Rini Varghese

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EDUCATION

08/2015 – 08/2021 **Doctor of Philosophy in Biokinesiology** (GPA: 3.85 /4.00)
Div. of Biokinesiology & Physical Therapy, *University of Southern California, Los Angeles, CA*
Dissertation title: "On hemisphere-specific deficits in the control of bimanual movements after stroke"

08/2012 – 08/2014 **Master of Science in Rehabilitation Sciences** (GPA: 4.00 /4.00)
Dept. of Physical Therapy, *University of Illinois at Chicago, Chicago, IL*
Thesis title "Effects of tai chi practice on a functional arm reaching task in older adults: a cross-sectional study"

08/2007 – 03/2012 **Bachelor in Physiotherapy** (GPA: 3.93 /4.00)
Dept. of Physiotherapy, Krishna Institute of Medical Sciences University, India

POST-GRADUATE TRAINING

08/2021 – Present **Postdoctoral Research Fellow** (Dr. Amy Bastian**)**
Center for Movement Studies, Kennedy Krieger Institute, Baltimore, MD and
Dept. of Neuroscience, Johns Hopkins University School of Medicine, Baltimore, MD

GRANT SUPPORT

External

04/2019 – 07/2021 **NIH F31 Ruth L. Kirschstein NRSA Individual Pre-Doctoral Fellowship**
HD098796 (*National Center for Medical Rehabilitation Research, NICHD)*
Role: Principal Investigator
Funding: $50,136
Overall aim: The primary purpose of this predoctoral fellowship was to provide support for my dissertation research, which sought to characterize hemisphere-specific deficits in the control of bimanual movements after stroke, as well as training and career development activities.

RESEARCH PUBLICATIONS

Peer-Reviewed Articles

1. **Varghese R,** Chang, B, Kim, B, Liew, S-L, Schweighofer, N, Winstein CJ (2022). Corpus callosal microstructure predicts bimanual motor performance in chronic stroke survivors (in press). *Top. Stroke Rehab*. 2021.05.14.443663. [Data/Code] [Preprint]
2. Maenza C, Sainburg RL, **Varghese R**. *et al* (2022). Ipsilesional arm training in severe stroke to improve functional independence (IPSI): phase II protocol. *BMC Neurol* 22, 141.
3. Demers M, **Varghese R**, Winstein CJ (2022). Retrospective Analysis of Task-Specific Effects on Brain Activity After Stroke: A Pilot Study. *Front Hum Neurosci*. Jun 2;16:871239. [Data/Code] [Preprint]

4. Maenza C, Wagstaff DA, **Varghese R**, Winstein C, Good DC, Sainburg RL. (2021) Remedial training of the less-impaired arm in chronic stroke survivors with moderate to severe upper-extremity paresis improves functional independence: A pilot study. *Front Hum Neurosci*. Mar 12;15:645714.
5. **Varghese R,** Kutch JJ, Schweighofer N, Winstein CJ. (2020). The probability of choosing both hands depends on an interaction between motor capacity and limb-specific control in chronic stroke. *Exp Brain Res*. 238:2569–2579. [Data/Code] [Preprint]
6. **Varghese R,** Winstein CJ (2020). Relationship between motor capacity of the contralesional and ipsilesional hand depends on the side of stroke in chronic stroke survivors with mild-to-moderate impairment. *Front Neurol* 10:1340. [Data/Code] [Preprint]
7. Buxbaum LJ, **Varghese R,** Stoll H, Winstein CJ. (2020). Predictors of arm nonuse in chronic stroke: a preliminary investigation. *Neurorehabil Neural Repair*. 34(6):512-522. [Preprint]
8. Subramaniam S, **Varghese R,** Bhatt T. (2019). Influence of chronic stroke on functional arm reaching: Quantifying deficits in the ipsilesional upper extremity. *Rehabil Res Pract*. 1–10.
9. Winstein CJ and **Varghese R.** (2018) Been there, done that, so what's next for arm and hand rehabilitation in stroke? *NeuroRehabilitation*. 43(1), 3-18.
10. Plummer HA, Sum JC, Pozzi F, **Varghese R,** Michener LA. (2017). Observational scapular dyskinesis: known-groups validity in patients with and without shoulder pain. *J Orthop Sports Phys Ther.* 47(8):530-537.
11. Vora JP, **Varghese R,** Patron V, Weisenbach SL, Bhatt T (2017) Test-retest reliability of a computerized neuropsychological test battery: a cross-sectional study assessing cognition in healthy young and old adults, and stroke survivors. *J Psychiatry Cogn Behav* 2017: J107.
12. Bhatt T, Subramaniam S, **Varghese R.** (2016). Examining interference of different cognitive tasks on voluntary balance control in aging and stroke. *Experimental Brain Research*. 234.9. 2575-2584.
13. Vora JP, Kannan L, **Varghese R**, Patel P, Bhatt T. (2016). Effects of a high intensity tapering conventional balance training for improving balance control among chronic stroke survivors. *Arch of Phys Med and Rehabil*, 97(10), e120-e121.
14. Vora JP, **Varghese R**, Weisenbach SL, Bhatt T. (2016). Test-retest reliability and validity of a custom-designed computerized neuropsychological cognitive test battery in young healthy adults. *J Psych and Cogn*, 1(1), 11.
15. **Varghese R,** Hui-Chan CWY, Bhatt T. (2016). Reduced cognitive-motor interference on voluntary balance control in older tai chi practitioners. *J Geriatr Phys Ther*. 39:190–199.
16. **Varghese R,** Hui-Chan CW, Bhatt T. (2015) Effects of Tai Chi on a functional arm reaching task in older adults: A cross-sectional study. *J Aging Phys Act*. 23:361–368.
17. **Varghese R**, Hui-Chan CW, Wang E, Bhatt T. (2014) Internal consistency and test-retest reliability of an instrumented functional reaching task using wireless electromyographic sensors. *J Electromyogr Kinesiol*, 24(5), 593-600.

Manuscripts in Preparation

#working title

1. **Varghese R**, Gordon JE, Sainburg RL, Winstein CJ, Schweighofer N. Adaptive Control is Reversed Between Hands After Right Paretic Stroke, and Lost Following Left Paretic Stroke.
2. **Varghese R**, Gordon JE, Sainburg RL, Schweighofer N, Winstein CJ. [#] The lack of interlimb interference in discrete asymmetric reaching movements: Revisiting the bilateral Fitts paradigm. [Experimental Protocol]

Presentations

*presenting author

Invited Talks

1. **Varghese, R* (2020)**. Control of a redundant bimanual task after stroke.
    - Dec 1, 2020: delivered (virtually) to the Motion Lab at the Center for Movement Studies, Kennedy Krieger Institute, Dept. of Neuroscience, Johns Hopkins University School of Medicine.
2. **Varghese, R* (2020).** Characterizing hemisphere-specific deficits in bimanual motor control post-stroke.
    - Jul 29, 2020: delivered (virtually) to the Cognition and Action Lab at Dept. of Psychology, University of California, Berkeley.
3. **Varghese, R* (2020)**. Evidence for disorganization of the corpus callosum in chronic stroke.
    - Jul 20, 2020: 1 of 4 selected trainee presentations delivered (virtually) to the Stroke Program in Neurorecovery (SPiN) workshop, Canadian Partnership for Stroke Recovery.

Posters

4. **Varghese, R***, Gordon, J, Sainburg RL, Winstein, CJ. Discrete asymmetric bilateral reaches are separately initiated and separately terminated, but not separately monitored**.**
    - *2020 Neural Control of Movement,* Dubrovnik, Croatia (accepted, but conference cancelled due to the COVID19 pandemic).
    - *2020 Herman Ostrow School of Dentistry Research Day & Jacquelin Perry Research Day*, Los Angeles, CA (accepted, but symposium cancelled due to the COVID19 pandemic).

5. **Varghese, R***, Sainburg RL, Gordon, J, Winstein, CJ. Temporal coupling is preserved after right but not left hemisphere damage.
    - *2019 XII Progress in Motor Control,* Amsterdam, The Netherlands.
    - *2019 Herman Ostrow School of Dentistry Research Day & Jacquelin Perry Research Day*, Los Angeles, CA.

6. **Varghese, R***, Sainburg, RL, Gordon, J, Winstein, CJ. Interlimb differences during bimanual aiming after stroke.
    - *2018 Society for Neuroscience*, San Diego, CA. (won the Trainee Professional Development Award)
    - *2018 American Society of Neurorehabilitation,* San Diego, CA.

7. **Varghese, R***, Gordon, J, Winstein, CJ. Interlimb differences during bimanual aiming after stroke: Effect of target distance.
    - *2018 Progress in Clinical Motor Control I: Neurorehabilitation,* State College, PA, July 23-26.

8. **Varghese, R*** and Winstein, CJ. (2018) Abstract WP152: Exploration of the factors that influence bimanual arm use after stroke: Implications for clinical rehabilitation. *Stroke*, 49(1): AWP152, Orig. published 01/22.
    - *2018 International Stroke Conference*, Los Angeles, CA
    - *2018 Herman Ostrow School of Dentistry Research Day*, Los Angeles, CA.

9. Maenza C*[1], **Varghese R,** Good, D*[2], Winstein, CJ, Wagstaff, D, Sainburg RL. (2018) Abstract T3: Intensive non-paretic arm training in chronic stroke patients with severe paresis improves functional independence without compromising paretic arm function. Abstracts from the 2017 Annual Meeting. *Neurorehabilitation and Neural Repair*, 32(3), 243.
    1. *2017 Society for Neuroscience & American Society of Neurorehabilitation*, Washington DC
    2. *2018 World Congress of Neurorehabilitation*, Mumbai, India

10. **Varghese, R*** and Winstein, CJ. Arm use patterns in chronic stroke: Observations from covert bimanual task performance.
    - *2017 Progress in Motor Control Annual Meeting*, Miami, FL,
    - *2017 Herman Ostrow School of Dentistry Research Day & Jacquelin Perry Research Day*, Los Angeles, CA.

11. **Varghese, R*** and Winstein, CJ. (2018) Abstract F32: Bimanual use in chronic stroke survivors with left or right hemiparesis is differentially influenced by non-paretic arm function. Abstracts from the 2017 Annual Meeting. *Neurorehabilitation and Neural Repair*, 32(3), 277–278.
    - *2017 Society for Neuroscience & American Society of Neurorehabilitation,* Washington D.C.

12. **Varghese R***, Stoll, HM, Jax, S, Buxbaum, LJ, Winstein, CJ. (2018) Abstract T60: The Best Predictors of Non-Use in Chronic Stroke: A Preliminary Investigation. Abstracts from the 2017 Annual Meeting. *Neurorehabilitation and Neural Repair*, 32(3), 264–265.
    - 2017 *American Society of Neurorehabilitation*

13. Michener LA*, Plummer HA, Pozzi F, **Varghese R**, Sum JC. Observational scapular dyskinesis: Is it relevant?
    - *2017 Combined Sections Meeting of the American Physical Therapy Association*
    - *2016 Annual meeting of the American Society of Shoulder and Elbow Therapists*

14. **Varghese, R*,** Hui-Chan, CW, Wang, E, Bhatt, T. (2015). Internal consistency and test-retest reliability of an instrumented functional reaching task using wireless electromyographic sensors.
    - *2015 Research Section, Combined Sections Meeting of the American Physical Therapy Association,* Indianapolis, IN.

15. **Varghese, R*,** Hui-Chan, CW, Bhatt, T. (2015). Reduced cognitive-motor interference on intentional balance control in older Tai Chi practitioners.
    - *2015 Geriatrics Section, Combined Sections Meeting of the American Physical Therapy Association,* Indianapolis, IN.

16. **Varghese, R**, Subramaniam, S, Bhatt, T*. Influence of chronic stroke on functional arm reaching: Quantifying deficits in the ipsilesional arm.
    - *2015 Society for Neuroscience,* Chicago, IL.

17. Vora, JP*, **Varghese, R**, Bhatt, T. The test-retest reliability of a computerized neuropsychological cognitive test battery in chronic stroke survivors: Application for dual-task paradigms.
    - *2015 Society for Neuroscience,* Chicago, IL

18. **Varghese, R*,** Hui-Chan, CW, Bhatt, T. (2015). Effects of Tai Chi on a functional arm reaching task in older adults: A cross-sectional study.
    - *2015 Research Section of the Combined Sections Meeting of the American Physical Therapy Association, Indianapolis, IN.*
    - *2014 Annual Student Research Forum of the University of Illinois at Chicago,* Chicago, IL

Other Open Source Efforts

1. ***cLBT acquisition program.*** Varghese, R, Ma, J, and, Winstein CJ. (June 2, 2020). A Computerized Version of the Line Bisection Test (v.1.2). https://github.com/rinivarg/cLBT. GitHub repository. A standalone application using MATLAB Runtime that can be run remotely to simulate the paper-based line bisection test used to assess unilateral spatial neglect after stroke.

AWARDS & HONORS

05/2021	**Order of Arête** (University-wide recognition of campus or community leadership) *USC's highest honor accorded graduate students upon completion of their academic programs*
04/2021	**GSG Research Symposium Award** (Winning Entry for Best Research Pitch) *USC Graduate Student Government*
09/2020	**Jacquelin Perry Scholarship** (Distinguished PhD Candidate Award) *Division of Biokinesiology and Physical Therapy, USC*
11/2018	**Nancy Rutledge Zahniser Trainee Professional Development Award** *Society for Neuroscience, Neuroscience 2018, San Diego, CA*
06/2018	**NSF Travel Award** with an opportunity to participate in a scholarly exchange with senior scientists *1st Progress in Clinical Motor Control Meeting, State College, PA*
06/2018	**Winning entry** entitled ***CNS Fireworks*** in the Best Humorous Brain Illustration Category *Brain Art Competition of the Neuro Bureau, Organization for Human Brain Mapping*
05/2017	**2nd Place Award for Best Poster** in the Biokinesiology Student Category *Herman Ostrow School of Dentistry Research Day, University of Southern California*
	BKN-PT Division Support & Graduate Student Travel Grant to support:
11/2018	*American Society of Neurorehabilitation*
02/2018	*International Stroke Conference, Los Angeles, CA*
11/2017	*American Society of Neurorehabilitation and Society for Neuroscience, Wash. D.C.*
07/2017	*Progress in Motor Control Meeting, State College, PA, Miami, FL*
06/2017	*Organization for Human Brain Mapping, Vancouver, Canada*
11/2016	*American Society of Neurorehabilitation and Society for Neuroscience, Wash. D.C.*
08/2008 – 03/2011	**University Honors (top 5%) – Cumulative 2nd rank** *2008: 1st rank, 2009 & 2010: 3rd rank, 2011: 2nd rank*

EXPERIENCE

Research

08/2015 – 07/2021	**Research Assistant** *Motor Behavior and Neurorehabilitation Laboratory, PI Carolee Winstein* *University of Southern California, Los Angeles, CA*
08/2015 – 12/2015	**Clinical Research Assistant** (part-time) *USC PT Associates, Health Science Campus,* *University of Southern California, Los Angeles, CA*
08/2012 – 05/2015	**Graduate Research Assistant** and **Visiting Research Associate** (2014 - 2015) *Cognitive Motor and Balance Rehabilitation Laboratory, PI Tanvi Bhatt* *University of Illinois at Chicago, Chicago, IL*

Teaching

01/2016 – 01/2019	**Teaching Assistant** (part-time) • *PT 546 Neuropathology (3 units, Sp.);*

08/2016 – 12/2016 **Teaching Assistant** (part-time)
- *PT 539 Clinical Pharmacology (2 units, Fa.)*

01/2014 – 05/2014 **Teaching Assistant** (part-time)
- *PT 634 Neuromuscular Dysfunction II (5 credit hours, Sp.)*

Clinical

03/2012 – 07/2012 **Home Health Physiotherapist**
Mumbai, India

02/2012 – 03/2012 **Physiotherapy Intern**
Krishna Charitable Hospital, Karad, India

08/2011 – 01/2012 **Physiotherapy Intern**
Sir JJ Hospital, Mumbai, India

08/2009 – 03/2011 **Physiotherapy Student Clinical Assistant**
Dept. of Physiotherapy, Krishna Charitable Hospital, Karad, India

OTHER ACADEMIC ACTIVITIES

07/2020 **Neurohackademy Summer School** (https://neurohackademy.org)
Organized by the University of Washington eScience Institute (delivered virtually).

07/2020 **Stroke Program in Neurorecovery (SPiN) Workshop**, Heart and Stroke Foundation's Canadian Partnership for Stroke Recovery (delivered virtually)

06/2017 **Participated in a certified BrainSuite Training Workshop**
Vancouver, Canada

06/2016 **Participated in the 3rd European Computational Motor Control Summer School**
Montpellier, France

03/2016 "**Clinical Research Support: Moving Research into Practice"**
Co-author, The Explorer (Vol. 8), USC Herman Ostrow School of Dentistry

08/2015 **Participated in the TMS Methods and Practice Workshop**
University of Southern California, Los Angeles, CA

SERVICE

05/2020 – Present **Social Media Coordinator**, *American Society of Neurorehabilitation*

Ad-Hoc Reviewer
02/2020 *Journal of Neurology*
10/2019 *Neurorehabilitation and Neural Repair*
07/2019 *Topics in Stroke Rehabilitation*
06/2019 *Experimental Brain Research*

10/23/2019 **Guest Lecture,** *Nu Rho Psi Honors Society (Neuroscience outreach)*
Nu Rho Psi is an undergraduate student-run Neuroscience academic group

Graduate Student Mentor, *STAR and EHA Research Program*
Bravo Medical Magnet High School, LAUSD
06/2019 – 07/2020 Students: Jasmine Ma and Xenia Dela-Cueva (Xenia was with us only until 08/2019)
08/2016 – 06/2017 Students: Cassandra Castillo and Antonio Raymundo

11/2018 – 11/2019 **NeurOnline Community Leader**, *Society for Neuroscience*

04/2018 – 08/2019	**Section Editor**, Stroke and General Research Interest Section *Journal Watch for the American Society of Neurorehabilitation*
01/2018 – 01/2019	**President**, *Biokinesiology Student Council, USC*
01/2016 – 01/2017	**Neuroscience Representative**, *Biokinesiology Student Council, USC*
08/2016 – 05/2017	**Coordinator**, *Neurorehabilitation Seminar Series, USC*

PROFESSIONAL MEMBERSHIPS

	Postdoctoral Member
05/2017 – Present	*Organization for Human Brain Mapping*
09/2016 – Present	*Society for the Neural Control of Movement*
07/2016 – Present	*International Society of Motor Control*
11/2014 – Present	*American Society of Neurorehabilitation*
09/2014 – Present	*Society for Neuroscience*
05/2012 – Present	**Registered Physiotherapist** *Maharashtra State Occupational Therapy and Physiotherapy Council, Mumbai*

SKILLS

- **Experimental and analysis**: Psychophysical paradigms, kinematic analysis, diffusion imaging analysis (FSL)
- **Programming**: Proficient in MATLAB and R. Beginner in Python and bash shell.
- **Other**:
    - *Version control*: Git, GitHub (/rinivarg)
    - *Interactive computing*: Jupyter Notebook
    - *Open source platforms*: OSF, Protocols.io.