Rajeev Raizada

Math Educator | Ph.D. in Cognitive & Neural Systems
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Education

Ph.D., Cognitive & Neural Systems | Boston University | 2000
M.Sc., Cognitive Science | University of Birmingham, England | 1995
B.A., Mathematics & Philosophy | University of Oxford, England | 1994

School Teaching Experience

Math Teacher, Grades 5-8 | Speyer Legacy School, NYC | 2024-present
- Teaching highly accelerated gifted math curriculum including Algebra 1, Algebra 2, and Geometry
- Coaching AMC 8 and Mathcounts competition math teams
- Integrating educational technology (Desmos, Python) to make abstract concepts intuitive
- Curriculum development, emphasizing problem-solving and conceptual understanding

Math Teacher, Grades 6, 9, 10 & 11 | St. Ann's School, Brooklyn | 2022-2023
- High School: Calculus, Precalculus, and Algebra 2
- Middle School: 6th Grade Math and Mathematical Problem-Solving (Grades 6-8)
- Developed open-ended problem-solving curricula emphasizing multiple solution pathways

Upper School Math Teacher | The Birch Wathen Lenox School, NYC | 2021-2022
- Taught multiple levels of high school mathematics
- Created differentiated instruction to meet diverse student needs

Advanced math classes I am equipped to teach:
- Linear Algebra, Multivariable Calculus, Differential Equations
- Statistics, probability, and computational data analysis
- Mathematical foundations of neural networks and machine learning

Educational Technology Experience

Interaction Developer | Desmos, Amplify | 2023-2024
- Developed interactive math activities using Graphing Calculator, Activity Builder, and Polypad
- Wrote Computation Layer code connecting graphs with interactive student responses
- Collaborated with cross-functional teams of educators, designers, and developers
- Created activities used by thousands of students nationwide

Portfolio: teacher.desmos.com/collection/63cc058074accdec3cad3d2c

Interactive educational apps, made with Python:

- How matrix linear algebra underpins a statistical classifier (here)
- How the backpropagation learning algorithm works in neural networks (here)
- Nearest-neighbour classifier tutorial (here)
- Time-series convolution tutorial(here)
- Multivariate regression using a General Linear Model (GLM) design matrix (here)
- Math billiards, calculating the Greatest Common Factor (GCF) of two numbers (here)
- A fractal: right-angled triangles containing similar subtriangles (here)
- Python Turtle cardioid string art (here)

Portfolio: https://rajeevraizada.github.io/python.html

Selected Teaching Materials & Presentations

Conference Presentations:

- "Making proofs more visual and intuitive: the reflective properties of conic sections, and the Law of Cosines". Museum of Mathematics, NYC. (Abstract here)
- Video explanation of the Law of Cosines proof (here)

Example Desmos Activities:

- *Snakes on quadratics* (here)
- *Radians space invaders* (here)
- *17 Wallpaper Symmetry Groups* (here)

Educational Videos:

- An intuitive visual explanation of the Inscribed Angle Theorem (here)
- The surprising geometry of aiming a soccer ball at a goal (here)
- Why the first n odd numbers sum to n² (using patterns in the American flag). (Here)
- How to make a snowflake in Desmos Geometry (here)
- Why does negative × negative = positive? (an intuitive explanation). (Here)
- How the science of visual attention can help you make better presentations (here)

Wikipedia Contributions

- Pythagorean Theorem proof by area-preserving shearing (here)
- Animated visual demonstration of Ptolemy's theorem (here)
- Animated proof of Angle Bisector Theorem (here)
- Animation of Penrose tiling substitution rules (here)

Wikipedia user-page: https://en.wikipedia.org/wiki/User:RajRaizada

Mathematical Games:

- Javascript math games: https://rajeevraizada.github.io/javascript.html
- Virtual Galton board: https://openprocessing.org/sketch/2751815
- Mandelbrot set explorer: https://openprocessing.org/sketch/2711617

University Teaching & Research Experience

Assistant Professor | Dept. of Brain & Cognitive Sciences, University of Rochester | 2013-2021
- Taught cognitive neuroscience, statistics, and computational data analysis
- Mentored undergraduate and graduate students in research projects
- Developed interactive statistics tutorials adopted by multiple universities
- Published research on how the brain builds and organizes conceptual knowledge

Research Scientist | Cornell University & Dartmouth College | 2008-2013
Postdoctoral Researcher | University of Washington & MGH-NMR Center | 2000-2008

Research Grants & Awards

NSF CAREER Award | 2017-2021 | $513,000
Testing models of semantic spaces in the brain
Google Faculty Award | 2015-2016 | $66,000
Good representations of meaning enable good inferences
Additional NSF Research Grants | Multiple awards | $730,000+
Research theme: measuring and modeling conceptual and perceptual representations

Selected Publications

Complete list: Google Scholar Profile
- Anderson, A.J., et al., **Raizada, R.D.S.**, et al. (2018). Multiple regions of a cortical network commonly encode the meaning of words. *Cerebral Cortex*, 29(6), 2396-2411. (PDF)
- **Raizada, R.D.S.**, et al. (2010). Linking brain-wide multivoxel activation patterns to behaviour: examples from language and math. *NeuroImage*, 51, 462-471. (PDF)
- **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*. (PDF)

References

- Tom Jameson, Head of Math, Speyer Legacy School: tjameson@speyerlegacyschool.org
- Thor Johnson, Competition Math Coach, Speyer: tjohnson@speyerlegacyschool.org
- Parent reference: Shanti Ifill, Board of Trustees, Speyer: shantiifill@livenation.com
- Parent reference: Elizabeth Styron, Head of Parents Association, Speyer: styron@gmail.com