

Rajeev Raizada

Math and computer science educator in NYC

<https://rajeevraizada.github.io>

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Summary

I am a math and computer science educator based in NYC. For the last two years I have been teaching high school and middle school math, and greatly enjoying it. Before switching to school teaching, I was a cognitive neuroscience faculty member in a university, teaching and carrying out brain imaging research.

I enjoy making tutorial content and math games in Desmos, Python and javascript, and sharing online them with the broader community.

Appointments

Math teacher, grades 6, 9, 10 & 11. St. Ann's School, Brooklyn	Sept.2022 - present
Upper school math teacher, The Birch Wathen Lenox School, NYC	Sept.2021 - Aug.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

School math classes

- Calculus (limits, chain rule, product rule, integrals as anti-derivatives, etc.)
- Precalculus (trigonometry, logs and exponentials, rational functions, intro matrices etc.)
- Algebra 2 (systems of eqs, quadratics, exponential funcs, intro complex numbers, etc.)
- 6th Grade (fractions, decimals, proportions, angles, symmetry, intro algebra)
- Mathematical problem-solving, Grades 6-8 (assorted explorations: patterns, math games, geometry, logical reasoning)

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](#)

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.

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 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](#).

University classes taught

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

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](https://doi.org/10.3389/neuro.09.003.2010). [PDF](#).

Grants and awards

Currently funded	NSF CAREER Award #1652127: "Testing models of semantic spaces in the brain." PI. \$513k.	2017 - 2021
Previously funded	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