Department of Physical Medicine & Rehabilitation

Scholarly Activities
September – November 2016

REGULAR FACULTY

Randy Calisoff:
Nominated 2015-2016 Outstanding Teacher of the Year, FSM clinical preceptorship curriculum (2nd year)

Reviewer: Topics on Stroke Rehabilitation

Abstracts accepted: 2017 American Academy of Pain Medicine annual meeting:
“Short-Term Functional and Psychological Outcomes of Comprehensive, Interdisciplinary Pain Management of Chronic Lumbar Radicular Pain”; “Enhancing Physical Conditioning of Patients with Chronic Lumbar Radicular Pain through a Comprehensive, Interdisciplinary Pain Management Program”; “Retrospective and Prospective Functional Outcomes of an Interdisciplinary Pain Management Program on Patients with Fibromyalgia”

Two book chapters in progress.

Co-Investigator, grant submitted to NIDA/NIH (Schnitzer and Apkarian, PI’s) – Chronic Low Back Pain

Sam Chu:
Faculty Instructor, Musculoskeletal Ultrasound Learning Lab, AAPM&R Annual Meeting, New Orleans, October

Clinical Case Panel Discussant, Best Musculoskeletal Cases, AAPM&R Annual Meeting, New Orleans, October

Andrea Domenighetti:
October 5: Submitted an NIH R01 grant application entitled: “Muscle impairment in children with cerebral palsy: a role for muscle satellite cells dysfunction”

October 27: Submitted a manuscript to the Journal of Molecular Biology, entitled: “Cullin E3-ligase activity is required for myoblast differentiation”

November 2: Presented at the Annual ACRM Conference “Stem Cells and Muscle Satellite Cells in Cerebral Palsy: Current State of Regenerative Therapies”

Deborah Gaebler:
The use of robotics in pediatrics - 4th International Congress: Research in Disability, at Instituto Nacional de Rehabilitación in México City – November 17, 2016
Robotic rehabilitation improves sensorimotor functions of lower limb impairments for children with cerebral palsy. The impact of robotic therapy has been extensively studied in recent years, demonstrating significant improvements in sensorimotor functions.


Levi Hargrove:

Presented “Simultaneous and Proportional Control of Powered Prosthesis using Intramuscular EMG”, International Society of Electrophysiology and Kinesiology Congress, July 5-8, 2016, Chicago, IL


Papers submitted


Conference papers


Spanias, J, Simon, A, Perreault, E., Hargrove LJ. “Preliminary results for an adaptive pattern recognition system for novel users using a powered lower limb prosthesis” 38th International conference of the IEEE Engineering in Medicine and Biology Society, August 16-20, Orlando, FL.

Woodward, R., Spanias, J, Hargrove LJ. “User intent prediction with a scaled conjugate gradient trained artificial neural network for lower limb amputees using a powered
prosthesis” 38th International conference of the IEEE Engineering in Medicine and Biology Society, August 16-20, Orlando, FL.

Conference paper submitted

Grants submitted
Dept. of Defense Congressionally Directed Medical Research Program: Prosthetics Outcomes Research Award; Determining the Functional Importance of a Powered Multifunction Wrist; Submitted November 16.

Patent

Allen Heinemann:


Heinemann AW. Development and Validation of the SCI-QOL Ability to Participate and Satisfaction with Participation Item Banks. Symposium presentation at the International Society of Quality of Life, Copenhagen, Denmark, October 21, 2016.


Deutsch A, Heinemann AW, Loft J, Smith L. Quality Measure Developments in Medical Rehabilitation. Symposium presented at the 93rd annual meeting of the American Congress of Rehabilitation Medicine, November 1, 2016.

Heinemann, AW. The Spinal Cord Injury Model System, Fujian University of Traditional Chinese Medicine, November 9, 2016.

Grants Funded;
Midwest Regional Spinal Cord Injury Care System renewal Chen/Heinemann (Principal Investigators), 2016-2021.

Grant submitted:
NIH: Defining Trajectories of Neurologic and Quality of Life Outcomes Following Stroke
DoD: Evaluating the Utilization and Efficiency of Wearable Exoskeletons for SCI Rehabilitation

Grants in development: TBI Model Systems


Mark Huang:

Abstracts:

Ma H, Huang ME, Cognitive Deficits and Swallowing in Patients Admitted to Acute Inpatient Rehabilitation for Recovery from Severe Burn Trauma, Poster presentation, AAPM&R Annual Assembly New Orleans 2016.

Conference presentations:

Arun Jayaraman:


Papers Published


Conference papers

Lonini L, Gupta A, Kording K, Jayaraman A. “Activity Recognition in Patients with Lower Limb Impairments: Do we need training data from each patient?” Accepted; Proceedings of the IEEE Engineering in Medicine and Biology Society (EMBC’16) conference.


Grants awarded
NIDILRR SCI Midwest Regional Model Systems: 08/01/2016-07/30/2021 Role: Co-I (Module PI) Funding: $400,000

Ekso WISE Trial: Randomized Controlled Multi-Site Clinical Trial Comparing Robotic Exoskeleton vs. Conventional Rehabilitation for Individuals with Incomplete SCI: 10/01/2016-9/30/2018.
Role: Site PI; Funding: $200,000

Todd Kuiken:
Presented “Building Bionics” October 21, Northern Illinois University, De Kalb, IL


**Papers submitted**


**Conference papers**


**Conference paper submitted**


Richard Lieber:

Grant Award: Falk Medical Research Trust Catalyst Award, “Breakthrough Technology to Measure Human Muscle Function”

**Full Refereed Papers:**


Review Articles:


Full Papers (submitted):


Christina Marciniak:


Published Abstracts:
Gaebler-Spira D., Byrne R., Todd A., Panko Reis J., Wolfman J., Nandam N., Bloom Z.,


Laura Miller:


Maria Reese:
Poster presentations at AAPMR (October 2016):

Christopher Reger:

Presented “Rehabilitation Principles for the Medically Complex Lower Extremity Amputee”, NUPOC, September 22

ITB Workshop, AAPM&R Annual Meeting: Instructor for ITB titration programming. October 20


Elliott Rouse:
Presented: Dynamic Walking Conference, June 2016, Impedance inspired design and control
The Ohio State University, August 2016, The hidden mechanics of locomotion

Presented: “The case for impedance control in wearable robotics” International Society of Electrophysiology and Kinesiology Congress, July 5-8, 2016, Chicago, IL

Shepherd MK, Rouse EJ. A Quasi-Passive Ankle-Foot Prosthesis with Continuously Variable Stiffness IEEE Transactions on Neural Systems and Rehabilitation Engineering, in review
Azocar AF, Rouse EJ. Stiffness Perception During Active Ankle and Knee Movement. IEEE Transactions on Biomedical Engineering, in review

Shepherd MK, Rouse EJ. Design and Validation of a Torque-Controllable Knee Exoskeleton for Sit-to-Stand Assistance. IEEE Transactions on Mechatronics, in review


**Grants Submitted**

DOD STTR Follow on: *Data Driven Intent Recognition Framework*, Submitted 6/4/16

ONR DURIP: *Robotic instrument for measuring leg stiffness to detect likelihood for injury*, Submitted 7/25/16

NIH DP2: *A new generation of soft fabric exoskeletons that unlocks the study of assistance and therapy*, Submitted 9/9/16

DOD STTR: Passive Ankle Prosthesis with Variable Mechanics, Submitted 10/26/16

ONR YIP: *Leg joint stiffness as a quantifiable metric for screening and rehabilitation from musculoskeletal injuries*, Submitted 11/4/16

W. Zev Rymer:

September 27. Presented “Acute Intermittent Hypoxia Enhances Neuroplasticity In Incomplete Spinal Cord Injury” at International Advisory Committee (IAC) Meeting, Center for Bionics in Seoul, Korea, September 27

Presented “Acute Intermittent Hypoxia Enhances Neuroplasticity in Incomplete Spinal Cord Injury” at Seoul National University Hospital in Seoul, Korea, September 28

Attended Cybathlon Symposium in Zurich, Switzerland, October 6

Attended Hocoma Scientific Advisory Board Meeting in Zurich, Switzerland, October 7-8

Attended Cybathlon Robotics Competition in Zurich, Switzerland, October 8

Co-presented with Dr. Arun Jayaraman: "Exoskeletons for rehabilitation & personal mobility: creating clinical evidence" at WeRob 2016 in Segovia, Spain, October 18

Presented "Identifying Spinal Lesion Site from Surface EMG Grid Recordings" by Babak Afsharipour, Milap Sandhu, Ghulam Rasool, Nina Suresh, and William Rymer at ICNR 2016 in Segovia, Spain, October 19

Presenting "Acute Intermittent Hypoxia Induces Rapid Spinal Plasticity in Quadriplegic Patients" at Neuroscience 2016 Satellite Symposium in San Diego, CA, November 11

Diane Dudas Sheehan:

Fall 2016 Small group tutor for Foundations of Clinical Ethics Class – M1 medical students, NU
9/22/16 “Neuromuscular Scoliosis Evaluation and Management” presented to PM&R fellow/residents / students = 7 during Pediatric rotation at RIC

9/27/16 “Systems of Care & Chronic Illness in Pediatrics” presented to PM&R 3rd year residents at the Rehabilitation Institute of Chicago

10/4/16 “SMA & Arthrogryposis” presented to PM&R 3rd year residents at the Rehabilitation Institute of Chicago

10/25/16 “Comprehensive Evaluation and Practical Treatment of Children with Wounds” I presented to PM&R residents during Pediatric rotation at the Rehabilitation Institute of Chicago

RESEARCH FACULTY

Anne Deutsch:


American Congress of Rehabilitation Medicine Early Career Development Course. Participated in panel discussion, mentoring lunch and breakout sessions. American Congress of Rehabilitation Medicine Annual Conference, Chicago, IL; November 1, 2016.

Professional Service:

Member, Expert Panel, Skilled Nursing Facility Prospective Payment System. Convened by Acumen and funded by the Centers for Medicare and Medicaid Services, Baltimore, October 14, 2016.


Member with Methodological Expertise in Performance Measures for the Stroke Performance Measures Oversight Committee (SPOC) of the COUNCIL ON STROKE, American Stroke Association, 2016-2018

Technical Report:

Linda Ehlich-Jones:

**Ehrlich-Jones, L.** Systemic Lupus Erythematosus: Challenges in Diagnosis and Management at Illinois Society of Advanced Practice Nurses Midwest Conference, Lisle, IL, 10/6/16.


Lee J, Song J, Chang RW, Semanik PA, Pellegrini CA, **Ehrlich-Jones LS**, Pinto D, Jackson RD, & Dunlop DD. Prediction of triaxial accelerometer counts from uniaxial accelerometer counts among adults with or at risk for knee osteoarthritis: Data from the Osteoarthritis Initiative. Poster presented at 2016 ACR/ARHP Annual Scientific Meeting, Washington, DC on 11/12/16-11/16/16

**Grants in development**

PCORI Ehrlich-Jones (Principal Investigator): Comparison of Walk with Ease and Enhance Fitness to Increase Physical Activity in Older Adults with Osteoarthritis of the Knee

**Professional Activities**

Member, Provost’s Advisory Council on Women Faculty

Sherri LaVela:


Tommi Raij received a Falk Medical research Trust Catalyst Award

Annie Simon:


Conference Papers:

Spanias, J, Simon, A, Perreault, E., Hargrove LJ. “Preliminary results for an adaptive pattern recognition system for novel users using a powered lower limb prosthesis” 38th International conference of the IEEE Engineering in Medicine and Biology Society, August 16-20, Orlando, FL.

NUPOC

Publications:

"NUPOC Launches the NU-FlexSIV Socket." Industry Review, O & P Edge, October, 2016, pp. 10.

"NUPOC Launches the NU-FlexSIV Socket,” http://www.oandp.com/articles/NEWS_2016-08-25_01.asp


“Get Involved in O&P Research: With the need for outcome and validation studies in O&P, boosting patient enrollment is more important than ever.” O&P News, October 2016. Including interviews with Matthew Major and Steven Gard.


Presentations:

Stefania Fatone, PhD, BPO (Hons), Michael Dillon, PhD, BPO (Hons) and Tammy Hoffman, PhD. “Outcomes of Partial Foot Amputation Can Inform Difficult Decisions about Amputation Surgery Using a Shared Decision-Making Approach.” Symposium Presentation, American Orthotic and Prosthetic Association (AOPA) National Assembly held in Boston, MA from September 8 to 11, 2016.

Stefania Fatone, PhD, BPO (Hons). Ryan Caldwell, CP. “Development of the Northwestern University Flexible Sub-Ischial Vacuum (NU-FlexSIV) Socket for Persons with Transfemoral Amputation." Free Paper Session on "Treating the Lower Limb Amputee," American Orthotic and Prosthetic Association (AOPA) National Assembly held in Boston, MA from September 8 to 11, 2016.

Stefania Fatone, PhD, BPO (Hons), Michael Dillon, PhD, BPO(Hons), Matthew Major, PhD, and Brian Kaluf, CP. “How Well Can the Amputee Mobility Predictor and Basic Patient Demographics Predict the Medicare Functional Classification Level (K-level) in People with Transfemoral and Transtibial Amputation?” Poster Session, American Orthotic and Prosthetic Association (AOPA) National Assembly held in Boston, MA from September 8 to 11, 2016.
Chris Robinson, MS, MBA, CPO, ATC, FAAOP(D), Ashley Mullen, MS, CPO, and Jonathan Day, MS, CPO. “Approved Clinical Mentor Training Workshop” One-Day Seminar, American Orthotic and Prosthetic Association (AOPA) National Assembly held in Boston, MA from September 8 to 11, 2016.


Stefania Fatone, PhD, BPO (Hons) “Development of Sub-Ischial Prosthetic Sockets with Vacuum-Assisted Suspension for Highly Active Persons with Transfemoral Amputations.” U.S. Army Medical Research and Materiel Command Clinical and Rehabilitative Medicine Research Program Socket Technology and Related Limb Health In-Progress Review, September 27, 2016, Ft. Detrick, Maryland.


Stefania Fatone, PhD, BPO (Hons), Lily Tran, MS, Ryan Caldwell, CP/L, and Matthew Quigley. “Stakeholder Input on the Development of a Residual Limb Monitoring System." Presented at ISPO European Congress on Prosthetics and Orthotics in Rotterdam, The Netherlands, on October 6, 2016.

Stefania Fatone, PhD, BPO (Hons) “Orthotic Management of Stroke.” Invited Speaker at “Evidensbaseret ortosebehandling efter apopleksi” Seminar sponsored by Ortos in Valby, Denmark on October 13, 2016.


Major M, Borrenpohl D, Kaluf B. “Survey of U.S. Practitioners on the Validity of the Medicare Functional Classification Level System and Utility of Clinical Outcome Measures for

**Chris Robinson, MS, MBA, CPO, ATC, FAAOP(D), Ashley Mullen, MS, CPO, and Michael Cavanaugh, CPO.** “Approved Clinical Mentor Training Workshop” One-Day Seminar, Midwest Chapter of the American Academy of Orthotists and Prosthetists, November 3-5, 2016, Rosemont, Illinois.

**Stefania Fatone, PhD, BPO(Hons)** “Flexible Sub-ischial Vacuum Socket for Transfemoral Amputees” Plenary Lecture, Asian Prosthetic and Orthotic Scientific Meeting 2016, November 4-6, Seoul, South Korea.

**Stefania Fatone, PhD, BPO(Hons)** “Flexible Sub-ischial Vacuum Socket for Transfemoral Amputees” KOREC Workshop, November 7, 2016, Seoul, South Korea.


**Laboratory Visits/Events:**

**NUPOC** collaborated with the National Commission on Orthotics & Prosthetics Education (NCOPE) to participate in Health Professions Week (HPW) September 26 through 30, 2016, educating students about opportunities in P&O and offering person-to-person conversations with Anna Avakian-Li, CPO, John W. Michael, MEd, CPO, and Melinda Thorpe, CPO; and “Talk to an O&P Professional in Illinois” with John Brinkmann, MA, CPO, FAAOP(D), John W. Michael, MEd, CPO, and Chris Robinson, CPO, MS, MBA, ATC, FAAOP(D). R. J. Garrick, PhD, led the outreach activities and facilitated the collaboration with NCOPE.

**Dr. Stefania Fatone, PhD, BPO (Hons) and Ryan Caldwell, CP,** taught the Northwestern University Flexible Sub-Ischial Vacuum (NU-FlexSIV) Socket workshop to 10 prosthetists from Ortos in Brondby, Denmark on October 11 and 12. The course was sponsored by Ortos through an agreement with Northwestern University.

**Dr. Stefania Fatone, PhD, BPO (Hons) and Ryan Caldwell, CP,** taught the Northwestern University Flexible Sub-Ischial Vacuum (NU-FlexSIV) Socket workshop to prosthetists from Ossur Americas in Orlando, Florida on November 18 and 19. The course was sponsored by Ossur through an agreement with Northwestern University.

**Grant Submissions:**

**Steven Gard, PhD,** was invited to submit an application entitled “Development and Evaluation of an Improved Prosthetic Foot/Shoe Interface” to the Department of Defense on November 16, 2016, in response to the FY16 Orthotics and Prosthetics Outcomes Research Program (OPORP) Prosthetics Outcomes Research Award (PORA).
Steven Gard, PhD, and Yeongchi Wu, MD, were invited to submit an application entitled “Comparison of Dilatancy, Plaster and CAD-CAM Approaches for Transtibial Socket Fabrication” to the Department of Defense on November 16, 2016, in response to the FY15 Orthotics and Prosthetics Outcomes Research Program (OPORP) Prosthetics Outcomes Research Award (PORA).

Steven Gard, PhD, was a co-investigator on an application entitled, “Bionic Prosthetic Foot with Passive Propulsion Joints” that was submitted to the Department of Defense STTR program on October 26, 2016 by Dr. Jing Zhao, CEO of Agiltron Incorporated.

Matthew Major, PhD, was invited to submit an application entitled “Women’s-Specific Footwear with Prosthetic Feet” to the Department of Defense on November 16, 2016, in response to the FY16 Orthotics and Prosthetics Outcomes Research Program (OPORP) Prosthetics Outcomes Research Award (PORA).

Matthew Major, PhD, was invited to submit an application entitled “Targeted Balance-Confidence Interventions to Increase Social Activity in Users of Lower-limb Prostheses” to the Department of Defense on November 16, 2016, in response to the FY16 Orthotics and Prosthetics Outcomes Research Program (OPORP) Prosthetics Outcomes Research Award (PORA).

Matthew Major, PhD, was invited to submit an application entitled “Connecting Mechanical to Biomechanical Performance of Prosthetic Feet to Design Customized, Passive Devices that Provide Improved Mobility” to the Department of Defense on December 7, 2016, in response to the FY16 Peer Reviewed Orthopaedic Research Program (PRORP) Applied Research Award (ARA).

OTHER FACULTY

Rosemarie B. King served as an abstract reviewer for the 2017 ISC Conference