

JAMES J. ABBAS, Ph.D.

CONTACT INFORMATION

Address: Center for Adaptive Neural Systems
School of Biological and Health Systems Engineering
PO Box 879709, Arizona State University
Tempe, AZ 85287-9709

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Citizenship: USA

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
(formerly Harrington Department of Bioengineering)
Arizona State University, Tempe, AZ.

- Jan '10 - present **Member, Graduate Faculty.**
Graduate Program in Mechanical Engineering
School of Mechanical, Aerospace, Chemical & Materials Engineering
Arizona State University, Tempe, AZ.
- Aug '08 - present **Member, Graduate Faculty.**
Interdisciplinary Graduate Program in Neuroscience
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 Department
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.

Neural-enabled Prostheses with Sensorimotor Integration

NIH-National Institute of Biomedical Imaging and Bioengineering
 R01-EB008578 09/30/07- 06/30/15; \$3,281,759
 PI: Ranu Jung, Ph.D (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, Ph.D (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)
 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)
 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, Ph.D. (Center for Adaptive Neural Systems/Bioeng.)
 co-Investigator: Ranu Jung, Ph.D.

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, Ph.D. (Center for Adaptive Neural Systems/Bioeng.)
co-Investigator: James J. Abbas, Ph.D. (Center for Adaptive Neural Systems/Bioeng.)
 Co-I: A. Razdan, Ph.D. (PRISM/Computer Science)
 Sub-contract: T. Hamm, Ph.D. (Barrow Neurological Institute)
 Sub-contract: G. Yamaguchi, Ph.D. (E^xponent, Inc.)
 Sub-contract: V. Booth, Ph.D. (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, Ph.D.
 Co-I on STTR: V. Jung, MBA (AdveNSys, LLC)
PI on subcontract: James J. Abbas, Ph.D. (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, Ph.D. (Center for Adaptive Neural Systems/Bioeng.)
co-Investigators: James J. Abbas, Ph.D. (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, Ph.D.

Co-Investigator: Vikram Jung, MBA (AdveNSys, LLC)

PI on subcontract: James J. Abbas, Ph.D. (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

Sucontract 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, PhD

co-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, PhD

co-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, PhD

co-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

PEER-REVIEWED PUBLICATIONS (* indicates students mentored)

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.

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.

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:10.3389/fnins.2014.00371), 2014

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. Neuroscience Methods*, (dx.doi.org/10.1016/j.jneumeth.2014.07.020), 2014.

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.

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.

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.

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.

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.

M.L. Boninger, J. French, J. Abbas, L Nagy, M. Ferguson Pell, S. Johnson Taylor, M. Rodgers, N. Saunders, P.H. Peckham, R. Marshall, and A. Sherwood, "Technology for mobility in SCI ten years from now", *Spinal Cord*, Vol. 50, pp. 358-363, doi:10.1038/sc.2011.165, 2012.

M. Fairchild, S.J. Kim, A. Iarkov, J.J. Abbas, R. Jung, "Repetitive hindlimb movement using intermittent adaptive neuromuscular electrical stimulation in an incomplete spinal cord injury rodent model", *Exp Neurol*. Vol. 223(2), pp. 623-33, 2010.

R. Jung, A. Belanger, T. Kanchiku, M. Fairchild, and J.J. Abbas, "Neuromuscular stimulation therapy after incomplete spinal cord injury promotes recovery of locomotor control", *J. Neural Eng.*, Vol. 6(5), doi:10.1088/1741-2560/6/5/055010, 2009.

- R. Jung, K. Ichihara, G. Venkatasubramanian and J.J. Abbas, "Chronic neuromuscular electrical stimulation of paralyzed hindlimbs in a rodent model", *J. Neuroscience Methods*, Vol. 183(2), pp. 241-54, 2009.
- A. Downing*, K. Ganley, D.R. Fay, and J.J. Abbas, "Temporal characteristics of lower extremity moment generation in children with cerebral palsy", *Muscle & Nerve*, 29, pp. 800-809, 2009.
- S. J. Kim, M. Fairchild, A. Iarkov, J.J. Abbas, and R. Jung, "Adaptive control of movement for neuromuscular stimulation-assisted therapy in a rodent model", *IEEE Trans. Biomed. Eng.*, Vol. 56(2), pp. 452-461, 2009.
- K. Ichihara, G. Venkatasubramanian, J.J. Abbas, and R. Jung. "Neuromuscular electrical stimulation of the hindlimb muscles for movement therapy in a rodent model". *J Neurosci Methods*, Vol. 176(2), pp. 213-224, 2009.
- J.C. Gillette, C. A. Stevermer, N.E. Quick, and J.J. Abbas, "Alternative foot placements for individuals with spinal cord injuries standing with the assistance of functional neuromuscular stimulation", *Gait and Posture*, Vol. 27(2), pp.280-285, 2008.
- T.J. Kanchiku, J.V. Lynskey, D. Protas, J.J. Abbas and R. Jung. "Neuromuscular electrical stimulation induced forelimb movement in a rodent model", *J. Neurosci. Methods*, Vol. 167(2), pp. 317-26, 2008.
- J.C. Gillette and J.J. Abbas, "Foot Placement Alters the Mechanisms of Postural Control While Standing and Reaching", *IEEE Trans. Neural Systems & Rehab*, Vol. 11(4), pp. 377-385, 2003.
- J.C. Gillette, N.E. Quick, and J.J. Abbas, "Center of pressure measures to assess FNS standing performance" *Biomedical Sci Instrum*, Vol. 38, pp. 239-244, 2002.
- J.A. Riess*, and J.J. Abbas, "Adaptive Control of Cyclic Movements as Muscles Fatigue Using Functional Neuromuscular Stimulation", *IEEE Trans. Rehab. Eng.* Vol. 9(3), pp. 326-330, 2001.
- J.J. Abbas and R. Riener, "Using Mathematical Models and Advanced Control Systems Techniques to Enhance Neuroprosthesis Function", *Neuromodulation*, Vol. 4(4), pp. 187-195, 2001.
- R. Jung, E.J. Brauer, and J.J. Abbas, "Real-time Interaction Between a Neuromorphic Electronic Circuit and the Spinal Cord", *IEEE Trans. Rehab. Eng.* Vol. 9(3), pp. 319-326, 2001.
- J.J. Abbas and J.C. Gillette, "Approaches to Control Standing Posture using Electrical Stimulation", *IEEE Control Systems Mag.* Vol. 21(4), pp. 80-90, 2001.
- E. Stites* and J.J. Abbas "Sensitivity and Versatility of an Adaptive System for Controlling Cyclic Movements Using Functional Neuromuscular Stimulation", *IEEE Trans. Biomed. Eng.* Vol. 47(9), pp. 1287-1292, 2000.
- J.A. Riess* and J.J. Abbas, "Adaptive Neural Network Control of Cyclic Movements Using Functional Neuromuscular Stimulation", *IEEE Trans. Rehab. Eng.*, Vol. 8(1), pp. 42-52, 2000.
- D.R. Gater, S.M. McDowell, and J.J. Abbas, "Electrical Stimulation: A Societal Perspective", *Assistive Technology*, Vol. 12, pp. 85-91, 2000.

S. Grandhe, J.J. Abbas and R. Jung, "Brain-spinal cord interactions stabilize the locomotor rhythm to an external perturbation", *Biomedical Sci Instrum*, Vol. 35, pp. 175-180, 1999.

J.J. Abbas and R.J. Triolo, "Experimental Evaluation of an Adaptive Feedforward Controller for Use in Functional Neuromuscular Stimulation Systems", *IEEE Trans. Rehab. Eng.*, Vol. 5(1), pp. 12-22, 1997.

J.A. Riess* and J.J. Abbas, "Evaluation of FNS Control Systems: Software Development and Sensor Characterization", *Biomedical Sci Instrum*, Vol. 33, pp. 197-202, 1997.

P.E. Crago, N. Lan, P.H. Veltink, J.J. Abbas and C. Kantor, "New Control Strategies for Neuroprosthetic Systems", *J. Rehab. Res. & Devel.*, Vol. 33(2), pp.158-172, 1996.

J.J. Abbas and H.J. Chizeck, "Neural Network Control of Functional Neuromuscular Stimulation Systems: Computer Simulation Studies", *IEEE Trans. Biomed. Eng.*, Vol. 42(11), pp. 1117-1126, 1995.

J.J. Abbas and H.J. Chizeck, "Feedback Control of Coronal Plane Hip Angle Using Functional Neuromuscular Stimulation", *IEEE Trans. Biomed. Eng.*, Vol. 38(7), pp. 687-698, 1991.

H.J. Chizeck, R. Kobetic, E.B. Marsolais, J.J. Abbas, I.H. Donner and E. Simon, "Control of Functional Neuromuscular Stimulation Systems for Standing and Locomotion in Paraplegics", *Proceedings of the IEEE*, Vol. 76(9), pp. 1155-1165, 1988.

PATENTS AND PATENT FILINGS

"Lower extremity exercise device with stimulation and related methods", E. Hartman, J. Abbas, J. Resig, J. Alton, N. Quick & M. Griffin. U.S. Patent No. 8,249,714, 2012.

"Communication Interface for Sensory Stimulation". R. Jung, K. Horch, J.J. Abbas, S. Phillips, B. Bakkaloglu, & S. Kim. U.S. Patent No. 9,026,224 B2, 2015.

"Systems and methods for a resistive microcracked pressure sensor", O. Graudejus and J. Abbas. U.S. Patent Application No. 2014/0290390/A1.

"Fitting System for a Neural Enabled Limb Prosthesis System", S. Kuntaegowdanahalli, R. Jung, J. Abbas, and K. Horch. U.S. Patent Application No. 2014/0277583/A1.

"Modular Multi-Channel Inline Connector System", S. Kuntaegowdanahalli, J. Abbas, R. Jung, and K. Horch. U.S. Patent Application No. 2014/0128951/A1.

"Self-anchoring MEMS intrafascicular neural electrode"; R. Jung, S. Phillips, & J. Abbas. U.S. Patent Application No. 2010/0268055/A1.

"Method for Mapping Sensor Signals to Output Channels for Neural Activation", R. Jung, J. Abbas, B.P. Smith, and K. Horch. U.S. Patent Application No. 2014/0236176/A1.

"Systems and methods for decoding intended motor commands from recorded neural signals for the control of External devices or to interact in virtual environments", M. Abdelghani, R. Jung, J. Abbas, and K. Horch. U.S. Patent Application No. 2014/0330404/A1.

"Simulator of Neural Activity Patterns and Recordings of those Patterns from Electrodes", M. Abdelghani, R. Jung, J. Abbas, and K. Horch. U.S. Provisional Patent Application No. 61/714,578.

“Method for Scheduling Pulses to Achieve Multi-Channel Pulse Frequency Modulation”, J. Abbas, B.P. Smith, B. Swanson, K. Horch, and R. Jung. U.S. Provisional Patent Application No. 61/765,545.

PEER-REVIEWED AND INVITED BOOK CHAPTERS (* indicates students mentored)

J.J. Abbas and A. Abraham*, “Biomimetic Approaches to Physiological Control” in Biomedical Engineering Fundamentals: The Biomedical Engineering Handbook, 4th Edition, Ed. J.D. Bronzino, CRC Press, Inc., Boca Raton, FL, 2015. (*Invited Chapter*).

J.J. Abbas, “Models of Neuromuscular Control Systems” in Encyclopedia of Computational Neuroscience, Ed. D. Jaeger and R. Jung, Springer, 2014. (*Invited Chapter*).

M. Abdelghani, J.J. Abbas, and R. Jung, “Peripheral Nerve Interface Applications, EMG/ENG” in Encyclopedia of Computational Neuroscience, Ed. D. Jaeger and R. Jung, Springer, 2014. (*Invited Chapter*).

J.J. Abbas, “Biomimetic Adaptive Control Algorithms” in Biohybrid Systems: Nerves, Interfaces, and Machines, First Edition. Edited by Ranu Jung, Wiley-VCH Verlag GmbH & Co. KGaA., pages 141-157. 2011 (*Invited Chapter*).

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"Smart Prosthetics" presentation the Board of the National Academies and to the Beckman Center Advisory Board, (Irvine, CA), Feb. 2007.

"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.

"Functional Neuromuscular Stimulation", presented at *1st Annual Neurorehabilitation Symposium, "Clinical Advanced 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)

"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.

"Adaptive Algorithms to Custom-fit the Neuroprosthesis to the User", presented at the *NIPS*2000 Workshop*, (Breckenridge, CO), Dec. 2000.

"Neural Networks for Control of Posture and Locomotion", presented at the *American Control Conference*, (Albuquerque, NM), June, 1997.

"Justifying Technology in the Managed Care Environment", presented at *9th Annual Interdisciplinary Rehabilitation Conference*, (Lexington, KY), August, 1996.

“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.

“Functional Electrical Stimulation Ambulation Techniques”, presented at *Spinal Cord Injury: Issues and Advances*, (Washington, DC), Nov. 1994.

“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

“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.

“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.

“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.

“Improving access to quality healthcare using medical technology”, World Health Organization, (Geneva, Switzerland), Nov. 2013.

“Adaptive Technology, Neural Adaptation and Rehabilitation”, Institute of Biomaterials and Biomedical Engineering, University of Toronto, (Toronto, Canada), Apr. 2011.

“Adaptive Technology to Promote Neural Adaptation”, The Miami Project, (Miami, FL), Mar. 2011.

“Neural Systems, Rehabilitation Engineering, and Adaptive Processes”, Paradise Valley Hospital, (Phoenix, AZ), May 2010.

“Promoting Neural Adaptation Using Adaptive Technology”, Dept. of Kinesiology, University of Maryland, (College Park, MD), Oct. 2009.

“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.

“Neuromorphic Design of Adaptive Systems for Neuromotor Rehabilitation”, Department of Mechanical Engineering, University of Florida, (Gainesville, FL), Feb. 2009.

“Personalized Technology for Neuromotor Therapy”, Department of Physical Therapy, University of Florida, (Gainesville, FL), Feb. 2009.

“Adaptive Biomimetic Technology to Promote Neural Adaptation”, Joint Basic Medical Sciences and Biomedical Informatics Departmental Seminar Series, Arizona State University, (Tempe, AZ), Oct. 2008.

"Promoting Neural Adaptation using Adaptive Technology", Department of Electrical Engineering, Northern Arizona University, (Flagstaff, AZ), Oct. 2008.

"Advances in neuromotor therapy after spinal cord injury", J. Abbas, 8th Educational Conference of the Arizona Spinal Cord Injury Association (Phoenix, AZ), Oct. 2007.

"Delivering Neurotechnology", presented at 'Commercializing Arizona Forum' (Phoenix, AZ), Oct. 2007.

"Improving neuromotor function after incomplete spinal cord injury", Neurorehabilitation Unit, Barrow Neurological Institute, (Phoenix, AZ), Sept. 2007.

"Parkinson's Disease: Treatment Using Deep Brain Stimulation" Arizona Grand Democrats, (Sun City, AZ), March 2007.

"Traumatic Spinal Cord Injury: Adaptation and Recovery" President's Community Enrichment Program, Arizona State University, (Tempe, AZ), March 2007.

"Adaptive Neural Systems", Arizona State University Foundation, (Tempe, AZ), Oct. 2006.

"Designing Adaptive Systems to Promote Adaptation in Neural Systems", The Biodesign Institute at Arizona State University, (Tempe, AZ), June 2006.

"Technology to Promote Adaptation in Neural Systems", Discovery Tour, The Ira A. Fulton School of Engineering, Arizona State University, (Tempe, AZ), April 2006.

"Neuroengineering and Neurorehabilitation", The Biodesign Institute, Arizona State University, (Tempe, AZ), Feb. 2006.

"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)

"Spinal Cord Injury Research", presented at the Annual Meeting of the Arizona Spinal Injury Association, (Phoenix, AZ), Oct. 2005.

"Improving Deep Brain Stimulation System Parameter Selection", Wintech, Department of Electrical Engineering, Arizona State University, (Tempe, AZ), Nov. 2005.

"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.

"Neuroprostheses and neuromotor therapy after spinal cord injury", Neurorehabilitation Unit, Barrow Neurological Institute, (Phoenix, AZ), Feb. 2005.

"Neuromuscular electrical stimulation for exercise and neuromotor therapy after spinal cord injury", The NeuroInstitute, (Tempe, AZ), Feb. 2005.

"New Strategies for Using Electrical Stimulation in Neurorehabilitation", Barrow Neurological Institute, (Phoenix, AZ), Jan. 2004.

"Standing after spinal cord injury: strategies for improving functional performance", Biomedical Engineering Program, University of Arizona, (Tucson, AZ) April 2003.

“Posture Control in Parkinson’s Disease”, Department of Kinesiology, Arizona State University, (Tempe, AZ), Dec. 2003.

“Adaptive Control of Systems for Neurorehabilitation”, Department of Mathematics and Statistics, Arizona State University, (Tempe, AZ) Nov. 2003.

“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.

“Standing after spinal cord injury: strategies for improving functional performance”, Scottsdale Community College, (Tempe, AZ) Feb. 2003.

“Engineering a new era in medical rehabilitation”, Biomedical Engineering Department Seminar, Arizona State University, (Tempe, AZ) Sept. 2002.

"Advanced 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.

"Neural Stimulation for Motor Control" presented to the Lexington Chapter of the IEEE (Lexington, KY), May 2001.

"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.

“Fitting the Neural Prosthesis to the User”, Department of Electrical Engineering, University of Twente, (Enschede, The Netherlands), July, 2000.

“Fitting the Neural Prosthesis to the User”, Center for Biomedical Engineering, University of Kentucky (Lexington, KY), April 1999.

“Customizing the FNS Control System for the User”, Neural Prosthesis Seminar, FES Center, Case Western Reserve University, (Cleveland, OH), March 1999.

“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.

“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.

“Closed-Loop Control of FNS Walking”, presented at FES Center, (Cleveland, OH), March 1995.

“Modulated Reflexes and Multi-joint Control of FNS Systems”, presented at the Rehabilitation Engineering Center, MetroGeneral Health Center, (Cleveland, OH), March 1995.

“Neural Network Control of Functional Neuromuscular Stimulation Systems”, presented at Center for Biomedical Engineering, University of Kentucky, (Lexington, KY), Jan. 1995.

“Using Neural Models in the Design of a Biomedical Engineering Control System”, presented at The Mathematical Research Branch, NIH, (Bethesda, MD), Aug. 1994.

“Neural Network Control of Cyclic Movements Using Functional Neuromuscular Stimulation”, presented at Dept. of Physiology, Howard Univ. Medical School, (Washington, DC), Feb. 1994.

“Control of Functional Neuromuscular Stimulation Systems”, presented at Shriver Laboratory, University of Maryland at College Park, (College Park, MD), Oct. 1993.

“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.

“Neural Network Control of Cyclic Movements Using Functional Neuromuscular Stimulation”, presented at Dept. of Bioengineering, Univ. of Pennsylvania, (Philadelphia, PA), October 1992.

“Neural Network Control of Functional Neuromuscular Stimulation Systems”, presented at Dept. of Biomedical Engineering, Case Western Reserve Univ.,(Cleveland, OH), May 1992.

“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.

“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.

NATIONAL/INTERNATIONAL HONORS AND OFFICES

Editorships:

| | |
|--------------------|--|
| Dec. '14 – present | Associate Editor, IEEE Neural Engineering Conference |
| Oct. '14 – present | Associate Editor International Journal of Clinical Engineering and Health Technology Assessment (CEHTA) |
| June '09 - present | Review Editor, Frontiers in Neuroengineering |
| June '03 - present | Editorial Board, Journal of Neuroengineering and Rehabilitation |
| 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:

- April '10 – April '15 Associate Editor,
IEEE EMBS Conference Editorial Board (CEB)
- 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)
2nd 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

- 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 Prosthesis"
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 Panel:*
National Institutes of Health:

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

Congressionally-Directed Medical Research Program:

Peer-Reviewed Medical Research Panel, Chair (2015)

Peer-Reviewed Medical Research Panel, Chair (2014)

Joint Warfighter Medical Research Panel, Chair (2014)

Spinal Cord Injuries Research Panel, Chair (2010,2011,2012)

Member, Funding Agency Review Panel:

National Institutes of Health:

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),
Chair, ad hoc panel (2013a,b)

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 (2001)

Biomedical Engineering Research to Aid Persons with Disabilities Panel (2000)

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)
Department of Veterans Affairs, Rehabilitation Research & Development
(2003,2010,2013, 2015)
Medical Research Council, United Kingdom (2012)
Neurological Foundation of New Zealand (2009)
Canada Foundation for Innovation (2009)
Netherlands Technology Foundation (2009)
US Army MRMC (2008)
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
- Annals of Biomedical Engineering
- Neuromodulation
- 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
- Canadian National Spinal Cord Injury Conference
- Rehabilitation Engineering Society of North America Conference

Arizona State University

| | |
|---------------|---|
| 2015- present | Member, Dean's Faculty Advisory 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

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

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

| | |
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| 2001 | Chair, Faculty Search Committee. |
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- 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

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)

Lectures in:

Introduction to Bioengineering (BME 100, 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)
 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 (Phys Med & Rehab, 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)

STUDENTS MENTORED

Primary advisor for:

GRADUATE STUDENTS

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

Stefani Mulligan, M.S., 2005,

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

Brian Glaister, M.S., 2005

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

Andrew Hayes, M.S., 2005

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

Shelly Allison, M.S., 2006

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

Almir Halilcevic, M.S., 2006

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

Anjali Gupta, M.S., 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, M.S., 2006 (co-advised with Neil Crawford, PhD)

Thesis title: *Subject-Specific Finite Element Modeling of the Lower Cervical Spine*

John McCamley, M.S., 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, M.S. 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, M.S., 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, M.S., 2014

(co-advised with Narayanan Krishnamurthi, PhD)

Thesis Title: *Age-Related Changes in Balance and Gait*

Jeremy Jellish, M.S., 2014

(co-advised with Narayanan Krishnamurthi, PhD)

Thesis Title: *Real-Time Feedback to Improve Posture and Gait in Parkinson's Disease*

Saaransh Jain, M.S., 2015

(co-advised with Marc Jacofsky, PhD)

Thesis Title: *Validation and standardization of biomechanical testing procedure of modern olecranon plates*

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, expected 2016.

Anna Newcomb, PhD, expected 2017.

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

Bennion Cannon, PhD, expected 2017.

Postbaccalaureate Research Education Program, Arizona State University

Danielle Sampson, 9/09 – 8/10.

Center for Biomedical Engineering, University of Kentucky:

JoAnne A. Riess, M.S., 1997

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

Pankaj Kataria, M.S., 1999

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

Eric Hartman, M.S., 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, M.S., 2000

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

Junli Ou, M.S., 2001

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

Joseph Finley, M.S., 2002

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

POST-DOCTORAL FELLOWS

Jason C. Gillette, Ph.D. 1999-2002.

Alfred Haas, Ph.D., 2009-2011.

UNDERGRADUATE STUDENTS**Barrett, The Honors College, Arizona State University:**

Crystal Ong, Honors Thesis Mentor, 2003.
 Anjali Gupta, Honors Thesis Mentor, 2004
 Jeremy Jellish, Honors Thesis Mentor, 2010-11
 John Spanias, Honors Thesis Mentor, 2010-11
 Shravan Sridhar, Honors Thesis Mentor, 2010-11
 Stuart Wentz, Honors Thesis Co-Mentor, 2010-11

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

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 |

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 Ducey, 2012-2013 (Primary mentor: James Lynskey, PT, PhD)

Kamini Halani, 2012-2013 (Primary mentor: James Lynskey, PT, PhD)

Served on Graduate Committee:

Harrington Department of Bioengineering, Arizona State University:

Ryan Knight, M.S., 2003, (Advisor: Jiping He, Ph.D.)
Matthew Dixon, M.S., 2003, (Advisor: Gary Yamaguchi, Ph.D.)
Jeremy Crandell, M.S., 2003, (Advisor: Gary Yamaguchi, Ph.D.)
Patrick Koegler, M.S., 2004, (Advisor: Gary Yamaguchi, Ph.D.)
Adam Bellanger, M.S., 2005 (Advisor: Ranu Jung, Ph.D.)
Ganapriya Venkatasubramanian. M.S., 2005 (Advisor: Ranu Jung, Ph.D.)
Helen Huang, PhD, 2006 (Advisor: Jiping He, Ph.D.)
Joseph M. Guericabeitia, M.S., 2006, (Advisor: James Sweeney, Ph.D.)
Jeremy Crandell, M.S., 2007, (Advisor: Stephen Helms-Tillery, Ph.D.)
Jacob Goble, PhD, 2007 (Advisor: Natalia Dounskia, PhD)
Joseph Graham, PhD, 2008 (Advisor: Ranu Jung, Ph.D.)
Kimberly Tan, M.S., 2009, (Advisor: James Sweeney, Ph.D.)
Lubna Ahmad, PhD, 2009 (Advisor: Lokesh Joshi, Ph.D.)
Mallika Fairchild, PhD, 2009 (Advisor: Ranu Jung, Ph.D.)
Sivakumar Balasubramanian, PhD, 2009 (Advisor: Jiping He, Ph.D.)
Lisa Raleigh, PhD, 2010 (Advisor: Marco Santello, PhD)
Rashaad Sidique, M.S., 2010 (Advisor: Bruce Towe, PhD)
Shawna Fletcher, M.S, 2010 (Advisor: Christopher Buneo, PhD)
Simon Lubeck, M.S, 2010 (Advisor: Kevin Bennett, PhD)
Samhavi Subramanian, M.S, 2010 (Advisor: Ranu Jung, PhD.)
Brian Hillen, PhD, 2012 (Advisor: Ranu Jung, Ph.D.)
Sindhu Anand, PhD, 2013 (Advisor: Jit Muthuswamy, PhD)
Jonathan Plasencia, PhD, expected 2016 (Advisor: David Frakes, PhD)
Swathy Sampath Kumar, PhD, expected 2017 (Advisor: Jit Muthuswamy, 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, expected 2015 (Advisor: Richard Hinrichs, PhD)

Department of Biomedical Engineering, Florida International University:

Ilian Black, PhD, expected 2016 (Advisor: Ranu Jung, PhD)
Andres Pena, PhD, expected 2017 (Advisor: Ranu Jung, PhD)
Ricardo Siu, PhD, expected 2017 (Advisor: Ranu Jung, PhD)

Institute of Biomaterials and Biomedical Engineering, University of Toronto:

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

Center for Biomedical Engineering, University of Kentucky:

Sarvani Grandhe, M.S., 1999, (Advisor: Ranu Jung, Ph.D.)
Xiaobin Zhang, Ph.D., 2000, (Advisor: Eugene Bruce, Ph.D.)
Heng Wang, M.S., 2000, (Advisor: Ranu Jung, Ph.D.)

Nicole Cleary, M.S, 2002, (Advisor: Eugene Bruce, Ph.D.)

Kegang Hua, M.S., 2002, (Advisor: Dayong Gao, Ph.D.)

Department of Electrical Engineering, University of Kentucky:

Hock Jin Lee, M.S., 1997, (Advisor: Elizabeth J. Brauer, Ph.D.)

Department of Kinesiology and Health Promotion, University of Kentucky:

Elizabeth A. Knapp, M.S. 1996, (Advisor: Robert Shapiro, Ph.D.)

Timothy Brindle, Ph.D., 2001, (Advisor: Robert Shapiro, Ph.D.)

Department of Mechanical Engineering, The Catholic University of America:

Thang Dang, M.S., 1994, (Advisor: Jack Winters, Ph.D.)

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)

Speech & Hearing Sciences, Arizona State University:

Cynthia Dana, BS, 2003, Barrett Honors College Thesis (Advisor: M. Dorman, PhD)

Department of Kinesiology, Arizona State University:

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)

Department of Psychology, Arizona State University:

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