

## Sankaraleengam (Sankar) Alagapan

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 School of Electrical and Computer Engineering  
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RESEARCH INTERESTS	Brain stimulation and data science with a focus on understanding brain dynamics in cognition and psychiatric disorders	
EDUCATION	<b>Ph.D. Biomedical Engineering</b> University of Florida, Gainesville, FL	2014
	<b>M.S. Biomedical Engineering</b> University of Florida, Gainesville, FL	2008
	<b>B.E. Electrical and Electronics Engineering</b> Anna University, Chennai, India	2007
RESEARCH EXPERIENCE	Research Scientist II Georgia Institute of Technology	2022 – Present
	Research Engineer II Georgia Institute of Technology	2018 – 2022
	Postdoctoral Research Associate University of North Carolina at Chapel Hill	2014 – 2018
	Graduate Research Assistant University of Florida	2008 – 2014
HONORS & AWARDS	University of North Carolina at Chapel Hill Helen Lyng White Postdoctoral Fellowship Office of Postdoctoral Affairs Travel Award	2016 2016
	University of Florida Office of Research Travel Award Graduate Student Council Travel Award College of Engineering Achievement Award	2010, 2013 2011 2007
RESEARCH SUPPORT	<b>Funded</b> <i>R21 NS094988 NINDS (\$418,000)</i> Modulating oscillations and working memory in patients with subdural electrodes PIs: Flavio Frohlich, Hae Won Shin Role: Postdoc	2016 – 2019

Contributed to writing background, significance, aims, research strategy

### Pending

CRCNS Research Proposal: Modeling multiscale dynamics of depression and distress during DBS-mediated recovery 2023-2028  
 PIs: Christopher Rozell and Helen Mayberg  
 Role: Faculty Associate

## PUBLICATIONS

[\(Google Scholar\)](#)

### Journal Articles

- Alagapan S.**, Heisig S., Choi K., Riva Posse P., Crowell A., ..., Mayberg H. M., and Rozell, C. (2023) Cingulate dynamics track depression recovery with deep brain stimulation (In Revision)
- Smith E.E., Choi K.S., Veerakumar A., Obatusin M., Howell B., Smith A.H., Crowell A., Riva Posse P., **Alagapan S.**, Rozell C.J., Mayberg H.S., and Waters A.C. (2022) Time-frequency signatures evoked by single-pulse deep brain stimulation to the subcallosal cingulate. *Frontiers in Human Neuroscience*, 16:939258
- Wong, J. K., Deuschl, G., Wolke, R., Bergman, H., Muthuraman, M., Groppa, S., ... **Alagapan, S.**, ... and Okun, M. S. (2022). Proceedings of the Ninth Annual Deep Brain Stimulation Think Tank: Advances in Cutting Edge Technologies, Artificial Intelligence, Neuromodulation, Neuroethics, Pain, Interventional Psychiatry, Epilepsy, and Traumatic Brain Injury. *Frontiers in Human Neuroscience*, 16:813387
- Alagapan S.**, Riddle, J., Huang, W.A., Hadar, E., Shin H.W., Fröhlich., (2019) Network-targeted, multi-site direct cortical stimulation enhances working memory by modulating phase lag of low frequency oscillations. *Cell Reports* 29 (9), 2590-2598
- McPherson, T. †, Berger, D.S., **Alagapan, S.**, and Fröhlich, F. (2019) Active and passive music therapy interventions differentially modulate sympathetic autonomic nervous system activity. *Journal of Music Therapy* 56 (3), 240-264
- Alexander, M.L.\*, **Alagapan, S.\***, Lugo, C.E., Mellin, J.M., Lustenberger, C., Rubinow, D.R., and Fröhlich, F. (2019) Double-blind, randomized pilot clinical trial targeting alpha oscillations with transcranial alternating current stimulation (tACS) for the treatment of major depressive disorder (MDD). *Translational Psychiatry* 9:106
- Alagapan, S.**, Fröhlich, F., and Wu, H-T., Diffusion geometry approach to efficiently remove electrical stimulation artifacts in intracranial electroencephalography. (2018) *Journal of Neural Engineering* 16, 036010
- Sheffield, A. †, Ahn, S., **Alagapan, S.**, and Fröhlich, F. (2018) Investigating Effects of Neural Oscillations by Lateral Transcranial Static Magnetic Field Stimulation on the Prefrontal Cortex: A crossover, double-blind, sham-controlled pilot study. *European Journal of Neuroscience* 00:1-13.
- Ahn S., Mellin, J.M., **Alagapan, S.**, Lugo, C.E., Alexander, M.L., Gilmore, J.H., Jarskog, L.F., and Fröhlich, F. (2018) Targeting impaired neural oscillations in patients with

schizophrenia by transcranial alternating current stimulation: A randomized, double-blind, placebo-controlled pilot study. *NeuroImage* 186, 126-136

- Alagapan, S.**, Lustenberger, C., Hadar, E., Shin, H.W., and Fröhlich, F. (2018) Low-frequency direct cortical stimulation of left superior frontal gyrus enhances working memory performance. *NeuroImage* 184, 697-706
- McPherson, T. †, Berger, D.S., **Alagapan, S.**, and Fröhlich, F. (2018) Intrinsic Rhythmicity Predicts Synchronization-Continuation Entrainment Performance. *Scientific Reports* 8, 11782
- Mellin, J.M., **Alagapan, S.**, Lustenberger, C., Lugo, C.E., Alexander, M.L., Gilmore, J.H., Jarskog, L.F., and Fröhlich, F. (2018). Randomized Trial of Transcranial Alternating Current Stimulation for Treatment of Auditory Hallucinations in Schizophrenia. *European Psychiatry* 51, 25-33.
- Lustenberger, C., Patel, Y.A., **Alagapan, S.**, Page, J.M., Price, B., Boyle, M.R., and Fröhlich, F. (2017). Topographical characterization of brain responses to auditory rhythmic stimuli during wakefulness and NREM sleep. *NeuroImage* 169, 57-68
- Sellers, K.K., Yu, C.X., Zhou, Z.C., Stitt, I., Li, Y.H., Radtke-Schuller, S., **Alagapan, S.**, and Fröhlich, F. (2016). Oscillatory Dynamics in the Frontoparietal Attention Network during Sustained Attention in the Ferret. *Cell Reports* 16, 2864-2874.
- Lustenberger, C., Boyle, M.R., **Alagapan, S.**, Mellin, J.M., Vaughn, B.V., and Fröhlich, F. (2016). Feedback-Controlled Transcranial Alternating Current Stimulation Reveals a Functional Role of Sleep Spindles in Motor Memory Consolidation. *Current Biology* 26, 2127-2136.
- DeMarse, T.B., Pan, L., **Alagapan, S.**, Brewer, G., and Wheeler, B.C. (2016). Feed-Forward Propagation of Temporal and Rate Information between Cortical Populations during Coherent Activation in Engineered In Vitro Networks. *Frontiers in Neural Circuits* 10.
- Alagapan, S.**, Schmidt, S.L., Lefebvre, J., Hadar, E., Shin, H.W., and Fröhlich, F. (2016). Modulation of Cortical Oscillations by Low-Frequency Direct Cortical Stimulation Is State-Dependent. *PLoS Biology* 14, e1002424.
- Alagapan, S.**, Franca, E., Pan, L., Leondopulos, S., Wheeler, B.C., and DeMarse, T.B. (2016). Structure, Function, and Propagation of Information across Living Two, Four, and Eight Node Degree Topologies. *Frontiers in Bioengineering and Biotechnology* 4, 15.
- Franca, E., Jao, P.F., Fang, S.P., **Alagapan, S.**, Pan, L., Yoon, J.H., Yoon, Y.K., and Wheeler, B.C. (2016). Scale of Carbon Nanomaterials Affects Neural Outgrowth and Adhesion. *IEEE Transactions in Nanobioscience* 15, 11-18.
- Pan, L.\*, **Alagapan, S.\***, Franca, E., Leondopulos, S.S., DeMarse, T.B.\*, Brewer, G.J., and Wheeler, B.C. (2015). An in vitro method to manipulate the direction and functional strength between neural populations. *Frontiers in Neural Circuits* 9, 32.
- Pan, L., **Alagapan, S.**, Franca, E., DeMarse, T., Brewer, G.J., and Wheeler, B.C. (2014). Large extracellular spikes recordable from axons in microtunnels. *IEEE Transactions in Neural Systems and Rehabilitation Engineering* 22, 453-459.

Brewer, G.J., Boehler, M.D., Leondopoulos, S., Pan, L., **Alagapan, S.**, DeMarse, T.B., and Wheeler, B.C. (2013). Toward a self-wired active reconstruction of the hippocampal trisynaptic loop: DG-CA3. *Frontiers in Neural Circuits* 7, 165.

Pan, L., **Alagapan, S.**, Franca, E., Brewer, G.J., and Wheeler, B.C. (2011). Propagation of action potential activity in a predefined microtunnel neural network. *Journal of Neural Engineering* 8, 046031.

### Book Chapters

Fröhlich, F., **Alagapan, S.\***, Boyle, M.R.\*, Hamilton, F.\*, Li, G.\*, Lustenberger, C.\*, and Schmidt, S.L.\* (2016). Target Engagement with Transcranial Current Stimulation. In *Transcranial Direct Current Stimulation in Neuropsychiatric Disorders: Clinical Principles and Management*, A. Brunoni, M. Nitsche and C. Loo, eds., pp. 197-222.

\* Contributed equally † Mentee

TALKS	Society for Neuroscience Annual Meeting	2022
	Society of Biological Psychiatry Annual Meeting	2022
	Transcranial Electric Stimulation Workshop (Carolina Neurostimulation Conference)	2018
	Society for Industrial and Applied Mathematics Southeast Atlantic Section Conference	2018
	Neuroscience Center Seminar Series (University of North Carolina at Chapel Hill)	2017
	<b>Teaching Experience</b>	
TEACHING & MENTORING	University of North Carolina at Chapel Hill Guest Lecturer, Network Neuroscience	2015, 2017
	University of Florida Graduate Teaching Assistant, Neural Engineering	2011
	Graduate Teaching Assistant, Neurodynamics	2010
<b>Mentoring Experience</b>		
	Georgia Institute of Technology Mentor graduate students in analysis of electrophysiological data analysis Elif Ceren Fitoz, Graduate student	2022 – Present
	University of North Carolina at Chapel Hill Mentored undergraduate and graduate students in brain stimulation studies and data analysis. Sat on 1 undergraduate honors thesis committee Jhana Parikh, Undergraduate research assistant (Honors Thesis Committee) Trevor Mcpherson, Undergraduate research assistant	2018 2017 – 2018

Florian Schertenleib, Visiting graduate researcher 2016 – 2017  
Matt Mattoni, Undergraduate research assistant 2016 – 2017

SERVICE Nanosymposium Chair, Society for Neuroscience Annual Meeting 2022  
Conference Program Committee - Carolina Neurostimulation Conference 2018  
**Ad-hoc Reviewer** 2016 – Present  
Psychological Medicine, Scientific Reports, Psychiatry Research, Neuroscience Letters, Journal of Neuroscience Methods, NeuroImage, Frontiers in Neuroscience, IEEE Journal of Biomedical and Health Informatics