

# 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](#)]

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

## EXPERIENCE

### Research

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

## 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 3<sup>rd</sup> 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
- 02/2020      **Ad-Hoc Reviewer**  
*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	<b>NeurOnline Community Leader</b> , <i>Society for Neuroscience</i>
04/2018 – 08/2019	<b>Section Editor</b> , Stroke and General Research Interest Section <i>Journal Watch for the American Society of Neurorehabilitation</i>
01/2018 – 01/2019	<b>President</b> , <i>Biokinesiology Student Council, USC</i>
01/2016 – 01/2017	<b>Neuroscience Representative</b> , <i>Biokinesiology Student Council, USC</i>
08/2016 – 05/2017	<b>Coordinator</b> , <i>Neurorehabilitation Seminar Series, USC</i>

## PROFESSIONAL MEMBERSHIPS

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

## 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.