

ARCHAN RAY

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EDUCATION

- University of Massachusetts, Amherst MA.** Ph.D. in Computer Science. May 2024
Thesis: Sublinear Algorithms for Matrices: Theory and Applications. *Advised by* [Cameron Musco](#)
- Indian Statistical Institute, Kolkata.** M.Tech. in Computer Science. July 2015
Thesis: Estimation of Facial Emotions for Emotion Synthesis. *Advised by* [Dipti Prasad Mukherjee](#)
- Jalpaiguri Government Engineering College, West Bengal.** B.Tech. in Computer Science. June 2013

RESEARCH EXPERIENCE

- Graduate Research Assistant, University of Massachusetts, Amherst, MA** May 2017 - June 2024
- Compared sublinear matrix-vector query methods for eigenvalue approximation (in preparation). *Sublinear Algorithms*.
 - Approximated symmetric matrices in their spectral norm using deterministic algorithms. Applications include PSD testing, singular value and singular vector approximations (in ITCS 2024 [[link to arxiv](#)]). *Sublinear Algorithms*.
 - Approximated all eigenvalues of symmetric matrices using random sampling (extended abstract in ICALP 2023 and full paper in Algorithmica 2024 [[link to arxiv](#)]). *Sublinear Algorithms, Randomized Algorithms*.
 - Approximated matrices, with applications to real world datasets arising in NLP (in AAAI 2022 [[link to arxiv](#)]). *Sublinear Algorithms, NLP*.
 - Created a database of annotated historical maps. Detect and recognize texts in historical maps (published as technical reports [[link to tech report 1](#)], [[link to tech report 2](#)]). *Computer Vision*.
- Visiting Research Scholar, Indian Statistical Institute, Kolkata, India** August 2015 - August 2016
- Designed an algorithm to detect and recognize objects from planogram images (in ECCV 2018 [[link to paper](#)]), patented in 2020 [[link to patent](#)]). *Computer Vision, Graph Theory*.

WORK EXPERIENCE

- Applied Research Scientist, JPMorgan Chase, New York, NY** September 2024 - *present*
- I design quantum-inspired and machine learning algorithms. *NLA, Randomized Methods, Optimization, Quantum*
- Postdoctoral Research Scholar, Sloan Kettering Institute, New York, NY** Summer 2024
- Designed algorithms for matrix approximation with applications in clinical data. *NLA, Randomized Methods, Optimization*
- Applied Research Intern, Amazon Web Services, New York, NY** Summers 2019, 2020
- Designed an algorithm for pseudo semi-supervised learning for short texts. *Unsupervised Learning, NLP*.
 - Designed an algorithm for visual question answering using transformer architecture. *Computer Vision, NLP*.
- Research Intern, TCS Innovation Labs, Gurgaon, India** Summer 2014
- Designed an algorithm for classification of images of human faces with emotions. *Computer Vision, SVMs*.
- Research Intern, Indian Space Research Organization (RRSC-E), Kolkata, India** Summer 2012
- Designed an algorithm to identify distinct signals in a hyperspectral image. *Game Theory, Signal Processing*

LEADERSHIP EXPERIENCES

- University of Massachusetts, Amherst MA** August 2016 - May 2024
- **Graduate Teaching Assistant.** Representing, Storing, and Retrieving Information (CS145), *Spring '21*; Algorithms for Data Science (CS514), *Spring '20*; Graduate Computer Vision (CS670), *Fall '19*; Graduate Machine Learning (CS589), *Spring '19*; Graduate Machine Learning (CS589), *Spring '17*; Introduction to Algorithms (CS311), *Fall '16*.
 - **Mentor.** CARE PhD Application Support Program; Undergraduate Research Volunteers; Masters students at the Computer Vision Lab.
 - **Co-organizing/Stewardship.** Machine Learning and Friends Lunch at UMass; Graduate Employee Organisation.

TECHNICAL STRENGTHS

Computer Languages & Tools Python (Over 15000 LOC), C; Matlab[®], PyTorch, Tensorflow, LibSVM.

HONORS AND ACHIEVEMENTS

Dissertation Writing Fellowship Award, Manning College of Information and Computer Sciences, University of Massachusetts Amherst Spring 2023

AAAI-22 Student Scholarship, 36th AAI Conference on Artificial Intelligence January 2022

Best Dissertation in M.Tech. Computer Science, Indian Statistical Institute, Kolkata July 2015