CURRICULUM VITAE

LAURI BISHOP, PhD, PT, DPT   **September 2021**

Personal Information
  University Address
  1540 Alcazar St. CHP 155
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Education
Post Graduate

2021	Postdoctoral Fellowship, Biokinesiology and Physical Therapy
	Mentor: Carolee Winstein, PhD, PT, FAPTA
	University of Southern California,
	Los Angeles, CA

Graduate

2018	PhD in Kinesiology (emphasis in Motor Learning)
	Primary Advisor: Lori Quinn, PT, EdD
	Teachers College, Columbia University
	New York, NY
2004	Doctor of Physical Therapy
	University of Miami
	Coral Gables, FL

Undergraduate

1999	Bachelor of Science, Exercise Science
	The Florida State University
	Tallahassee, FL

Academic Appointments

2021 to present	Assistant Professor of Research, Division of Biokinesiology & Physical Therapy, University of Southern California, Los Angeles, CA
2018 to 2021	Postdoctoral Research Associate, Division of Biokinesiology & Physical Therapy, University of Southern California, Los Angeles, CA
2015 to 2018	Associate Director, Robotics Research, Department of Rehabilitation & Regenerative Medicine, Columbia University Medical Center, NY, NY
2009 to 2015	Research Physical Therapist, Department of Rehabilitation & Regenerative Medicine, Columbia University Medical Center, NY, NY

Research Experience

2019 to 2020	Coordinator, NeuroRehabilitation Seminar Series, University of Southern California, Los Angeles, CA
2018 to present	Coordinator, Motor Behavior and Stroke Journal Club, University of Southern California, Los Angeles, CA
2018 to 2020	Site Coordinator, Predicting Ipsilesional Deficits in Stroke with Dynamic Dominance, University of Southern California, Los Angeles, CA
2015 to 2018	Associate Director, Robotics Research, Department of Rehabilitation & Regenerative Medicine, Columbia University Medical Center, NY, NY
2009 to 2015	Research Physical Therapist, Department of Rehabilitation & Regenerative Medicine, Columbia University Medical Center, NY, NY

Teaching Experience

2021 to present	Adjunct Faculty, *Biomechanics of Human Movement*, Department of Physical Therapy, Chapman University, Irvine, CA
2020 to present	Adjunct Faculty, *Scientific Inquiry II (Statistics)*, Department of Physical Therapy, Chapman University, Irvine, CA
2016 – present	Guest Lecturer, Careers in Physical Therapy Research. Annual Lecture. Program in Physical Therapy, Columbia University, NY, NY.
2020	Guest Lecturer, Movement Disorders: Stroke. Teachers College, Columbia University, NY, NY.

2018 to 2019	Course Assistant, *Fundamentals of Neuroscience*, University of Southern California, Los Angeles, CA
2018	Guest Lecturer, Bases of Motor Control: Stroke. Teachers College, Columbia University, NY, NY.
2015 – 2018	Guest Lecturer, Technology in Neurologic Rehabilitation. Annual Lecture. Program in Physical Therapy, Columbia University, NY, NY.
2007 to 2016	Adjunct Lab Instructor, *Physical Therapy Procedures*, Program in Physical Therapy, Columbia University, NY, NY
2015	Adjunct Instructor, *Research Methods*, Program in Occupational Therapy, Columbia University, NY, NY

Clinical Experience

2008 to 2009	Assistant Supervisor of Physical Therapy, Allen Pavilion, Columbia University Medical Center, New York Presbyterian Hospital, NY, NY
2006 to 2008	Staff Physical Therapist, Columbia University Medical Center, New York Presbyterian Hospital, NY, NY
2004 to 2006	Staff Physical Therapist, Johns Hopkins Hospital, Baltimore, MD

Professional Licenses
Physical Therapist, CA (active)
Physical Therapist, NY (inactive)
Physical Therapist, MD (inactive)

Honors and Awards

2011	Excellence in Research Writing, Best Paper. American Journal of Physical Medicine and Rehabilitation.

Grants and Funding

2021	NIH Small Business Technology Transfer (STTR). **[Co-Investigator]** MiGo: Wearable sensors that combine actionable data with a behavioral intervention to improve function after stroke. *$93,000*.

2019-2021   SC CTSI Voucher, University of Southern California. **[Co-Investigator]** Monitoring physical activity in community-dwelling stroke survivors: an ecological study. $3,000. [NCE due to COVID delays]

2017   Deans Grant for Student Research, Teachers College, Columbia University. **[Principal Investigator]**. The integration of principles of motor learning to reduce gait asymmetry using a novel robotic device in individuals chronically post stroke. $2,000.

Publications (peer-reviewed journals)

1. Stein J, **Bishop L**, Gillen G, Helbok R. Robot-assisted exercise for hand weakness after stroke. American Journal of Physical Medicine and Rehabilitation. 2011; 90:887-894. doi:10.1097/PHM.0b013e3182328623
   Primary therapist for data collection.

2. Wong CK, **Bishop L**, Stein J. A wearable robotic knee orthosis for gait training: A case-series of hemiparetic stroke survivors. Prosthetics and Orthotics International. 2012; 36(1):113-120.
   Primary therapist for data collection, data analysis, and contributed to manuscript preparation and revisions.

3. **Bishop L**, Stein J, Wong CK. Robot-aided gait training in an individual with chronic spinal cord injury: A case study. Journal of Neurological Physical Therapy. 2012; 36:138-143.
   Collaborated with J.Stein on study design. Led data collection, data analysis, manuscript preparation, revisions and publication efforts.

4. Stein J, Hillinger M, Clancy C, **Bishop L**. Sexuality after stroke: Patient counseling preferences. Disability and Rehabilitation. 2013; 35(21): 1842-1847.
   Assisted with study data collection and collated surveys. Assisted with data analysis.

5. **Bishop L**, Stein J. Three upper limb robotic devices for stroke rehabilitation: A review and clinical perspective. NeuroRehabilitation. 2013; 33(1):3-11.
   Collaboration for concept and primary preparation of manuscript.

6. Stein J, **Bishop L**, Stein DJ, Wong CK. Gait training with a robotic leg brace after stroke: A randomized controlled pilot study. American Journal of Physical Medicine and Rehabilitation. 2014; 93(11)987-994.
   Lead therapist for data collection. Contributed to data analysis and manuscript preparation.

7. Park S, **Bishop L**, Post T, Xiao Y, Stein J, Ciocarli M. On the feasibility of wearable exotendon networks for whole-hand movement patterns in stroke patients. IEEE International Conference on Robotics and Automation (ICRA). Stockholm, Sweden: 2016.
   Contributed to device design, usability, and feasibility of device use in stroke survivors. Collaboration to pilot device use with individuals post stroke including obtaining feedback on various control mechanisms.

8. **Bishop L**, Gordon AM, Kim H. Hand robotic therapy in children with hemiparesis: A pilot study. American Journal of Physical Medicine and Rehabilitation. 2017; 96(1):1-7.
    Collaborated with all authors for study design, led data collection, data analysis, manuscript preparation, and revisions.

9. **Bishop L,** Khan M, Martelli D, Quinn L, Stein J, Agrawal S. Exploration of two training paradigms using force induced weight shifting with the tethered pelvic assist device to reduce asymmetry in individuals after stroke: Case reports. American Journal of Physical Medicine and Rehabilitation. 2017; 96(10 Suppl 1):S135-140.
    Lead role in study concept, study protocol design, data collection, data analysis, manuscript preparation, revisions and publication.

10. Meeker C, Park S, **Bishop L**, Stein J, Ciocarlie M. EMG pattern classification to control a hand orthosis for functional grasp assistance after stroke. IEEE International Conference of Rehabilitation Robotics. 2017:1203-1210.
    Lead role in data collection, and recording feedback from users in respect to device design.

11. Miller A, Duff SV, Quinn L, **Bishop L**, Youdan GA, Ruthrauff H, Wade E. Development of sensor-based measures of upper extremity interlimb coordination. Conference Proceedings, IEEE Engineering in Medicine and Biology Society International Conference 2018:3160-3164.
    Collaboration with team leads to design study tasks. Managed site-specific study regulatory documentation. Led data collection at CUMC site including data management. Collaborated with team on manuscript preparation and revisions.

12. Park S, Meeker C, Weber LM, **Bishop L**, Stein J, Ciocarlie M. Multimodal sensing and interaction for a robotic hand orthosis. IEEE Robotics and Automation Letters (2019). 4(2):315-22.
    Continued collaboration on the development and evaluation of feasibility and efficacy of a robotic hand orthosis. Lead role in project administration, data collection, and manuscript revisions.

13. **Bishop L**, Kitago T. Getting involved in research with stroke rehabilitation technologies. Stroke. 2019 Feb;50(2):328-e30.
    Collaboration with contribution to manuscript concept and preparation.

14. **Bishop L**, Omofuma I, Stein J, Agrawal S, Quinn L. Treadmill-based locomotor training with robotic pelvic assist and visual feedback: A feasibility study. J Neurol Phys Ther. 2020 Jul;44(3):205-213.
    Primary publication from dissertation work. Served as team lead in project theory, design, execution, manuscript preparation and publication.

15. Barbuto S, Martelli D, Omofuma I, Lee N, **Bishop L**, Kuo S, Agrawal S, Lee S, O'Dell M, Stein J. Phase I single-blinded randomized control trial comparing balance and aerobic training degenerative cerebellar disease. PM R. 2021 Apr;13(4):364-371.
    Collaborated with lead author to assist in preparation of therapy protocol and progression of therapy difficulty.

16. Hidayah R, **Bishop L**, Jin X, Chamarthy S, Stein J, Agrawal SK. Gait adaptations using a cable-driven active leg exoskeleton (C-ALEX) with post-stroke participants. IEEE Trans Neural Syst Rehabil Eng. 2020 Sept;28(9):1984-1993.
   Collaborated with primary author in respect to motor learning and physical therapy aspects of study protocol design and execution. Contributed significantly to manuscript preparation, revisions, and publication.

17. Park S, Fraser M, Weber LM, Meeker C, **Bishop L**, Geller D, Stein J, Ciocarlie M. User-driven functional movement training with a wearable hand robot after stroke. IEEE Trans Neural Syst Rehabil Eng. 2020 Oct;28(10):2265-2275.
   Continued collaboration on piloting variations of device design.

18. Krakauer JW, Kitago T, Goldsmith J, Ahmad O, Roy P, Stein J, **Bishop L**, Casey K, Vallardares B, Harran MD, Cortes JC, Forrence A, Xu J, Deluzio S, Held J, Schwarz A, Steiner L, Widmer M, Jordan K, Ludwig D, Moore M, Barbera M, Vora I, Stockley R, Celnik P, Zeiler S, Branscheidt M, Kwakkel G, Luft A. Comparing a novel neuroanimation experience to conventional therapy for high-dose, intensive upper-limb training in subacute stroke: The SMARTS2 randomized trial. Neurorehabil Neural Repair. 2021 May;35(5):393-405.
   Served as primary study therapist. Designed therapy protocol for 'control' group including leading regular therapy team meetings to ensure consistency in therapy execution between the 3 sites. Contributed to manuscript preparation and revisions of therapy rationale and methods.

19. Torriani-Passin C, Demers M, Polese J, **Bishop L**, Wade E, Winstein C. mHealth technologies used to capture walking and arm use behavior in adult stroke survivors: a scoping review beyond measurement properties. Disabil Rehabil. 2021 Jul; 23:1-13. **Reviewed publications for data extraction. Contributed significantly to manuscript organization, preparation, writing, and revisions.**

Manuscripts in Preparation
1. **Bishop L**, Winstein C. Mind the translation gap! Locomotor rehabilitation after stroke.
   Primary contributor to content that discusses both challenges that limit the translation of locomotor skill into everyday environments and offer solutions that integrate approaches to overcome barriers.

2. Desai R, Martelli D, Alomar J, Li X, Agrawal S, Quinn L, **Bishop L**. Validity and reliability of inertial measurement units for gait assessment among stroke survivors.
   Primary contributor to protocol design. Provided leadership on data collection, mentorship with manuscript organization, data analysis and manuscript submission.

3. **Bishop L**, DiCarlo J, Winstein C, Lin D. A comprehensive description of locomotor function throughout the first year of recovery after stroke.
   Primary contributor to providing theoretical background of gait characteristics after stroke and the effects on mobility during stroke recovery. Contributing also to data analysis, manuscript preparation and submission.

4. **IPSI Team**. Predicting ipsilesional motor deficits in stroke with dynamic dominance model: A protocol paper.
   Lead coordination of study initiation at USC site, currently serve as blinded evaluator. Authored manuscript sections on standardization of interventions and assessments, adverse event reporting, data management and data control procedures.

5. **Bishop L***, Demers M*, Rowe J, Zondervan D, Winstein C. Establishing accuracy, acceptability and maximizing usability of community-worn sensors for upper and lower limb movements of stroke survivors. (Tentative title)
   Primary contributor to theoretical framework and study design. Leader of recruitment, data collection, and assisted with data analysis and interpretation of results. *Shared primary author on manuscript preparation and submission.

Publications (books & chapters)

1. Stein J, **Bishop L**, Agrawal S, Fasoli SE, Krebs HI, Hogan N. Robots in stroke rehabilitation. In Stroke Recovery and Rehabilitation, 2nd ed. New York, NY: Demos Medical; 2014.

Professional Presentations (abstracts)

Led demonstrations and discussion of the use of various robotic devices for rehabilitation after stroke.

1. Stein J, **Bishop L**, Krebs HI, Esquenazi A. Incorporating lower limb robots in clinical practice. Annual Assembly, American Academy of Physical Medicine and Rehabilitation. Seattle, WA: 2010.

2. Stein J, **Bishop L,** Huang V, Krebs HI, Rivera-Finnen L. Incorporation upper limb robots in clinical practice. Annual Assembly, American Academy of Physical Medicine and Rehabilitation. Orlando, FL: 2011.

3. Stein J, Krebs HI, **Bishop L**, Rivera-Finnen L, Glosser J. Incorporating upper limb robots in clinical practice. Annual Assembly, American Academy of Physical Medicine and Rehabilitation. Atlanta, GA: 2012.

4. Stein J, **Bishop L**, Bonato P, Esquenazi A, Grusmeyer S, Hartigan C, Leslie DP. Exoskeletal robots: The future is now. Annual Assembly, American Academy of Physical Medicine and Rehabilitation. Boston, MA: 2015.

5. Stein J, **Bishop L**, Esquenazi A. Incorporating exoskeletal robots into practice. Annual Assembly, American Academy of Physical Medicine and Rehabilitation. New Orleans, LA: 2016.

Professional Posters (abstracts)

1. **Bishop L**, Wong CK, Stein J. Improvements of gait parameters in stroke survivors after training with a wearable robotic knee orthosis. Combined Sections Meeting, American Physical Therapy Association. New Orleans, LA: 2011.
   Led data collection. Primary contributor for abstract preparation and poster presenter.

2. **Bishop L**, Gillen G, Stein J. A pilot study of a hand robotic device for post-stroke rehabilitation. Combined Sections Meeting, American Physical Therapy Association. New Orleans, LA: 2011.
   Led data collection and preliminary data analysis. Primary contributor for abstract preparation and poster presenter.

3. **Bishop L**, Stein J, Chen C, Helbok, R. Robot-assisted hand training compared with conventional hand therapy in chronic ischemic stroke patients: A pilot study. Vancouver, BC (CA): 2012.
   Led data collection. Primarily prepared abstract submission, and poster presenter.

4. **Bishop L**, Gordon AM, Kim HK. Training with the Amadeo Hand Robot in children with hemiplegia: A pilot study. Annual Meeting, American Academy of Cerebral Palsy and Developmental Medicine. Milwaukee, WI: 2013.
   Primarily prepared and submitted abstract with author input. Presented poster.

5. Rand E, Sorkin L, **Bishop L**, Joshi S, Stein J. A novel brain-muscle-computer interface for use in stroke survivors. Annual Meeting, Association of Academic Physiatrists. Nashville, TN: 2014.
   Contributed to study design, and input on abstract submission.

6. Chen C, **Bishop L**, Stein J, Schoenherr GS, Nilsen D, Beer R, Helbok R. Robot-assisted hand exercise compared with conventional exercise therapy after ischemic stroke: A pilot study. Annual Meeting, American Society of Neurorehabilitation. Washington, DC: 2014.
   Contributed to study design, led data collection, preparation and submission of abstract, primary presenter of poster.

7. Rand E, Sorkin L, Chang L, Patel P, Armstrong H, **Bishop L**, Skavhaug IM, Joshi S, Stein J. A single surface EMG interface to control multiple degrees of freedom in stroke survivors. Annual Assembly, American Academy of Physical Medicine and Rehabilitation. Boston, MA: 2015.
   Contributed to study design, and input on abstract submission.

8. **Bishop L**, Stein J, Vashista V, Khan M, Hinds S, Agrawal S. Stroke survivor gait adaptations using asymmetric forces with the tethered pelvic assist device. Annual Conference, American Congress of Rehabilitation Medicine. Dallas, TX: 2015.
   Collaborated for development of study concept, led data collection, prepared and submitted conference abstract, and presented poster.

9. **Bishop L**, Stein J, Martinez-Hernandez IE, Kitago T. The feasibility of sequential robotic arm and hand training for maximizing function of the arm and hand in a population of chronic stroke. Annual Conference, American Congress of Rehabilitation Medicine. Atlanta, GA: 2017.
   Collaboration on study design. Led data collection. Primary preparation of abstract submission, and presenter.

10. Krakauer J, Kitago T, Goldsmith J, Ahmad O, Roy P, Stein J, **Bishop L**, Casey K, Valladares B, Harran M, Cortes JC, Alexander F, Xu J, DeLuzio S, Hertler B, Held J, Eenhoorn B, Steiner L, Jordan K, Ludwig D, Moore M, Casey M, Vora I, Zeiler S, Branscheidt M, Kwakkel G, Luft A. Enhancing motor recovery with two types of intense and high-dose training in the sub-acute period after stroke: The SMARTS2 study. Annual Meeting, American Society of NeuroRehabilitation. Chicago, IL 2019.
    Served as primary study therapist.

11. Rowe J, Demers M, **Bishop L,** Zondervan D, Winstein C. Validity and usability of a wearable, multi-sensor system for monitoring upper and lower limb activity in chronic stroke survivors in a community setting. Annual Meeting, American Society of NeuroRehabilitation. Virtual Format. 2021.
    Collaboration on study design. Co-lead in study data collection and data analysis. Lead contributor to preparation of abstract and poster design.

Professional Memberships

2001 to present	American Physical Therapy Association
2016 to present	American Society of Neurorehabilitation
2018 to present	American Heart Association

Review Activities

Conference/Symposia Reviewer for:

The 2017 International Symposium on Wearable & Rehabilitation Robotics, WeRob2017

Manuscript Reviewer for:

2011 – 2018	American Journal of Physical Medicine and Rehabilitation
2017 – 2018	International Journal of Neuroscience
2018 – present	NeuroRehabilitation and Neural Repair
2018 – present	Stroke
2019 – present	Journal of Neurologic Physical Therapy
2020 – present	Gait & Posture
2020 – present	Journal of Motor Learning & Development
2020 – present	Journal of Clinical Neuroscience