

Robert Arthur Scheidt

Education

PhD	Biomedical Engineering, Northwestern University , Evanston, Illinois	December, 1999
	<i>Effects of mechanical and visual constraints during voluntary movement of the arm</i>	
MS	Biomedical Engineering, Northwestern University , Evanston, Illinois	June, 1992
	<i>Modeling of binocular sensory interactions in the spatial, disparity, and time domains during the human fusional response</i>	
BS	Electrical Engineering (cum laude), Marquette University , Milwaukee, Wisconsin	June, 1989

Appointments

	Marquette University , Milwaukee, Wisconsin	August, 2000 - Present
	<i>Professor (tenured): Biomedical Engineering; Electrical and Computer Engineering (2013-present)</i>	
	<i>Associate Professor (tenured): Biomedical Engineering; Electrical and Computer Engineering (2007-13)</i>	
	<i>Assistant Professor: Biomedical Engineering; Electrical and Computer Engineering (2000-07)</i>	
	<i>Founding Director: Neuromotor Control Laboratory (2000-present)</i>	
	Northwestern University Feinberg School of Medicine , Chicago, Illinois	2002 - Present
	Rehabilitation Institute of Chicago , Chicago, Illinois	
	<i>Adjunct Professor: Department of Physical Medicine and Rehabilitation</i>	
	Medical College of Wisconsin , Milwaukee, Wisconsin	2007 - Present
	<i>Adjunct Associate Professor: Department of Neurology</i>	
	Rocky Mountain University of Health Professions , Provo, UT	2003-2007
	<i>Adjunct Assistant Professor: Department of Neurology</i>	
	Rehabilitation Institute of Chicago	2000
	<i>Postdoc: Sensory Motor Performance Program</i>	
	Baxter Healthcare; Fenwal Division , Round Lake, Illinois	1999 - 2000
	<i>Principal Engineer and Subsystem Lead</i>	
	Medical Research Labs , Buffalo Grove, Illinois	1997 - 1999
	<i>Senior Research Scientist</i>	
	General Electric – Hotpoint , Milwaukee, Wisconsin	1986 - 1989
	<i>Quality Control Engineer / Manufacturing Engineer Co-op</i>	

Honors and Professional Affiliations

2012 Outstanding Researcher Award, College of Engineering, Marquette University
2010 APTA Dorothy Briggs Memorial Scientific Inquiry Award - co-Recipient w/ Stoeckmann, Sullivan
2009-2012 Way-Klingler Science Fellowship, Marquette University
Visiting Scholar: The Weizmann Institute, Rehovot, Israel. May 2005
Academic Leadership Program, Whitaker Foundation, 2004
CAREER Award; National Science Foundation, 2003
2000 Baskin Award for Excellence in Research; Rehabilitation Institute of Chicago
Walter P. Murphy Fellowship, Northwestern University, 1989-1990
Member: IEEE (Senior Grade), ASEE: Am Soc Eng Education, SFN: Soc. for Neuroscience, NCM: Soc. for the Neural Control of Movement, APS: American Physiological Soc., TBII Engineering Honor Soc., HKN Electrical Engineering Honor Soc.

Research Grants

PI: "Augmenting kinesthetic feedback to improve hemiparetic arm control after stroke" \$438K NICHD R15 2017-20 (20% effort)
PI: "Examining deficits of sensorimotor learning and performance after concussion in the student athlete" \$138k Marquette University Innovation Fund 2016-18 (10% effort)
Project PI: "VibraSense" \$2.4k NSF I-Corps Site 2016-7 (2% effort)
site PI: "Sensorimotor Integration and Aging: effects of reduced sensory acuity and cognitive capability on coordinated control of limb position." \$50K NIH/CTSA 2015-16 (5% effort)
Project PI: "Wearable UV exposure monitor" \$2.4k NSF I-Corps Site 2015-6 (2% effort)
PI: "Robotically-enhanced neuroimaging of memory and prediction in children with autism spectrum disorders – a pilot study." \$50K NIH/CTSA 2014-15 (5% effort)
CoI: "Impairments in sensorimotor control and their contribution to tremor and dysmetria in persons with MS" \$50K NIH/CTSA 2011-12 (5% effort)
PI: "Control of Arm Posture and Movement Following Stroke." \$1.5M NICHD R01 2008-14 (30% effort)
site PI: "Functional remapping of hand control." \$250K, NIH/NICHD R01: 2009-11 (20% effort)
CoI: "Multi-Joint Sensorimotor Dysfunction of the Stroke Arm" (PI: Schmit): 2005-10 (7% effort)
PI: "CAREER: Adaptive Control in Biological and Man-made Systems." \$667k, NSF BES 2003-8 (20%)
Project PI: "Quantifying Motor Adaptation Following Stroke" \$167k NIH R24 to RIRC 2002-6 (30%)
PI: "Sensory feedback contributions to motor adaptation in humans" \$239k Whitaker Foun 2002-5 (30%)
PI: "Robotics in Rehabilitation Engineering" \$72k Alvin and Marion Birnschein Found. 2002-2004 (15%)

Education Grants

site PI: " Marquette University and the University of Genoa: Student and Staff Mobility" \$71K European Union Erasmus+ for Higher Education, Mobility between Programme and Partner Countries. 2017-9.
PI: "Fostering a durable international partnership between Marquette University (MU) and the University of Genoa, Italy (UNIGE)" \$65K Marquette Univ Opus College of Engineering. 2016-7. (8% effort)
coI: "Youth Obesity Prevention at St. Margaret Mary School." \$23k American Cancer Society. 2012
PI: "Faculty and Resource Development: Guided Discovery Learning in Grades PreK-8" A Chicago parochial elementary school STEM initiative. \$22k Big Shoulders Fund 2010 (3% effort)

**Peer-Reviewed
Journal Papers
Submitted (S)
In Revision (R)
or In Press (J)**

key:

graduate student
*undergrad student

- S1) Salowitz NMG, Van Hecke AV, Logan B, **Scheidt RA**. Integration of visual and proprioceptive perception of movement kinematics in children with autism spectrum disorders. *In preparation for: Neuroscience*
- R1) Goetz-Haswell T, **Scheidt RA**. Environmental variability induces prediction uncertainty during adaptation of reaching to a proprioceptive goal. *In revision: J Neurophysiol.*
- J37) Mrotek LA, Bengtson M, Stoeckmann T, Botzer L, Ghez CP, McGuire J, **Scheidt RA**. (2017) The Arm Movement Detection (AMD) Test—a fast robotic test of proprioceptive acuity in the arm. *J Neural Eng Rehab 14:64*; DOI 10.1186/s12984-017-0269-3.
- J36) Krueger A, Giannoni P, Casadio M, **Scheidt RA** (2017) Optimizing vibrotactile feedback to enhance real-time control of the arm during reach and stabilization tasks. *J Neural Eng Rehab 14:36*; DOI 10.1186/s12984-017-0248-8.
- J36e) Krueger A, Giannoni P, Casadio M, **Scheidt RA** (2017) Erratum to: Optimizing vibrotactile feedback to enhance real-time control of the arm during reach and stabilization tasks. *J Neural Eng Rehab 14:69*; DOI 10.1186/s12984-017-0281-7.
- J35) Laczko J, **Scheidt RA**, Simo LS, Piovesan D (2017) Inter-joint coordination deficits revealed in the decomposition of endpoint jerk during goal-directed arm movement after stroke. *In press: IEEE Trans Neural Sys Rehab Eng*. DOI: 10.1109/TNSRE.2017.2652393.
- J34) Tzorakoleftherakis E, Murphey TD, **Scheidt RA** (2016) Augmenting sensorimotor control using goal-aware vibrotactile stimulation during reaching and manipulation behaviors. *Exp Brain Res 234*: 2403-2414.
- J33) Lee JY, Oh Y, Kim SS, **Scheidt RA**. Schweighofer N (2016) Optimal schedules in multi-task motor learning. *Neural Computation 28*: 667-685.
- J32) Conrad MO, Gadhoke B, **Scheidt RA**, Schmit BD (2015) Effect of tendon vibration on hemiparetic arm stability in unstable workspaces. *PLoS One*. 10(12): e0144377. doi:10.1371/journal.pone.0144377
- J31) Heenan M, **Scheidt RA**, Woo D, Beardsley SA (2014) Upper extremity motor dysfunction and impairments in sensorimotor control in Multiple Sclerosis – a pilot study. *J NeuroEng Rehab. 11*: 170, doi: 10.1186/1743-0003-11-170
- J30) Ranganathan R, Wieser J, Mosier K, Mussa-Ivaldi F, **Scheidt RA** (2014) Learning redundant motor tasks with and without overlapping dimensions: facilitation and interference effects. *J Neurosci 34(24)*: 8289-8299
- J29) Simo L, Botzer L, Ghez C, **Scheidt RA** (2014) A robotic test of proprioception within the hemiparetic arm post-stroke. *J NeuroEng Rehab. 11*: 77. DOI: 10.1186/1743-0003-11-77
- J28) Carson A, Salowitz N, **Scheidt RA**, Van Hecke A (2014) Electroencephalogram Coherence in Children with and without Autism Spectrum Disorders: Decreased Inter-hemispheric Connectivity in Autism. *Autism Res. DOI: 10.1002/aur.1367*
- J27) Judkins T, **Scheidt RA** (2014) Visuo-proprioceptive interactions during adaptation of the human reach. *J Neurophysiol. 111*: 868-887. doi:10.1152/jn.00314.2012
- J26) Salowitz NMG, Dolan B, Rommel R, Van Hecke A, Mosier KM, Simo L, **Scheidt RA** (2014) Simultaneous robotic manipulation and functional magnetic resonance imaging: Feasibility in children with autism spectrum disorders. *J. Systemics, Cybernetics & Informatics. 12(2)*: 67-73
- J25) Patton J, Wei Y, *Bajaj P, **Scheidt RA** (2013) Visuomotor learning enhanced by augmenting instantaneous trajectory error feedback during reaching. *PLoS ONE 8(1)*: e46466.doi:10.1371/journal.pone.0046466
- J24) **Scheidt RA**, Zimelman J, Salowitz N, Suminski A, Simo L, Houk J, Mosier KM. (2012) Remembering forward: Neural correlates of memory and prediction in human motor adaptation. *NeuroImage 59*: 582-600. DOI: 10.1016/j.neuroimage.2011.07.072
- J23) Salowitz NMG, Eccarius P, Karst J, Meyer A, Schohl K, Stevens S, Vaughan Van Hecke A, **Scheidt RA** (2012) Brief Report: Visuo-spatial guidance of movement during gesture imitation and mirror drawing in children with autism spectrum disorders. *J Autism Develop Disord*. DOI: 10.1007/s10803-012-1631-8
- J22) Eccarius P, *Bour R, **Scheidt RA**. (2012) Dataglove measurement of joint angles in sign language handshapes. *Sign Language & Linguistics, 15(1)*, 39-72
- J21) **Scheidt RA**, Ghez C, Asnani S. (2011) Patterns of hypermetria and terminal cocontraction during point-to-point movements demonstrate independent action of trajectory and postural controllers. *J Neurophysiol. 106(5)*, 2368-2382
- J20) Conrad M, **Scheidt RA**, Schmit BD. (2011) Effects of wrist tendon vibration on arm tracking in people post-stroke. *J. Neurophysiol. 106*:1480-1488
- J19) Liu X, Mosier KM, Mussa-Ivaldi FA, Casadio M, **Scheidt RA**. (2011) Reorganization of finger coordination patterns during adaptation to rotation and scaling of a newly-learned sensorimotor transformation. *J Neurophysiol. 105*:454-473
- J18) Conrad M, **Scheidt RA**, Schmit BD. (2010) Effects of wrist tendon vibration on targeted upper arm movements in post-stroke hemiparesis. *Neurorehab Neural Repair. 25*: 61-70
- J17) **Scheidt RA**, Lillis KP, *Emerson SJ (2010) Visual motor and attentional influences on proprioceptive discrimination between straight and curved hand paths in reaching *Exp. Brain Res 204*: 239-54
- J16) Stoeckmann T, Sullivan K, **Scheidt RA**. (2009) Elastic, viscous, and mass load effects on post-stroke muscle recruitment and cocontraction during reaching: A pilot study. *Phys Ther 89*:1-14
- J15) Liu X, **Scheidt RA**. (2008) Contributions of online visual feedback to the learning and generalization of novel finger coordination patterns. *J. Neurophysiol 99*:2546-2557

- J14) Ghez C **Scheidt RA**, Heijink H (2007) Different learned coordinate frames for planning trajectories and final positions in reaching. *J. Neurophysiol.* 98: 3614-3626
- J13) **Scheidt RA**, Ghez C (2007) Separate adaptive mechanisms for controlling trajectory and final position in reaching. *J. Neurophysiol.* 98: 3600–3613
- J12) Suminski A, Zimbelman J, **Scheidt RA** (2007) Design and validation of an MR-compatible pneumatic manipulandum. *J. Neurosci Meth.* 163: 255-266
- J11) **Scheidt RA**, Stoekmann T (2007) Reach adaptation and final position control amid environmental uncertainty following stroke. *J. Neurophysiol.* 97: 2824-2836
- J10) Suminski A, Rao SM, Mosier KM, **Scheidt RA** (2007) Neural and electromyographic correlates of wrist posture regulation. *J. Neurophysiol* 97: 1527-1545
- J9) Mosier KM, **Scheidt RA**, Acosta S, Mussa-Ivaldi FA (2005) Remapping hand movements in a novel geometrical environment. *J Neurophysiol.* 94: 4362–4372
- J8) **Scheidt RA**, Conditt M, Secco EL, Mussa-Ivaldi FA (2005) Interaction of visual and proprioceptive feedback during adaptation of human reaching movements *J Neurophysiol* 93: 3200-13
- J7) Benz EN, Hornby TG, Bode RK, **Scheidt RA**, Schmit BD. (2005) A Physiologically Based Clinical Measure for Spasticity in Spinal Cord Injury. *Arch Phys Med Rehabil.* 86: 52-9
- J6) Kuiken TA, Amir H, **Scheidt RA**. (2004) Computerized biofeedback knee goniometer: Acceptance and effect on exercise behavior in post TKA rehabilitation. *Arch Phys Med Rehabil.* 85: 1026-30
- J5) **Scheidt RA**, Dingwell JB, Mussa-Ivaldi FA. (2001) Learning to move amid uncertainty. *J Neurophysiology* 86, 971-985
- J4) Takahashi CD, **Scheidt RA**, Reinkensmeyer DJ (2001) Impedance control and internal model formation when reaching in a randomly varying dynamical environment. *J Neurophysiol* 86, 1047-51
- J3) **Scheidt RA**, Conditt MA, Reinkensmeyer DJ, Mussa-Ivaldi FA (2000) Persistence of motor adaptation during constrained, multi-joint, arm movements. *J Neurophysiology*, 84, 853-862
- J2) **Scheidt RA**, Rymer WZ. (2000) Control strategies for the transition from multijoint to single-joint arm movements studied using a simple mechanical constraint. *J Neurophysiology*, 83, 1-12
- J1) **Scheidt RA**, Kertesz AE. (1993) Temporal and spatial aspects of sensory interactions during human fusional response. *Vision Research*, 33, 1259-1270
- C30) *Doudlah RC, Suminski AJ, Scheidt RA (2016) Neural mechanisms mediating limb stabilization in older adults and chronic stroke survivors: A pilot study. *Conf Proc IEEE EMBS Orlando, FL.*
- C29) Heenan M, **Scheidt RA**, Woo D, Beardsley, SA (2015) Visual delay adaptation reduces intention tremor in Multiple Sclerosis: A case series. *Conf Proc IEEE EMBS Soc, Milan, Italy.*
- C28) Tzorakoleftherakis E, Bengtson MC, Mussa-Ivaldi FA, **Scheidt RA**, Murphey TD (2015) Tactile proprioceptive input in robotic rehabilitation after stroke. *Conf Proc IEEE ICRA Soc, Seattle, WA.*
- C27) Bengtson MC, Mrotek LA, Stoekmann T, Ghez C, **Scheidt RA** (2014) Stroke reduces neuromotor control bandwidth at the elbow – a pilot study. *Conf Proc BMES Soc, Houston, TX.*
- C26) Bengtson MC, Mrotek LA, Stoekmann T, Ghez C, **Scheidt RA** (2014) The arm motion (AMD) detection test. *Conf Proc IEEE EMBS Soc, Chicago, IL.*
- C25) Simo LS, Piovesan D, **Scheidt RA**, Ghez C, Laczko J (2014) Submovements during reaching movements after stroke. *Conf Proc IEEE EMBS Soc, Chicago, IL.*
- C24) Heenan M, **Scheidt RA**, Beardsley SA (2014) Age-related differentiation of sensorimotor control strategies during pursuit and compensatory tracking. *Conf Proc IEEE EMBS Soc, Chicago, IL.*
- C23) Tzorakoleftherakis E, Muss-Ivaldi FA, **Scheidt RA**, Murphey TD (2014) Effects of Optimal Tactile Feedback in Balancing Tasks: a Pilot Study. *Conf Proc IEEE American Control Conf., Portland, OR.*
- C22) Mrotek LA, Stoekmann T, Bengtson M, Ghez C, **Scheidt RA** (2013) Deficits of sensorimotor control and their impact on limb stabilization post-stroke: a case series. *Am Soc Neur Rehab, San Diego, CA.*
- C21) Salowitz NMG, Dolan B, Rommel R, Van Hecke A, Mosier KM, Simo L, **Scheidt RA** (2013) Functional Magnetic Resonance Imaging of Goal-Directed Reaching in Children with Autism Spectrum Disorders: A Feasibility Study. *Proc 17th World Multi-Conf: System, Cybernet & Inform, Orlando, FL. 17: 187-192. Best Paper Award.*
- C20) Heenan ML, **Scheidt RA**, Beardsley SA (2011) Visual and proprioceptive contributions to stabilization and tracking movements in humans. *Conf Proc IEEE EMBS Soc, Boston, MA: 7356-9.*
- C19) Simo LS, Ghez C, Botzer L, **Scheidt RA** (2011) A quantitative and standardized robotic method for the evaluation of arm proprioception after stroke. *Conf Proc IEEE EMBS Soc, Boston, MA: 8227-30.*
- C18) Zimbelman JL, Suminski AJ, Rao SM, **Scheidt RA** (2007) Predicting the future: neural correlates of internal models. *NeuroImage*, 36: Suppl 1, p. S65.
- C17) Suminski AJ, Rao SM, & **Scheidt RA** (2007) Contribution of the cerebellum and posterior parietal cortex in the integration of visual and proprioceptive feedback for the online correction of performance errors during stabilization of wrist posture. *NeuroImage*, 36: Suppl 1, p. S40.
- C16) Suminski AJ, Zimbelman JL, & **Scheidt RA** (2007) Experimental validation of a MR-compatible pneumatic manipulandum for imaging the neural correlates of motor control. *NeuroImage*, 36: Suppl 1, p. S123.

- C15) Zimbelman JL, *Bratcher K, Rao SM, Suminski AJ & **Scheidt RA** (2007) Neural activity in primary sensorimotor cortex increases with movement extent (not force) during goal-directed movement. *NeuroImage*, 36: Suppl 1, p.S76.
- C14) Karnik S, Johnson MJ and **Scheidt RA** (2007) Evaluation of position based cueing strategies for bilateral robotic assessment and therapy after stroke. *Proc RESNA Conf*. Phoenix, Arizona.
- C13) Patton J, Wei Y, Scharver, C, Kenyon RV and **Scheidt RA** (2006) Motivating rehabilitation by distorting reality. *Proc Intl. Conf Biorob*. Pisa, Italy.
- C12) **Scheidt, RA** & Stoeckmann, T (2005) Characterization of Motor Adaptation and Limb Posture Regulation During Arm Reaching Movements Following Stroke. *IEEE Intern. Conf Robotics Rehab*.
- C11) Wei Y, Patton J, *Baja P & **Scheidt R** (2005) Visual Error Augmentation for Enhancing Motor Learning and Rehabilitative Relearning. *IEEE Intern. Conf Robotics Rehab*. Chicago, IL.
- C10) Wei Y, Patton J, *Baja P & **Scheidt R** (2004) A real-time haptic/graphic demonstration of how error augmentation can enhance learning. *Proc International Conf Robotics and Automation*.
- C9) **Scheidt, RA** (2004) A vector-ARX model of motor adaptation during reaching. *Advances in Computational Motor Control III- Society for Neuroscience*, SanDiego, CA.
- C8) Lillis, KP & **Scheidt, RA** (2003) Sensitivity to hand path curvature during reaching. *IEEE EMBS Soc*. Cancun MX.
- C7) **Scheidt, RA**, Waples, L & Ropella, KM (2002) Reengineering biomedical engineering curricula: A new product development approach. *Proceed. of the IEEE EMBS/BMES Soc.*, Houston, Tx.
- C6) Suminski, AJ, Ropella, KM & **Scheidt RA** (2002) A pneumatically actuated manipulandum for neuromotor control research. *Proceed. of the IEEE EMBS/BMES Soc.*, Houston, Tx
- C5) Lillis, KP, Amans, MR, **Scheidt RA** (2002) Design and Validation of a real-time controller for a two-joint neurorehabilitation robot. *Proceed. of the IEEE EMBS/BMES Soc.*, Houston, Tx.
- C4) Amans, MR, Lillis, KP, **Scheidt RA** (2002) Compensation for the passive dynamics of a five-bar neurorehabilitation robot. *Proceed. of the IEEE EMBS/BMES Soc.*, Houston, Tx.
- C3) Mussa-Ivaldi, FA, Conditt, MA, Dingwell, JB, Karniel, A, Mah, CD, Patton, JL & **Scheidt RA** (2002) A force-field approach to the adaptive control and learning of arm movements. *Proceedings of the 4th World Congress of Biomechanics*, Calgary, Alberta, Canada, August 4-9, 2002.
- C2) **Scheidt RA**, Rymmer WZ (1996) A comparison of single- and multi-joint arm movements in the horizontal plane. *Engineering Foundation Conference*, Deer Creek, Ohio.
- C1) Battocletti JH, Myers TJ, **Scheidt, RA** (1989) A low-field P-31 NMR spectrometer to measure bone mineral in the human wrist. *Proceedings of the IEEE/EMBS Society*.

Book Chapters (B)

- B4) Casadio M, Iandolo R, Nataletti S, Marini F, Morasso P, Ponassi V, **Scheidt RA** (submitted) Robotic techniques for the assessment of proprioceptive deficits and for proprioceptive training. *Submitted: Rehabilitation Robotics*. Elsevier Press.
- B3) Ranganathan R, **Scheidt RA** (2016) Organizing and reorganizing coordination patterns. In: Laczko J., Latash M. (eds) *Progress in Motor Control. Advances in Experimental Medicine and Biology*, vol 957. Springer, Cham. p. 327-49.
- B2) Suminski AJ, **Scheidt RA** (2014) Exploring the feedback regulation of limb position using fMRI and a MRI-compatible manipulandum. In *Advanced Neuroimaging Topics in Health and Disease – Methods and Applications*. Eds.T. Dorina Papageorgiou, George I. Christopoulos and Stelios M. Smirnakis. InTech, 2014: 457-480. ISBN 979-953-307-775-7.
- B1) Mussa-Ivaldi FA, Casadio M, Danziger ZC, Mosier KM, **Scheidt RA** (2011) Sensory motor remapping of space in human-machine interfaces. In Andrea M Green, C. Elaine Chapman, John F. Kalaska, Franco Lepore, editors: *Progress in Brain Research*, Vol. 191, Amsterdam, The Netherlands, pp. 45-64.

National/International Meeting Abstracts and Conference Presentations (A)

- A112) Ballardini G, Carlini G, **Scheidt RA**, Nisky I, Casadio M (2017) Tactile-STAR: A novel tactile STimulator And Recorder system for evaluating and improving tactile acuity. *Perception and action in Complex Environments III, Genoa, Italy*.
- A111) Shadmehr R, **Scheidt RA**, Prut Y (2017) Distinct neural circuits for control of movement vs. holding still. *Soc. Neural Control Movement, Dublin, Ireland*.
- A110) Risi N, Mrotek LA, Shah V, Casadio M, **Scheidt RA** (2017) Learning to use supplemental vibrotactile feedback of limb position enhances goal-directed reach performance. *Soc. Neural Control Movement, Dublin, Ireland*.
- A109) Bengtson M, Mrotek LA, Stoeckmann T, Ghez CP, **Scheidt RA** (2017) Deficits in proprioception differentially impair arm stabilization and movement after stroke *Soc. Neurosci*. Washington DC.
- A108) Slick RA, Lantagne D, Mrotek LA, Beardsley S, Thomas D, Smith C, Moody H, Leigh D, Ahamed I, **Scheidt RA** (2017) Memory use during implicit learning varies across sensory feedback conditions, but is not impacted by interposed self-assessments *Soc. Neurosci*. Washington DC.
- A107) Johnson N, Van Abel M, Van Hecke A, Ahamed SI, **Scheidt RA** (2017) Assessing Preparation For Magnetic Resonance Imaging in a Research Study of Children With and Without Autism Spectrum Disorder and Their Parent. *13th International Family Nursing Conference*, Pamplona Spain.

- A106) Risi N, Krueger A, Giannoni P, Casadio M, **Scheidt RA** (2016) Learning to use supplemental kinaesthetic feedback for enhancing reach performance. *Karniel Computational Motor Control Workshop*, Beer-Sheva, Israel.
- A105) Shah V, Gagas M, Krueger A, Iandolo R, *Peters D, Casadio M, **Scheidt RA** (2016) Vibrotactile discrimination thresholds vary among dermatomes in the upper extremity of healthy humans. *Soc. Neurosci.* San Diego, CA
- A104) Mrotek LA, Bengtson M, Stoeckmann T, Ghez CP, McGuire J, **Scheidt RA** (2016) Deficits of coordination, sensation, agility and strength predict motor dysfunction after stroke. *Soc Neurosci.* San Diego, CA.
- A103) Beardsley SA, **Scheidt RA** (2016) Sensorimotor dynamics in the brain during intermittent control of goal-directed movements. *International Society for Electrophysiology and Kinesiology*, Chicago, IL
- A102) Krueger A, Giannoni P, Casadio M, **Scheidt RA** (2016) Optimizing supplemental vibrotactile feedback for real-time control of arm stabilization behaviors in humans. *Proc Am Conf Human Vibration*, Milwaukee WI.
- A101) Shah V, Gagas M, Krueger A, Iandola R, Casadio M, **Scheidt RA** (2016) Vibrotactile discrimination in the upper extremity of healthy human subjects. *Proc Am Conf Human Vibration*, Milwaukee WI.
- A100) Johnson N, Salowitz N, *Van Abel M, Van Hecke A, Ahamed SI, **Scheidt RA** (2016) Using an Ipad Application to Prepare Children with ASD for Research MRI. *IMFAR*, Baltimore, MD.
- A99) **Scheidt RA** (2016) Facilitation and interference in multi-dimensional motor skill learning. *COSYNE Workshops*, Salt Lake City, UT.
- A98) **Scheidt RA** (2015) Facilitation and interference in the learning of motor tasks with and without overlapping dimensions. *Prog Motor Control X*. Budapest, Hungary.
- A97) Suminski AJ, **Scheidt RA** (2015) Neural correlates of nonlinear integration of visual and proprioceptive feedback during wrist stabilization. *Soc Neurosci* Chicago IL.
- A96) Bengtson MC, Stoeckmann T, Mrotek LA, Ghez C, **Scheidt RA** (2015) Neuromuscular control bandwidth at the elbow following stroke. *Soc Neurosci* Chicago IL.
- A95) Mrotek LA, Bengtson MC, Stoeckmann T, Ghez C, **Scheidt RA** (2015) Age differences in muscle activation patterns supporting arm stabilization. *Soc Neurosci* Chicago IL.
- A94) Heenan M, **Scheidt RA**, Woo D, Beardsley SA (2015) Visuomotor delay adaptation reduces intention tremor in multiple sclerosis: a case series. *Soc Neurosci* Chicago IL.
- A93) Mrotek LA, Bengtson MC, *Smith C, Stoeckmann T, Ghez C, **Scheidt RA** (2015) Reliability of the Arm Movement Detection (AMD) test. *Neur Contr Mov Soc*. Charleston, SC.
- A92) **Scheidt RA**, Mrotek LA, Bengtson MC, Stoeckmann T, Ghez C (2015) Muscle coordination for feedback stabilization of arm posture after stroke. *Neur Contr Mov Soc*. Charleston, SC.
- A91) Salowitz N, Van Hecke A, **Scheidt RA** (2015) Integration of visual and proprioceptive perception of movement kinematics in children with & without Autism Spectrum Disorder *IMFAR Salt Lake City UT*
- A90) Salowitz N, Van Hecke A, Johnson N, **Scheidt RA** (2015) Neural correlates of goal-directed reaching movements in children with Autism Spectrum Disorder. *IMFAR, Salt Lake City, UT*.
- A89) Heenan M, **Scheidt RA**, Woo D, Beardsley S (2014) The role of visual feedback in movement control in individuals with Multiple Sclerosis. *CMSC-ACRIMS*, Orlando, FL.
- A88) Simo LS, Piovesan D, Botzer L, Bengtson M, Ghez CP, **Scheidt RA** (2013) Arm kinematics during blind and visually guided movements in hemiparetic stroke survivors. *Soc. Neurosci*, San Diego, CA.
- A87) **Scheidt RA** (2013) Uncertainty in the limits of visual depth perception. *Soc Neurosci* San Diego CA
- A86) Heenan M, **Scheidt RA**, Beardsley S (2013) Age-related differentiation of sensorimotor control strategies during pursuit and compensatory tracking. *Soc. Neurosci*, San Diego, CA.
- A85) Heenan M, **Scheidt RA**, Woo D, Beardsley S (2013) Impairments in Sensorimotor Control and Tremor in Individuals With Multiple Sclerosis. *CMSC-ACRIMS*, Orlando, FL.
- A84) Simo L, Botzer L, Bengtson M, Ghez C, **Scheidt RA** (2012) Impaired control of movement trajectory and final position in reaching after stroke. *Soc. Neurosci*, San Diego, CA.
- A83) Ranganathan R, Farshchiansadegh A, **Scheidt RA**, Mussa-Ivaldi FA (2012) Implicitly Eliciting Changes in Finger Coordination Patterns. *Soc. Neurosci*, San Diego, CA.
- A82) Kim S, Schaal S, **Scheidt RA**, Schweighofer N (2012) Directed exploration during learning of a high dimensional motor task. *Soc. Neurosci*, San Diego, CA.
- A81) Heenan M, **Scheidt RA**, Woo D, Bobholz D, Beardsley S (2012) Impairments in sensorimotor control during pursuit and compensatory tracking tasks in individuals with Multiple Sclerosis. *Soc. Neurosci*, San Diego, CA.
- A80) Mosier KM, **Scheidt RA**, Mussa-Ivaldi (2012) Central Mechanisms of Control in Coordinated Movement: How does the brain handle redundancy? *Neur Contr Mov Soc*. Venice, Italy.
- A79) **Scheidt RA** Salowitz N, Zimbelman J, Suminski A, Simo L, Houk J, Mosier KM (2012) Memory and prediction in cerebral cortex, basal ganglia and cerebellum. *Neur Contr Mov Soc*. Venice, Italy.

- A78) Ranganathan R, Wieser J, Mosier KM, Mussa-Ivaldi FA, **Scheidt RA** (2012) Learning finger coordination patterns by altering dimensionality. *Neur Contr Mov Soc*. Venice, Italy.
- A77) Botzer L, Ghez C, Simo L, **Scheidt RA** (2011) Transfer of visuomotor learning between movement and posture control actions: case studies in the hemiparetic arm post-stroke. *Soc. Neurosci*, Washington, DC.
- A76) Heenan M, **Scheidt RA**, Beardsley S (2011) Characterization of movement performance in Multiple Sclerosis *Soc. Neurosci*, Washington, DC.
- A75) Eccarius P, Foxworthy T, Wang Y, **Scheidt RA**, Mussa-Ivaldi F, Mosier K (2011) Motor Space Encoding in Motor Learning: Learning the metrics of space when grasp substitutes for reach. *Soc. Neurosci*, Washington, DC.
- A74) Ranganathan R, Wieser JA, **Scheidt RA** (2011) Reduced dimensionality training and learning of finger coordination patterns. *Soc. Neurosci*, Washington, DC.
- A73) Salowitz NMG, Van Hecke A, **Scheidt RA** (2011) Mirror drawing in an autistic child. *Soc. Neurosci*, Washington, DC.
- A72) **Scheidt RA**, Salowitz N, Zimelman J, Suminski A, Simo L, Houk J, Mosier KM (2011) Learning visualized in the cerebral cortex, basal ganglia and cerebellum. *8th Intl Conf Complex Syst, Quincy MA*
- A71) Kim SS, **Scheidt RA**, Schaal S, Schweighofer N (2011) Learning a new motor skill with a high dimension motor system: preliminary results. *Neural Cont. Movement Soc. Puerto Rico*.
- A70) Ranganathan R, Danziger Z, Eccarius P, **Scheidt RA**, Mosier KM, Mussa-Ivaldi FA (2010) Remapping of Hand Movements: Redundancy in Hand Postures. *Soc. Neurosci*. San Diego CA.
- A69) Mosier KM, Eccarius P, *Emerson S, Wang Y, **Scheidt RA**, Mussa-Ivaldi, FA (2010) Adaptive Representation of Reach and Grasp. *Soc. Neurosci*. San Diego CA.
- A68) Salowitz N, Zimelman J, Simo L, Suminski AJ, **Scheidt RA** (2010) Behavioral regression in functional magnetic resonance image analysis of sensory-motor learning. *Soc Neurosci*. San Diego CA.
- A67) Kanade PN, Ghez C, Wieser J, Botzer L, Simo LS, **Scheidt RA** (2010) Altered control of muscle activation and deactivation in the hemiparetic elbow post-stroke. *Soc. Neurosci*. San Diego CA.
- A66) Sukerkar P, **Scheidt RA**, Beardsley S (2010) Source Localization of Sensory Error Signals in the Brain for Visuomotor Control Using EEG. *Soc. Neurosci*. San Diego CA.
- A65) **Scheidt RA**, Casadio M, Liu X, Mussa-Ivaldi FA, Mosier KM (2010) Errors in movement direction and extent are processed separately and in computationally distinct ways during learning. *Soc. Neurosci*. San Diego CA.
- A64) Botzer L, Kanada PN, Ghez C, **Scheidt RA** (2010). Proprioceptive detection threshold decreases with increasing integration time in healthy humans *CMCW*, Israel.
- A63) **Scheidt RA**, Casadio, M, Liu X, Mussa-Ivaldi FA, Mosier KM (2010) Movement direction and extent errors are processed separately and in computationally distinct ways during learning. *CMCW*, Israel.
- A62) Kanade PN, Ghez C, Wieser J, Botzer L, Simo LS, **Scheidt RA** (2010). Muscle activation and deactivation in the hemiparetic elbow post-stroke. *CMCW*, Israel.
- A61) **Scheidt RA**, Liu X, Mussa-Ivaldi FA, Mosier KM (2010) Reorganization of coordination among redundant control signals during adaptation to rotation and scaling distortions of a newly learned sensorimotor transformation. *Comp Mot Contr Workshp*, Israel.
- A60) Eccarius P, **Scheidt RA** (2010) Defining an articulatory joint space for sign language handshapes. *LabPhon*. Albuquerque, NM.
- A59) Eccarius P, **Scheidt RA** (2010) The articulatory joint space of sign language handshape production and perception. *TISLR*. Indianapolis, IN.
- A58) Conrad MO, **Scheidt RA**, Schmit B (2009) Effects of tendon vibration on manual tracking tasks after stroke. *Soc. Neurosci*, 33. Chicago, IL. Online.
- A57) Poladia C, **Scheidt RA**, Beardsley S (2009) Characterizing sensorimotor integration during wrist stabilization: a systems identification approach. *Soc. Neurosci*, 33. Chicago, IL. Online.
- A56) **Scheidt RA**, Simo LS, Ghez C, Wieser JA (2009) Robotic evaluation of arm proprioception following stroke. *Soc. Neurosci*. 33, Chicago, IL. Online.
- A55) Conrad MO, **Scheidt RA**, Schmit B (2008) Effects of sensory manipulations on targeted arm movements after stroke. *Soc. Neurosci*, 32. Washington DC.
- A54) Poladia C, **Scheidt RA**, Beardsley S (2008) Systems Identification of Sensory-Motor Control for Visually Guided Wrist Movements. *Soc. Neurosci*, 32. Washington DC.
- A53) Gregor N, Chua M, Matheys L, Nathan D, Rath S, Walker E, Xu R, **Scheidt RA** (2008) Temporal delays between visualizing the hand and onset of reaching degrades movement accuracy. *Soc. Neurosci*, 32. Washington DC.
- A52) Liu X, **Scheidt RA** (2008) Differential reorganization of redundant control variables in adapting to rotation and dilation of a novel sensorimotor mapping. *Soc. Neurosci*, 32. Washington DC.

- A51) Conrad M, **Scheidt RA**, Schmit B (2008) Effects of vibration on targeted arm movements. *Neural Cont. Movement Soc*, Naples, FL.
- A50) Asnani S, Ghez C & **Scheidt RA** (2008) Differential control of arm trajectory and final position: electromyographic correlates of trajectory planning errors. *Neural Cont. Movement Soc*, Naples, FL.
- A49) Kanade P, Ghez C & **Scheidt RA** (2008) Spatial mapping of posture-dependent endpoint forces in the hypertonic arm post-stroke: a novel application of rehabilitation robotics. *Neural Cont. Movement Soc*, Naples, FL.
- A48) Smith M, **Scheidt RA** & Mussa-Ivaldi FA (2008) Error clamps for studying motor learning: How the ability to experimentally control error signals can give new insights into motor adaptation. *Neural Cont. Movement Soc*, Naples, FL.
- A47) Kurtzer I, Perreault E, Sainburg R & **Scheidt RA** (2008) Flexibility and coordination of upper limb reflexes. *Neural Cont. Movement Soc*, Naples, FL.
- A46) Zimbelman JL, Suminski AJ, Rao SM, & **Scheidt RA** (2008) Neural correlates of internal models for adapting goal-directed wrist movements. *Abstr Am Phys Thera Assn*.
- A45) Suminski A, Rao S, Mosier K and **Scheidt R** (2007) Distinct neuronal circuits process kinematic performance errors over long and short time scales during wrist stabilization. *Neural Cont. Movement Soc*, Seville Spain.
- A44) Zimbelman J, Suminski A, Rao S and **Scheidt R** (2007) Predicting the future: neural correlates of internal models in the cerebellum and anterior cingulate. *Neural Cont. Movement Soc*, Seville Spain.
- A43) Bastian A, **Scheidt R**, Celnik P and Krakauer J (2007) Does our current understanding of motor learning and memory actually help patients? *Neural Cont. Movement Soc*, Seville Spain.
- A42) *Pompe JW, Suminski AJ and **Scheidt RA** (2006) Neural Correlates of Wrist Stabilization Guided by Time-Varying Visual Feedback. *Proceedings of the BMES Society Annual Meeting, Chicago, IL*.
- A41) Suminski AJ, Zimbelman JL and **Scheidt RA** (2006) Experimental Validation of an MR-Compatible Manipulandum. *Proceedings of the BMES Society Annual Meeting, Chicago IL*.
- A40) Haswell TM and **Scheidt RA** (2006) Does motor adaptation depend on the statistical properties of the environment? *Abstr. of the Soc. for Neuroscience*, 32. Atlanta, GA.
- A39) Heijink H, Ghez C and **Scheidt RA** (2006) Reaching errors reflect separate sources of spatial and temporal variability in trajectory and final position planning. *Abstr. Soc. Neurosci*, 32. Atlanta, GA.
- A38) Zimbelman, JL, **Scheidt RA**, Rao SM and Suminski AJ (2006) During reach, neural activity in primary sensorimotor areas increases with movement extent, not force. *Abstr. Soc. Neurosci*, 32. Atlanta, GA.
- A37) Suminski AJ, Rao SM, Mosier KM and Scheidt RA (2006) Contributions of premotor-parietal networks to sensory-to-motor transformations - an fMRI study. *Abstr. of the Soc. for Neuroscience*, 32. Atlanta, GA.
- A36) **Scheidt RA** and Ghez C (2006) Asymmetric transfer of learning and systematic extent errors are predicted by independent control of trajectory and final equilibrium position in reaching. *Neural Cont. Movement Soc*. Key Biscayne, FL.
- A35) Suminski A, Rao S, Mosier K and **Scheidt RA** (2006) Neural and Electromyographic Correlates of Wrist Posture Regulation in Humans. *Neural Cont. Movement Soc*. Key Biscayne, FL.
- A34) Liu X and **Scheidt RA** (2006) Trial-by-trial remapping of novel motor coordination patterns. *Neural Cont. Movement Soc*. Key Biscayne, FL.
- A33) **Scheidt RA** & Ghez C (2006) Independent control of trajectory and final equilibrium position predicts asymmetric transfer of learning and systematic extent errors in reaching. *Computational Motor Control Workshop II*, Ben-Gurion University, Israel.
- A32) *Bengtson M, Suminski A, *Tomkowiak M, Asnani S & **Scheidt RA** (2005) Effects of auditory biofeedback on wrist stabilization. *Proceedings of the IEEE/EMBS Society*.
- A31) Liu X, Mosier KM, Mussa-Ivaldi FA & **Scheidt RA** (2005) Learning novel finger coordination by reduced visual feedback. *Abstr. of the Soc. for Neuroscience*, 31. Washington, DC.
- A30) Mosier KM, **Scheidt RA**, Acosta S, Lau C, Wang Y & Mussa-Ivaldi FA (2005) Motor space learning: behavioral mechanisms and neural correlates of remapping hand movements in a novel geometrical environment. *Abstr. of the Soc. for Neuroscience*, 31. Washington, DC.
- A29) Ghez C, **Scheidt R**, & Mussa-Ivaldi, FA (2005) Posture and movement invoke separate adaptive mechanisms and are represented in different coordinate systems. *Proceedings of the Computational Motor Control Workshop*, Ben-Gurion University, Israel.
- A28) Thoroughman K, Sabes P, **Scheidt R** & Smith M. (2005) Movement-by-movement Motor Adaptation: A Novel Window into Computations and Mechanisms of Neural Control. *Neural Cont. Movement Soc*. Key Biscayne, FL.
- A27) Mosier KM, **Scheidt, RA** & Mussa-Ivaldi FA (2005) Independent neural mechanisms for the control of posture and movement in learning control of an artificial endpoint. *Neural Cont. Movement Soc*. Key Biscayne, FL.

- A26) Ghez C, I Dinstein, J Cappell, & **Scheidt RA** (2004) Posture and movement are encoded in different coordinate systems. *Abstr. of the Soc. for Neuroscience*, 30. San Diego, CA.
- A25) **Scheidt RA**, Mussa-Ivaldi FA & Ghez C (2004) Posture and movement invoke separate adaptive mechanisms. *Abstr. of the Soc. for Neuroscience*, 30. San Diego, CA.
- A24) Suminski AJ, Rao SM, Verber M, Mosier KM & **Scheidt RA** (2004) Sensorimotor coincidence enhances cerebellar output during feedback stabilization of the wrist. *Abstr. of the Soc. for Neuroscience*, 30. San Diego, CA.
- A23) Mosier, KM, **Scheidt, RA**, Acosta S & Mussa-Ivaldi, FA (2004) Remapping of finger coordination in a novel geometrical environment: a non-invasive testbed for brain-machine interfaces. *Abstr. of the Soc. for Neuroscience*, 30. San Diego, CA.
- A22) Suminski, AJ & **Scheidt, RA** (2004) Control system for mri compatible pneumatic manipulandum. *Proceed. of the IEEE EMBS Soc.*
- A21) Mosier KM, Wang, Y **Scheidt, R**, Acosta, S & Mussa-Ivaldi, FA (2004) Radiology and the cyborg: a novel functional imaging paradigm as a testbed for brain-machine interfaces. *Abstr. of the Radiological Society of North America.*
- A20) Mosier, KM, **Scheidt, RA**, Acosta, S & Mussa-Ivaldi, FA (2004) Learning control in novel coordinate systems: Implications for Brain-Machine Interfaces. *Abstr. Neural Cont. Movement Soc.*
- A19) **Scheidt, RA** & Stoekmann, T (2004) Reaching in uncertain environments following stroke. *Proc. Neural Control of Movement Soc.*
- A18) **Scheidt, RA**, Mussa-Ivaldi, FA & Ghez, C (2004) Different adaptive mechanisms for posture and movement control? *Proc. Neural Control of Movement Soc.*
- A17) **Scheidt, RA** & Mah, CD (2003) Feedforward control of virtual (isometric) reaching. *Abstr. of the Soc. for Neuroscience*, 29. New Orleans, LA.
- A16) Judkins, TN & **Scheidt, RA** (2003) Sensory coherence and memory-based motor adaptation. *Abstr. of the Soc. for Neuroscience*, 29. New Orleans, LA.
- A15) Lillis, KP & **Scheidt, RA** (2003) Hand path curvature sensitivity during reaching. *Abstr. of the Soc. for Neuroscience*, 29. New Orleans, LA.
- A14) Secco, EL, Scheidt, RA, Patton, J. & Mussa-Ivaldi, FA (2003) Misrepresentation of limb dynamics induced by the suppression of visual errors. *Abstr. of the Soc. for Neurosci.*, 29. New Orleans, LA.
- A13) Benz, E. **Scheidt, RA**, Schmit, BD (2003) Clinical Quantification of Spasticity In Individuals With Spinal Cord Injury. *Abstr. of the American Physical Therapy Association.*
- A12) **Scheidt, RA** Mah, CD and Mussa-Ivaldi, FA (2002) The role of concurrent sensory feedback in performing a virtual (isometric) reaching task. *Abstr. Soc. for Neuroscience*, 28, Orlando, FL.
- A11) Amir, H, **Scheidt, RA**, Kuiken, T (2002) Computerized Biofeedback Knee Goniometer: Acceptance and Effect on Exercise Behavior in Post Total knee Arthroplasty Rehabilitation. *Proceed. of the Association for Physical Medicine and Rehabilitation.*, 83: 1660-1661.
- A10) **Scheidt, RA**, Mussa-Ivaldi, FA and Mah, CD (2002) The role of concurrent sensory feedback in motor adaptation in a virtual (isometric) reaching task. *Abstr. Neural Control of Movement Soc.*
- A9) **Scheidt, RA**, Dingwell, JB. & Mussa-Ivaldi, FA. (2001) A linear systems approach to modeling motor adaptation. *Abstr. of the Soc. for Neuroscience.*, 27.
- A8) **Scheidt, RA**, Dingwell, JB. & Mussa-Ivaldi, FA. (2001) Internal model formation for control in stochastic environments. *Abstr. of the III International Symposium on Progress in Motor Control, Montreal, CA. p. 41.*
- A7) Dingwell, JB, Mah, CD, **Scheidt, RA** & Mussa-Ivaldi, FA. (2000) Do subjects learn feed-forward internal models when manipulating mass-spring objects? *Abstr. of the Soc. for Neuroscience*, 26(21)
- A6) **Scheidt, RA** & Mussa-Ivaldi, FA. (1999) Time series analysis of motor adaptation. *Abstr. of the Soc. for Neuroscience*, 25.
- A5) **Scheidt, RA**, Conditt, MA, Reinkensmeyer, DJ & Mussa-Ivaldi, FA. (1997) Motor adaptation persists in the absence of kinematic errors. *Abstr. of the Soc. for Neuroscience*, 23, 36.
- A4) Conditt, MA, **Scheidt, RA** & Mussa-Ivaldi, FA. (1997) Visual influence on learning arm dynamics. *Abstr. of the Soc. for Neuroscience*, 23, 36.
- A3) **Scheidt, RA** & Rymer, WZ. (1996) Single- and multi-joint arm movements: are they controlled the same way? *Abstracts of the Soc. for Neuroscience*, 22, 1640.
- A2) **Scheidt, RA**, Dewald, JP & Rymer, WZ. (1995) A time delay estimate of muscle EMG-to-force processing for use in the study of motor control. *Abstracts of the Soc. for Neuroscience*, 21, 681.25)
- A1) **Scheidt, RA**, & Kertesz, AE. (1992) Spatiotemporal aspects of sensory interactions during fusional response. *Investigative Ophthalmology & Visual Science*, 33(4), 1334.

Patents

- US Patent #6,292,692: "Medical treatment device with functions, operated under passcode control".
- US Patents #6,846,161 and #7,004,727: "Blood component processing systems and methods using fluid-actuated pumping elements that are integrity tested prior to use".

Invited Presentations (International)

- "Vibrotactile discrimination in the upper extremity." Department of Radiology, University of Genoa Medical Center, Genoa, Italy. 05/28/17
- "Multisensory contributions to feedback control of discrete and continuous actions." Motor Control Summer School XIII, Tzuba, Israel. 06/24/16

"Neural correlates of nonlinear multisensory integration during wrist stabilization." Ben Gurion University of the Negev, Israel. 06/20/16

"Mitigating somatosensory deficits post-stroke via sensory synthesis." NSF Workshop on Robotic & Interactive Technologies for Neuroscience & Neurorehabilitation, Arenzano, Italy. 8/31/15

"Facilitation and interference in the learning of motor tasks with and without overlapping dimensions." Progress in Motor Control X., Budapest, Hungary. 7/23/15

"Reorganization of coordination during adaptation to rotation and scaling of a newly learned sensorimotor transformation" Ben Gurion University of the Negev, Israel. 06/16/10

"Independent control of trajectory and final equilibrium position predicts asymmetric transfer of learning and systematic extent errors in reaching. Ben Gurion University of the Negev, Israel. 06/07/06

"Mind, machine, and motor nexus" National Science Foundation, Washington, DC, 05/10/17

"Facilitation and interference during learning of multi-dimensional motor skills." Illinois Institute of Technology. 4/22/16

"Mitigating somatosensory deficits post-stroke via sensory synthesis - Promise & progress" Univ of Florida, Gainesville, FL, 03/16/16

"Visual and Proprioceptive Contributions to Perception and Control of Arm Movement" Action Club, Penn State Univ., State College PA, 12/12/14

"Somatosensory Deficits and Their Mitigation: Foundations and Promise for Stroke Rehabilitation" Department of Kinesiology, Penn State Univ., State College PA, 12/11/14

"Rehab Robotics: Quantifying deficits in the control of arm posture and movement post-stroke " Univ Michigan, Ann Arbor MI, 04/04/11

"Neural correlates of limb posture and movement control" Univ of Southern California, CA, 12/16/10

"Control of limb posture and movement following stroke" Univ of Southern California, CA, 03/22/10

"Control of limb posture and movement following stroke" Univ of Kentucky, Lexington, KY, 12/05/08

"Separate control of limb posture and movement in reaching" Univ of IL, Chicago, IL, 03/14/08

"Independent control of arm posture and movement in reaching: implications for the control of functional movement post-stroke." Cleveland Clinic Foundation, OH, 12/07/07

"Sensory information processing underlying adaptation of the human reach." Department of Bioengineering, Washington University, St. Louis, MO, 01/18/07

"Visual and proprioceptive contributions to adaptation of the human reach." Department of Kinesiology, Arizona State University, Phoenix, AZ, 11/22/06

"Adaptation of reaching movements post-stroke." State of the Science (SOS) Workshop on Functional Restoration for the Stroke Survivor: Informing the Efforts of Engineers, San Diego, CA, 03/06/06

"A linear model of motor learning." Neurosciences Institute, La Jolla, CA. 11/15/01

"Systems identification of motor adaptation." Johns Hopkins Univ., 02/12/00

"Assessment and Mitigation of Proprioceptive Deficits After Stroke." Dept. of Physical Medicine and Rehabilitation, Medical College of Wisconsin 09/15/17

"Stroke Rehabilitation in the Cybernetic Age: Foundations and Promise." Dept. of Physical Medicine and Rehabilitation, Northwestern Univ Feinberg School of Medicine 08/19/14

"Memory and prediction in cerebral cortex, basal ganglia and cerebellum" Dept. of Bioengineering, University of Wisconsin, Milwaukee 11/09/12

"Memory and prediction in cerebral cortex, basal ganglia and cerebellum" Grand Rounds, Dept. Physical Medicine and Rehabilitation, Medical College of Wisconsin 09/21/12

"Remembering forward: Neural correlates of memory and prediction in human motor adaptation" Dept of Physiology, Northwestern University 04/08/11

"Reorganization of coordination during adaptation to rotation and scaling of a newly learned sensorimotor transformation" Rehabilitation Institute of Chicago, 06/16/10

"Optimality and suboptimality in the multi-objective control of movement" Northwestern Univ 02/11/10

"Re-learning to move: adaptation of reaching movements post-stroke." Grand Rounds, Medical College of Wisconsin, Milwaukee, WI, 12/18/06

"Peripheral and central mechanisms for motor control." Department of Neurology, Medical College of Wisconsin, Milwaukee, WI, 10/24/06

"Independent planning of arm trajectory and posture during reaching." Integrative Neuroscience Research Center, Marquette Univ., Milwaukee, WI, 12/05/05

"Quantifying Motor Adaptation Following Stroke." Centers for Research on Neurorehabilitation, Lake Bluff, IL, 06/12/04

"Visual and proprioceptive contributions to posture and movement regulation in the upper extremity." Northwestern University, Evanston, IL, 02/21/04

"Memory-based trajectory adaptation in the upper extremity following stroke." Rehabilitation Institute of Chicago, Chicago, IL, 02/20/04

"Visual and proprioceptive contributions to the control and adaptation of reaching movements." Rehabilitation Institute of Chicago, Chicago, IL, 12/18/03

"Re-learning to move amid uncertainty: Quantifying motor adaptation following stroke." Rehabilitation Institute of Chicago, Chicago, IL, 06/14/03

"Learning (and re-learning) to move amid uncertainty." Northwestern Univ. IL Chicago 03/08/02

Invited Presentations (National)

Invited Presentations (Local)

Professional Service

Member, NIH Study Section: MRS: Musculoskeletal Rehabilitation Sciences – current term: 2012-2018.
Member, NSF College of Reviewers: current term: 2013-2018.

Editorial Board: *Experimental Brain Research*, 2006-2016; *Frontiers in Integrative Neuroscience*, 2016-present.

Reviewer: *Behavioral Brain Research, Biological Psychology, Brain Research, Frontiers in Neurology, IEEE Transactions on Neural Systems and Rehabilitation Engineering, IEEE Transactions on Robotics, J. Applied Biomechanics, J. Computational Biology, J. Computational Neuroscience, J. Motor Behavior, J. Neural Engineering & Rehabilitation, J. Neurophysiology, J. Neuroscience, J. Neuroscience Methods, JOVE, Mathematical Bioscience, Nature Neuroscience, NeuroImage, Neuron, Neurorehabilitation and Neural Repair, Neuroscience, Neuroscience Letters, PLoS Biology, PLoS Computational Biology*

Grant Reviewer: NIH: 2002, 2005, 2007-2016; NSF: 2001, 2003-2008, 2010, 2012-2016; Wellcome Trust (UK), 2007; American Heart Association, 2008; Israel Science Foundation, 2011, 2015, 2016

Conference session organizer or chair: ICORR 2005, NCM 2005, IEEE/EMBS 2014, PMC 2015.

Scientific Program Committee: IEEE EMBS 2007, 2013-present; ICORR 2007, 2011, 2013; TCMC 2014-present; PMC 2015

University Service

Departmental: Director of Graduate Studies – Masters of Engineering Program (2016 – 2017)
Undergraduate Laboratory Committee (Chair: 2002-present; member 2001)
Undergraduate Curriculum Committee (member: 2001-06, 2010; Chair: 2006-08)
Graduate Program Committee (member: 2011- present)
Coordinator: Doctoral Qualifying Exam (2011-2105)
Departmental and Interdepartmental Faculty Search Committees (2002, '07, '13, '14)
Departmental Promotion and Tenure Committee (2013-present)

College: Mechanics Committee (member: 2001-2002)
Technology Committee (member: 2006-2007)
College Curriculum Committee (member: 2007-2009)
College Committee on Sabbatical (member: 2012-2013)
Undergraduate Research Committee (member: 2014-present)

University: Intellectual Property Review Board (member: 2014-2017; chair: 2015-2016)

Curriculum Developed

Embedded Biomedical Instrumentation (BIEN112 / BIEN4220): Development of embedded systems for the medical electronics industry (3 cr; junior standing); *Major Revision: 2012*.

Biocomputer Design Lab I: Physiological Simulation, Monitoring and Control (BIEN193 / BIEN4280): Small-scale computer-based medical systems; physiological monitoring/control (3 cr; senior standing); *Major Revisions: 2011, 2014*.

Neuromotor Control (BIEN151 / BIEN237 / BIEN6600): Integration of control theory with the study of movement biomechanics; study of normal and impaired human movement (3 cr; grad standing)

Mechanisms and Models of Motor Learning (BIEN289): Examination of the role of variability in the planning and execution of upper extremity movements (3 cr; grad standing).

Microprocessor-based Biomedical Instrumentation (BIEN241): Application of microprocessors, microcontrollers, digital signal processors to biomedical applications (3 cr; grad standing)

Topics in Medical Imaging Physics (BIEN6931): Functional Neuroimaging (3 cr; grad standing)

Research Methodologies I (BIEN289/8110): Scientific proposal preparation (3 cr; grad standing)

Research Methodologies II (BIEN289/8111): Scientific manuscript preparation (3 cr; grad standing)

Courses Taught

2017 Fall: **BIEN4280** – Biocomputer Design Lab 1
Spring: **BIEN4220** - Embedded Biomedical Instrumentation (and Lab); **BIEN3310** - Control Systems for Biomedical Engineers

2016 Fall: **BIEN4280** – Biocomputer Design Lab 1; **BIEN6931** Mechanisms and Models of Motor Learning
Spring: **BIEN4220** - Embedded Biomedical Instrumentation (and Lab)

2015 Fall: **BIEN4280** – Biocomputer Design Lab 1; **BIEN6931** Mechanisms and Models of Motor Learning
Spring: **BIEN4220** - Embedded Biomedical Instrumentation (and Lab)
BIEN6600 – Neuromotor Control

2014 Fall: **BIEN4280** – Biocomputer Design Lab 1; **BIEN6931** (overload) -Topics in Medical Imaging Physics; **BIEN6995** (overload) –Independent Study; **BIEN8110** (overload) –Research Methodologies I
Spring: **BIEN4220** - Embedded Biomedical Instrumentation (and Lab);
BIEN3310 – Control Systems for Biomedical Engineers

2013 Fall: **BIEN4280** – Biocomputer Design Lab 1
Spring: **BIEN4220** - Embedded Biomedical Instrumentation (and Lab)
BIEN3310 - Control Systems for Biomedical Engineers

2012 Fall: **BIEN4280** – Biocomputer Design Lab 1
Spring: **BIEN4220** - Embedded Biomedical Instrumentation (and Lab)

2011 Fall: **BIEN4280** – Biocomputer Design Lab 1
Spring: **BIEN6600** – Neuromotor Control; **BIEN8120** (overload) – Research Methodologies 2

- 2010 Fall: **BIEN4280** – Biocomputer Design Lab 1
Spring: Sabbatical; **BIEN289** (overload) – Research Methodologies 1
- 2009 Fall: Sabbatical
Spring: **BIEN237** – Neuromotor Control; **BIEN289** (overload) – Research Methodologies 2
- 2008 Fall: **BIEN193** – Biocomputer Design Lab 1; **BIEN289** (overload) – Research Methodologies 1;
BIEN295 (overload) – Independent Study
Spring: **BIEN289** – Mechanisms and Models of Motor Learning; **BIEN289** – Research Methodologies 2
- 2007 Fall: **BIEN193** – Biocomputer Design Lab 1
Spring: **BIEN237** – Neuromotor Control; **BIEN195** (overload) – Independent Study
- 2006 Fall: **BIEN193** – Biocomputer Design Lab 1
Spring: **BIEN112** - Embedded Biomedical Instrumentation (and Lab)
- 2005 Fall: **BIEN193** – Biocomputer Design Lab 1; **BIEN237** (overload) – Neuromotor Control
Spring: **BIEN112** - Embedded Biomedical Instrumentation (and Lab); **BIEN295** (overload) – Independent Study
- 2004 Fall: **BIEN193** – Biocomputer Design Lab 1
Spring: **BIEN112** - Embedded Biomedical Instrumentation (and Lab); **BIEN295** (overload) – Independent Study
- 2003 Fall: **BIEN193** – Biocomputer Design Lab 1
Spring: **BIEN112** - Embedded Biomedical Instrumentation (and Lab);
- 2002 Fall: **BIEN193** – Biocomputer Design Lab 1; **BIEN295** (overload) – Independent Study
Spring: **BIEN241** – Microprocessor-based Instrumentation Instrumentation; **BIEN295** (overload) Independent Study
- 2001 Fall: **BIEN112** - Embedded Biomedical Instrumentation (and Lab); **BIEN295** (overload) – Independent Study
Summer: **BIEN295** (overload) – Independent Study
Spring: **BIEN151** – Neuromotor Control

Dissertation Committees Chaired

- Heenan, Megan, 2015, PhD – Biomedical Engineering. *Identification and retraining of sensorimotor deficits to reduce intention tremor in Multiple Sclerosis.* (committee co-chair with Scott Beardsley)
- Salowitz, Nicole, 2014, PhD – Biomedical Engineering. *Multimodal sensory integration for perception and action in high functioning children with autism.* Current position: Post-doc, Marquette University.
- Liu, Xiaolin, 2009, PhD – Biomedical Engineering. *Sensorimotor learning and the control of motion in a novel coordinate system.* Current position: Post-doc, Medical College of Wisconsin
- Stoeckmann, Tina, 2007, DSc – Neurology (Rocky Mountain Univ. Health Professions) *Muscle recruitment and co-activation patterns in the spastic hemiparetic arm post-stroke: Effects of elastic, viscous, and mass loads.* Current position: Associate Prof., Physical Therapy, Marquette University.
- Suminski, Aaron, A. 2006, PhD – Biomedical Engineering. *Contribution of Visual and Proprioceptive Sensory Feedback to the Online Regulation of Wrist Posture in Humans using fMRI.* Current position: Assistant Professor, Milwaukee School of Engineering.

Thesis Committees Chaired

- Risi, Nicoletta, 2016 MS - Bioengineering, Univ. Genoa, Italy (co-chair: M Casadio, UNIGE). *Learning to use supplemental vibrotactile feedback of limb position enhances goal-directed reach performance.*
- Krueger, Alexis, 2016 MS – Biomedical Engineering. *Engineering synthetic feedback to promote recovery of self-feeding skills in people with sensory deficits due to stroke*
- Haswell, Timothy, 2010 MS – Biomedical Engineering. *Sensitivity of motor adaptation to the statistical properties of an environmental load*
- Kanada, Priyanka, 2009 MS – Biomedical Engineering. *Spatial mapping of posture-dependent endpoint forces in the hypertonic arm post-stroke*
- Amans, Matthew, 2008 MS – Biomedical Engineering. *Proprioceptive feedback contributions to control of elbow extension movements in man: Modulating upper limb position sense via tendon vibration*
- Asnani, Supriya, 2008 MS – Biomedical Engineering. *Interaction between the control of movement and posture during goal-directed elbow flexion*
- Judkins, Timothy N. 2004, MS - Biomedical Engineering. *Visual and proprioceptive contributions to adaptation of the human reach*
- Lillis, Kyle P. 2003, MS - Biomedical Engineering. *Proprioceptive sensitivity to hand path curvature during human reaching*

Dissertation and Thesis Committee Service

- Bao, Shancheng (Kinesiology, University of Wisconsin): *ongoing.* (chair: Wang)
- Tzorakoleftherakis, Emmanouil (Mech Eng, Northwestern University): 2017 PhD – *Stable control synthesis for human-in-the-loop systems* (chair: Murphey)

Poh, Eugene (Human Movement & Nutrition Sciences, University of Queensland, Australia): 2016 PhD - *Neural mechanisms underlying visumotor adaptation* (chair: Carroll)

Tzorakoleftherakis, Emmanouil (Mech Eng, Northwestern University): 2015 MS - *Vibrotactile Feedback in Human-Machine Interfaces*. (chair: Murphey)

Mawase, Firas: 2014 PhD (Biomed Eng, Ben Gurion University of the Negev, Israel) - *Predictive Capabilities of the Motor System in Individuals with Cerebral Palsy*. (chairs: Karniel, Bar-Haim)

Ji, An: 2014 PhD – *Speaker independent acoustic-to-articulator inversion*. (chair: Johnson, Michael)

Walker, Eric: 2013 PhD – *Dynamic balance control during treadmill walking in chronic stroke survivors*. (chair: Schmit)

Dang, Vincent: 2013 MS – *Characterization of two-dimensional oculomotor control during goal-directed eye movements in humans*. (chair: Beardsley)

Herzfeld, David: 2011 PhD - *Modeling and computational framework for the specification and simulation of large-scale spiking neural networks*. (chair: Beardsley)

Janik, John: 2011 PhD - *Investigation of spatio-temporal effects of FMRI visual field mapping techniques on VI* (chair: Ropella)

Srungboonme, Kakanand: 2011 PhD – *Sensorimotor control of 3D arm movement and stability in post-stroke hemiparesis* (chair: Schmit)

Dharhampal, Tushar: 2011 MS – *Adaptive real-time decoding of brain signals for long-term control of a neuroprosthetic device*. (chair: Beardsley)

Sukerkar, Prajakta: 2010 MS - *EEG source localization of visual and proprioceptive error processing during visually-guided target tracking with the wrist*. (chair: Beardsley)

Xu, Rubing: 2010 MS – *Design and validation of an MR conditional upper extremity evaluation system to study brain activation patterns after stroke* (chair: Johnson, Michelle)

Conrad, Megan: 2009 PhD - *Effects of distal sensory manipulations on arm movements in post-stroke hemiparesis*. (chair: Schmit)

Poladia, Chintan: 2009 MS - *Systems identification of sensorimotor control for visually-guided wrist movements* (chair: Beardsley)

Sangani, Samir: 2008 PhD – *Neural mechanisms underlying upper extremity heteronymous multijoint reflexes post-stroke*. (chair: Schmit)

Basta, Andrew 2008 MS – *A wireless sensor network for monitoring biometric signals using IEEE 802.15.4 protocol* (chair: Jeutter)

Kline, Tiffany: 2005 MS – *Posture effects on exaggerated finger flexion following stroke* (chair: Schmit)

Wisneski, Kimberly: 2005 MS – *Development and evaluation of a model to generate functional trajectories for implementation in robotic therapy* (chair: Johnson, Michelle)

Current Graduate Students

Maria Bengtson, PhD candidate – Biomedical Engineering, Marquette University (committee chair)

Valay Shah, PhD student – Biomedical Engineering, Marquette University (committee chair)

Devon Lantagne, PhD student – Biomedical Engineering, Marquette University (committee chair)

Francesca Bucci, MS student – Bioengineering, University of Genova, Italy (co-chair with M. Casadio)

Giovanni Huang, MS student – Bioengineering, University of Genova, Italy (co-chair with M. Casadio)

Marta Care', MS student – Bioengineering, University of Genova, Italy (co-chair with M. Casadio)

Undergraduate Research Directed

Becca Slick (UW-Oshkosh Kinesiology); Kaitlyn Nordmeyer (MU BME); Alaa Shanaa (MU BME); Doug Peters (MU BME); Luis Jimenez-Gonzalez (MU BME); Valay Shah (MU BME); Christine Smith (MU BME); Margaret Johnston (MU Physics); Alexis Krueger (MU BME); Samm Karshenas (MU BME); Hassan Quereshi (MU BME); Rebecca Pachuta (MU BME); Diksha Gandhi (MU BME); Natdhaphol Kulvadhanaphan (MU BME); Alex Braddock (MU BME); Rebecca Bour (MU BME); Spencer Greaves (MU BME); Andrew Bowser (MSOE BME); Peiyao Zhang (MU BME); David Johnston (MU Physics); Scott Emerson (MU BME); Karyn Bratcher (MU BME); Michael Tomkowiak (MU BME); Maria Bengtson (ASU BME); Andrew Steward (BME: Rose-Hulman Institute of Technology); Ali Pervaisz (MU BME); Cassandra Appleton (MU BME); Jeffrey Pompe (BME: Univ IL-Urbana Champaign)

Post-Doctoral Fellows Mentored

Janice Zimbelman, PT, PhD – Department of Neurology, Medical College of Wisconsin (2005-2008)

Petra Ecarus, PhD – Department of Biomedical Engineering, Marquette University (2009-2012)

Lior Botzer, PhD – Department of Biomedical Engineering, Marquette University (2009-2012)

Rajiv Raganathan, PhD - Sensory Motor Performance Prog, Rehab Institute of Chicago (2009-2013)