Rajeev Raizada

Math and computer science educator based in NYC

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Appointments

Math teacher, grades 5 - 8. Speyer School, NYC	Current
Desmos interaction developer, Amplify	2023 - 2024
Math teacher, grades 6, 9, 10 & 11. St. Ann's School, Brooklyn	2022 - 2023
Upper school math teacher, The Birch Wathen Lenox School, NYC	2021 - 2022
Assistant Professor, Dept. of Brain & Cog.Sci., Univ. of Rochester	2013 - 2021
Research Scientist, Dept. of Psychology, Cornell University	2011 - 2013
Research Scientist, Neukom Inst. for Comp. Science, Dartmouth College	2008 - 2011

Education & Training

Univ. of Washington, Seattle. Postdoc. Advisor: Patricia Kuhl	2003 - 2008
MGH-NMR Center, Charlestown. Postdoc. Advisor: Russell Poldrack	2000 - 2003
Boston Univ. Ph.D. in Cog. & Neural Systems. Advisor: Stephen Grossberg	1996 - 2000
Univ. of Birmingham, England. M.Sc. in Cognitive Science	1994 - 1995
Univ. of Oxford, England. B.A. in Mathematics & Philosophy	1991 - 1994

Teaching and Tutoring

Tutoring experience

- In-person tutoring in NYC (high school and middle school)
- Online tutoring via word-of-mouth and wyzant.com (middle school and college-level)

School math classes

- Calculus
- Precalculus
- Geometry and Trigonometry
- Algebra 2
- 6th Grade
- Mathematical problem-solving (Grades 6-8)

University classes taught

- Language and the brain
- Introduction to fMRI (functional magnetic resonance imaging)
- Statistical analysis of brain data
- Cognitive Neuroscience

Statistics tutorials

Interactive statistics tutorials, in Python and Matlab:

• Webpage containing these tutorials is here.
• YouTube video illustrating the interactive programs in action is here.
• These tutorials have been used for teaching at U.Mass Boston, here.

Python and Matlab for fMRI, General Linear Model and pattern-based analysis:
• Webpage with these tutorials is here.
• Used for teaching at the Univ. of Arizona, here and the Univ. of Gent, here.
• YouTube video of me presenting these tutorials to a class: here.

Matlab for neural networks:
• Webpage containing these tutorials is here.
• Page includes tutorial code implementing and explaining the backpropagation algorithm, which is the core tool used for training deep neural networks.

Desmos creations

A collection of some of my Desmos creations can be found here.

Some highlights:
• Game: snakes on trig graphs, here.
• Making percentage increases and decreases more tangible, here.
• Mathematical string art, here.
• Explore the 17 wallpaper symmetry groups, here.
• Game: radians space invaders, here.

Javascript web games

Math version of Candy Crush, here. Written using the javascript libraries p5play and p5js. Source code available on Github, here.

Coded games & tutorials

• Python implementation of "The Tax-Collector" math game, here.
• Text-based generator of NYT Digits puzzles using Python, here.

Python turtle math art:
• String art circle
• Star
• Cardioid
• Nested twisting triangles

Educational videos

I have recently experimented with making some short educational YouTube videos, in which I try to explain topics as simply and engagingly as possible.
• A simpler and more intuitive proof of the Law of Cosines, here.
• A mathematical pattern hidden in the American flag (explaining why the first n odd numbers sum to n^2), here.
• Why does a negative number times a negative number end up being positive? An intuitive explanation, here.
• Make better presentations, by controlling visual attention, here.

Selected publications

For a complete listing, please see my Google Scholar profile: https://scholar.google.com/citations?user=PJWjx8gAAAAJ

Anderson, A. J., Lalor, E., Lin, F., Binder, J.R., Fernandino, L., Humphries, C., Conant, L., Raizada, R.D.S., Grimm, S. and Wang, X. (2018) Multiple regions of a cortical network commonly encode the meaning of words in multiple grammatical positions of read sentences. *Cerebral Cortex*, 29(6), 2396-2411. PDF.

Zinszer, B.D., Anderson, A.J., Kang, O., Wheatley, T. and Raizada, R.D.S. (2016) Semantic structural alignment of neural representational spaces enables translation between English and Chinese words. *Journal of Cognitive Neuroscience*, 28, 1749-1759. PDF.

Mackey, A.P., Raizada, R.D.S. and Bunge, S.A. (2012) Environmental influences on prefrontal development. *In: Principles of frontal lobe function (2nd Edition), edited by Donald Stuss and Robert Knight. Oxford: Oxford University Press.* PDF.

Raizada, R.D.S., Tsao, F.M., Liu, H.M., Holloway, I.D., Ansari, D. and Kuhl, P.K. (2010) Linking brain-wide multivoxel activation patterns to behaviour: examples from language and math. *NeuroImage*, 51, 462-471. PDF. Supplementary Material.

Raizada, R.D.S. and Kishiyama, M. (2010) Effects of socioeconomic status on brain development, and how Cognitive Neuroscience may contribute to leveling the playing field. *Frontiers in Human Neuroscience*. doi:10.3389/neuro.09.003.2010. PDF.

Grants and awards

NSF CAREER Award #1652127: "Testing models of semantic spaces in the brain." PI. $513k.	2017 - 2021
Google Faculty Award: "Good representations of meaning enable good inferences: Bridging between word2vec and analogical reasoning in the human brain." PI. $66k.	2015 - 2016
NSF Award #1228261: "Measuring and modeling object similarity in the brain: combining conceptual and perceptual representations." PI. $480K.	2012 - 2015
IARPA Award: "Knowledge representation in neural systems." Co-PI. $400K.	2014 - 2015
NSF Award #1058753: "EAGER: Brain-mobile interfaces: Exploratory research into the development of networked NeuroPhones." Co-PI. $250K.	2010 - 2012
NSF 0121950 Cognitive Neuroscience Pilot Grant. Co-PI. "Enhancing human cortical plasticity: Visual psychophysics and fMRI." $50K.	2001 - 2001

References

Available upon request