Arizona State University:

Masood Nevisipour, PhD, expected 2018 (Advisor: Claire Honeycutt, PhD)

Department of Electrical Engineering, Arizona State University:

Niranjan Charkravarthy, PhD, 2007 (Advisor: Leon Iasemidis, PhD)
Shivkumar Sebasan, PhD, 2008 (Advisor: Leon Iasemidis, PhD)

Department of Kinesiology, Arizona State University:

Mu Qiao, PhD, 2012 (Advisor: Devin Jindrich, PhD)
Christopher Colloca, PhD, 2015 (Advisor: Richard Hinrichs, PhD)

Department of Biomedical Engineering, Florida International University:

Ilian Black, PhD, expected 2018 (Advisor: Ranu Jung, PhD)
Andres Pena, PhD, expected 2018 (Advisor: Ranu Jung, PhD)
Ricardo Siu, PhD, expected 2018 (Advisor: Ranu Jung, PhD)
Ashfaq Ahmed, PhD, expected 2019 (Advisor: Ranu Jung, PhD)

Institute of Biomaterials and Biomedical Engineering, University of Toronto:

Albert Vette, PhD, 2011 (Advisor: Milos Popovic, PhD)

Department of Kinesiology and Health Promotion, University of Kentucky:

Timothy Brindle, PhD, 2001, (Advisor: Robert Shapiro, PhD)

Served on MS Thesis Committee:

Harrington Department of Bioengineering, Arizona State University:

Ryan Knight, MS, 2003, (Advisor: Jiping He, PhD)
Matthew Dixon, MS, 2003, (Advisor: Gary Yamaguchi, PhD)
Jeremy Crandell, MS, 2003, (Advisor: Gary Yamaguchi, PhD)
Patrick Koegler, MS, 2004, (Advisor: Gary Yamaguchi, PhD)
Adam Bellanger, MS, 2005 (Advisor: Ranu Jung, PhD)
Ganapriya Venkatasubramanian. MS, 2005 (Advisor: Ranu Jung, PhD)
Joseph M. Guerricabeitia, MS, 2006, (Advisor: James Sweeney, PhD)
Jeremy Crandell, MS, 2007, (Advisor: Stephen Helms-Tillery, PhD)
Kimberly Tan, MS, 2009, (Advisor: James Sweeney, PhD)
Rashaad Sidique, MS, 2010 (Advisor: Bruce Towe, PhD)
Shawna Fletcher, MS, 2010 (Advisor: Christopher Buneo, PhD)
Simon Lubeck, MS, 2010 (Advisor: Kevin Bennett, PhD)
Samhavi Subramanian, MS, 2010 (Advisor: Ranu Jung, PhD.)
Sanchit Chirania Nolastname, MS, 2016 (Advisor: Bruce Towe, PhD)
Siva Palaniswamy, MS, 2016 (Advisor: Jit Muthuswamy, PhD)
Anngela Adams, MS, 2017 (Advisor: Jeffrey LaBelle, PhD)
Jake Turner, MS, expected 2018 (Advisor: Thurmon Lockhart, PhD)

Center for Biomedical Engineering, University of Kentucky:

Sarvani Grandhe, MS, 1999, (Advisor: Ranu Jung, PhD)
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Department of Mechanical Engineering, The Catholic University of America:

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Served on Undergraduate Honors Thesis Committee:

Harrington Department of Bioengineering, Arizona State University:

Taryn Jansen, BS, Barrett Honors College Thesis, 2004 (Advisor: Ranu Jung, PhD)

Charles McCartney, BS, Barrett Honors College Thesis, 2005 (Advisor: J. Davidson)

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Travis Johnson, BS, 2005, Barrett Honors College Thesis (Advisor: K. Matt, PhD)

Brian Brown, BS, 2010, Barrett Honors College Thesis (Advisor: Devin Jindrich, PhD)

Lisa Schroeder, BS, 2012, Barrett Honors College Thesis (Advisor: R. Hinrichs, PhD)

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Stanley Brewer, BS, 2008 Honor Thesis (Advisor: Eddie Casteneda, PhD)