

APARAJITA KHAN

Assistant Professor
Department of Computer Science and Engineering
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RESEARCH INTERESTS

- **Methodological Areas:** Machine Learning, Artificial Intelligence, Multi-View Learning, Subspace and Spectral Clustering, Dimensionality Reduction, Graph Learning, Manifold Optimization.
- **Application Areas:**
 - **Cancer Epidemiology:** Medical Natural Language Processing, Electronic Health Record Analysis, Risk Prediction Modelling, Lung Cancer Surveillance Studies.
 - **Cancer Genomics:** Multi-Omics Integration, Single-cell Transcriptomics, Chromosomal Aneuploidy Analysis, Brain Metastasis Studies.

WORK EXPERIENCE

- 11 February 2022 – 23 March 2024**
Postdoctoral Scholar, Department of Neurosurgery
Quantitative Sciences Unit, Department of Medicine
Stanford University, Stanford, California, USA
PI: [Dr. Summer S. Han](#) and Co-PI: [Prof. Hanlee P. Ji](#)
- 17 December 2021 - 9 February 2022**
Visiting Scientist, Machine Intelligence Unit
Indian Statistical Institute, Kolkata, India
PI: [Prof. Pradipta Maji](#)
- 19 December 2013 - 30 June 2015**
Project Fellow, Department of Computer Science and Engineering
Jadavpur University, Kolkata, India
Project: *Case Based Reasoning in Signature Authentication to Prevent Transactions*, funded by University Grants Commission
PI: [Dr. Chitrita Chaudhuri](#)

ACADEMIC TRAINING

- 2015-2021
Ph.D. in Computer Science - **Indian Statistical Institute**, Kolkata, India
Dissertation: *Integrative Clustering of Multi-View Data: Subspace Clustering, Graph Approximation to Manifold Learning*
Advisor: [Prof. Pradipta Maji](#)
Thesis defense: **19 November 2021**
Ph.D Coursework Marks (Best 5): **92%**
Relevant courses: Automata, Languages and Computation; Advanced Pattern Recognition; Discrete Mathematics; Design and Analysis of Algorithms

- 2012-2015 Master of Technology in Computer Technology - **Jadavpur University**, Kolkata, India
Specialization: Pattern Recognition and Bioinformatics
Thesis: **Gene Clustering and Construction of Intra-Cluster Gene Regulatory Network**
Advisor: [Prof. Mita Nasipuri](#)
CGPA: **9.45/10** [Marks: **89.05%**], First Class
Gold Medalist
Relevant courses: Theory of Computation; Advanced Operating Systems;
Computational Biology and Bioinformatics; Image Processing
- 2008-2012 Bachelor of Engineering – **University of Burdwan**, Burdwan, West Bengal, India
Computer Science & Engineering
Marks: **86.2%**, First Class with Honours
Relevant courses: Data Structures and Algorithms; Graph Theory;
Formal Languages and Automata Theory; Artificial Intelligence
- 2008 Higher Secondary Examination (12th Class), CBSE
Marks: **87.8%**, First Division
Courses: Mathematics, Computer Science, Physics, Chemistry, English
- 2006 Secondary Examination (10th Class), CBSE
Marks: **88.2%**, First Division
Courses: Mathematics, Science & Technology, Social Science, English, Bengali

AWARDS AND RECOGNITION

1. **University Gold Medal** from **Jadavpur University**, India, for standing First in Master of Technology in Computer Technology, 2015.
2. **Best Paper Award** in 3rd **International Conference on Computational Intelligence and Networks** (CINE 2017), Bhubaneswar, India, October 2017.
3. **First Prize** in Tenth **IDRBT Doctoral Colloquium** for the paper entitled “*Joint Eigenspace Approximation for Integrative Clustering of Multi-Omics Data*”, December 07-08, 2020.
4. **Reviewers’ Choice Abstract** in **American Society for Human Genetics Annual Meeting** (ASHG 2022), Los Angeles, California, USA, October 25-29, 2022.
5. **Nominee for Indian Science Congress Association Young Scientist Award**, 2023 in the section of Information and Communication Science & Technology, RTM Nagpur University, Nagpur, India, January 3-7, 2023.
6. **People’s Choice Award**, in **Metastasis Network Annual Meeting 2023**, New York University, New York, USA, October 10-11, 2023.

PUBLICATIONS

TOTAL: 15 (JOURNALS: 7 CONFERENCES: 4 POSTERS: 4)

• CITATIONS: 140 • h - Index: 5 • i10 - Index: 4 • Aggregated Impact Factor: 55.6
Source: Google scholar <https://scholar.google.com/citations?user=2c-EW9oAAAAJ>

PEER REVIEWED JOURNALS

1. **A. Khan** and P. Maji. “*Approximate Graph Laplacians for Multimodal Data Clustering*”. **IEEE Transactions on Pattern Analysis and Machine Intelligence**, 43(3): 798-813, Mar 2021.
DOI: [10.1109/TPAMI.2019.2945574](https://doi.org/10.1109/TPAMI.2019.2945574) (IF: 23.6, Citations: 38).
2. **A. Khan** and P. Maji. “*Multi-Manifold Optimization for Multi-View Subspace Clustering*”. **IEEE Transactions on Neural Networks and Learning Systems**, 33(8): 3895-3907, Aug 2022.
DOI: [10.1109/TNNLS.2021.3054789](https://doi.org/10.1109/TNNLS.2021.3054789) (IF: 10.4, Citations: 37).
3. **A. Khan** and P. Maji. “*Selective Update of Relevant Eigenspaces for Integrative Clustering of Multimodal Data*”. **IEEE Transactions on Cybernetics**, 52(2): 947-959, Feb 2022. DOI: [10.1109/TCYB.2020.2990112](https://doi.org/10.1109/TCYB.2020.2990112) (IF: 11.8, Citations: 5).

4. **A. Khan** and P. Maji. “*Low-Rank Joint Subspace Construction for Cancer Subtype Discovery*”. **IEEE/ACM Transactions on Computational Biology and Bioinformatics**, 17(4): 1290-1302, Aug 2020. DOI: [10.1109/TCBB.2019.2894635](https://doi.org/10.1109/TCBB.2019.2894635) (IF: 4.5, Citations: 3).
5. L. Wingfield, A. Salaun, **A. Khan**, H. Webb, T. Zhu, and S. Knight, "Clinical decision support systems used in transplantation: are they tools for success or an unnecessary gadget? A systematic review", **Transplantation**, 108(1): 72-99, May 2023. DOI: [10.1097/TP.0000000000004627](https://doi.org/10.1097/TP.0000000000004627) (IF: 5.3).
6. S. Bhattacharyya, **A. Khan**, I. Banerjee, and G. Sanyal, “A Robust Image Steganography Method Using PMM in Bit Plane Domain”, **International Journal of Computer and Information Engineering**, 8(9): 1712-1726, 2014. DOI: doi.org/10.5281/zenodo.1337857 (Citations: 5).
7. S. Bhattacharyya, **A. Khan**, and G. Sanyal, “DCT Difference Modulation(DCTDM) Image Steganography”, **International Journal of Information and Network Security**, 3(1): 40-63, 2014. [Link](#) (Citations: 12).

INTERNATIONAL CONFERENCES

ORAL PRESENTATIONS & FULL-LENGTH PAPERS

1. **A. Khan** and P. Maji, “Principal Subspace Updation for Integrative Clustering of Multimodal Omics Data”, in Proc. Third **International Conference on Computational Intelligence and Networks (CINE)**, Bhubaneswar, India, 2017, pp. 99-104. DOI: [10.1109/CINE.2017.14](https://doi.org/10.1109/CINE.2017.14). [Best Paper Award]
2. P. K. Singh, **A. Khan**, R. Sarkar and M. Nasipuri, "A Texture Based Approach to Word-Level Script Identification from Multi-script Handwritten Documents", in Proc. **International Conference on Computational Intelligence and Communication Networks**, Bhopal, India, 2014, pp. 228-232, DOI: [10.1109/CICN.2014.60](https://doi.org/10.1109/CICN.2014.60) (Citations: 8).
3. C. Chaudhuri, A. Chaudhuri and **A. Khan**, "Authentication of Offline Signatures Based on Central Tendency of Features and Dynamic Time Warping Values Preserved for Genuine Cases", in Proc. Fourth **International Conference of Emerging Applications of Information Technology**, Kolkata, India, 2014, pp. 256-261, DOI: [10.1109/EAIT.2014.38](https://doi.org/10.1109/EAIT.2014.38) (Citations: 1).
4. S. Bhattacharyya, **A. Khan**, A. Nandi, A. Dasmalakar, S. Roy and G. Sanyal, "Pixel mapping method (PMM) based bit plane complexity segmentation (BPCS) steganography", in Proc. **World Congress on Information and Communication Technologies**, Mumbai, India, 2011, pp. 36-41. DOI: [10.1109/WICT.2011.6141214](https://doi.org/10.1109/WICT.2011.6141214) (Citations: 31).

POSTER PRESENTATIONS

1. **A. Khan**, A. Sathe, R. Meka, S. Grimes, H. Lee, C. Petrisch, H. Vogel, M. H. Gephart, S. Han, H. Ji, “Distinct Genetic Alterations Driving Aggressive Brain Metastasis in Colorectal Cancer”, Presented at the **Metastasis Network Annual Meeting** October 10-11, 2023, New York University, New York, USA. [People’s Choice Award]
2. **A. Khan**, J. Wu, E. Choi, A. Graber-Naidich, S. Henry, H. A. Wakelee, A. W. Kurian, S. Liang, A. Leung, C. Langlotz, L. M. Backhus, and S. Han, “A Hybrid Modelling Approach for Abstracting CT Imaging Indications by Integrating Natural Language Processing from Radiology Reports with Structured Data from Electronic Health Records”, in Proc. **AACR Special Conference: Precision Prevention, Early Detection, and Interception of Cancer**, AACR Cancer Prevention Research 2023, vol 16, no.1_Supplement, November 17-19, 2022, Austin, Texas, USA. DOI: [10.1158/1940-6215.PrecPrev22-P068](https://doi.org/10.1158/1940-6215.PrecPrev22-P068) (Citations: 1).
3. **A. Khan**, A. Sathe, J. T. Wu, R. J. Huang, M. R. Amieva, R. Tibshirani, M. H. Gephart, H. Ji, and S. Han, “Simultaneous dimensionality reduction and cell-type annotation of single-cell RNA-seq data using marker enriched uniform manifold and projection”. Presented at the **American Society for Human Genetics Annual Meeting** 2022, October 25-29, 2022, page 2252, Los Angeles, California, USA. [Reviewers’ Choice Abstract] [Link](#)
4. L. Wingfield, A. Salaun, **A. Khan**, T. Zhu, S. Knight, “Clinical decision support systems in transplantation: are they helpful or a hindrance in patient care? A systematic review”. Presented at **British Transplant Society NHSBT Joint Congress 2023**, March 1-3, 2023, Edinburgh, UK. [Link](#)

UNDER REVIEW

- **A. Khan** and P. Maji, “Grassmann Learning with Graph Optimization for Multi-View Integrative Clustering”, **IEEE Transactions on Emerging Topics in Computational Intelligence**, Revision submitted April 2024.

- **A. Khan**, J. Wu, C. Su, J. Corrigan, R. Terashima, M. Chang, E. Rodriguez, C. J Shin, A. R. Shah, R. Kaushik, A. Kurian, H. Wakelee, C. Langlotz, L. Backhus, M. Kelley, N. Fillmore, S. Han, “*Automatic identification of brain metastasis development in patients with lung cancer using natural language processing*”, **AMIA Annual Symposium 2024**, March 2024.
- **A. Khan**, E. Choi, C. Su, A. Graber-Naidich, S. Henry, A. W. Kurian, S. Liang, J. Neal, M. Desai, A. Leung, H. A. Wakelee, L. M. Backhus, C. Langlotz, J. Wu, and S. Han, “*Automatic Abstraction of CT Imaging Indication using Natural Language Processing for Evaluation of Surveillance Patterns in Long-Term Lung Cancer Survivors*”, **JAMA Oncology**, February 2024.
- J. Wu, J. Corrigan, C. Su, C. Dumontier, J. La, **A. Khan**, S. Arya, A. Harris, L. Backhus, M. Das, N. Do, M. Brophy, S. Han, M. Kelley, N. Fillmore. “*The Performance Status Gap in Immunotherapy for Frail Patients with Advanced Non-Small Cell Lung Cancer*”. **Journal of Thoracic Oncology**, December 2023.

ACADEMIC SERVICES

1. **Organizer and speaker for Invited Session** “*Unveiling EHR Insights via Natural Language Processing: Informing Policy and Fostering Collaboration*” at **Joint Statistical Meetings JSM 2024**, August 3-8, 2024, Portland, Oregon, USA. [Proposal Accepted, Upcoming]
2. **Organizer and speaker for Topic Contributed Session** “*Recent Developments of Novel Statistical Methods of Analyzing Single-Cell Genomic Data for Precision Medicine and Public Health*” at **Joint Statistical Meetings JSM 2023**, August 5-10, 2023, Ontario, Canada.
3. **Data Manager** for **Stanford Brain Metastasis Consortium** in NIH/NCI funded project “*Deconvolution and interruption of the cancer-neuro-immune axis facilitating brain metastases*”, PI: **Melanie Hayden Gephart**, Department of Neurosurgery, Stanford University, April 2022 -Present.
4. **Technical Review Committee member** of 10th International Conference on Pattern Recognition and Machine Intelligence (PREMI’23), December 12 - 15, 2023, Maharashtra, India.
5. **Member of Trainee Working Group** of **NIH/NCI Metastasis Network** and **MetNet Trainee Events Planning Committee** of MetNet Annual Meeting 2023, USA, March 2023-Present.
6. **Technical Committee member** of International Conference on Intelligent Systems and Human Machine Collaboration (ICISHMC 2022), July 8 - 9, 2022, Maharashtra, India.
7. **Organizer** for “*Workshop on Mathematical and Statistical Foundations for Machine Learning Today*” under **ACM India Student Chapter, Indian Statistical Institute**, December 20 - 22, 2016, Kolkata, India.

TEACHING AND MENTORING

1. **Co-mentor** of Bowen Jiang, pursuing MS in Biomedical Informatics, **Stanford University**, in his master’s thesis on *Cell type-specific transcriptomic landscape analysis of lung cancer tumor microenvironment in never smokers*, October 2022-Present.
2. **Teaching Assistant** in **Data and File Structures Laboratory** for MTech (CS) course, offered by Prof. Mandar Mitra, **Indian Statistical Institute**, July-December, 2018.
3. **Teaching Assistant** in **Computer Graphics Laboratory** for Master of Computer Applications (MCA) course, offered by Dr. Chitrita Chaudhury, **Jadavpur University**, July-December, 2014.
4. **Assisted in mentoring** three **MCA Dissertations** with **Dr. Chitrita Chaudhuri** on *Hand-written signature authentication using case-based reasoning*, **Jadavpur University**, January 2014 - June 2015.

TALKS AND SEMINARS

INVITED

1. Title: “*Multi-View Learning Methodologies to Improve Cancer Outcomes Through Integrative Genomics and Medical Natural Language Processing*”, in IEEE EMBS Lecture, **Indian Institute of Technology Kharagpur**, Kharagpur, India, 26 July 2023.

2. Titles: “*Cellular, Genomic, and Molecular Features of Brain Metastases*” and “*Resource and Data Management for Stanford Brain Metastasis Consortium*” in National Institutes of Health Site Visit for Stanford MetNet Center, **Stanford University School of Medicine**, Stanford, USA, 14 April 2023.
3. Title: “*Integrative Clustering of Multi-View Data on Adaptively Weighted Joint Eigenspace*”, in ISCA Young Scientist Award Programme, **RTM Nagpur University**, Nagpur, India, 4 January 2023.
4. Title: “*Graph Approximation and Manifold Optimization for Multi-View Data Clustering*”, Hongmin Cai Lab, School of Computer Science and Engineering, **South China University of Technology**, Guangdong, China, 29 July 2022.
5. Title: “*Integrative Multi-Omics for Cancer Stratification and Single Cell Immunogenomics*” International Conference on Intelligent Systems and Human Machine Collaboration, **K. C. College of Engineering and Management Studies and Research**, Maharashtra, India, 9 July 2022.
6. Title: “*Spectral Clustering and its Application in R*”, in One Week Online Workshop on Statistics and Machine Learning in Practice at Department of Statistics, **Brahmananda Keshab Chandra College**, Kolkata, India, July 29, 2020.

CONTRIBUTED

7. Title: “*Simultaneous dimensionality reduction and cell-type annotation of single-cell RNA-seq data using marker enriched uniform manifold and projection*”, in **Joint Statistical Meetings**, Ontario, Canada, 09 August 2023.
8. Title: “*Basics of Machine Learning and Regression Analysis*”, in Winter School on Deep Learning: From Perceptrons to Transformers, Electronics and Communication Sciences Unit, **Indian Statistical Institute**, Kolkata, India, 28 January 2022.
9. Title: “*Supervised Feature Selection, Principal Component Analysis, and Linear Discriminant Analysis*”, in Short Term Course on Machine Learning for Practitioners at **Indian Statistical Institute**, Kolkata, India, November 19, 2019.
10. Title: “*Low-Rank Joint Subspace Construction for Multimodal Data Clustering*”, in Lightning Talk session in memory of Professor C. A. Murthy, at Machine Intelligence Unit, **Indian Statistical Institute**, Kolkata, India, March 14, 2019.

RESEARCH COURSES

1. Machine Learning

Instructor: Dr. **Andrew Ng**, Department of Computer Science, Stanford University

2. Single-cell Immunogenomics

Instructor: Prof. **Hanlee P. Ji**, Division of Oncology, Department of Medicine, Stanford University

JOURNAL PEER REVIEW ACTIVITIES

Total journal article reviews: **32**

- IEEE Transactions on Pattern Analysis and Machine Intelligence
- IEEE Transactions on Neural Networks and Learning Systems
- IEEE Transactions on Cybernetics
- IEEE Transactions on Systems, Man and Cybernetics: Systems
- IEEE Transactions on Knowledge and Data Engineering
- IEEE/ACM Transactions on Computational Biology and Bioinformatics
- IEEE Journal of Biomedical and Health Informatics
- Molecular Carcinogenesis

PROFESSIONAL MEMBERSHIPS

- American Statistical Association (**ASA**), May 2023 - Present.
- American Association for Cancer Research (**AACR**), January 2023 - Present.
- American Society for Human Genetics (**ASHG**), June 2022 - Present.
- Indian Science Congress Association (**ISCA**), August 2018 - Present.


TECHNICAL SKILLS

- Programming: R, Bioconductor, Matlab, Python, Scikit-learn, L^AT_EX
- Bioinformatics Tools and Repositories: [GDC](#), [TCGA](#), [cBioPortal](#), [GEO](#), [Seurat](#), [Cytoscape](#)
- Infographics: [BioRender](#)

ADDITIONAL INFORMATION

- **Date of Birth:** 11 July 1990
- Mother: Monidipa Khan Father: Giridhari Khan Spouse: Dr. Abir Ghosh
- Languages: English, Hindi, Bengali
- Gender: Female
- Nationality: Indian Ethnicity: South Asian

Date: May 1, 2024


APARAJITA KHAN
Place: Roorkee, India