

# NUTTIDA RUNGRATSAMEETAWEEMANA

nrungrat@salk.edu • <https://nrungrat.github.io/>

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## EMPLOYMENT

**Postdoctoral Research Fellow**, Computational Neurobiology Laboratory, July 2020 - Present  
The Salk Institute for Biological Studies La Jolla, CA  
Advisor: Dr. Terrence J. Sejnowski

**Postdoctoral Research Fellow**, Army Research Laboratory, July 2020 - Present  
The U.S. Army Human Research and Engineering Directorate Aberdeen, MD  
Advisor: Dr. Javier O. Garcia

## EDUCATION

**Ph.D. in Neurosciences (Computational Specialization)**, May 2020  
University of California, San Diego La Jolla, CA  
Thesis: *Neural Dynamics of Probabilistic Perceptual Decision Making in the Human Brain*  
Advisors: Dr. John T. Serences & Dr. Larry R. Squire

**M.S. in Neurosciences (Computational Specialization)** August 2016  
University of California, San Diego La Jolla, CA  
Advisors: Dr. John T. Serences & Dr. Larry R. Squire

**B.A. in Mathematics and Neuroscience with Highest Distinction** May 2014  
Middlebury College Middlebury, VT  
Mathematics Thesis: *A Mathematical Approach to Selective Visual Attention*  
Neuroscience Thesis: *The Influence of Internal and External Arousal on Memory*  
Advisors: Dr. Jason Arndt & Dr. Michael Olinick

## RESEARCH EXPERIENCE

**Computational Neuroscience Research** December 2018 - Present  
Computational Neurobiology Laboratory, The Salk Institute La Jolla, CA  
Research Advisor: Dr. Terrence J. Sejnowski

- Developing computational frameworks to investigate the neural computations that underlie complex cognitive functions

**Clinical Neuroscience Research** December 2018 - Present  
Computational Neurobiology Laboratory, The Salk Institute La Jolla, CA  
The U.S. Army Research Laboratory Aberdeen, MD  
Research Advisors: Dr. Terrence J. Sejnowski & Dr. Javier O. Garcia

- Using computational approaches to probe the dynamics of neural state changes in drug-resistant epilepsy
- First-author peer-reviewed paper (preprint)
- Co-first author peer-reviewed paper (*Chaos: An Interdisciplinary Journal of Nonlinear Science*)

**Cognitive Neuroscience Research** October 2014 - May 2016  
Neuroscience Graduate Program, UCSD La Jolla, CA  
Research Advisors: Dr. John T. Serences & Dr. Larry R. Squire

- Examined neural dynamics underlying visual memory, attention, and decision making in healthy individuals and amnesic patients
- First-author peer-reviewed papers (*Proceedings of the National Academy of Sciences*; *Journal of Neuroscience*; *Learning & Memory*)
- First-author peer-reviewed perspective article (*Current Opinion in Psychology*)

**Experimental Psychology Research** January 2011 - May 2014  
Department of Psychology, Harvard University (Advisor: Dr. Daniel Schacter)  
Department of Psychology, UCSD (Advisor: Dr. John T. Serences)  
Department of Neuroscience & Psychology (Advisor: Dr. Jason Arndt)

- Designed and performed experiments to probe the flexibility of human memory and attention
- Third-author peer-reviewed paper (*Journal of Neuroscience*)

## AWARDS AND HONORS

### Funding

U.S. ARL BAA for Basic and Applied Scientific Research Award (\$182,640)	2021 - 2023
• Proposal: <i>Hybrid decision-making in humans and artificial neural networks</i>	
• Role: Principal investigator	
U.S. Army Research Laboratory Graduate Fellowship (\$120,118)	2018 - 2020
• Proposal: <i>Predictive coding in human sensory perception and cognition</i>	
Training Grant, UCSD Neurosciences Graduate Program	2014 - 2015

### Awards

Career Advancement Award, Salk Institute	2021
Anuradha Rao Memorial Award, Cell Press/ Society for Neuroscience	2021
College Scholar Award, Middlebury College	2010 - 2014
Senior Research Fellowship, Middlebury College	2013 - 2014
Middlebury College Research Travel Award	2013
• Awarded to present a poster at <i>44th Annual Meeting of the Society for Neuroscience</i>	
Middlebury College Summer Research Fellowship	2012
• Awarded to intern in the lab of Dr. John T. Serences, UCSD	
Neuroscience Undergraduate Research Scholarship	2009 - 2014
• Awarded by the Ministry of Science and Technology of Thailand	

## TECHINICAL SKILLS

Statistical modelling, Bayesian modelling, recurrent neural network, PCA, logistic regression, spectral analysis, feature extraction, graph-theoretical modelling, non-linear differential analysis

## PUBLICATIONS

- [1] **Rungratsameetaweemana N**, Lainscsek C, Cash SS, Garcia JO, Sejnowski TJ\*, Bansal K\*. Intrinsic network topology underlies heterogeneity of seizure dynamics. Preprint, 2021.
- [2] **Rungratsameetaweemana N**, Itthipuripat S, Garcia JO, Serences JT. Distinct neural dynamics of top-down control shape decision-making under uncertainty. Preprint, 2021.
- [3] Nelli S, Itthipuripat S, **Rungratsameetaweemana N**, Serences JT. The speed-accuracy tradeoff reveals flexible access to accumulating sensory evidence during human decision-making. Under revision.
- [4] Lainscsek C\*, **Rungratsameetaweemana N\***, Cash SS, Sejnowski TJ. Cortical chimera states predict epileptic seizures. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 29: 121106, 2019.
- [5] **Rungratsameetaweemana N**, Squire LR, Serences JT. Preserved capacity for learning statistical regularities and directing selective attention after hippocampal lesions. *The Proceedings of the National Academy of Sciences*, 116 (39): 19705-19710, 2019.
- [6] **Rungratsameetaweemana N**, Serences JT. Dissociating the impact of attention and expectation on early sensory processing. *Current Opinion in Psychology*, 29: 181-186, 2019.
- [7] **Rungratsameetaweemana N\***, Itthipuripat S\*, Salazar A, Serences JT. Expectations do not alter early sensory processing during perceptual decision-making. *Journal of Neuroscience*, 38 (24): 5632-5648, 2018.
- [8] **Rungratsameetaweemana N**, Squire, LR. Preserved capacity for scene construction and shifts in perspective after hippocampal lesions. *Learning & Memory*, 25: 347-351, 2018.
- [9] Itthipuripat S, Garcia, JO, **Rungratsameetaweemana N**, Sprague TC, Serences JT. Changing the spatial scope of attention alters patterns of neural gain in human cortex. *Journal of Neuroscience*, 34(1): 112-123, 2014.

\* these authors made equal contributions

## INVITED TALKS

- [1] Probing decision making under uncertainty & The importance of allyship in science *STEMinar Series*, UCSD, May, 2021.
- [2] Dynamics of top-down modulatory signals in humans and neural networks. *Dr. Dobromir Rahnev's lab*, Georgia Institute of Technology. March, 2021.

- [3] Probabilistic decision making in humans and recurrent neural networks & The importance of mentorship in supporting diversity in science. *Diversity and Science Lecture Series*, UCSD. December, 2020.
- [4] Uncovering dynamical chimera states in the human brain. *Intelligent and Complex Systems Research Seminar Series*, Chulalongkorn University, Thailand. June, 2020.
- [5] Temporal dynamics of probabilistic decision making. *Neuroscience and Psychology Research Talk Series*, Middlebury College. January, 2020.

## CONFERENCE TALKS

- [1] **Rungratsameetaweemana N**, Kim R, Sejnowski TJ. Neural dynamics of probabilistic computations in humans and recurrent neural networks. Selected research spotlight, *Virtual Meeting of the Cognitive Neuroscience Society*. March, 2021.
- [2] **Rungratsameetaweemana N**, Kim R, Sejnowski TJ. Probabilistic information processing in humans and recurrent neural networks. *Neuromatch 3.0 Conference*. October, 2020.
- [3] **Rungratsameetaweemana N**, Lainscsek C, Cash SS, Sejnowski TJ. Cortical chimera states as predictors for epileptic seizures. Selected research spotlight, *IEEE Engineering in Medicine and Biology Society symposium and workshop on Brain, Mind, and Body: Cognitive Neuroengineering for Health and Wellness*. December, 2019.
- [4] **Rungratsameetaweemana N**, Itthipuripat S, Salazar A, Serences JT. Expectation influences late stages of information processing. *18th Annual Meeting of the Vision Sciences Society*. May, 2018.
- [5] **Rungratsameetaweemana N**, Olinick M. Mathematical implications of the normalization model of attention. *Annual Conference of Women in Mathematics of New England*. September, 2012.

## CONFERENCE POSTER PRESENTATIONS

- [1] **Rungratsameetaweemana N**, Kim R, Sejnowski TJ. Neural dynamics of probabilistic information processing in recurrent neural networks. *18th Annual Computational and Systems Neuroscience (Cosyne) Meeting*. February, 2021.
- [2] **Rungratsameetaweemana N**, Lainscsek C, Cash SS, Sejnowski, Garcia JO, Bansal K. Intrinsic network topologies underlie distinct propagation dynamics of focal seizures. *Society for Neuroscience Global Connectome*. January, 2021.
- [3] **Rungratsameetaweemana N**, Lainscsek C, Garcia JO, Bansal K, Cash SS, Sejnowski TJ. Uncovering dynamical states through concurrent electroencephalography (EEG) and electrocorticography (ECoG). *Virtual Meeting of the Cognitive Neuroscience Society*. June, 2020.
- [4] **Rungratsameetaweemana N**, Lainscsek C, Cash SS, Sejnowski TJ. Cortical chimera states as predictors for epileptic seizures. *17th Annual Computational and Systems Neuroscience (Cosyne) Meeting*. February, 2020.
- [5] **Rungratsameetaweemana N**, Lainscsek C, Cash SS, Sejnowski TJ. Cortical chimera states as predictors for epileptic seizures. *IEEE Engineering in Medicine and Biology Society symposium and workshop on Brain, Mind, and Body: Cognitive Neuroengineering for Health and Wellness*. December, 2019.
- [6] **Rungratsameetaweemana N**, Itthipuripat S, Serences JT. Dissociable modulation of top-down control on perceptual decision making. *19th Annual Meeting of the Vision Sciences Society*. May, 2019.
- [7] **Rungratsameetaweemana N**, Schmaelzle R, Bansal K, Wasylshyn N, Roy H, Lauharatanahirun N, Johnson T, Fernandez R, O'Donnell M, Falk E, Metcalfe J, Vettel JM, Garcia JO. Capturing communication success of driver-passenger dyads during real-world driving. *9th International Conference of the IEEE Engineering in Medicine and Biology Society on Neural Engineering*. March, 2019.
- [8] Garcia JO, Bansal K, **Rungratsameetaweemana N**, Wasylshyn N, Roy H, Lauharatanahirun N, Johnson T, Fernandez R, Falk E, Metcalfe J, Vettel JM. Brain network communities between driver-passenger dyads capture successful communication while driving. *9th International Conference of the IEEE Engineering in Medicine and Biology Society on Neural Engineering*. March, 2019.

- [9] **Rungratsameetaweemana N**, Vettel JM, Oliva JB, Verstynen T, Serences JT, Garcia JO. Intrinsic neural oscillations modulate feature selectivity in human visual cortex. *48th Annual Meeting of the Society for Neuroscience*. November, 2018.
- [10] **Rungratsameetaweemana N**, Itthipuripat S, Serences JT. Temporal dynamics of prior expectations on human perceptual decision-making. *41st Annual European Conference on Visual Perception*. August, 2018.
- [11] **Rungratsameetaweemana N**, Squire LR, Serences JT. Effects of attention and expectation on perceptual decision making after medial temporal lobe lesions. *47th Annual Meeting of the Society for Neuroscience*. November, 2017.
- [12] **Rungratsameetaweemana N**, Itthipuripat S, Barker E, Wagstaff L, Serences JT. Task-irrelevant contextual expectation impairs orientation discrimination performance. *16th Annual Meeting of the Vision Sciences Society*. May, 2016.
- [13] **Rungratsameetaweemana N**, Itthipuripat S, Barker E, Salazar A, Serences JT. Dissociable effects of attention and expectation on perceptual decision making. *45th Annual Meeting of the Society for Neuroscience*. October, 2015.
- [14] **Rungratsameetaweemana N**, Itthipuripat S, Serences JT. Dissociable effects of sensory evidence and expectation during visual discrimination tasks. *15th Annual Meeting of the Vision Sciences Society*. May, 2015.
- [15] **Rungratsameetaweemana N**, Arndt J. The influence of internal and external arousal on memory. *55th Annual Meeting of the Psychonomic Society*. November, 2014.
- [16] Itthipuripat S, Garcia JO, **Rungratsameetaweemana N**, Sprague TC, Serences JT. Changing the spatial scope of attention alters patterns of neural gain in human cortex. *43rd Annual Meeting of the Society for Neuroscience*. November, 2013.

## OUTREACH & MEDIA

Team Member, <i>Expanding Your Horizons of San Diego</i>	2021
<ul style="list-style-type: none"> <li>Organized an outreach workshop with the Society for Women in Graduate Studies that aimed to increase advancement of girls and women in STEM</li> </ul>	
Featured news article on <i>Middlebury Magazine Class Notes</i>	2021
Featured news article on <i>Pomfret School Alumni Spotlight</i>	2021
Featured news article on <i>The U.S. Army CCDC Research Spotlight</i>	2020
Member, <i>Diversity Admission Committee</i> , Neurosciences Graduate Program, UCSD	2015 - 2020
<ul style="list-style-type: none"> <li>Represented UCSD at Annual Meeting of the Society for Advancement of Chicanos/Hispanics and Native Americans in Science</li> </ul>	2019
Team Member, <i>Xiao Pengyou</i> , VT	2011 - 2014
<ul style="list-style-type: none"> <li>Organized outreach activities for local Asian adoptees in Vermont</li> </ul>	
Program Leader, Pakchong Community Science Outreach, Thailand	2011 - 2013
Executive Board Member, Southeast Asian Service Leadership Network (SEALNet)	2011
Team Member, Middlebury College Community Friends Outreach Program	2011
Program Leader, National Mathematics and Science Outreach, Thailand	2010

## TEACHING & MENTORING EXPERIENCE

### Research Mentor

<ul style="list-style-type: none"> <li>Julie Eitzen (Undergraduate Independent Project, UCSD)</li> </ul>	2021
<ul style="list-style-type: none"> <li>Carolyn Deustch (Undergraduate Independent Project, Cal Poly State University)</li> </ul>	2021
<ul style="list-style-type: none"> <li>Mia Borzello (Graduate Rotation Project, UCSD)</li> </ul>	2020
<ul style="list-style-type: none"> <li>Brianna Marsh (Graduate Rotation Project, UCSD)</li> </ul>	2020
<ul style="list-style-type: none"> <li>Julia Phillips (Undergraduate Research Assistant, Fordham University)</li> </ul>	2020
<ul style="list-style-type: none"> <li>Jimmy Yu (Undergraduate Independent Project, UCSD)</li> </ul>	2017 - 2019
<ul style="list-style-type: none"> <li>Chenlu Wang (Undergraduate Research Assistant, UCLA)</li> </ul>	2018
<ul style="list-style-type: none"> <li>Emely Anaya (Undergraduate Research Assistant, UCSD)</li> </ul>	2018
<ul style="list-style-type: none"> <li>Kevin Diep (Undergraduate Independent Project, UCSD)</li> </ul>	2017
<ul style="list-style-type: none"> <li>Lilli Wagstaff (Undergraduate Independent Project, UCSD)</li> </ul>	2016 - 2017
<ul style="list-style-type: none"> <li>Tzu-en Wang (Undergraduate Independent Project, UCSD)</li> </ul>	2016 - 2017
<ul style="list-style-type: none"> <li>Emily Barker (Undergraduate Independent Project, UCSD)</li> </ul>	2015 - 2017

<b>STEM Career Mentor</b> , <i>Association for Women in Science (AWIS)</i>	
• Sarah Maples (Neuroscience Graduate Student, UC Riverside)	2021-2022
<b>Contest Judge</b> , <i>The Afro-Academic, Cultural, Techonological and Scientific Olympics</i>	2021
<b>Reviewing Mentor</b> , <i>Computational &amp; Systems Neuroscience (Cosyne) Mentoring Forum</i>	2020
<b>Guest Lecturer</b>	
<i>Neuroscience: From Brain to Behaviors</i> , UCSD	2019
<i>Geometry</i> , Roong Arun High School, Thailand	2011
<i>Calculus I</i> , Roong Arun High School, Thailand	2011
<i>General Biology</i> , Princess Chulabhorn's College, Thailand	2010
<b>Teaching Assistant</b>	
<i>Special Topics in Psychology Course</i> , UCSD	2015
<i>Neurophysiology</i> , Middlebury College	2013
<i>Multivariable Calculus</i> , Middlebury College	2013
<i>Differential Equations</i> , Middlebury College	2013
<i>Psychological Statistics</i> , Middlebury College	2013
<i>Introduction to Psychology</i> , Middlebury College	2013
<i>Heart of Mathematics</i> , Middlebury College	2012
<i>Calculus II</i> , Middlebury College	2011 - 2012

#### **AD HOC REVIEWING**

Biological Psychiatry: Global Open Science; eLife; Expert Systems with Applications; Frontiers in Human Neuroscience; IEEE Transactions on Biomedical Engineering; Journal of Neuroscience; Learning & Memory; NeuroImage