Curriculum Vitae

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physics · vision science · computational neuroscience · psychedelics

PostDoc · Geisler vision lab · Center for Theoretical & Computational Neuroscience · The University of Texas at Austin

Researcher · Fonzo lab · Center for Psychedelic Research & Therapy · The University of Texas at Austin

2013-22 · PhD, Physics · Geisler lab · The University of Texas at Austin

2008-13 · BS-MS, Physics · Indian Institute of Science Education and Research, Kolkata

Research highlights · Google Scholar · ResearchGate

current · Understanding camouflage detection · with Dr Wilson Geisler · PhD Thesis · Vision Sciences Society (VSS) conference 2022, 2020, 2018 (talk) · Computational and Systems Neuroscience (COSYNE) conference 2018

current · Measuring psychedelic treatment with eye-tracking · with Dr Greg Fonzo · UT Austin Annual Psychology Graduate Research Showcase · poster & talk

2021 · A method to integrate and classify normal distributions · with Dr Geisler · Journal of Vision (cover article) · arXiv · VSS conference

2020 · Systematic errors in inferring strongly recurrent circuits from activity · with Ila Fiete · Nature Neuroscience · bioRxiv · Austin Conference on Learning and Memory · Gordon Research Conference: Neural circuits for perception, memory, thought and consciousness · COSYNE conference

2017 · Applying a variational autoencoder:

· for visual texture classification and synthesis · Junior Scientist Workshop on Machine Learning and Computer Vision, Janelia Research Campus · I presented a talk and coordinated a python workshop.

· for unsupervised latent variable extraction from mouse head-direction cell population recordings · with Dr Ila Fiete, dept. of Neuroscience, UT Austin.

2015 · Transient dynamics in the thermal ratchets transport model · with Dr Soumitro Banerjee · arXiv paper · MS thesis

2011 · Process time comparison between GPU and CPU · with Dr Robi Banerjee, University of Hamburg · with the DAAD (German Academic Exchange Service) scholarship · I benchmarked the use of CUDA for parallel computing on NVIDIA GPU's, for numerical astrophysics.

2010 · Perspective: the maths of seeing (book) · Lambert Academic Publishing, Germany · I wrote this book from high school through my first undergrad year, on mathematical/computational models of perspective projection in vision.

Programming highlights · Github · Arctic code vault contributor

2023 · Orientation Stats · open source · compute mean and sd of orientations with correct angle-wrapping.

2022 · Trace Contours · open source · trace sequential pixel coordinates of all contours in a binary image.

2022 · Colored Noise · open source · generate power-law coloured noise signals of any dimensions.

2021 · Center for Theoretical and Computational Neuroscience website · open source

2021 · Integrate and Classify Normal Distributions · open source

Integrate multinormal distributions in any dimensions with any parameters in any domain, compute pdf/cdf/inverse cdf of any function of a normal vector, and measures of classification performance among two or more multinormals, such as error matrix and sensitivity index.

2021 · Generalized chi-square distribution · open source · compute the statistics, pdf, cdf, inverse cdf and random numbers of the distribution.

2015-16 · Particle image velocimetry · open source · for the experimental study of internal waves in Dr Harry Swinney's fluid dynamics group.

Career highlights, teaching, outreach

2020-now · The Room of Lives podcast · I showcase people's lives and perspectives in conversations that touch on science, spirituality and mind · 93

episodes with 40 guests so far

2019 · Texas Prison Education Initiative · Taught meditation and UT-accredited math courses at Lockhart Women's prison

2018 · Invited talk at Trinity University: 'Making Sense of the Brain with Physics'

2017-18 · Radio show host · co-hosted UT student-run KVRX 91.7 FM show 'They Blinded Me with Science', that showcased grad student research.

2015-19 · Organized Molotov Seminar (104 talks by 89 speakers), a weekly series of open talks by anyone, for anyone, on anything, at UT Austin · News coverage articles 1, 2, 3

2015-16 · Assistant Instructor and Head Teaching Assistant, UT Austin · as Assistant Instructor, I taught an undergrad electromagnetism course. As Head Teaching Assistant of engineering physics lab, I instructed and oversaw all other graduate TA's.

2013 · IISER Kolkata Gold Medal of Excellence from state governor M.K. Narayanan, for academics and extracurriculars during BS-MS.

2012 · Invited as instructor for the National Centre for Radio Astrophysics & Inter-University Centre for Astronomy and Astrophysics Radio Astronomy Winter School in India · I coordinated experiments, gave a talk, and analyzed galactic neutral hydrogen data from the Giant Metrewave Radio Telescope, with Dr Subhashis Roy.

2011-12 · DAAD (German Academic Exchange Service) Young Ambassador to India · elected in 2011, re-elected in 2012. I promoted German education programs and scholarships by writing online, organizing seminars, and helped applicants with scholarship, program and visa questions.

2010 · NCRA-IUCAA Radio Astronomy Winter School, India · voted best of seven teams in experiments, seminar and poster.

2008-9 · Received the C.N.R. Rao Foundation Prize for achieving institute rank 1 in both semesters 1 and 2 at IISER Kolkata.

Talks

2022 · Open your Science and be More Seen · Big Data in Neuroscience Workshop

2017 · Unsupervised latent variable extraction from head-direction cells using a variational autoencoder

2016 · Noise correlations in neural systems

2015, 13, 12 · Telling right from left: the misleading handedness of electrodynamics

2012 · Web Design: HTML · CSS · Javascript

2012 · Diffusion-limited aggregation

2009 · DNA double helix: a mathematical approach to the physical structure

2008 · Cellular Automata

Technical articles

2017 · Depth estimation from stereo image pairs · Matlab code

2015 · Training neural networks with genetic algorithms (R)

2014-15 · Calculating the Lyapunov exponent of: time series (python) · logistic map (Mathematica)

2014 · Multivariate random-walk Metropolis sampling (R)

2014 · Partners meet halfway: a simple correlation study of an undergrad lab class

2013 · A/B and Rh antigens in blood types: a statistical test of independence among IISER Kolkata students

2012 · Locating numbers inside bisected interval sequences (python)

2011 · Chaos in the brain (Matlab)

2011 · Simulating evolution and behaviour (python)

References

Dr Wilson Geisler · PhD & PostDoc advisor · Center for Theoretical & Computational Neuroscience, UT Austin · w.geisler@utexas.edu

Dr Greg Fonzo · research supervisor · Center for Psychedelic Research & Therapy, UT Austin · gfonzo@austin.utexas.edu

Dr Soumitro Banerjee · Masters thesis advisor · depts. of mathematics & physics, IISER Kolkata · soumitro@iiserkol.ac.in