Rajeev Raizada, Ph.D.
Mathematics Teacher
Saint Ann's School
129 Pierrepont St
Brooklyn, NY 11201
rajeev.raizada@gmail.com

July 20, 2023

Dear Amplify,

I am writing to apply for your Activity Specialist, 6-12, Digital Curriculum position. I have been working as a math teacher at an independent school in NYC, and I love using Desmos as a central part of my teaching. I have taught in middle and upper school, in grades ranging from 6 to 12. For a long time I have also been making my own Desmos graphs and activities and sharing them with the broader math-education community on social media. A sampling is here.

Several of those activities involve the Computation Layer, typically for passing information between different screens and panels. For example, consider my game of graphing trig functions, here, in which the aim is to steer a snake to eat all the apples in a scene. The snake follows the path of a user-entered function, and when that function matches the one along which the apples are distributed, the player scores some points. After successfully matching five trig functions at a given difficulty level, but not before then, the player can progress to the next level. At that next stage, one additional aspect of the graph might vary, e.g. a sine wave might vary only in amplitude in Level 1, but in Level 2 its midline can also vary.

That activity uses CL in the following ways: the coverText and coverButtonLabel vary depending on whether the player has scored enough on the previous screen to be allowed to proceed. The graph reads the .latex from the math response box, and uses simpleFunction to turn it into a graph to be plotted. The math response box uses CL to start each screen with a default initialLatex of `sin x`.

I used CL in additional ways in a space invaders-style game for learning radian angles that I wrote, here. In that game, multiple-choice components allow the user to select between various difficulty levels. The isSelected values from those components get read into the graph component as numbers, via when-otherwise statements. I also used CL to calculate and display the class-wide high-score, using the function aggregate(). Although I feel that math can sometimes tend to become overly competitive, I found that in this game my students very much enjoyed seeing this class-wide high-score updating, and they had fun trying to chase each other into the top spot. All enabled by the power of CL.

The question of how to improve math education is, of course, longstanding and urgent. I truly believe that Desmos has created the most powerful set of tools anywhere for achieving that. On the small scale of a single classroom, I have had the pleasure and opportunity of exploring this in my own teaching. This has given me direct experience of its great potential, and also of the some of the practical issues that can arise in a classroom setting. I cannot think of a more enjoyable and worthwhile job than helping to create activities to share the joys and educational potential of Desmos with teachers and their students throughout the world. It would be a thrilling opportunity, and an inspiring challenge.

Sincerely,

RDSRaizada

Rajeev D. S. Raizada, Ph.D.

Rajeev Raizada

Math and computer science educator in NYC

https://rajeevraizada.github.io

rajeev.raizada@gmail.com

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 strongly believe that the traditional follow-the-textbook mode of math instruction completely fails to do justice to the subject. Moreover, it all too often results in students trying to follow memorised tricks and procedures, without any understanding of why they work. For all those reasons and more, I am a huge fan of Desmos. I especially enjoy using it to make math games, exploiting features such as the ticker and its ability to trigger actions. A collection of some of my Desmos creations can be found here.

Several of those games use the Computation Layer in order to pass information between different screens and panels. Examples include my game of steering a snake along trigonometric graphs, here, and a space invaders-style game for learning radian angles, here.

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 (trig, logs and exps, rational funcs, intro matrices etc.)
- Algebra 2 (systems of eqs, quadratics, exp funcs, complex numbers, etc.)
- 6th Grade (fractions, decimals, proportions, angles, 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.

Interactive code 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.

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. 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