

Ela B. Plow PhD PT

Curriculum Vitae

plowe2@ccf.org

PROFESSIONAL EXPERIENCE

Assistant Professor

Cleveland Clinic Lerner College of Medicine

2014- Present

Investigator

Advanced Platform Technology Center, VA Center of Excellence

2014- Present

Assistant Staff

Cleveland Clinic, Department of Biomedical Engineering, Lerner Research Institute

2013- Present

Staff

Cleveland Clinic, Center for Neurological Restoration, Neurological institute

2011- Present

Staff

Cleveland Clinic, Department of Physical Medicine & Rehabilitation, Neurological Institute

2010- Present

University Graduate Faculty

Cleveland State University, Dept. of Chemical and Biomedical Engineering

2010- Present

Project Staff Scientist

Cleveland Clinic, Department of Biomedical Engineering, Lerner Research Institute

2010- 2013

University Graduate Faculty

Cleveland State University, Dept. of Chemical and Biomedical Engineering

2010- Present

Graduate Fellow

University of Minnesota, Program in Rehabilitation Science, Dept. of Physical Therapy

2006-2007

Research and Teaching Assistant

University of Minnesota, Program in Rehabilitation Science, Dept. of Physical Therapy

2003-2006

Graduate Intern

University of Rhode Island, Eleanor Slater Hospital

2002-2002

Home Health Care Physical Therapist

Private Practice, India

2002-2002

EDUCATION

Bachelor of Science

Physical Therapy,
Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh,
India.

8/1997 - 4/2002

Doctor of Philosophy

Rehabilitation Science (Minor, Neuroscience)
University of Minnesota, Minneapolis, MN
Thesis: Finger vs. Elbow Tracking: Neural Substrates of Motor Skill Learning
Revealed Using fMRI
Advisor: Prof. James R Carey; Members: Drs. Teresa Kimberley, Angus MacDonald III,
James Ashe, Carl J Kukulka

1/2003 - 11/2007

Post-doctoral Fellowship

Neurology
Harvard Medical School, Berenson-Allen Center for Noninvasive Brain Stimulation, Beth
Israel Deaconess Medical Center, Boston, MA
Advisors: Prof. Alvaro Pascual-Leone, Dr. Lotfi B. Merabet

10/2007 - 1/2010

GRANTS/FUNDING

Active

1K01HD069504 (Plow) 9.0 calendar 09/10/2011 – 06/30/2016

NIH/NICHD \$509,595

Brain Stimulation- aided Stroke Rehabilitation: Neural Mechanisms of Recovery

Brain stimulation has been immensely popular as an adjunct to stroke rehabilitation. However, it is not yet clinically indicated in practice due to recent failures in clinical trials. The main reason is only one type of stimulation is used across all patients. The present study compares neural mechanisms in patients who respond to brain stimulation versus those who do not to better understand why there is variability in its benefit.

13BGIA17120055 (Plow) 1.8 Calendar 07/01/2013– 06/31/2015

American Heart Association \$132,000

Improving Targeting of Brain Stimulation in Stroke Using Novel Image-Guidance

The overall aim of this application is to establish feasibility of a new method of imaging to localize brain stimulation in stroke. The method identifies surviving pathways, which would potentially improve reliability of localizing brain stimulation because traditional imaging of blood-flow is unreliable due to perfusion abnormalities in stroke brain.

W81XWH-11-1-0707 (PI: Plow; PD: Lin) 2.04 Calendar 9/15/2011 - 9/14/2014

Dept. of Defense \$540,928

Directing Neuroplasticity to Improve Rehabilitative Outcomes of the Upper Limb in Incomplete Quadriplegia

The major goal of this project will be to directly affect adaptive neuroplasticity in the motor cortex using brain stimulation to enhance function of the weak upper limbs in incomplete cervical Spinal Cord Injured population.

Scott Hamilton Cancer Alliance (Davis) 0.6 Calendar 11/2012-12/2014

\$97,528

Neural Substrates of Cognitive Impairments and Movement-Related fatigue in Women Undergoing Adjuvant Chemotherapy

The overall goal of this study is to understand neural mechanisms of chemotherapy-induced toxicity that explain fatigue and cognitive impairments in breast-cancer survivors.

PFIZ1207MD (Davis) 0 calendar 7/2012-6/2017

Pfizer, Inc \$173,536

Exploration of the Neuromuscular Mechanisms Associated with Sunitinib Related Fatigue

The goal of this industry-sponsored study is to address chemotherapy-induced neurotoxicity in survivors of with renal carcinoma using single pulse Transcranial Magnetic Stimulation

Completed

Feasibility of enhancing recovery of sensory deficits after stroke with rTMS (Pundik)
Clinical and Translational Science Collaborative (CTSC) \$50,000 6/2012- 5/2013

The overall goal of this pilot study is to test the feasibility and preliminary efficacy of noninvasive therapeutic brain stimulation, using repetitive TMS, targeted to sensory cortical regions to augment sensory rehabilitation in stroke.

Effects of Mental Training on Voluntary Muscle Strength in Aging (Plow, transferred from Yue)
NIH-NINDS R01NS35130 \$1,503,527 2/2008- 1/2013

The major goal of the study is to examine whether mental training with brain activity feedback yields greater strength improvements compared to mental training without feedback.

A pilot study of Brain Stimulation-aided Stroke Rehabilitation: Neural Mechanisms of Recovery (Plow)
Clinical & Translational Sci. Collaborative RPC 2011-1006 \$25, 000 3/2011-12/2012

The major goal of this pilot project is to explore neural mechanisms of recovery underlying combination of noninvasive brain stimulation (tDCS) and concurrent movement rehabilitation in chronic stroke.

Respiratory Muscle conditioning using Magnetic Stimulation for SCI Patients (Lin)
 Veterans Affairs' Merit Review B2714R \$175,000 10/2011-9/2011

The major goal of the study is to examine the effectiveness of Functional Magnetic Stimulation, a noninvasive method of neuromuscular activation, versus pulmonary physical therapy in spinal cord injury.

Combining Noninvasive Brain Stimulation with Visual Rehabilitation in Hemianopia (Merebet)
 NovaVision Inc., Boca Raton, FL \$100,000 11/2007- 12/2010

Scientific and Technological Cooperation: Republic of Italy and The United States of America (Merabet, Cattaneo)
 Travel Grant: 2007-2009

Neural Substrates of Motor Skill Learning Revealed Using Functional MRI (Plow) 9/2006-7/2007
 University of Minnesota Graduate Doctoral Dissertation Fellowship \$21,000

PROFESSIONAL AFFILIATIONS

American Physical Therapy Association	2005 – Present
Society for Neuroscience	2007 – Present
American Academy of Neurology	2010 – Present
American Society for Neurorehabilitation	2011 – Present
American Heart Association (Stroke)	2012 – Present

AWARDS, HONORS, MEDIA RELEASES

Medpage Today mention regarding editorial published in Neurology	2014
Article from Neurotherapeutics appeared in MDlinx	2013
Article from Trials appeared in MDlinx	2013
Front-page coverage in Center for Clinical Research Newsletter, Cleveland Clinic for Study Team Communication in the 21 st Century	2013
Featured in <i>Research News</i> by Cleveland Clinic “Brain Plasticity and Recovery from Disease”	2012
Article from <i>Neurorehabilitation and Neural Repair</i> featured on MDlinx	2012
Article from <i>Journal of Pain</i> made cover image	2012
Feature article in <i>Neuroscience Pathways</i> by Cleveland Clinic	2011
Feature article in <i>Frontiers in Rehabilitation</i> by Cleveland Clinic	2011
Feature article <i>Frontiers in Rehabilitation</i> “Improving Efficacy of Stroke Rehabilitation”	2010
Press Release (<i>Doctor's Guide- Neurologic</i>)	2010
Feature article <i>Neurology Today</i> “Use of Transcranial Stimulation to Improve Vision Rehabilitation”	2009
Best Student in Physical Therapy, Department of Physical Therapy, Post Graduate Institute of Medical Education and Research, Chandigarh, India	2002
All India Rank 2nd National Gold Medal Exam, Indian Association of Physiotherapists, India	2001
All India Rank 1st National Entrance Physical Therapy Program, Post Graduate Institute of Medical Education and Research, Chandigarh, India	1997

MANUSCRIPT REVIEW FOR SCIENTIFIC JOURNALS

Annals of Neurology
 Neurology
 Human Brain Mapping
 Neuroimage
 Neurorehabilitation and Neural Repair
 Brain Stimulation
 European Journal of Neurology
 Journal of Gerontology: Medical Sciences
 Journal of Neuroscience Methods
 Physical Therapy

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EDITORIAL AND GRANT REVIEW ACTIVITIES

Guest co-editor, Supplement to <i>Archives of Physical Medicine & Rehabilitation</i>	2014
National Institute of Disability & Rehabilitation Research (NIDRR), Washington DC	2013
American Heart Association	2013
Abstract issue of Neural Repair/Neurorehabilitation (Abstracts for Annual Meeting of American Academy of Neurology)	2013
ZonMw, The Netherlands Organisation for Health Research and Development, The Hague, The Netherlands	2012
DoD: Dept. of Defense, U.S. Army Medical Research and Materiel Command (USAMRMC), Fort Detrick, MD	2012
National Institute of Disability & Rehabilitation Research (NIDRR), Washington DC	2012
Abstract issue of Neural Repair/Neurorehabilitation (Abstracts for Annual Meeting of American Academy of Neurology)	2012
National Institute of Disability & Rehabilitation Research (NIDRR), Washington DC	2011
Graduate Women in Science Fellowships, Sigma Delta Epsilon, St. Paul, MN	2010

PUBLICATIONS

1. **Plow EB**, Cattaneo Z, Carlson TA, Alvarez GA, Pascual-Leone A, Battelli LB. The compensatory dynamic of inter-hemispheric interactions in visuospatial attention revealed using rTMS and fMRI. *Frontiers in Human Neuroscience* (in press)
2. **Plow EB**, Varnerin N, Cunningham DA, Janini D, Bonnett C, Wyant A, Hou J, Siemionow V, Wang X, Machado AG, Yue GH. *Age-related Weakness of Proximal Muscle studied with Motor Cortical Mapping: A TMS Study*. PlosOne (in press).
3. **Plow EB** and Fehlings MG. [invited] Hypoxic locomotor rehabilitation for incomplete spinal cord injury: Not an oxymoron (2013). *Neurology* (in press)
4. **Plow EB** and Machado A (2013). *Invasive Neuro-stimulation in Stroke Rehabilitation*. *Neurotherapeutics* (in press).
5. **Plow EB**, Cunningham DA, Beall E, Jones S, Wyant A, Bonnett C, Yue GH, Lowe M, Wang, X, Sakaie K, Machado, A (2013). *Effectiveness and neural mechanisms associated with tDCS delivered to premotor cortex in stroke rehabilitation: study protocol for a randomized controlled trial*. *Trials* (in press)
6. **Plow EB**, Cunningham DA, Bonnett C, Gohar D, Bayram M, Wyant A, Varnerin N, Mamone B, Siemionow V, Hou J, Machado A, Yue GH (2013). *Neurophysiologic Correlates of Aging-Related Muscle Weakness*. *Journal of Neurophysiology* (in press)
7. **Plow EB**, Malone D, Machado A (2013). *Deep brain stimulation of the ventral striatum/anterior limb of the internal capsule in thalamic pain syndrome: study protocol for a pilot randomized controlled trial*. *Trials* 14:241. doi: 10.1186/1745-6215-14-241.
8. Cunningham DA, Machado A, Yue GH, Carey JR, **Plow EB** (2013). *Functional somatotopy revealed across multiple cortical regions using a model of complex motor task*. *Brain Research*. 1531:25-36
9. **Plow EB** and Carey JR (2012). *Pilot fMRI Investigation of Representational Plasticity associated with Motor Skill Learning and its Functional Consequences*. *Brain Imaging and Behavior* (DOI: 10.1007/s11682-012-9158-3)
10. Machado A, Baker K, **Plow EB**, Malone D (2012). *Cerebral stimulation for the affective component of neuropathic pain*. *Neuromodulation* (DOI: 10.1111/j.1525-1403.2012.00517)
11. **Plow EB**, Obretenova SN, Merabet LB (2012) *Temporal Profile of Functional Visual Rehabilitative Outcomes Modulated by Transcranial Direct Current Stimulation (tDCS)*. *Neuromodulation: Technology at Neural Interface* (Epub: DOI 0.1111/j.1525-1403.2012.00440.x.)
12. **Plow EB**, Pascual-Leone A, Machado A (2012) *Brain Stimulation in the Treatment of Chronic Neuropathic and Non-Cancerous Pain*. *Journal of Pain* 13 (5): 411-424
13. **Plow EB**, Obretenova SN, Fregni F, Pascual-Leone A, Merabet LB (2012) *Comparison of visual field training for hemianopia with active versus sham transcranial direct cortical stimulation*. *Neurorehabilitation and Neural Repair* 26 (6): 616-626.
14. **Plow EB**, Obretenova SN, Halko MA, Kenkel S, Jackson ML, Pascual-Leone A, Merabet LB (2011) *Combining Visual Rehabilitative Training and Noninvasive Brain Stimulation to Enhance Visual Function in Patients with Hemianopia: A Comparative Case Study*. *Physical Medicine and Rehabilitation* 3(9): 825-835.

15. Halko MA, Datta A, **Plow EB**, Scaturro J, Bikson M, Merabet LB (2011) *Neuroplastic changes following rehabilitative training correlate with regional electrical field induced with tDCS*. Neuroimage. 57(3): 885-91.
16. **Plow EB**, Arora P, Pline MA, Binstock MT, Carey JR (2010) *Within-limb Somatotopy in Primary Motor Cortex-revealed using fMRI*. Cortex. 46(3): 310-321.
17. Obretenova SN, Halko MA, **Plow EB**, Pascual-Leone A, Merabet LB (2010) *Neuroplasticity Associated with Tactile Language Communication in a Deaf-Blind Subject*. Frontiers in Human Neuroscience. 3 (ID 20130756). 60
18. **Plow EB**, Maguire SB, Obretenova SN, Pascual-Leone A, Merabet LB (2009) *Approaches to Rehabilitation for Visual Field Defects following Brain Lesions*. Expert Review of Medical Devices. 6(3): 291-305.
19. LaPointe, Kyle E; Klein, Jacob A; Konkol, Meagan L; Kveno, Sara M; **Bhatt (Plow) E**, DiFabio, Richard P; Carey, James R (2009) *Cortical activation during finger tracking vs. ankle tracking in healthy subjects*. Restorative Neurology and Neuroscience. 27(4): 253-264.
20. **Plow EB**, Carey JR, Nudo RN, Pascual-Leone A (2009) *Invasive Cortical Stimulation to Promote Recovery of Function After Stroke: A Critical Appraisal*. Stroke. 40(5); 1926-1931.
21. Carey JR, Evans CD, Anderson DC, **Bhatt (Plow) E**, Nagpal A, Kimberley TJ, Pascual-Leone A (2008) *Safety of 6-Hz Primed Low-Frequency rTMS in Stroke*. Neurorehabilitation and Neural Repair 22 (2) 185-192.
22. Durfee WK, Weinstein SA, **Bhatt (Plow) E**, Nagpal A, Carey JR (2009) *Design and Usability of a Home Telerehabilitation System to Train Hand Recovery Following Stroke*. Journal of Medical Devices. 041003-1- 8.
23. Carey JR, Durfee WK, **Bhatt (Plow) E**, Nagpal A, Weinstein SA, Anderson KM, Lewis SM (2007) *Comparison of finger tracking versus simple movement training via telerehabilitation to alter hand function and cortical reorganization after stroke*. Neurorehabilitation and Neural Repair 21 (3) 216-232.
24. **Bhatt (Plow) E**, Nagpal A, Greer KH, Grunewald T, Steele JL, Wiemiller JW, Lewis SM, Carey JR (2007) *Effect of Finger Tracking Combined with Electrical Stimulation on Brain Reorganization and Hand Function in Subjects with Stroke* Experimental Brain Research 182(4) 435-447.
25. Carey JR, Greer KR, Grunewald TK, Steele JL, Wiemiller JW, **Bhatt (Plow) E**, Nagpal A, Lungu O, Auerbach EJ (2006) *Primary Motor area Activation during Precision-Demanding versus Simple Finger Movement*. Neurorehabilitation and Neural Repair 20 (3) 361-37
26. Cattaneo Z, Merabet LB, **Bhatt (Plow) E**, Vecchi T (2008) *Effects of complete monocular deprivation in visuo-spatial memory*. Brain Research Bulletin. 30: 77(2-3): 112-116.
27. Cattaneo Z, **Bhatt (Plow) E**, Merabet LB, Pece A, Vecchi T (2008) *The influence of reduced visual acuity on age-related decline in spatial working memory: an investigation*. Neuropsychology, Development and Cognition Section B, Aging, Neuropsychology and Cognition. 15(6): 687-702.
28. Carey JR, **Bhatt (Plow) E**, Nagpal A (2005) *Neuroplasticity promoted by task complexity*. Exercise & Sport Sciences Reviews 33:24-31

COMMITTEE SERVICES

Cleveland Clinic - Lerner Research Institute: (Dept. of Biomedical Engineering, Lerner Research Institute) Committee Name/Role: Graduate Student and Fellow Travel Award Reviewer	2011 – Present
University of Minnesota, Minneapolis, MN Educational Committee: Medical Neuroscience; instructor	2007
Harvard Medical School, Boston, MA Educational Committee: Transcranial Magnetic Stimulation; Faculty	2008- 2013
Cleveland State University's College of Sciences & Health Professions and Cleveland Clinic's Department of Physical Medicine and Rehabilitation Ph.D. in Rehabilitation Science Joint Committee: Committee member	2010 - 2011

INVITED TALKS AND PODIUM PRESENTATIONS

Panel Chair/Moderator marked as * and talks by co-author denoted with*

Building evidence-based practice in neuro-rehabilitation: using neuroplasticity as a guide At the Ohio Physical Therapy Association's Annual Meeting, Columbus, Ohio	2014
Neuromodulation and Imaging: Opportunities for Neuro-rehabilitation Grand Rounds at VA's Center of Excellence, Advanced Platform Technology Center, Cleveland, OH	2014

*Advances in Neuromodulation and Functional Restoration in Stroke Rehabilitation: American Heart and American Stroke Association's International Stroke Conference, San Diego, CA	2014
Brain Stimulation in Upper Limb Rehabilitation in incomplete SCI, Spinal Cord Injury Service Louis Stokes VA, Cleveland, OH	2013
Non-invasive Brain Stimulation, Center for Neurological Restoration, Cleveland Clinic, Cleveland, OH	2011 - 2013
Neuromodulation: Novel Applications for Assessment and Treatment in Neuro-Rehabilitation. CME course offered by Harvard Medical School, Berenson-Allen Center for Noninvasive Brain Stimulation, Neurology, Beth Israel Deaconess Medical Center, Boston, MA.	2012- 2013
Evidence-based Motor Rehabilitation in Stroke. Training Course for Multi-site NIH grant Between Cleveland Clinic and University of Sao Paulo, Brazil	2012- 2013
*Neuromodulatory Rehabilitation: Stroke Motor Recovery and Beyond. American Council of Rehabilitation Medicine- American Society of Neuro-rehabilitation At Vancouver, British Columbia, Canada	2012
NeuroStimulation and NeuroModulation Taussig Cancer Center for Research, Cleveland Clinic, Cleveland, OH	2012
Advances in Stroke Rehabilitation. University of Miami, Medical School, Miami, FL	2012
#Merabet LB. Vision Rehabilitation. European Federation of Neurological Societies. Stockholm, Sweden.	2012
Effect of rTMS on Inter-hemispheric Interactions Between Parietal Lobes During Sustained Bilateral Attention: Evidence of a Network Effect Revealed Using fMRI Nanosymposium at the Society for Neuroscience at Washington D.C.	2011
#Yue GH, Plow EB, Davis M. Excessive Central Fatigue Limits Motor Function of Cancer Survivors with Fatigue Symptoms. American College of Rehabilitation Medicine- American Society of NeuroRehabilitation, Atlanta, GA	2011
Therapeutic Applications of Repetitive Transcranial Magnetic Stimulation in Epilepsy. Grand Rounds, Department of Epilepsy, Cleveland Clinic, Cleveland, OH.	2010
Combining Visual Rehabilitation and Noninvasive Brain Stimulation to Enhance Function in Patients with Hemianopia. Scientific Plenary Session: S57 Neural Repair/Neurorehabilitation. American Academy of Neurology, Toronto, ON	2010
Cortical Neuromodulation in Stroke. University of Milano-Bicocca, Milano, Italy	2010
#Machado A. Brain Stimulation in Neurologic Disease and Recovery, Center for Neurological Restoration Retreat, Cleveland Clinic	2012
Evidence-based Stroke Rehabilitation. Physical Medicine and Rehabilitation, Cleveland Clinic, OH	2010 - 2013
#Merabet LB. Neuro-Rehabilitation Combined with Noninvasive Brain Stimulation to Enhance Visual Function in Patients with Hemianopia. Massachusetts Eye and Ear Infirmary, Boston, MA	2009
Hemianopia Rehab, Spaulding Rehabilitation Hospital, Boston, MA.	2009
Stroke Rehabilitation: Options, Feasibility and Outcomes,	

Physical Med and Rehabilitation, Cleveland Clinic, Cleveland, Ohio	2009
Stroke Rehabilitation: Options, Feasibility and Outcomes, Physical Med and Rehabilitation, Rehabilitation Institute of Chicago, Northwestern University, Chicago, IL	2009
Directing Recovery in Stroke: Potential Options, Feasibility and Comparative Outcomes, University of Vermont, Burlington, VT	2009
Directing Recovery in Stroke: Potential Options, Feasibility and Comparative Outcomes, University of Florida, Gainesville, FL	2009
Vision Rehabilitation with Cortical Stimulation, Novavision, Boca Raton, FL	2009
Hemianopia Rehab, Boston University Med. Ctr., Neurology, Boston, MA	2008

PAST TRAINEES/MENTEES AND THEIR CURRENT PLACEMENTS

Members who were transferred to my lab from a former lab are marked with *

Staff/Faculty

*Wlodzimierz (Vlodek) Siemionow PhD: Consultant Emeritus, Contract Staff (*retired*) 2011-2012

Fellows:

*Venkateswaran Rajagopalan PhD (*Research Associate, Kessler Foundation, NJ*) 2012-2012

*Didier Allexandre PhD (*Research Scientist, Kessler Foundation, West Orange, NJ*) 2012-2012

Dina Gohar, MD (*Resident, Psychiatry, MetroHealth Medical Center, Cleveland, OH*) 2010-2011

Students and Clinical Coordinators

Ardyn Olszko (*pursuing B.S. at Lehigh University, Bethlehem, PA*) 2011

Emily Grandy MS (*pursuing Ph.D. at Queen Mary University of London*) 2011

*Alexandria Wyant, BA (*Research Coordinator, Neurological Restoration, Cleveland Clinic*) 2011-2013

Daniel Janini (*pursuing BS, Case Western Reserve. Currently at University College, London*) 2011-2013

*Mehmed Bayram, PhD (*pursuing post-doctoral fellowship at Kessler Foundation, NJ*) 2012-2013

*Bernadett Mamone, PhD (*Research coordinator, Mellen Center, Cleveland Clinic, OH*) 2012-2013

Sherry Cucci, BS (*pursuing Anesthesia technology, Case Western Reserve, Cleveland, OH*) 2013-2013

Jonathan Holmes BS (*pursuing MS at Cleveland State University*) 2013- 2013

Jennifer Sharma BS (*Medical Student, Case Western School of Medicine, Cleveland, OH*) 2012-2013

CURRENT TRAINEES/MENTEES

Beth Lewandowski PhD from NASA Glenn Research Center, Cleveland, OH as a visiting faculty 2014- Present

Sarah Roelle BS Research Technologist 2013- Present

Nicole Varnerin BS Research Technologist 2010- Present

David Cunningham MS. Now PhD student in Neuroscience (from Fall 2013) at Kent State, OH 2011- Present

Corin Bonnett BS Lab Manager. Now MPH student at Kent State University, Kent, OH 2011- Present

Myranda Long BS Clinical Research Coordinator 2013- Present

Patrick Chabra BS Clinical Research Coordinator 2013- Present

Anthony Necastro Intern 2014- Present

Vishwanath Sankarasubramanian PhD Post-doctoral Fellow 2014- Present

Kelsey Potter PhD Post-doctoral Fellow 2014- Present

RECOGNITION OF STUDENTS

Corin Bonnett: Awarded Best graduate Student of the Year award, Kent State, NEOMED 2014

Nicole Varnerin, Corin Bonnett: Chosen for Study Team Communication in the 21st Century- story on
frontpage of Clinical Research Newsletter, Cleveland Clinic 2013
Janini D. 2nd place Capstone Research Project, Case Western Reserve University 2012
Janini D. 2nd place Poster Award Cleveland Clinic Research Day 2013

PHD THESIS COMMITTEES

Mehmed Bayram, Ph.D., Cleveland State, Fenn College of Engineering, Cleveland, OH 2010 – 2013
David Cunningham, PhD student, Kent State University, Program in Neuroscience, Kent, OH 2013 – Present

TEACHING ACTIVITIES

Instructor, Transcranial Magnetic Stimulation, Harvard Medical School, Berenson-Allen Center
For Non-invasive Brain Stimulation, Beth Israel Deaconess Medical Center, Boston, MA 2008- 2010
Teaching Assistant: Medical Neuroscience (Laboratory) in Dept. of Neuroscience,
at University of Minnesota 2007
Teaching Assistant: Neuro-rehabilitation, Clinical Assessment, Motor Control, Integument,
Clinical research methodology, Neuroscience, Neurological rehabilitation Practicum and Lab in
Program in Physical Therapy at University of Minnesota 2004-06

POSTER PRESENTATIONS: SELF

Plow EB, Bonnett C, Cunningham DA, Wyant A, Janini D, Bayram MB, Hou J, Mamone B,
Siemionow V, Machado A, Yue GH. Motor cortical map plasticity underlying strengthening
counteracts aging-related degeneration: A transcranial magnetic stimulation study.
Society for Neuroscience. 184.19/MM8. New Orleans, LA. 2012
Plow EB, Gohar D, Wyant A, Mehmed B, Varnerin N, Hou J, Mamone B, Fang Y,
Siemionow V, Yue GH. Neurophysiologic markers of aging-related muscle weakness.
American Neurological Association. Published as Conference proceedings abstract in
Annals of Neurology. 77. San Diego, CA. 2011
Plow EB, Gohar D, Wyant A, Varnerin N, Hou J, Bayram M, Siemionow V, Yue GH.
Mental imagery training facilitates neural adaptations associated with muscle strengthening.
Society for Neuroscience. 2010
Plow EB. Pilot study combining Visual Rehabilitation and Noninvasive Brain Stimulation to
enhance function in patients with post-stroke visual field loss, Cleveland Clinic Research Day 2010
Plow EB. Noninvasive Brain Stimulation: Applications for Rehabilitation,
VA Research Day, Cleveland, OH 2010
Plow EB, Obretenova SN, Maguire SB, Torun N, Jackson ML, Halko MA,
Pascual-Leone A, Merabet LB. Noninvasive Brain Stimulation combined with Visual
Rehabilitation to enhance function in patients with Visual Field Defects.
American Physical Therapy Association meeting. Las Vegas, NV. 2009
Plow EB, Obretenova SN, Halko M, Poggel DA, Kenkel S, Torun N, Jackson ML, Pascual-Leone A,
Merabet LB. Neuro-visual rehabilitation combined with Noninvasive Brain Stimulation to enhance
function in patients with visual field loss. American Neurological Association.
Published as Conference proceedings abstract in Annals of Neurology, Baltimore, MD. 2009
Plow [nee (Bhatt)] E, Arora P, Nagpal A, Carey JR.
Neural Substrates of Motor Skill Learning- Revealed using FMRI. Society for Neuroscience. 2007

Plow [nee (Bhatt)] E, Carey JR. Effects of Electrical Stimulation and Tracking Training on cortical reorganization and hand function of chronic stroke patients. III Step American Physical Therapy Association meeting. Salt Lake City, UT 2005

POSTER PRESENTATIONS: STUDENTS AND COLLEAGUES

Student presenters in bold. Colleague presenters underlined.

Varnerin N, Cunningham DA, Sakaie K, Beall E, Machado A, Plow EB. Premotor cortical stimulation in stroke rehabilitation: Neural mechanisms of recovery. International Congress of Clinical Neurophysiology (ICCN) of the IFCN, Berlin, Germany 2014

Janini D, Cunningham DA, Rini B, Davis M, Plow EB. Cortical correlates of sunitinib-induced fatigue in metastatic renal cell carcinoma. Lerner Research Institute Research Day. 2013

Machado AG, Cooperrider J, Furnaga H, Plow EB, Park H, Gale JT. Bursting and regular chronic cerebellar stimulation modulate perilesional cortical reorganization as well as expression of synaptophysin and markers of long-term potentiation. Society for Neuroscience. San Diego, CA. 2013

Cunningham DA, Machado A, Rajagopalan V, Lowe M, Jones S, Beall E, Sakaie K, Plow EB. Diffusion Tensor Imaging exhibits more proximate and reliable Transcranial Magnetic Stimulation measures compared to fMRI in stroke. Society for Neuroscience. 249.14/Z9-DP6. San Diego, CA. 2013

Varnerin N, Cunningham DA, Janini D, Beall E, Jones S, Wyant A, Bonnett C, Yue GH, Lowe M, Sakaie K, Machado A, Plow EB. Premotor cortical stimulation in stroke rehabilitation: Neural mechanisms of recovery. Society for Neuroscience. 338.05/U15. San Diego, CA. 2013

Cunningham DA, Machado A, Rajagopalan V, Lowe M, Jones S, Beall E, Sakaie K, Plow EB. Diffusion Tensor Imaging exhibits more proximate and reliable Transcranial Magnetic Stimulation measures compared to fMRI in stroke. American Society of Neurorehabilitation. San Diego, CA. 2013

Varnerin N, Cunningham DA, Janini D, Beall E, Jones S, Wyant A, Bonnett C, Yue GH, Lowe M, Sakaie K, Machado A, Plow EB. Premotor cortical stimulation in stroke rehabilitation: Neural mechanisms of recovery. American Society of Neurorehabilitation. San Diego, CA. 2013

Sharma J, Cunningham DA, Bonnett C, Varnerin N, Cucci S, Allexandre D, Machado A, Plow EB. Intra-cortical and interhemispheric inhibition during a bimanual force task with asymmetric levels of force magnitude. Society for Neuroscience. 651.09/UU16. San Diego, CA. 2013

Cunningham DA, Machado A, Rajagopalan V, Lowe MJ, Jones S, Beall E, Sakaie K, Plow EB. DTI versus fMRI: accuracy and reliability in predicting response to TMS in Stroke. American Neurological Association. S101. Published as proceedings in Annals of Neurology. New Orleans, LA 2013

Janini D. Plow EB. Capstone Undergraduate Research poster at Case Western Reserve 2012

Wyant A, Bonnett C, Cunningham DA, Plow EB, Siemionow V, Yue GH. Voluntary muscle fatigue alters motor cortical maps - a transcranial magnetic stimulation study. Organization of Human Brain Mapping. 6217. New Orleans, LA. 2012

Siemionow V, Yue GH, Plow EB, Kisiel-Sajewicz K, Wyant A, Siemionow M. Cortical reorganization assessment in face transplanted patients: EEG study. Society for Neuroscience. 680.19/OO6. New Orleans, LA. 2012

Bonnett C, Cunningham D, Wyant A, Bayram MB, Janini D, Rajagopalan V, Mamone B, Hou J, Siemionow V, Plow EB, Yue GH. Central neural adaptations underlying voluntary muscle strengthening in healthy aged individuals. Society for Neuroscience. 582.22/QQ8. New Orleans, LA 2012

- Wyant A**, Cunningham DA, Bonnett C, Janini D, Hou J, Siemionow V, Plow EB, Yue GH. Motor map plasticity associated with voluntary muscle fatigue- a transcranial magnetic stimulation study. Society for Neuroscience. 582.02/PP8. New Orleans, LA. 2012
- Cunningham D**, Hou J, Carey JR, Yue GH, Machado A, Plow EB. Functional somatotopy across multiple cortical regions revealed using a model of complex visuomotor task. Society for Neuroscience. 381.11/WW17. New Orleans, LA. 2012
- Mamone B**, Zhang Y, Bayram MB, Wyant A, Cunningham D, Bonnett C, Plow EB, Hou J, Siemionow V, Yue GH. Strength training facilitates neural adaptations associated with muscle strengthening in aging. Society for Neuroscience. 582.29/QQ15. New Orleans, LA. 2012
- Bayram MB**, Cunningham D, Bonnett C, Mamone B, Plow EB, Hou J, Siemionow V, Yue GH. Effects of strength and motor imagery training on corticomuscular signal coupling in aging. Society for Neuroscience. 478.01/LL20. New Orleans, LA. 2012
- Sharma J**, Cunningham D, Bonnett C, Wyant A, Janini D, Yue GH, Plow EB. Measures of reliability of transcranial magnetic stimulation-based cortical measures in proximal musculature. Society for Neuroscience. 506.09/FFF22. New Orleans, LA. 2012
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