CATHERINE ECKELS LANG PT, PHD
CURRICULUM VITAE

DATE June 12, 2026

CITIZENSHIP USA

CONTACT INFORMATION Program in Physical Therapy
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PRESENT POSITION Barbara J. Norton Professor of Physical Therapy
Professor, Occupational Therapy, Neurology
Associate Director, Movement Science PhD Program
Washington University

EDUCATION

1993	BS	Physical Therapy	University of Vermont, Burlington VT
1997	MS	Physical Therapy	University of Vermont, Burlington VT
2001	PhD	Movement Science	Washington University, St. Louis MO
2001-2004		Postdoctoral Fellowship	University of Rochester, Rochester NY

ACADEMIC POSITIONS/EMPLOYMENT

1993-1994	Physical therapist, New England Rehabilitation Hospital, Portland ME
1994-1995	Physical therapist, Traveling Medical Professionals, Eastern USA
1995-1997	Physical therapist (part-time), Fletcher Allen Health Care, Burlington VT
1995-1997	Student & Teaching Fellow, University of Vermont, Department of Physical Therapy, Burlington VT
1997-2001	Student & Research Assistant, Movement Science Program and Program in Physical Therapy, Washington University, St. Louis MO
2001-2004	Postdoctoral Research Fellow, Department of Neurology, University of Rochester, Rochester NY
2004-2005	Instructor, Program in Physical Therapy, Washington University, St. Louis MO
2005-2011	Assistant Professor, Program in Physical Therapy, Program in Occupational Therapy, Department of Neurology, Washington University, St. Louis MO
2011-2015	Associate Professor with tenure, Program in Physical Therapy, Program in Occupational Therapy, Department of Neurology, Washington University, St. Louis MO

2015-present Professor, Program in Physical Therapy, Program in Occupational Therapy, Department of Neurology, Washington University, St. Louis MO
2017-present Associate Director, Movement Science PhD Program, Washington University, St. Louis MO
2024-present Barbara J. Norton Professor of Physical Therapy, Washington University, St. Louis MO

TEACHING TITLE and RESPONSIBILITIES

Past Experience

1995-1997 Teaching Assistant, Department of Physical Therapy, University of Vermont, VT
Courses: Clinical Medicine: Neurology
Clinical Medicine: Orthopedics
Physical Therapy Modalities
Sensorimotor Development across the Lifespan

2000- 2001 Guest Lecturer, Program in Physical Therapy, Washington University, MO
Lectures: Sensory Cortical Plasticity
Motor Cortical Plasticity
Sensory Cortex & Cortical Plasticity
Motor Cortex & Cortical Plasticity

2002-2003 Guest Lecturer, Department of Physical Therapy, Nazareth College, NY
Lectures: Motor Cortex Anatomy, Physiology, and Function

2004-2023 Course Master, Movement Science III – Biocontrol Mechanisms, PhD Curriculum

2005-2013 Course Master, Motor Control and Motor Learning, DPT Curriculum
Program in Physical Therapy, Washington University
2006-2007 Lecturer, Washington University Medical Student Curriculum
Lecture: Neurorehabilitation
2008-2019 Residency Program in Physical Medicine and Rehabilitation
Lecturer on Motor Rehabilitation after Stroke
2012-2013 Residency Program in Neurology
Lecturer on Motor Rehabilitation after Stroke
2005-2014 Program in Occupational Therapy
Lecturer on: Neural Control of Movement, Sensorimotor Impairments after CNS Damage, Motor Learning

Current Responsibilities

2004- present Program in Physical Therapy
Lecturer
DPT Curriculum related to Neuroscience, Motor Control, Motor Learning, Research Design, and PT Management After Stroke.

2015- present Program in Physical Therapy
Course Master for Program Seminar, PhD Curriculum

UNIVERSITY AND HOSPITAL APPOINTMENTS AND COMMITTEES

2004-2014 Coordinator, Emergency Recovery Team, Program in Physical Therapy, Washington University

2004-present Member, Research Advisory Council, Program in Physical Therapy, Washington University

2006-2015 Coordinator, Visiting Lecture Series in Movement Science, Program in Physical Therapy, Washington University

2008-present Member, Research Committee, The Rehabilitation Institute of St. Louis.

2009-present Ad Hoc Reviewer, Clinical and Translational Research Funding Program, Barnes-Jewish Hospital Foundation and Washington University Institute of Clinical and Translational Sciences

2009-2016 Co-Director, Brain Recovery Core, a partnership between Washington University, Barnes Jewish Hospital, and the Rehabilitation Institute of Saint Louis to coordinated stroke rehabilitation across the continuum of care

2010-2021 Member, Physical Therapy Committee on Academic and Professional Evaluation of Students, Washington University

2011-2013 Member, Post-Acute Care Work Group, BJC Healthcare Stroke Integrated Practice Unit

2013-2017 Member, Faculty Rights Committee, Washington University Medical School

2013-2021 Member, Curriculum Committee, Program in Physical Therapy, Washington University

2014-present Member (2014) and Vice Chair (2026-present), Quality Assurance Committee, Human Research Protection Office, Washington University

2014-2015 Chair, Faculty Search Committee, Program in Physical Therapy, Washington University

2014-present Member, Senior Scientific Advisory Committee, Intellectual and Developmental Disabilities Research Center, Washington University

2016-2021 Member, Stroke Care Clinical Expert Council, BJC Healthcare

2017-2022 Member, Academic Advisory Board, Program in Occupational Therapy, Washington University

2021 Member, Provost's Working Group on Graduate and Professional Education, to inform the University Strategic Plan, Washington University.

2021-present Member, Graduate Program Council, School of Medicine, Washington University

2022 Interim Member, Doctoral Council, Office of the Provost, Washington University

2022-2023 Interim Chair, Graduate Program Council, School of Medicine, Washington University
2023-present Member, Doctoral Council, Office of the Provost, Washington University

CURRENT PHYSICAL THERAPY LICENSURE

Missouri #2004025518

HONORS and AWARDS

1993 Margaret Corbin Award for Outstanding Academic and Clinical Student
Department of Physical Therapy, University of Vermont
1999-2000 Doctoral Opportunities for Clinicians and Scholars, PODS Level I
Foundation for Physical Therapy
2000-2001 Doctoral Opportunities for Clinicians and Scholars, PODS Level II
Foundation for Physical Therapy
2000 MaryLou Barnes Adopt-A-Doc Award**,** Neurology Section,
American Physical Therapy Association
2005 Junior Faculty Scholarship, III Step Conference
American Physical Therapy Association, Neurology and Pediatric Sections
2007 Golden Synapse Award for best paper
Journal of Neurologic Physical Therapy
2009 Special Recognition for Excellence in Mentoring
Graduate School of Arts & Sciences, Washington University
2014 Special Recognition for Excellence in Mentoring
Graduate School of Arts & Sciences, Washington University
2017 Lifetime Member, Stroke Society of Australasia
2018 Excellence in Neurologic Research Award
Academy of Neurologic Physical Therapy
2018 Marian Williams Award for Research in Physical Therapy
[Honoring sustained, outstanding research in physical therapy]
American Physical Therapy Association
2019 Fellow, American Society of NeuroRehabilitation
2020 Catherine Worthingham Fellow, American Physical Therapy Association
2022 Steven J. Rose Excellence in Research Award
[Honoring the best orthopedic physical therapy research article of the year]
Academy of Orthopedic Physical Therapy
2023 Helen Hislop Award for Outstanding Contributions to Professional Literature,
American Physical Therapy Association.
2024 Outstanding Faculty Award [for excellence in PhD student mentoring]
Graduate Student Senate, Washington University

EDITORIAL RESPONSIBILITIES

2009 – 2022 Associate Editor, Journal of Neurologic Physical Therapy
2012 – 2015 Section Editor for Rehabilitation, Motor Control
2014 Guest Editor, Special Issue on Motor Learning, Vol. 38, No. 3
Journal of Neurologic Physical Therapy
2022 Guest Editor, Special Issue on Cognitive and Motor interactions, Vol 46, No. 1
Journal of Neurologic Physical Therapy
2022-present Editorial Board Member, Journal of Neurologic Physical Therapy

Reviewer for over 40 scientific journals in the areas of physical therapy, occupational therapy, neurorehabilitation, neuroscience, neurology, motor control, pediatric psychiatry, and human development.

NATIONAL PANELS, COMMITTEES, BOARDS

2004 – present Occasional Ad Hoc Grant Reviewer for:
NSF Division of Behavioral & Cognitive Sciences
NIH NICHD-Special Emphasis Panels (P2Cs, T32, etc)
NIH NINDS-Neurological Sciences and Disorders K (NSD-K)
NIH CSR Member Conflict Special Emphasis Panels
Motor Function Speech and Rehabilitation (MFSR)
Musculoskeletal Rehabilitation Sciences (MRS)
Acute Neural Injury and Epilepsy (ANIE)
Fellowships in Physiology and Pathobiology of Musculoskeletal, Oral, and Skin Systems (ZRG F10B-B)
Neurological Foundation of New Zealand
Thrasher Research Fund
Swiss National Science Foundation

2011 – 2013 Scientific Review Committee member, Foundation for Physical Therapy

2014 – 2019 Oversight Advisory Committee for the Centers of Excellence in Stroke Collaborative Research for Regeneration, Resilience, and Secondary Prevention, American Heart Association / American Stroke Association / Bugher Foundation

2015-2018 NIH Musculoskeletal Rehabilitation Sciences (MRS) study section member
2016-2018 NIH Musculoskeletal Rehabilitation Sciences (MRS) study section chair
2020-2021 NIH NINDS/NICHD Common Data Elements Rehabilitation Working Group
Chair of motor subgroup
2020-2024 NIH National Advisory Council for Child Health and Human Development
2021-2023 International Stroke Recovery and Rehabilitation Roundtables (SRRR)
3rd cycle, co-chair for "Taking Control of Control Interventions'.

PROFESSIONAL SOCIETIES AND ORGANIZATIONS

Academic Women's Network, Washington University School of Medicine
American Congress of Rehabilitation Medicine
American Heart Association/American Stroke Association, member since 2008
- International Stroke Conference Abstract Reviewer, 2009-2012, 2016-2019, 2025-2026
- Guidelines for Post-Acute Stroke Rehabilitation Writing Committee, 2013-2015
- Rehabilitation and Recovery Committee, 2014-2018
- Stroke Outcome Metrics Writing Committee, 2016-2020

American Physical Therapy Association, member since 1993
- Academy of Neurological Physical Therapy member
- Academy of Research member
- 2009-2011 Abstract Review Committee, Annual Conference

American Society for Neurorehabilitation, member since 2009
- Program Committee 2014-2020
- Program Committee Chair, 2017-2018
- Treasurer/Secretary, 2019-2020
- Vice President, 2021-2022
- President, 2023-2025
- Past President, 2025-2027
- Membership Engagement Committee Chair 2021-2023

International Stroke Think Tank for upper limb rehabilitation, 2011 – 2020
International Functional Electrical Stimulation Society, Upper Limb Assessment Grp, 2008-2010
Society for the Neural Control of Movement 2001-2007
Society for Neuroscience, member since 1998
World Congress of Neurorehabilitation, Scientific Programme Committee 2021-2024

INVITED LECTURES

1. Bastian AJ, Earhart GM, Lang CE (2000) *Mechanisms and treatment of cerebellar ataxia*. Educational Seminar, APTA Scientific Exposition and Mtg., Indianapolis IN.
2. Lang CE, Earhart GM (2003) *Postdoctoral Study: Why and How*. Educational Seminar, APTA Combined Sections Mtg., Tampa FL.
3. Lang CE (2003) *Control of finger movements after damage to the motor cortex or corticospinal tract in humans*. Neuroscience Colloquium, University of Rochester School of Medicine and Dentistry, Rochester NY.
4. Lang CE (2004) *Upper extremity movement control in people with hemiparesis*. PT Conclave, Washington University School of Medicine, St Louis MO.
5. Lang CE (2005) *Upper extremity movement control in people with hemiparesis*. Stroke Conference, Washington University School of Medicine, St Louis MO.

6. Lang CE (2005) *Multisegmental movement control in people with hemiparesis: relationships to hand function.* Physical Therapy Research Seminar, Washington University School of Medicine, St Louis MO.
7. Lang CE (2005) *Multisegmental movement control in people with hemiparesis: relationships to hand function.* Neurology/Hope Center for Neurological Disorders Research Seminar, Washington University School of Medicine, St Louis MO.
8. Lang CE (2006) *Counting reps: an observational study of outpatient day treatment for people with hemiparesis*. The Rehabilitation Institute of Saint Louis, St Louis MO.
9. Lang CE (2006) *Recovery of upper extremity movement control in people with hemiparesis post stroke*. Department of Kinesiology Seminar, Arizona State University, Tempe AZ
10. Lang CE (2006) *Testing Albert Pujols*. Town Hall Meeting, Facilities Management Department, Washington University School of Medicine, St Louis MO.
11. Lang CE (2007) *Implications of CIMT data for clinical practice*. As part of Lang CE, Page SJ, Dromerick AW. *Two applications of constraint-induced therapy to the clinic: Modified constraint-induced therapy in the outpatient setting and constraint-induced therapy in the acute inpatient rehabilitation setting.* Educational Seminar, APTA Combined Sections Mtg., Boston MA.
12. Lang CE (2007) *Relating the neuromuscular movement system diagnoses to medical diseases: disease prognosis and rehabilitation prognosis*. As part of Lang CE, Scheets PK, Wagner JM, Stith JS, Sahrmann SA. *Neuromuscular impairment, diagnosis, and related pathokinesiology.* Pre-conference Course, APTA Combined Sections Mtg., Boston MA.
13. Lang CE (2007) *Incorporation of disease-specific evidence into treatment selections based on the neuromuscular movement system diagnoses*. As part of Lang CE, Scheets PK, Wagner JM, Stith JS, Sahrmann SA. *Neuromuscular impairment, diagnosis, and related pathokinesiology.* Pre-conference Course, APTA Combined Sections Mtg., Boston MA.
14. Lang CE (2007) *Attempting to minimize motor disability in people with hemiparesis post stroke*. Rehabilitation Services Meeting, Carle Foundation Hospital, Urbana IL.
15. Lang CE (2007) *Selecting, grading, and measuring therapeutic activities to improve upper extremity function.* Physical and Occupational Therapist Workshop, Carle Foundation Hospital, Urbana IL.
16. Lang CE (2007) *Motor learning*. As part of Lang CE, Earhart GE, Crowner B. *Recent research and practical applications in motor control.* Conference Course, Missouri Physical Therapy Association Fall Mtg., St Louis MO.
17. Lang CE (2007) *Control of skilled movements*. As part of Lang CE, Earhart GE, Crowner B. *Recent research and practical applications in motor control.* Conference Course, Missouri Physical Therapy Association Fall Mtg., St Louis MO.
18. Lang CE (2007) *Upper extremity motor deficits after stroke*. As part of Lang CE, Earhart GE, Crowner B. *Recent research and practical applications in motor control.* Conference Course, Missouri Physical Therapy Association Fall Mtg., St Louis MO.

19. Lang CE (2007) *Upper extremity motor deficits after stroke.* Department of Kinesiology and Program in Occupational Therapy Research Seminar, University of Wisconsin, Madison WI.
20. Lang CE (2008) *Practice and activity in people with hemiparesis post stroke*. Invited Speaker, Stroke Special Interest Group, APTA Combined Sections Mtg., Nashville TN.
21. Lang CE (2008) *How much movement practice actually occurs during post stroke rehabilitation.* Physical Therapy Research Seminar, Washington University School of Medicine, St Louis MO.
22. Lang CE (2008) *Practice and activity in people with hemiparesis post stroke.* Invited Speaker, St. John's Mercy Rehabilitation Hospital, Chesterfield MO.
23. Lang CE (2008) *Upper extremity motor deficits and rehabilitation after stroke*. Department of Physical Therapy Research Seminar, Saint Louis University, St. Louis MO.
24. Lang CE (2009) *Results from the multi-site study*. As part of Lang CE, Boyd LA, Scheets PL. *Categorizing practice and counting repetitions: What are we doing for people after stroke?* Educational Seminar, APTA Combined Sections Mtg., Las Vegas NV.
25. Lang CE (2009) *Upper extremity motor deficits and rehabilitation post stroke.* Neurology Grand Rounds, Washington University, St. Louis MO.
26. Lang CE (2009) *Motor learning principles: all our patients have nervous systems.* Alumni Day Education, Program in Physical Therapy, Washington University, St. Louis MO.
27. Lang CE (2009) *Doses of movement practice and functional recovery after stroke.* Alumni Day Education, Program in Physical Therapy, Washington University, St. Louis MO.
28. Lang CE (2009) *Doses of task-specific training after stroke*. Stroke Research Day, Rehabilitation Institute of Saint Louis, St. Louis MO.
29. Lang CE (2010) *Constraints, successes, and results from the Phase II VECTORS trial*. As part of Winstein CJ, Blanton S, Lang CE, Roberts P, Velozo C, Woodbury M. *Interdisciplinary clinical trials in rehabilitation: Beyond the profession-level boundary.* American Occupational Therapy Foundation Invited Workshop, AOTA Annual Mtg., Orlando FL.
30. Lang CE (2010) *Doses of movement practice after stroke*. Invited Research Seminar, the Rehabilitation Institute of Chicago, Chicago IL.
31. Lang CE, Fucetola R, Conner LT (2010) *The Brain Recovery Core: Building a model system for organized stroke rehabilitation.* Educational Session, American Congress of Rehabilitation Medicine –American Society of Neurorehabilitation Joint Educational Conference, Montreal, Canada.
32. Lang CE (2010) *Upper extremity motor deficits and rehabilitation post stroke.* Invited Seminar, Burke-Cornell Medical Research Institute, White Plains NY.
33. Lang CE (2010) *Rehabilitation of motor function after stroke*. 11th Annual Jack Allison Memorial Lecture, Program in Physical Therapy, University of Minnesota, Minneapolis MN.
34. Lang CE, Bland MD, Whitson M (2011) *The Brain Recovery Core: Building a model system for organized stroke rehabilitation.* Educational Session, APTA Combined Sections Mtg., New Orleans LA.

35. Hornby TG, Lang CE, Reisman DS, Moore JL (2011) *Structuring clinical interventions to maximize motor recovery after stroke and spinal cord injury: the importance of amount intensity, and type of practice.* Educational Session, APTA Combined Sections Mtg., New Orleans LA.
36. Lang CE (2011) *Top 5 reasons for compensatory approaches in neurorehabilitation*. As part of: Eugene Michel's Research Forum: Restorative vs. Compensatory Approaches. Annual invited lecture, APTA Combined Sections Mtg., New Orleans LA.
37. Lang CE (2011) *Dose specific intensity for rehabilitation*. Keynote Address of the 2011 Annual Interdisciplinary Stroke Course, Rehabilitation Institute of Chicago, Chicago IL.
38. Lang CE (2011) *Understanding therapy*. State of the Science Conference on Robotics for Stroke Rehabilitation. Chicago, IL.
39. Lang CE (2011) *Upper extremity motor deficits and rehabilitation post stroke*. Grand Rounds, Department of Physical Medicine and Rehabilitation, University of Pittsburgh, Pittsburgh PA.
40. Lang CE (2012) *Upper extremity rehabilitation post stroke*. 1st Annual Visiting Scholar, Keynote Lecture, School of Allied Health Professionals, University of East Anglia, Norwich UK.
41. Lang CE (2012) *Integrating research into an academic career*. 1st Annual Visiting Scholar, Masterclass to faculty, School of Allied Health Professionals, University of East Anglia, Norwich UK.
42. Lang CE (2012) *Integrating research into a clinical career*. 1st Annual Visiting Scholar, Masterclass to clinicians, School of Allied Health Professionals, University of East Anglia, Norwich UK.
43. Lang CE (2012) *Intensity of stroke rehabilitation in the inpatient setting: how can we squeeze in more practice?* Innovations in Stroke Rehabilitation Pre-Conference Course, American Congress of Rehabilitation Medicine –American Society of Neurorehabilitation Joint Educational Conference, Vancouver, Canada.
44. Lang CE (2013) *Assessment of upper extremity impairment, function, and activity following stroke: Foundations for clinical decision making.* Educational Session, APTA Combined Sections Mtg., San Diego CA.
45. Lang CE (2013) *Intensity in Neurorehabilitation*. Educational Session, APTA Combined Sections Mtg., San Diego CA.
46. Lang CE (2013) *Upper extremity Interventions*. As part of Moore JL, Hornby TG, Lang CE, Galloway JC, Cherney L. *Variability and Error in Clinical Practice*. Continuing Education course for internal staff, Rehabilitation Institute of Chicago, Chicago IL.
47. Lang CE (2013) *How much do we need to succeed?* Rehabilitation and Participation Science Seminar, Program in Occupational Therapy, Washington University, St. Louis MO.
48. Birkenmeier RL, Bailey RR, Lang CE (2013) *Assessment of upper extremity impairment, function, and activity following stroke: Foundations for clinical decision making.* Educational Session, AOTA Annual Conference and Exposition, San Diego CA.

49. Lang CE (2013) *Stroke rehab 101: Biases from the middle of the USA*. Invited lecture, International Colloquium on Emerging Approaches to Computational Neurorehabilitation, Chateau de la Bretesche, France.
50. Lang CE (2013) *What I wish I had known sooner*. Commencement Address, School of Health Sciences, Elon University, Elon NC.
51. Lang CE (2014) *Motor rehabilitation and motor learning*. Commissioned Course in Neurorehabilitation, Hong Kong Hospital Authority, Hong Kong SAR, China.
52. Lang CE (2014) *Prediction of walking and driving abilities after stroke*. Commissioned Course in Neurorehabilitation, Hong Kong Hospital Authority, Hong Kong SAR, China.
53. Lang CE (2014) *Upper extremity assessment and treatment*. Commissioned Course in Neurorehabilitation, Hong Kong Hospital Authority, Hong Kong SAR, China.
54. Lang CE (2014) *Rehabilitation after TBI vs. stroke*. Commissioned Course in Neurorehabilitation, Hong Kong Hospital Authority, Hong Kong SAR, China.
55. Lang CE (2014) *The Brain Recovery Core: a model system of rehabilitation across the continuum of care*. Commissioned Course in Neurorehabilitation, Hong Kong Hospital Authority, Hong Kong SAR, China.
56. Lang CE (2014) *Introduction to upper extremity neurorehabilitation*. Part of: Task Specific Training for the Neurologic Upper Extremity: A Comprehensive Approach to Evaluation and Treatment. Rehabilitation Institute of Chicago Continuing Education course, Chicago IL.
57. Lang CE (2014) *Transition from assessment and prognosis to intervention: Introduction and principals of task-specific training*. Part of: Task Specific Training for the Neurologic Upper Extremity: A Comprehensive Approach to Evaluation and Treatment. Rehabilitation Institute of Chicago Continuing Education course, Chicago IL.
58. Lang CE (2014) *Task-specific training for the severely affected upper extremity*. Part of: Task Specific Training for the Neurologic Upper Extremity: A Comprehensive Approach to Evaluation and Treatment. Rehabilitation Institute of Chicago Continuing Education course, Chicago IL.
59. Lang CE (2014) *The endless search for better outcomes for people with stroke*. Invited Lecture, Departments of Occupational Therapy and Physical Therapy, University of Pittsburgh, Pittsburgh PA.
60. Lang CE (2014) *The far end of the line: pursuing better rehabilitation and outcomes for people with stroke.* Neurovascular Injury and Repair Seminar, Washington University, St. Louis MO
61. Lang CE (2014) *The endless search for better outcomes for people with stroke*. Key Note Speaker, Mini-Symposium on Measurement and Outcomes in Upper Extremity Rehabilitation, Universiteit Hasselt, Hasselt, Belgium.
62. Lang CE (2014) *Using technology to capitalize on available therapy time*. Invited talk at Recovery Machines, an IEEE-EMBc pre-conference meeting, Chicago IL.
63. Lang CE (2014) *The endless search for better outcomes after stroke.* Invited Lecture, Department of Physical Therapy, University of Maryland, Baltimore MD.

64. Lang CE (2014) *Task-specific training for the upper extremity.* Invited lecture at 35th Annual Neurorehabilitation Conference, Braintree Rehabilitation Hospital, Cambridge MA.
65. Lang CE (2014) *The Brain Recovery Core: Building and sustaining an organized model of stroke rehabilitation across the continuum of care*. Invited lecture at 35th Annual Neurorehabilitation Conference, Braintree Rehabilitation Hospital, Cambridge MA.
66. Lang CE (2014) *How might we do more in research and clinical practice?* As part of Lang CE, Boyd LA, Lohse K *The importance of dose in stroke rehabilitation*. Invited Symposium, American Society of Neurorehabilitation Annual Meeting, Washington DC.
67. Lang CE (2015) *Grantsmanship: Development of the research plan.* As part of Early Career Scientist Workshop, Neurology Section, APTA Combined Sections Mtg, Indianapolis IN.
68. Lang CE (2015) *Clinical rehabilitation perspective: Can robotics be part of the solution?* Invited lecture, 3rd Annual Rehabilitation Robotics Workshop, Arizona State University, Tempe AZ.
69. Lang CE (2015) *The endless search for better outcomes after stroke.* Invited Lecture, Department of Biokinesiology and Physical Therapy, University of Southern California, Los Angeles CA.
70. Lang CE (2015) *Matching therapies to the likelihood of meaningful change in individuals with stroke.* Satellite on Neurorehabilitation, Society for the Neural Control of Movement Annual Mtg., Charleston SC.
71. Lang CE (2016) *The endless search for better outcomes after stroke.* Distinguished Lecture, 3rd Annual Neuroscience and Motor Control Summit, Department of Applied Physiology and Kinesiology, University of Florida, Gainesville FL.
72. Lang CE (2016) *Learning principles for motor skill training*, as part of Van Dillen LR, Lanier V, and Lang CE, *Motor skill training in people with chronic low back pain: an alternative to traditional therapeutic exercise*; Educational Session, APTA Combined Sections Mtg., Anaheim CA.
73. Lang CE (2016) *Accelerometry numbers to clinically-useful information*, as part of Lang CE, Hayward KS, Eng JJ, *Making real world arum use measurement a clinical reality in stroke*; Educational Session, APTA Combined Sections Mtg., Anaheim CA.
74. Lang CE (2016) *The endless search for better outcomes after stroke.* Grand Rounds, Department of Rehabilitation and Regenerative Medicine, Columbia University, New York NY.
75. Lang CE (2016) *The hunt for better outcomes after stroke*. Invited Seminar, Department of Physical Therapy and Human Movement Science, Northwestern University, Chicago IL.
76. Lang CE (2016) *Dosing for rehabilitation trials*. Invited talk, Rehabilitation Research at NIH: Moving the Field Forward Conference, Bethesda MD.
77. Lang CE (2016) *Dosing and timing for plasticity and participation: Adult stroke.* Invited Plenary Talk, APTA IV STEP Meeting, Columbus OH.
78. Lang CE (2016) *Stroke rehabilitation research adventures*. Invited Seminar, CARE Initiative, University of Texas – Austin, Austin TX.

79. Linblad A, Lang CE (2016) *Data and safety monitoring*. Invited presentation, NIH NCMRR Clinical Trials Meeting, Bethesda MD
80. Lang CE (2016) *Dose-response of task-specific upper limb training ≥ 6 months post stroke: A Phase II, single-blind, randomized controlled trial.* Research Seminar, Program in Physical Therapy, Washington University, St. Louis MO
81. Lang CE with Wolf SL, Celnick P, Corbett D, Ward NS (2016) *Neurorehabilitation, Brain Plasticity, Recovery, and Compensation: What is "NeuroRehab" when we do it?* Invited Panel, American Society for Neurorehabilitation Annual Meeting, San Diego CA.
82. Lang CE with Dibble L, Sigward, S, Wiley R (2017) *Learning from each other: Sports and Neurology Sections discuss motor learning.* Educational Session, APTA Combined Sections Mtg., San Antonio TX.
83. Lang CE (2017) *Remote limb ischemic conditioning: a neurorecovery agent post-stroke?* Educational Session, APTA Combined Sections Mtg., San Antonio TX.
84. Lang CE with Manal TJ, Novak I (2017) *What not to do and why.* 35th annual Eugene Michels Research Forum, APTA Combined Sections Mtg., San Antonio TX.
85. Lang CE (2017) *Integration of neurorehabilitation best practices into comprehensive stroke care.* Stroke Review and Update, Boone Hospital, Columbia MO.
86. Lang CE (2017) *Stroke rehabilitation research adventures*. Invited Seminar, Burke Medical Research Institute, White Plains NY.
87. Lang CE (2017) *Dose in stroke rehabilitation: the value of explicit hypothesis testing.* Invited Seminar. Faculty of Health Sciences, University of Southampton, Southampton UK.
88. Lang CE (2017) *Current evidence for stroke rehabilitation: what we know now and where we go next*. Keynote Lecture, 27th Annual Scientific Meeting of the Stroke Society of Australasia, Queenstown New Zealand.
89. Lang CE (2017) *Five tips for a successful research career*. Invited Speaker to Early Career Luncheon, 27th Annual Scientific Meeting of the Stroke Society of Australasia, Queenstown New Zealand.
90. Lang CE (2017) *Prescription of motor therapy: issues of dosing and timing*. Invited Lecture, 27th Annual Scientific Meeting of the Stroke Society of Australasia, Queenstown New Zealand.
91. Lang CE (2017) *Rehabilitation data to drive better outcomes*. Invited Lecture, 27th Annual Scientific Meeting of the Stroke Society of Australasia, Queenstown New Zealand.
92. Lang CE (2017) *Dose in stroke rehabilitation: the value of explicit hypothesis testing*. Grand Rounds, Department of Physical Medicine and Rehabilitation, Johns Hopkins University, Baltimore MD.
93. Lang CE (2018) *Dose in stroke rehabilitation: the value of explicit hypothesis testing*. Invited Seminar, NIH-COBRE Center for Human Movement Variability, Department of Biomechanics, University of Nebraska – Omaha, Omaha NE.
94. Lang CE (2018) *Not intensity, but capacity vs. performance*. Plenary Speaker, International Neurophysiotherapy Conference, Association of Chartered Physical Therapists Interested in Neurology, Manchester UK.

95. Lang CE (2018) *Stroke Recovery and Rehabilitation*. Invited Seminar for Issues in Aging Series, Harvey A. Freidman Center for Aging, Washington University, St. Louis MO.
96. Lang CE (2018) *Not intensity, but capacity vs. performance*. Keynote Speaker, Canadian Partnership for Stroke Recovery, Ottawa Canada.
97. Lang CE (2018) *Wearable technology for rehabilitation (Part 1): why do we care and how is it useful?* Invited symposium. American Congress of Rehabilitation Medicine, Dallas TX.
98. Lang CE (2018) *Wearable technology for rehabilitation (Part 2): what have we learned so far?* Invited symposium. American Congress of Rehabilitation Medicine, Dallas TX.
99. Lang CE (2018) *Not intensity, but capacity vs. performance*. Research Seminar. Shirley Ryan Ability Lab, Chicago IL.
100. Lang CE (2019) *The view from the upper limb: impairments, prognosis, and evidence.* As part of Integrating Evidence into Neurologic Physical Therapy Education. Pre-Conference Course, APTA Combined Sections Meeting, Washington DC.
101. Lang CE (2019) *Wearable technology: why do we care and what are we measuring?* As part of Smith BA, Lang CE, Winstein CJ, and Reisman DS. Moving Technology to Clinical Practice: Sensors and Real-World Activity Assessment. Education Session, APTA Combined Sections Meeting, Washington DC.
102. Lang CE (2019) *Why NOT robotics from the upper limb perspective.* As part of Jayaraman A, Hoehl K, DeWald J, Lang CE, and Field-Fote E. Why we love and hate our robots. Educational debate, APTA Combined Sections Meeting, Washington DC.
103. Lang CE (2019) *Not intensity, but capacity vs. performance.* Invited Seminar. College of Health Professions, Medical University of South Carolina, Charleston SC.
104. Lang CE (2019) *Some unsolicited advice.* Graduation address, Physical Therapy Residency Program, Medical University of South Carolina, Charleston SC.
105. Lang CE (2019) *Is there added value in robots for neurorehabilitation?* As part of Rauter G, Klamroth-Marganska V, Burdet E, Lambercy O, O'Malley M, Lang CE, Wiskerke E, and Smith B. Simple or complex robots? Choosing appropriate tools for neurorehabilitation. Pre-conference workshop, RehabWeek 2019, Toronto Canada.
106. Lang CE (2019) *mRehab is the future: the upper limb perspective*. Invited speaker at the LiveWell RERC State of the Science Conference at RehabWeek 2019, Toronto Canada.
107. Lang CE (2019) *Wearable sensors are changing how we think about movement and neurorehabilitation*. Invited Seminar. Department of Health and Exercise Science, Colorado State University, Fort Collins CO.
108. Lang CE (2020) *The challenges of translating cool ideas into actual benefit to patients*. As part of Bhatt T, Madhavan S, Kesar T, Bowden M, and Lang CE. Emerging interventions for improving post-stroke functional mobility: Current evidence and barriers to translation. Education Session, APTA Combined Sections Meeting, Denver CO.
109. Lang CE (2020) *Wearable sensors are changing how we think about movement and neurorehabilitation.* Community talk for the University of Nevada – Las Vegas Annual Distinguished Lecture Series. Given via Zoom to an audience in Las Vegas NV.

110. Lang CE (2020) *Attempting to improve stroke rehabilitation across the translational pathway.* Address to faculty and students as part of the University of Nevada – Las Vegas Annual Distinguished Lecture Series. Given via Zoom to an audience in Las Vegas NV.
111. Lang CE (2020) W*earable sensors are changing how we think about movement and neurorehabilitation.* Keynote Address, Annual Trainee and Faculty Retreat for NIH HD T32 057850, Kansas University Medical Center. Given via Zoom to an audience in Kansas City MO.
112. Lang CE (2020) *Mentoring is the best part of my job.* Invited talk as part of the Foundation for Physical Therapy Research Mentoring Webinar. Given via Zoom to an audience throughout the United States.
113. Lang CE (2021) *Translating in-clinic outcomes to improvements in daily life post stroke*. Invited Seminar, California Physical Therapy Association Seminar Series. Given via Zoom to an audience throughout the state of California.
114. Lang CE (2021) *Wearable-sensing opens new windows to understand human movement.* Invited talk, Penn State University Action Club. Given via Zoom to an audience in State College, Pennsylvania.
115. Lang CE (2021) *The future of clinical practice and research*. As part of: Lang CE, Stowe AM, Hammond FL. The future of neurorehabiliation is bright, if we choose it to be. Closing session, American Society of Neurorehabilitation Annual Meeting. Given via Zoom to an international audience.
116. Lang CE (2021) *Translating in-clinic gains to improvements in daily life.* Mark Rochon Distinguished Lecture, KITE and University HealthNetwork affiliated with the University of Toronto. Given via Zoom to an audience in Toronto, Ontario, Canada.
117. Lang CE (2021) *Ischemic conditioning as a neurorecovery agent for stroke – or not*. Invite Seminar to the NeuroVascular Injury and Repair group, Washington University, St. Louis, MO.
118. Lang CE (2021) *Upper limb activity performance after stroke, as measured by wearable sensors.* As part of: Digital biomarkers for monitoring and predicting upper limb recovery after stroke. Special Session at IEEE-Biological Sensors and Networks. Given via Zoom to international audience.
119. Lang CE, Bland MD (2021) *Do we measure up?* Invited session, Academy of Neurologic Physical Therapy Annual Conference. Given via Zoom to a national audience.
120. Lang CE (2022) *You never know where you could get to from here.* DPT Induction Ceremony Key Note Address. Department of Rehabilitation and Movement Science, University of Vermont, Burlington VT.
121. Lang CE (2022) *Translation of in-clinic gains to gains in daily life after stroke*. Invited Seminar and Visiting Professor, Vermont Center for Cardiovascular and Brain Health, University of Vermont, Burlington VT.
122. Lang CE (2022) *Translation of in-clinic gains to gains in daily life after stroke.* NIH/NINDS StrokeNet Grand Rounds. Given via Zoom to a national audience.

123. Lang CE (2022) with LA Wheaton, *The future of neurorehabilitation is bright, if we choose it to be.* Invited talk, Association of the Academic Physiatry Annual Meeting, New Orleans LA.
124. Lang CE (2022) *More questions than answers: Wearable sensors for quantifying movement activity in daily life.* Invited talk, Academy of Physical Therapy Research Retreat: Advances in rehabilitation technology, Beverly MA.
125. Lang CE (2022) *Upper limb stroke rehabilitation*. Invited Seminar. City Hospital of Oslo, Norway. Given via Zoom.
126. Lang CE (2022) *The complexities, challenges, and promise of rehabilitation clinical trials.* Keynote address, MR3 Network 2022 Scientific Retreat, Medical Rehabilitation Research Resource Network. Given to a national audience via Zoom.
127. Lang CE (2022) *Counterpoint: Don't waste my time*. Given as part of the State of the Science on Impairment Measures at the American Congress of Rehabilitation Medicine, Chicago IL.
128. Lang CE (2022) *Upper limb stroke rehabilitation*. Invited Seminar. Institute for Knowledge Translation. Given to a national audience of physical therapists via Zoom.
129. Lang CE (2022) Moving your career forward in Neurorehabilitation. Part of the Women's Forum, World Congress of NeuroRehabilitation. Vienna, Austria.
130. Lang CE (2023) *Designing a control group for your trials: Learnings from the SRRR on control interventions.* Advances in Stroke Recovery Virtual Scientific Conference, Canadian Partnership for Stroke Recovery. Given to an international audience via Zoom.
131. Lang CE (2023) *Translation of in-clinic gains to gains in daily life.* Invited talk, Spinal Cord Lecture Series, Spaulding Rehabilitation Hospital and Harvard University, Boston MA.
132. Lang CE (2023) *Translation of in-clinic gains to gains in daily life*. Invited speaker, BIOMES Seminar Series, University of Delaware, Newark DE.
133. Lang CE (2023) *New science ideas come from the most unexpected places.* As part of Schindler-Ivens SM, Stevens-Lapsley JE, and Lang CE. Research to rehab: How scientific discovery drives innovation in patient care. Educational session at American Physical Therapy Association Combined Sections Meeting, San Diego CA.
134. Lang CE (2023) *Translation of in-clinic gains to gains in daily life.* Neurology Grand Rounds, University of Florida, Gainsville FL.
135. Lang CE (2023) with Hayward K on behalf of the Control Intervention SRRR3 task Force. *Selecting an optimal control group: A tool to facilitate decision-making*. Invited Workshop, American Society of NeuroRehabilitation Annual Mtg, Charleston SC.
136. Lang CE (2023) *Wearable sensors are changing how we think about movement and rehabilitation*. Invited Speaker at Neurorehabilitation: Creating a Vision for the Future conference held in honor of Dr. Carolee Winstein, Department of Biokinesiology and Physical Therapy, University of Southern California, Los Angeles CA.
137. Lang CE (2023) *Translation of in-clinic activity capacity gains to activity performance gains in daily life.* Invited Speaker, Academy of Neurologic Physical Therapy Annual Meeting, Minneapolis MN.

138. Lang CE (2023) *Motor learning for physical therapists*. Invited talk for Movement Science Monthly, an educational series for Japanese physical therapists, given with translation to an international audience via Zoom.
139. Lang CE (2023) *Translation of in-clinic gains to gains in daily life.* Invited Speaker, International Stroke Rehabilitation and Recovery Conference, TIRR Memorial Hermann and UT Houston McGovern Medical School, Houston TX.
140. Lang CE (2024) Panel member for *NIH Mock Study Section*, Educational session at American Physical Therapy Association Combined Sections Meeting, Boston MA.
141. Lang CE (2024) *Wearable sensing opens new windows to understand and improve human movement.* Invited Speaker, Actigraph Digital Data Summit, Pensacola Beach FL.
142. Lang CE (2024) *Wearable sensing opens new windows to understand and improve human movement.* Keynote Speaker, 9th Annual Rehabilitation Science PhD Program Symposium, University of Colorado School of Medicine, Denver CO.
143. Lang CE (2024) *Wearable technology in neurorehabilitation: towards improved measurement of performance for everyday activities.* Educational session with M Demers and MA Murphy. World Congress of Neurorehabilitation, Vancouver BC Canada.
144. Lang CE (2024) *Wearable sensors are changing how we think about movement and neurorehabilitation*. Invited Speaker for the symposium to celebrate Marc H. Schieber, University of Rochester, Rochester NY.
145. Lang CE (2024) *Assessments for "motor function"*. Invited Speaker. FDA/NIH Joint Public Workshop on Brain Computer Interface Clinical Outcome Assessment. Silver Springs, MD.
146. Lang CE (2024) *Wearable sensing opens new windows to understand and improve human movement.* Invited Speaker, Research Seminar Series, Shirley Ryan Ability Lab, Chicago IL.
147. Lang CE (2025) Panel member for *The NIH Scientific Grant Review Process - Mock Study Section and Round Tables*, Educational session at American Physical Therapy Association Combined Sections Meeting, Houston TX.
148. Lang CE (2025) *Indexing motor behavior and the interaction between motor learning and motor competence*. As part of Lang CE, Marrus N, and Iverson JM, Reframing Autism Spectrum Disorder with a Focus on the Importance of Motor Development. Educational session at American Physical Therapy Association Combined Sections Meeting, Houston TX.
149. Lang CE (2025) *Movement as a biomarker for risk of autism and other neurodevelopmental conditions.* As part of Field-Fote EC, Van Dillen LR, and Lang CE, Movement as a Biomarker: Using Movement to Predict, Prognose, and Evaluate Risk in Health-Related Conditions. Educational session at American Physical Therapy Association Combined Sections Meeting, Houston TX.
150. Lang CE (2025) *Enhancing function through movement: Advances in rehabilitation for stroke recovery.* Installation Ceremony: Catherine E. Lang as the Barbara J. Norton Professor of Physical Therapy. Washington University, St. Louis MO.

151. Lang CE (2025) *Wearable sensing opens up new window to understand and improve rehabilitation.* Invited Speaker, Collaborative Research Partnership: Brooks Rehabilitation and the University of Florida, Jacksonville FL.
152. Lang CE (2025) *Wearable sensing opens up new window to understand and improve rehabilitation.* Summer School: Towards a Continuum of Technology-assisted Therapy. Clinica Hildebrand Centro di Riabilitazione in Brissago, Ticino, Switzerland.
153. Lang CE on behalf of the SRRR3 Control Intervention Taskforce (2025) Support for clinical trial design in rehabilitation: Taking control of the control intervention. Lunch and Learn Webinar, US Interagency committee on disability research. Delivered via Zoom to a national audience.
154. Lang CE (2025) From motion to meaning: empowering neurorehabilitation across the lifespan via wearable sensing. Invited Annual Speaker, Department of Biokinesiology and Physical Therapy, University of Southern California, Los Angeles CA.
155. Lang CE (2025) From motion to meaning: empowering neurorehabilitation across the lifespan via wearable sensing. Invited Speaker, Program in Physical Therapy, Duke University, Durham NC.
156. Lang CE (2025) From motion to meaning: empowering neurorehabilitation across the lifespan via wearable sensing. Grand Rounds, Department of Physical Therapy and Rehabilitation Science, University of California – San Franciso, given virtually.
157. Lang CE (2026) Panel member for *What It Takes: Roundtables on Research, Grants, and Career Resilience*, Educational session at American Physical Therapy Association Combined Sections Meeting, Anaheim CA.
158. Lang CE (2026) *Strategies for developing digital measures using wearable sensors in pediatrics*. Invited Speaker, Ametris Digital Data Summit, Atlanta GA
159. Lang CE (2026) *From motion to meaning: empowering neurorehabilitation across the lifespan via wearable sensing*. Annual Invited Lecture, School of Biological Sciences, Georgia Tech, Atlanta GA.
160. Lang CE (2026) *Progress so far and challenges ahead for transitioning wearable movement sensors from research into clinical rehabilitation care.* Invited Symposium with AE Miller and M Rafferty, International Conference on Ambulatory Monitoring of Physical Activity and Movement , Biannual Mtg of the International Society for the Measurement of Physical Behavior, Knoxville TN.

CONSULTING RELATIONSHIPS AND BOARD MEMBERSHIPS

2006 Consultant to the SCI North American Clinical Trials Network, Hand Function Task Force

2008 – 2010 Consultant to the Somatosensation Toolbox, PI: W. Dunn, part of the NIH Neuroscience Blueprint Project, "The Toolbox of the Assessment of Neurological and Behavioral Function", PI: R. Gershon

2008 – 2010 Consultant to the University of Southern California's NIDRR Rehabilitation Rehabilitation Engineering Resource Center, "Successful aging with disabilities: Optimizing participation through technology", PI: C. Winstein

2009 – 2013 Advisory Board member, the Rehabilitation Institute of Chicago's NIDRR Rehabilitation Research and Training Center, "Enhancing the functional and employment outcomes of individuals who experience a stroke", PI: E. Roth.

2012 – 2018 Expert consultant to Neurolutions, Inc.

2013 – 2017 Advisory Board member, the Rehabilitation Institute of Chicago's NIDRR National Center for Rehabilitation Robotics, "Machines Assisting Recovery from Stroke and Spinal Cord Injury for return to Society (MARS3)", PI: J. Patton

2014 – 2017 Expert Panel Member for "Clinical Practice Guideline: Core Set of Outcome Measures for Patients with Neurologic Conditions", American Physical Therapy Association, PIs: J. Moore, K. Potter, J. Sullivan

2014 – 2017 Charter Member, Internal Academy Advisory Board, Rehabilitation Institute of Chicago

2014 – 2017 Steering Committee and Core Consortium Member for North America, James S. McDonnell Collaborative Activities Award, "Advancing the science of rehabilitation: Translating neuroscience and rehabilitation research into everyday life" PIs: L. Carey, C. Baum, N. Josman

2017 – 2022 External Advisory Board member, NIDILRR RERC, Collaborative Machines Enhancing Therapy (COMET), Shirley Ryan Ability Lab (formerly the Rehabilitation Institute of Chicago). PIs: J. Patton, D. Reinkensmeyer.

2019-present External Advisory Board member, NIH T32NS082168, Interdisciplinary training in movement disorders and neurorestoration. University of Florida, PIs: D. Vaillencourt, D Bowers

2019-2024 External Review Board member, NIDILRR ARRT 90ARHF0004, Combined human and rehabilitation machine system (CHARMS) training program. North Carolina State University and UNC – Chapel Hill, PI: D. Kamper.

2020-present External Advisory Board member, NIH T32 HD007490, PT/PhD Predoctoral training program. University of Delaware, PI: D. Reisman.

2020-present External Advisory Committee member, NIH T32 HD057850, Kansas University training program in neurological and rehabilitation sciences. KUMC, PI: R. Nudo.

2023-2026 External Advisory Board member, NIH P2CHD101913, Center for Reliable Sensor Technology-Based Outcomes for Rehabilitation (RESTORE Ctr). Stanford University, PI: S. Delp.

2024-present Expert consultant, Medtronic Inc.

2025-present External Advisory Board member, NIH T32HD007414, Research Training in Rehabilitation for Brain Injury and Neurological Disability. Johns Hopkins University, PI: A. Bastian.

2026-present Data Safety and Monitoring Committee member, The Canadian Maraviroc Randomized Controlled Trial To Augment Rehabilitation Outcomes After Stroke (CAMAROS). Sponsor: Governors of the University of Calgary.

2026-present NIH NINDS StrokeNet Workgroup on Dosing, member.

RESEARCH SUPPORT

Past

2002-2004 *Control of finger movements after stroke*
National Research Service Award, Postdoctoral Fellowship
NIH F32 NS044584 (PI) Direct costs $46,000/yr

This postdoctoral project investigated neural and mechanical factors contributing to control of finger movements after damage to the motor cortex or the corticospinal tract in humans.

2005-2011 *Mechanisms underlying loss of hand function after stroke*
Mentored Research Scientist Development Award
NIH K01 HD047669 (PI) Direct costs $93,000/yr

The goal of this longitudinal project is to investigate motor and somatosensory impairments underlying loss of hand function in people with hemiparesis post stroke.

2007- 2008 *Multi-site observation of PT and OT for people with hemiparesis post stroke*
Research Division Pilot Award (PI) Direct costs $1,474
Program in Physical Therapy, Washington University

The goal of this multi-site study was to examine the amount of practice currently provided during physical and occupational therapy and to determine if the amount of practice is affected by clinical setting, stroke severity, and stroke chronicity.

2008-2010 *Mechanism of Botox treatment of writer's cramp and other task-specific dystonias*
New Resource Proposal (Co-I; PI: Thach) Direct costs $7,580
McDonnell Center for Systems Neuroscience

The goal of this pilot project is to investigate mechanisms underlying the successful treatment of writer's cramp and other focal hand dystonias.

2008- 2009 *300 repetition doses to improve motor function after stroke*
Research Grant (PI) Direct costs $30,000
HealthSouth Corporation and Washington University Dept. of Neurology

Pilot funds are provided to develop and implement high repetition doses of motor training during post stroke rehabilitation.

2008-2009 *300 repetition doses to improve motor function after stroke*
Research Grant (PI) Direct costs $5,000
Missouri Physical Therapy Association

Supplemental funds for the above project to cover subject reimbursement, subject transportation, and therapy supplies.

2009-2011 *Developing virtual environment authoring tools for creating therapy interventions*
Research Grant (Co-I; PI: Engsberg)
Washington University ICTS/CTSA Direct costs $75,000/yr

The goal of this project is to develop programming tools for rehabilitation therapists to design virtual reality-based exercise programs.

2009-2012 *Effects of movement context on hemiparetic grasping early after stroke*
NIH R01 HD055964 (PI) Direct costs $200,000/yr

This project examines how various movement contexts affect the control and performance of grasping movements in people with stroke with the goal of determining optimal practice conditions for motor rehabilitation.

2009-2012 *Model system for organized stroke rehabilitation*
New Resource Proposal (PI) Direct costs $39,900
McDonnell Center for Systems Neuroscience

Pilot funds are provided to develop a model system of organized stroke rehabilitation across institutions and across the continuum of care.

2012-2013 *Repetitive task practice training to treat neglect after stroke: a pilot study*
Pilots Across the SPIRiT (PATS) 102 (PI) Direct costs $20,271
Washington University ICTS/CTSA sponsored by NIH UL1 RR024992

This collaborative pilot award, in collaboration with Dr. Elizabeth Skidmore at the University of Pittsburgh, is designed to: 1) examine the feasibility and tolerability

of the intervention in persons with neglect post stroke; 2) demonstrate feasibility of the multi-site collaboration; and 3) gather preliminary efficacy data.

2009-2014 *Understanding the effects of stroke using functional connectivity MRI*
NIH R01 HD061117 (Co-I; PI: Corbetta) Direct costs $475,000/yr

The goal of this competitive renewal is to examine neural connectivity and functional recovery in attention, language, and motor domains after stroke.

2013-2015 *Electrical Stimulation of Peripheral Nerve Repair to Improve Functional Recovery*
NIH R21 HD073767 (Co-I, PI: Tung) Direct costs $125,000/yr

The objective of this study is to perform a pilot human study of the safety and efficacy of electrical stimulation in improving success following reconstructive surgery in patients with brachial plexus and peripheral nerve injuries of the upper extremity.

2013-2015 *Using biosensors to identify therapy-driven brain reorganization in children*
Pilot Project (Co-PI with Schlagger, Peterson) Direct costs $50,000/yr
Washington University Hope Center

The goals of this pilot project are to: 1) develop and validate the use of biosensors (accelerometers) as a measure of real-world ability and activity in children, and 2) preliminarily evaluate relationships between behavior and brain networks in typically-developing children and children with brain-injury participating in rehabilitation.

2012-2015 *A Brain Recovery Core for measuring the effectiveness of stroke care*
Barnes Jewish Hospital Foundation (Co-PI with Corbetta, Lee)
Direct costs $125,000/yr

The goals of this project are to expand the existing Brain Recovery Core to capture longer-term, patient-oriented outcomes from all persons with stroke and to test the effectiveness of tPA on these outcomes within our academic hospital system.

2014-2016 *Diabetic upper extremity pathophysiology, limited joint mobility and disability*
NIH R21 DK100793 (Co-I; PI: Mueller) Direct costs $137,500/yr

The goals of this project are to examine the metabolic and movement related factors contributing to disability in people with long-standing diabetes.

2015 – 2017 *Pilot study of ischemic conditioning as a neurorecovery agent for stroke*
Research Grant (PI) Direct costs $27,000
HealthSouth Corporation and Washington University Dept. of Neurology

This project will test if a priming method, remote limb ischemic conditioning, can enhance learning and retention in healthy adults.

2013-2019 *Spinal control during functional activities to improve low back pain outcomes*
NIH R01 HD047709 (Co-I, PI: Van Dillen) Direct costs $299,000/yr

Our overall objective is to improve the costly, long-term course of mechanical low back pain (LBP) by building on the results of our recently completed clinical trial, "Classification-directed treatment of low back pain".

2013-2019 *Enhanced Medical Rehabilitation of older adults*
NIH R01 MH099011 (Co-I, PI: Lenze) Direct costs $386,000/yr

This project will test Enhanced Medical Rehabilitation's (EMR) benefits over standard-of-care rehabilitation for affective and functional recovery. Our aims are to examine the effectiveness of EMR for improving functional and affective outcomes in 252 older adults admitted to SNFs for post-acute rehabilitation, and to examine EMR's ability to overcome patient-level barriers (such as depression) to successful rehabilitation.

2015-2019 *Harnessing Neuroplasticity to Enhance Functional Recovery in Allogeneic Hand Transplant and Heterotopic Hand Replant Recipients*
W81XWH-15-2-0037 (Consultant; PI: Frey) Direct costs $500,000/yr

This project seeks to develop, implement and evaluate an innovative program of post-transplant and -replant rehabilitation of the hand.

2018-2021 *Transcranial direct current stimulation for post stroke motor recovery: a Phase II trial (TRANSPORT-2)* Direct costs $2,445,380/yr
NIH U01NS102353 (Site PI, PIs: Feng and Schlaug)

This is a Phase II multisite randomized controlled trial testing the efficacy of tDCS plus rehabilitation.

2016-2022 *Ischemic conditioning as a neurorecovery agent post stroke*
NIH R01 HD085930 (PI) Direct costs $230,000/yr

This Phase I, translational project investigates ischemic conditioning as a novel method to enhance the benefits of rehabilitation training for stroke and other neurological conditions.

2017-2022 *Characterizing Arm Recovery in People with Severe Stroke (CARPSS)*
CIHR/IRSC 374601 (Consultant; PI: Boyd)

This project seeks to identify clinical and imaging markers to predict partial recovery in persons with severe upper limb impairment post stroke.

2017-2023 *Development of a Micro-ECoG Neuroprosthesis for Motor Rehabilitation in a Chronic Corticospinal Stroke Injury*
NIH R01NS101013
(Co-I, PIs: Moran and Leuthhardt) Direct costs $450,000/yr

The goal of the project is to develop primate models and technologies for the neuroprosthetic rehabilitation of chronic stroke. The project will fundamentally expand the knowledge of how the brain changes with injury and the best method to harness these dynamics with a brain computer interface to induce a functional recovery.

2023 – 2024 Integrating wearable sensors into the clinical rehabilitation environment
JIT funding via UL1TR002345, #JIT996 Direct costs $4,900

This just-in-time funding covers mHealth Core services to provide scientific, legal, and regulatory assistance to postdoctoral fellow Allison Miller, as she develops a data pipeline integrating wearable sensor data into EPIC.

Current

2/12-7/27+ *Translation of in-clinic gains to gains in daily life*
NIH R01/R37 HD068290 (PI) Direct costs $350,041/yr

The third cycle of this project has been funded as a MERIT award. The goals are to identify and validate categories of upper limb performance in daily life that will provide meaningful information of upper limb rehabilitation research and clinical care across conditions that cause upper limb disability and across the lifespan.

5/21-4/27 *Variation in early motor function in autism, cerebellar injury, and normal twins.*
NIH R01 MH123723 (Co-PI with Marrus and Limperopoulis)
Direct costs, NCE

This project deploys wearable-sensor methodology in infants to identify two critical neural liabilities contributing to the development of autism: hyperactivity and impairment in motor coordination. These liabilities result in high risk of developing autism, but cannot yet be reliably measured within the first year of life.

7/93-4/31 *Doctoral Training Program in Movement Science*
NIH T32HD007434 (MPIs: Lang and Harris) Direct costs $235, 710/yr

This grant supports training of outstanding scientists by providing interdisciplinary predoctoral and postdoctoral training in Movement Science to students from diverse backgrounds.

8/24-7/29 *Efficacy and sustainability of a carepartner-integrated telerehabilitation program (CARE_CITE).*
NIH R01HD115644 (Consultant, PI: Blanton)

This clinical trial evaluates the early efficacy of a web-based, care partner-focused intervention (CARE-CITE) to improve upper limb activity in daily life in persons post stroke.

9/24-8/29 *Telerehabilitation in the home after stroke: A randomized, controlled, assessor-blind, clinical trial (TR-2 Trial).*
NIH UG3 NS133283 (Co-I; Co-PIs: Cramer and Edwards)

This definitive STROKENET clinical trial will evaluate the efficacy of home-based telerehabilitation for improving upper limb function, overall health, and economic costs in persons post stroke.

TRAINEE/MENTEE/SPONSORSHIP RECORD

Trainees

2003 – 2006 Joanne M. Wagner PT, PhD, ATC
Recipient of Foundation for Physical Therapy Doctoral Scholarships (2)
PhD Dissertation: Upper extremity impairment and motor performance in post-stroke hemiparesis

2004 – 2008 Justin A. Beebe PT, PhD
Recipient of Foundation for Physical Therapy Doctoral Scholarships (2)
Winner: 2007 Outstanding Post-Professional Student Abstract,
Neurology Section of the American Physical Therapy Association.
PhD Dissertation: Recovery of upper extremity movement control and the relationships with upper extremity function in individuals with acute hemiparesis

2005 – 2010 Dustin D. Hardwick PT, PhD
Recipient of Foundation for Physical Therapy Doctoral Scholarship
Recipient of American Heart Association Predoctoral Fellowship
PhD Dissertation: Shoulder pain and movement after stroke

2006 Breanna Fulton Young Scientist Program Participant

2007 – 2008 Marghuretta D. Bland DPT, MSCI
NIH TL1 RR024994 Predoctoral Clinical Research Fellow
Masters Thesis: Restricted active range of motion at the elbow, forearm, wrist or fingers decreases hand function.

2007 – 2009 Rebecca L. Birkenmeier OTD, OTR/L
OTD Thesis: 300 or more repetition doses to improve motor function after stroke: a Phase I feasibility trial.

2007 – 2011 Stacey L. DeJong. PT, PhD, PCS
Recipient of Foundation for Physical Therapy Doctoral Scholarships (3)
PhD Dissertation: Effects of movement context on reach-grasp-lift motion and grip force after stroke.

2007 – 2008 Tina Liou Undergraduate biology student

2008 – 2010 Eliza M. Prager OTD, MSCI
NIH TL1 RR024994 Predoctoral Clinical Research Fellow
OTD Thesis: Exploring expectations for upper extremity motor treatment in people after stroke

Masters Thesis: Assessment at initial hospitalization weakly predicts upper extremity function 3 months post stroke.

2008 – 2012 Sydney Y. Schaefer PhD Postdoctoral Research Fellow
Recipient of American Heart Association Postdoctoral Fellowship

2010 – 2012 Katherine Niemann Poppen OTD, OTR/L
OTD Thesis: Upper extremity real world use after stroke

2011 – 2015 Ryan R. Bailey MSOT, OTR/L, PhD
NIH TL1 RR024994 Predoctoral Clinical Research Fellow
PhD Dissertation: Assessment of real-world upper limb activity in adults with chronic stroke.

2012 – 2015 Elyse Aufman MSOT, OTR/L Medical student
Recipient of the American Academy of Neurology Summer Research Fellowship
NIH TL1 RR024994 Predoctoral Clinical Research Fellow
Recipient of the American Academy of Neurology G. Milton Shy Award

2012 – 2016 Timothy Wolf OTD, OTR/L, MSCI Assistant Professor
NIH K23 HD073190 – Primary mentor

2012 - 2016 Kendra M. Cherry-Allen DPT, PhD
Recipient of the Mr & Mrs Spencer T Olin Fellowship for Women
Recipient of Foundation for Physical Therapy Doctoral Scholarships (3)
PhD Dissertation: Exogenous and endogenous priming to enhance learning

2012 – 2013 Kimberly J. Waddell MSOT, OTR/L Rehabilitation Institute of Chicago
Recipient of the Buchanan Family Fellowship

2012 – 2015 Michael A. Urbin PhD Postdoctoral Research Fellow
Recipient of NIH F32 NS086392, Postdoctoral NRSA

2013 – 2019 Nico Dosenbach MD, PhD Assistant Professor
Child Neurology Foundation
PERF Scientific Research Award – Mentor for rehabilitation aspects
NIH K23 NS088590 – Mentor for rehabilitation aspects

2014 – 2019 Amar Dhand MD, PhD Assistant Professor
AHA 14CRP20080001 – Mentor for stroke outcomes aspects
NIH K23 HD083489 – Mentor for stroke outcomes aspects

2014 – 2015 Caitlin Doman MSOT, OTR/L Rehabilitation Institute of Chicago

Recipient of the Buchanan Family Fellowship

2015 – 2019 Kimberly J. Waddell MSOT, OTR/L, PhD
NIH TL1 TR000449 Predoctoral Clinical Research Fellow
PhD Dissertation: Exploring complexities of real world upper limb performance after stroke

2016 – 2019 Anna Mattlage PhD Postdoctoral Research Fellow

2017 – 2019 Swati M. Surkar PT, PhD Postdoctoral Research Fellow

2016 – 2021 Sook-Lei Liew OTR/L, PhD Assistant Professor at USC
NIH K01 HD091283 – Mentor for stroke outcomes aspects

2017 – 2022 Heidi Schambra MD Assistant Professor at NYU
NIH K02 NS104207 – Mentor for stroke outcomes aspects

2018 – 2022 Jessica Barth, OTR/L PhD Student, Movement Science
NIH TL1 TR000449 Predoctoral Clinical Research Fellow
PhD Dissertation: Validation, categorization, and prediction of upper limb outcomes after stroke.

2019 Kendall Werhane Undergraduate summer student

2019 – 2024 Jeffrey D. Konrad, PT, DPT PhD Student, Movement Science
Recipient of Foundation for Physical Therapy Research Doctoral Scholarships (2)
PhD Dissertation: Measurement of and contributors to developmental coordination impairment.

2021-2027 Ishmael Seanez PhD Assistant Professor
NIH IREK12 HD073945
NIH K01NS127936

2022-2025 Laura M. McPherson PT, DPT, PhD Assistant Professor
NIH KL2TR002346

2022-present Allison E. Miller PT, DPT, PhD Postdoctoral Research Fellow
Foundation For Physical Therapy Research Digital Research Grant, 2024-2025
NIH Loan Repayment Program Awardee, 2024-2026

2022-2023 Kevin Chang Undergraduate biology student

2023 – 2024 Kayla R. Bell DPT student researcher

TiDe Scholar, NIH R25HD109110

2024-present Chelesa M. Macpherson PT, DPT, PhD Postdoctoral Research Fellow

Thesis Committees / Thesis Reviews *[this section not added to Interfolio]*

2005 – 2007 Kelly J. Fuller PhD Washington University, Biomedical Engineering
PhD Dissertation: The influence of gravity on arm dynamics, motor planning, and behavior.

2006 – 2007 Jannette Blennerhassett PhD School of Psychological Science
School of Occupational Therapy
La Trobe University, Bundoora, Vic. Australia
PhD Dissertation: The contribution of somatosensory impairment to pinch grip ability after stroke.

2007 Michael S. Fine PhD Washington University, Biomedical Engineering
PhD Dissertation: Trial-by-trial motor adaptation to novel force perturbations in children and adults.

2007 – 2009 Sara A. Scholtes DPT, PhD Washington University, Movement Science
PhD Dissertation: The effect of limb movement on the lumbopelvic region in people with low back pain

2007 – 2011 Jennifer A. Semrau PhD Washington University, Neuroscience
PhD Dissertation: Using visual feedback to guide movement: properties of adaptation in changing environments and Parkinson disease

2008 – 2009 Madeleine Hackney PhD Washington University, Movement Science
PhD Dissertation: Argentine Tango as therapy for Parkinson Disease

2009 – 2010 Michael J. Falvo PhD Washington University, Movement Science
PhD Dissertation: Neurophysiological adaptations to resistance training and repetitive grasping.

2009 – 2010 Rachel Profitt OTD, OTR/L Washington University, Occupational Therapy
OTD Thesis: Developing virtual reality tools for occupational therapy.

2010 - 2012 Marie McNeely PhD Washington University, Neuroscience
PhD Dissertation: Locomotor control in Parkinson Disease

2010 – 2012 Corey Lohnes PhD Washington University, Movement Science
PhD Dissertation: Oculomotor function and locomotion in Parkinson's Disease

2010 - 2013 Daniel Peterson PhD Washington University, Movement Science
PhD Dissertation: Biomechanical and neural factors associated with gait dysfunction and freezing in those with Parkinson disease

2010 – 2016 Elisabetta Colucci PhD University of East Anglia, Norwich UK
PhD Dissertation: Dosage in stroke rehabilitation trials

2011 - 2014 Emily Grattan OTR/L, PhD University of Pittsburgh, Rehabilitation Science
PhD Dissertation: Examining the effects of a repetitive task practice program among individuals with unilateral spatial neglect

2011 - 2015 David Bundy PhD Washington University, Biomedical Engineering
PhD Dissertation: Human ipsilateral motor physiology and neuroprosthetic applications in chronic stroke.

2012 - 2013 Greg Seymour OTD, OTR/L Washington University, Occupational Therapy
OTD thesis: Comparing upper extremity movement among persons with and without stroke while manipulating tablet devices

2012 – 2016 Lenny Ramsey PhD Washington University, Neuroscience
PhD Dissertation: Behavioral and neurophysiological mechanisms of recovery post stroke

2012 – 2015 Kerri Morgan OTR/L, PhD Washington University, Movement Science
PhD Dissertation: Wheelchair training program for new manual wheelchair users.

2012 - 2014 Kshamata Shah PT, PhD Washington University, Movement Science
PhD Dissertation: Diabetes Mellitus and limited joint mobility in the upper extremity

2013 Sandeep Subramanian PhD McGill University, Physical & Occupational Therapy
PhD Dissertation: Motor learning in stroke: Role of Extrinsic Feedback

2013 – 2015 Christopher Sorenson PhD Washington University, Movement Science
PhD Dissertation: Validation and use of an induced-pain paradigm to investigate risk factors for low back pain development during prolonged standing

2013 – 2015 Rachel Tinius PhD Washington University, Movement Science
PhD Dissertation: Physical activity and maternal and neonatal outcomes in obese pregnant women

2014 Ilse Lamers PT, PhD Universiteit Hasselt, Belgium

PhD Dissertation: Upper limb function in multiple sclerosis: assessment and relationships between the levels of the International Classification of Functioning

2014 – 2016 Sam Nemanich PhD Washington University, Movement Science
PhD Dissertation: Motor adaptation and automaticity in people with Parkinson's disease and freezing of gait

2015 – 2017 Andrej Marich PT, PhD Washington University, Movement Science
PhD Dissertation: Examining the lumbar movement pattern during functional activities in people with low back pain

2016 - 2018 Adam Bittel PT, PhD Washington University, Movement Science
PhD Dissertation: Effects of resistance exercise on postprandial metabolism in obese men with prediabetes

2017 – 2018 Elinor Harrison, PhD Washington University, Movement Science
PhD Dissertation: Singing as a therapeutic technique to improve gait for people with Parkinson Disease.

2018 – 2020 Stefanie Foster PT, PhD Washington University, Movement Science
PhD Dissertation: Hip and pelvic floor strength and mobility in women with and without urgency and frequency predominant lower urinary tract symptoms

2018 – 2020 Hyo-Jung Jeong PT, PhD Washington University, Movement Science
PhD Dissertation: Midfoot and ankle movement dysfunction in people with diabetes mellitus and peripheral neuropathy

2019 – 2020 Adam Horin PhD Washington University, Movement Science
PhD Dissertation: Rhythmic auditory cueing of gait in Parkinson Disease

2020 – 2021 Quenten Hooker PhD Washington University, Movement Science
PhD Dissertation: Movement Patterns during Functional Activities in People with Chronic Low Back Pain

2020 – 2022 David May DPT, PhD Washington University, Movement Science
PhD Dissertation: Advancing the assessment and treatment of signs and symptoms of Parkinson Disease

2021 - 2024 Lauren Tueth DPT Washington University, Movement Science
PhD Dissertation: Assessment of gait, balance, and falls in individuals with neurodegenerative diseases.

2022 Meng-Fen Tsai BS University of Toronto, Biomedical Engineering

PhD Dissertation: Monitoring hand use and hand role of stroke survivors at home using egocentric video

2023-2025 Jacob Parson Washington University, Movement Science
PhD Dissertation: Targeting the beiging of muscle-associated adipose tissue to promote muscle regeneration.

2024-2025 Allison Haussler Washington University, Movement Science
PhD Dissertation: Enhancing Exercise Engagement and Gait in Parkinson Disease: Participation Factors, Novel Approaches, and the Role of Rhythmic Auditory Cueing

2025-present Rodolfo Keesey Washington University, Biomedical Engineering

2025-present Christina Bourantas Washington University, Movement Science

PATENTS
NA

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*Senior authorship designated by **
Award winning paper designated by †

Peer-reviewed original research in refereed journals

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Books

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Occupational Therapy and Physical Therapy. Alexandria; AOTA Press Inc. Available at Amazon.com.

Abstracts at Scientific and Clinical Meetings

Dr. Lang and colleagues regularly attend and present data at various scientific and clinical meetings, including meetings of the American Physical Therapy Association, the American Society for NeuroRehabilitation, the Society for the Neural Control of Movement, the Society for Neuroscience, and the International Stroke Conference of the American Heart Association. Most often, the abstracts are presented by trainees, but occasionally by Dr. Lang herself. Specific information on abstract presentations is available upon request.

Other, non-refereed publications and products

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