

# Anirban Chakraborty

<https://anirbanchakraborty.github.io>

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CONTACT INFORMATION	Assistant Professor Dept. of Computational and Data Sciences Indian Institute of Science, Bangalore 560012	Office: CDS 205 Phone: +91-9073108710 Email: anirban@iisc.ac.in
DATE OF BIRTH	01 July, 1985	
RESEARCH INTERESTS	I am interested in Computer Vision, Machine Learning and their applications to real-world problems. My recent research has focused on data-efficient and privacy-preserving deep learning, perceiving humans and their actions and learning across modalities and domains.	
EDUCATION	<b>University of California, Riverside, CA, USA</b>	
	Ph.D., Electrical Engineering	Aug 2014
	<ul style="list-style-type: none"><li>• Thesis Title: <i>Exploration of Contextual Relationships for Robust Video Analysis: Applications in Camera Networks, Bio-image Analysis and Activity Forecasting.</i></li><li>• Advisor: Dr. Amit K. Roy-Chowdhury</li></ul>	
	M.S., Electrical Engineering, GPA: 4.0/4.0	Dec 2010
	<ul style="list-style-type: none"><li>• Specialization: <i>Intelligent Systems</i></li></ul>	
	<b>Jadavpur University, India</b>	
	B.E., Electrical Engineering, GPA: 8.7/10	Jun 2007
	<b>West Bengal Council of Higher Secondary Education, India</b>	
	Higher Secondary (H.S.) Examination, Science Stream, 92.9%	2003
	<b>West Bengal Board of Secondary Education, India</b>	
	Madhyamik Pariksha (10 <sup>th</sup> ), 87.125%	2001
RESEARCH AND WORK EXPERIENCES	<b>Assistant Professor</b>	Jun 2017 to Present
	Department of Computational and Data Sciences (CDS) Indian Institute of Science, Bangalore, India	
	<ul style="list-style-type: none"><li>• Leading the Visual Computing Lab (VCL) at CDS, Indian Institute of Science.</li></ul>	
	<b>Researcher</b>	Dec 2016 to Jun 2017
	Research and Technology Center (RTC), India Robert Bosch Corporate Research Bangalore, India	
	<ul style="list-style-type: none"><li>• As a researcher in the computer vision group at Robert Bosch RTC India, the primary responsibilities were to explore visual analytics problems in relation to Bosch products and business units including automotive, health care, consumer electronics and IoT platforms, to provide innovative solutions and to develop prototypes that can be further translated and integrated into Bosch products/solutions.</li></ul>	

- Research Fellow** Nov 2015 to Dec 2016
- Rapid-Rich Object Search (ROSE) Lab  
 School of Electrical and Electronic Engineering,  
 Nanyang Technological University, Singapore  
 Supervisors: Dr. Dennis Sng, Dr. Junsong Yuan
- Involved in developing deployable computer vision systems for large scale multi-camera video surveillance in collaboration with industrial partners. Research and development problems include person re-identification in real-world camera networks, multi-camera object detection and tracking in crowded scenes, fast anomaly detection and activity forecasting from streaming video data etc.
- Post-doctoral Research Fellow** Oct 2014 to Nov 2015
- Clinical Imaging Research Centre  
 Department of Diagnostic Radiology,  
 National University of Singapore  
 Supervisors: Dr. David Townsend and Dr. John Totman
- Developed automated image analysis pipeline for segmentation and estimation of trabecular bone volume fraction from MR and micro-CT images. Also established an automated pipeline to quantify adipose tissue from whole body VIBE Dixon MRI.
- Graduate Student Researcher** Sep 2009 to Aug 2014
- Department of Electrical and Computer Engineering,  
 University of California, Riverside  
 Supervisor: Dr. Amit K. Roy-Chowdhury
- Introduced the idea of network consistency to data association problems and proposed a rigorous mathematical framework. Showed its application in problems such as person re-identification, spatio-temporal tracking of biological cells etc.
  - Developed a novel image analysis pipeline for high throughput analysis of (3D+t) confocal image stacks of plant meristems. Made fundamental contributions to all components of such a pipeline, viz. image registration, segmentation, spatio-temporal cell tracking and cell resolution 3D reconstruction.
  - Investigated the effect of spatio-temporal interrelationships between objects, actions and scene in relation to the human activity recognition and forecasting problems.
- Visiting Student Researcher** Jun 2012 to Sep 2012
- Janelia Farm Research Campus,  
 Howard Hughes Medical Institute  
 Supervisor: Dr. Dmitri M. Chklovskii
- Worked in the ‘Fly EM’ project that aimed to reconstruct the entire *Drosophila* nervous system from EM image stacks. Developed novel techniques for improving the performance of agglomerative segmentation algorithms and contributed to the software library (GALA) containing the automated segmentation pipeline.
- Assistant Systems Engineer - Trainee** Sep 2007 to Jul 2008
- Tata Consultancy Services
- Implemented numerous database objects (in pL/SQL) for an Oracle 10g database as a part of a system-development project.
- Undergraduate Research** Jul 2006 to Jun 2007
- Jadavpur University
- Designed a system identification method to recognize different single phase converter classes using cross-correlation features of output voltage and current waveforms.

1. G. K. Nayak, R. Rawal, I. Khatri, **A. Chakraborty**, “Robust Few-shot Learning Without Using any Adversarial Samples”, *IEEE Transactions on Neural Networks and Learning Systems (T-NNLS)* (accepted, in press) [Core A\*].
2. V. Kumar<sup>†</sup>, H. Patil<sup>†</sup>, R. Lal, **A. Chakraborty**, “Improving Domain Adaptation Through Class Aware Frequency Transformation”, *International Journal of Computer Vision (IJCV)* (2023) 131(11):2888-2907 [Core A\*].
3. A. Tripathi, R. R. Dani, A. Mishra, **A. Chakraborty**, “Multimodal query-guided object localization”, *Multimedia Tools and Applications (MTAP)* (2023): 1-25.
4. G. K. Nayak, M. K. Reddy, S. Jain, **A. Chakraborty**, “Mining Data Impressions from Deep Models as Substitute for the Unavailable Training Data”, *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)* (2021) 44(11): 8465-8481 [Core A\*].
5. A. Lakshmi, **A. Chakraborty**, C. S. Thakur, “EvAn: Neuromorphic Event-Based Sparse Anomaly Detection”, *Frontiers in Neuroscience* 15 (2021): 853.
6. U. Shreemali, **A. Chakraborty**, “Robust Gait Based Human Identification on Incomplete and Multi-view Sequences”, *Multimedia Tools and Applications* (2020) 80(7): 10141-10166..
7. A. Majumder, R. Venkatesh Babu, **A. Chakraborty**, “PerSeg: Segmenting Salient Objects From Bag of Single Image Perturbations”, *Multimedia Tools and Applications* (2020) 79(3): 2473-2493.
8. K. L. Navaneet, R. K. Sarvadevabhatla, S. Shekhar, R. Venkatesh Babu, **A. Chakraborty**, “Operator-in-the-Loop Deep Sequential Multi-Camera Feature Fusion for Person Re-Identification”, *IEEE Transactions on Information Forensics and Security* (2019) 15: 2375-2385 [Core A].
9. A. Lakshmi, **A. Chakraborty**, C. S. Thakur, “Neuromorphic vision: From sensors to event-based algorithms”, *Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery* (2019) 9(4): p.e1310.
10. **A. Chakraborty**, B. Mandal, J. Yuan, “Person Re-identification Using Multiple Egocentric Views”, *IEEE Transactions on Circuits and Systems for Video Technology* (2017) 27(3):484-498.
11. K. Mkrtychyan, **A. Chakraborty**, A. K. Roy-Chowdhury, ‘Optimal Landmark Selection for Registration of 4D Confocal Image Stacks in Arabidopsis’, *IEEE/ACM Transactions on Computational Biology and Bioinformatics* (2017) 14(2):457-467.
12. **A. Chakraborty**, A. Das, A. K. Roy-Chowdhury, “Network Consistent Data Association”, *IEEE Transactions on Pattern Analysis and Machine Intelligence* (2016) 38(9):1859-1871 [Core A\*].
13. **A. Chakraborty**, A. K. Roy-Chowdhury, “Context Aware Spatio-temporal Cell Tracking In Densely Packed Multilayer Tissues”, *Medical Image Analysis* (2015) 19(1):149-163.
14. T. Parag, **A. Chakraborty**, S. Plaza, L. Scheffer, “A Context-Aware Delayed Agglomeration Framework for Electron Microscopy Segmentation”, *PLoS ONE* (2015) 10(5): e0125825.

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<sup>†</sup> Denotes equal contribution.

15. J. Nunez-Iglesias, R. Kennedy, S. M. Plaza, **A. Chakraborty**, W. T. Katz, “Graph-based Active Learning of Agglomeration (GALA): a Python library to segment 2D and 3D neuroimages”, *Frontiers in Neuroinformatics* (2014) 8(00034).
16. **A. Chakraborty**, M. M. Perales, G. V. Reddy, A. K. Roy-Chowdhury, “Adaptive Geometric Tessellation for 3D Reconstruction of Anisotropically Developing Cells in Multilayer Tissues from Sparse Volumetric Microscopy Images”, *PLoS ONE* (2013) 8(8): e67202.
17. M. Liu<sup>†</sup>, **A. Chakraborty**<sup>†</sup>, D. Singh, M. Gopi, R. Yadav, G.V. Reddy, A. K. Roy-Chowdhury, “Adaptive Cell Segmentation and Tracking for Volumetric Confocal Microscopy Images of A Developing Plant Meristem”, *Molecular Plant* (2011) 4(5): 922-931.

ARTICLES UNDER  
REVIEW IN  
JOURNALS

1. G. K. Nayak, I. Khatri, S. Randive, R. Rawal, **A. Chakraborty**, “DAD++: Improved Data-free Test Time Adversarial Defense”, *International Journal of Computer Vision (IJCV)* [Core A\*].

CONFERENCE  
PUBLICATIONS

1. A. Tripathi, A. Mishra, **A. Chakraborty**, “Query-guided Attention in Vision Transformers for Localizing Objects Using a Single Sketch”, *Winter Conference on Applications of Computer Vision (WACV)*, 2024 [Core A].
2. M. Yashwanth, G. K. Nayak, H. Rangwani, A. Singh, R. V. Babu, **A. Chakraborty**, “Minimizing Layerwise Activation Norm Improves Generalization in Federated Learning”, *Winter Conference on Applications of Computer Vision (WACV)*, 2024 [Core A].
3. A. Tripathi, R. Singh, **A. Chakraborty**, P. Shenoy, “Edges to Shapes to Concepts: Adversarial Augmentation for Robust Vision”, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023 [Core A\*].
4. A. Tripathi, A. Mishra, **A. Chakraborty**, “Grounding Scene Graphs on Natural Images via Visio-Lingual Message Passing”, *Winter Conference on Applications of Computer Vision (WACV)*, 2023 [Core A].
5. V. Kumar<sup>†</sup>, R. Lal<sup>†</sup>, H. Patil, **A. Chakraborty**, “CoNMix for Source-free Single and Multi-target Domain Adaptation”, *Winter Conference on Applications of Computer Vision (WACV)*, 2023 [Core A].
6. G. K. Nayak<sup>†</sup>, R. Rawal<sup>†</sup>, **A. Chakraborty**, “DE-CROP: Data-efficient Certified Robustness for Pretrained Classifiers”, *Winter Conference on Applications of Computer Vision (WACV)*, 2023 [Core A].
7. J. N. Kundu, S. Seth, Y. M. Pradyumna, V. Jampani, **A. Chakraborty**, R. Venkatesh Babu, “Uncertainty-Aware Adaptation for Self-Supervised 3D Human Pose Estimation”, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022 [Core A\*].
8. G. K. Nayak<sup>†</sup>, R. Rawal<sup>†</sup>, **A. Chakraborty**, “DAD: Data-free Adversarial Defense at Test Time”, *Winter Conference on Applications of Computer Vision (WACV)*, 2022 [Core A].
9. G. K. Nayak<sup>†</sup>, R. Rawal<sup>†</sup>, R. Lal<sup>†</sup>, H. Patil, **A. Chakraborty**, “Holistic Approach to Measure Sample-level Adversarial Vulnerability and its Utility in Building Trustworthy Systems”, *Computer Vision and Pattern Recognition Workshop (CVPR-W)*, 2022.

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<sup>†</sup> Denotes equal contribution.

10. C. Jambigi, U. Masud, **A. Chakraborty**, “G-PreDICT: Generalizable Person Re-ID using Domain Invariant Contrastive Techniques”, *Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP)*, 2022 (Oral).
11. J. N. Kundu, S. Seth, A. Jamkhandi, Y. M. Pradyumna, V. Jampani, **A. Chakraborty**, R. Venkatesh Babu, “Non-local Latent Relation Distillation for Self-Adaptive 3D Human Pose Estimation”, *Advances in Neural Information Processing Systems (NeurIPS)*, 2021 [Core A\*].
12. G. K. Nayak<sup>†</sup>, M. K. Reddy<sup>†</sup>, **A. Chakraborty**, “Effectiveness of Arbitrary Transfer Sets for Data Free Knowledge Distillation”, *Winter Conference on Applications of Computer Vision (WACV)*, 2021 [Core A].
13. C. Jambigi<sup>†</sup>, R. Rawal<sup>†</sup>, **A. Chakraborty**, “MMD-ReID: A Simple but Effective Solution for Visible-Thermal Person ReID”, *British Machine Vision Conference (BMVC)*, 2021 (Oral, 3.32%) [Core A].
14. S. Seth, A. Sonth, **A. Chakraborty**, “Pose Transformation and Radial Distance Clustering for Unsupervised Person Re-identification”, *British Machine Vision Conference (BMVC)*, 2021 [Core A].
15. G. K. Nayak<sup>†</sup>, H. Shah<sup>†</sup>, **A. Chakraborty**, “Incremental Learning for Animal Pose Estimation using RBF k-DPP”, *British Machine Vision Conference (BMVC)*, 2021 [Core A].
16. G. K. Nayak<sup>†</sup>, M. Keswani<sup>†</sup>, S. Seshadri, **A. Chakraborty**, “Beyond Classification: Knowledge Distillation using Multi-Object Impressions”, *British Machine Vision Conference (BMVC)*, 2021 [Core A].
17. V. Vinod, K. Ram Prabhakar, R. Venkatesh Babu, **A. Chakraborty**, “Multi-Domain Conditional Image Translation: Translating Driving Datasets from Clear-Weather to Adverse Conditions”, *International Conference on Computer Vision Workshops (ICCV-W)*, 2021.
18. V. Kumar, S. Srivastava<sup>†</sup>, R. Lal<sup>†</sup>, **A. Chakraborty**, “CAFT: Class Aware Frequency Transform for Reducing Domain Gap”, *International Conference on Computer Vision Workshops (ICCV-W)*, 2021.
19. Y. Bethi, S. Narayanan, V. Rangan, **A. Chakraborty**, C. S. Thakur, “Real-Time Object Detection and Localization in Compressive Sensed Video”, *International Conference on Image Processing (ICIP)*, 2021.
20. N. Choubey, A. Verma, **A. Chakraborty**, “Automated Crowd Parameter Estimation and Crowd Movement Analysis in Kumbh Mela”, *Proceedings of the Sixth International Conference of Transportation Research Group of India (CTRG)*, 2021.
21. S. Srivastava, B. Mandal, **A. Chakraborty**, “HFCER: Hybrid Fusion for Cultural Event Recognition in Images”, *International Conference of Pattern Recognition Systems (ICPRS)*, 2021.
22. N. Choubey, A. K. Prajapati, A. Verma, **A. Chakraborty**, “Density Estimation of Heterogeneous Crowd in Mass Religious Gatherings Using Image Processing and Denoising Filter”, *Soft Computing for Problem Solving (SocProS), Advances in Intelligent Systems and Computing*, 2021.
23. A. Tripathi, R. R. Dani, A. Mishra, **A. Chakraborty**, “Sketch-Guided Object Localization in Natural Images”, *European Conference on Computer Vision (ECCV)*, 2020 (Spotlight, 5%) [Core A\*].

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<sup>†</sup> Denotes equal contribution.

24. J. N. Kundu<sup>†</sup>, S. Seth<sup>†</sup>, V. Jampani, R. Mugalodi, R. Venkatesh Babu, **A. Chakraborty**, “Self-Supervised 3D Human Pose Estimation Via Part Guided Novel Image Synthesis”, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020 (Oral, 5.7%) [Core A\*].
25. J. N. Kundu<sup>†</sup>, S. Seth<sup>†</sup>, R. M. Venkatesh<sup>†</sup>, R. Mugalodi, R. Venkatesh Babu, **A. Chakraborty**, “Kinematic-Structure-Preserved Representation for Unsupervised 3D Human Pose Estimation”, *Conference of the American Association for Artificial Intelligence (AAAI)*, 2020 (Oral, 4.5%) [Core A\*].
26. S. Addepalli, G. K. Nayak, **A. Chakraborty**, R. Venkatesh Babu, “DeGAN : Data-enriching GAN for retrieving Representative Samples from a Trained Classifier”, *Conference of the American Association for Artificial Intelligence (AAAI)*, 2020 [Core A\*].
27. S. Aggarwal, R. Venkatesh Babu, **A. Chakraborty**, “Text-based Person Search via Attribute-aided Matching”, *Winter Conference on Applications of Computer Vision (WACV)*, 2020 [Core A].
28. V. Ramanathan, P. Dwivedi, B. Katabathuni, **A. Chakraborty**, C. S. Thakur, “QUICKSAL: A small and sparse visual saliency model for efficient inference in resource constrained hardware”, *Winter Conference on Applications of Computer Vision (WACV)*, 2020 [Core A].
29. S. Aggarwal, J. N. Kundu, R. Venkatesh Babu, **A. Chakraborty**, “WAMDA: Weighted Alignment of Sources for Multi-source Domain Adaptation”, *British Machine Vision Conference (BMVC)*, 2020 (Oral, 5.07%) [Core A].
30. G. K. Nayak, S. Jain, R. Venkatesh Babu, **A. Chakraborty**, “Fusion of Deep and Non-Deep Methods for Fast Super-Resolution of Satellite Images”, *IEEE International Conference on Multimedia Big Data (BigMM)*, 2020 (Oral, 19.5%).
31. A. K. Singh, A. Mishra, S. Shekhar, **A. Chakraborty**, “From Strings to Things: Knowledge-enabled VQA Model that can Read and Reason”, *International Conference on Computer Vision (ICCV)*, 2019 (Oral, 4.3%) [Core A\*].
32. G. K. Nayak<sup>†</sup>, M. K. Reddy<sup>†</sup>, V. Shaj<sup>†</sup>, R. Venkatesh Babu, **A. Chakraborty**, “Zero Shot Knowledge Distillation in Deep Networks”, *International Conference on Machine Learning (ICML)*, 2019 [Core A\*].
33. A. Mishra, S. Shekhar, A. K. Singh, **A. Chakraborty**, “OCR-VQA: Visual Question Answering by Reading Text in Images”, *International Conference on Document Analysis and Recognition (ICDAR)*, 2019 [Core A].
34. G. K. Nayak, U. Shreemali, R. Venkatesh Babu, **A. Chakraborty**, “Efficient Person Re-identification in Videos Using Sequence Lazy Greedy Determinantal Point Process (SLGDPP)”, *International Conference on Image Processing (ICIP)*, 2019.
35. A. Pahuja<sup>†</sup>, A. Majumder<sup>†</sup>, **A. Chakraborty**, R. Venkatesh Babu, “Enhancing Salient Object Segmentation Through Attention”, *Computer Vision and Pattern Recognition Workshops (Deep Vision)*, pp. 27-36, 2019.
36. Navaneet, K. L., V. Todi, R. Venkatesh Babu, **A. Chakraborty**, “All for One: Frame-wise Rank Loss for Improving Video-based Person Re-identification”, *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 2472-2476, 2019 (Oral).

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<sup>†</sup> Denotes equal contribution.

37. B. R. Pradhan, Y. Bethi, S. Narayanan, **A. Chakraborty**, C. S. Thakur, “n-HAR: A Neuromorphic Event-Based Human Activity Recognition System Using Memory Surfaces”, *IEEE International Symposium on Circuits and Systems (ISCAS)*, 2019.
38. A. Majumder, R. Venkatesh Babu, **A. Chakraborty**, “Anomaly from Motion: Unsupervised Extraction of Visual Irregularity via Motion Prediction”, *NCVPRIPG*, 2017 (Oral).
39. **A. Chakraborty**, B. Mandal, H. K. Galoogahi, “ Person Re-identification Using Multiple First-Person-Views on Wearable Devices”, *Winter Conference on Applications of Computer Vision (WACV)*, 2016 [Core A].
40. T. Mahmud, M. Hasan, **A. Chakraborty**, A. K. Roy-Chowdhury, “ A Poisson Process Model for Activity Forecasting”, *International Conference on Image Processing (ICIP)*, 2016.
41. A. Das<sup>†</sup>, **A. Chakraborty**<sup>†</sup>, A. K. Roy-Chowdhury, “Consistent Re-identification in a Camera Network”, *European Conference on Computer Vision (ECCV)*, 2014 (\***Jointly first-authored**) [Core A\*].
42. **A. Chakraborty**, A. K. Roy-Chowdhury, “Context-Aware Activity Forecasting”, *Asian Conference on Computer Vision (ACCV)*, 2014.
43. **A. Chakraborty**, A. K. Roy-Chowdhury, “A Conditional Random Field Model For Tracking In Densely Packed Cell Structures”, *IEEE International Conference on Image Processing (ICIP)*, 2014.
44. K. Mkrтчyan, **A. Chakraborty**, A. K. Roy-Chowdhury, “Automated registration of live imaging stacks of Arabidopsis”, *International Symposium on Biomedical Imaging (ISBI)*, 2013.
45. **A. Chakraborty**, R. Yadav, G. V. Reddy, A. K. Roy-Chowdhury, “Cell Resolution 3D Reconstruction of Developing Multilayer Tissues from Sparsely Sampled Volumetric Microscopy Images”, *International Conference on Bioinformatics and Biomedicine (BIBM)*, 2011 (**Oral**).
46. **A. Chakraborty**, M. Liu, K. Mkrтчyan, G. V. Reddy, A. K. Roy-Chowdhury, “Cell Volume Estimation From A Sparse Collection of Noisy Confocal Image Slices”, *Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP)*, 2010.

PAPERS  
CURRENTLY  
UNDER REVIEW IN  
CONFERENCES

1. G. K. Nayak, I. Khatri, R. Rawal, **A. Chakraborty**, “Data-free Defense of Black Box Models Against Adversarial Attacks”.
2. A. Tripathi, P. Shenoy, **A. Chakraborty**, “Dynamic Data Selection for Efficient SSL via Coarse-to-Fine Refinement”.
3. S. Joshi, A. Tripathi, V. Gopalakrishnan, **A. Chakraborty**, “Enhancing 3D Referential Grounding by Learning Coarse Spatial Relationships”.
4. P. Saraf, S. S. Mallick, L. Jagarlamudi, **A. Chakraborty**, Y. Simmhan, “Cost Optimised Placement using Adversarial Reinforcement Learning”.
5. M. Yashwanth, G. K. Nayak, A. Singh, Y. Simmhan, **A. Chakraborty**, “Adaptive Distillation for Minimizing Client Drift in Heterogeneous Federated Learning”.

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<sup>†</sup> Denotes equal contribution.

BOOK CHAPTERS

1. K. Mkrtychyan, **A. Chakraborty**, M. Liu, A. Roy-Chowdhury, “Automatic Image Analysis Pipeline for Studying Growth in Arabidopsis”, *Video Bioinformatics*, vol. 22, pp. 215-236, Springer International Publishing, 2015.
2. **A. Chakraborty**, R. Yadav, M. Liu, M. Tataw, K. Mkrtychyan, A.K. Roy Chowdhury, G. V. Reddy, “Computational Tools For Quantitative Analysis of Cell Growth Patterns And Morphogenesis in Actively Developing Plant Stem Cell Niches”, *Plant Signalling Networks: Methods and Protocols*, 2012.

PATENTS AND COPYRIGHTS

1. “Method and System for Recognizing Activities in Surrounding Environment for Controlling Navigation of Autonomous Vehicle”, with C. S. Thakur, B. R. Pradhan, S. Narayanan (US Patent application no. 17/377,761 filed on 16-07-2021, Indian application filed on 31-03-2021).
2. “IISc Ped Sense (IPS) - A machine learning based non intrusive crowd parameter estimation tool for Indian scenarios”, with A. Verma, N. Choubey, Certified by the Copyright Office, Government of India on 14-07-23 (Reg. No. SW-16877/2023).

AWARDS AND HONORS

- Dept. of Atomic Energy Young Scientist Research Award (BRNS, 2020 - 2022).
- Associate Editor, The Visual Computer (Dec 2020 – Jan 2022).
- Outstanding Reviewer Award, Computer Vision and Pattern Recognition (CVPR), 2020.
- Pratiksha Trust Young Investigator Award, Indian Institute of Science (2018 - 2020).
- Dean’s distinguished fellowship, UC Riverside.
- ‘Tech talk award’ for best technical presentation in CEPCEB symposium, UC Riverside (Dec 2013).
- IEEE BIBM travel award, 2011.
- Certificate of merit for securing 35<sup>th</sup> rank among around 4,50,000 students in Higher Secondary Examination, West Bengal, India.

STUDENT ADVISING AND MENTORING

**Ph.D. Students**

- Aditay Tripathi Aug 2018 - Present
- Yashwanth M. Aug 2021 - Present
- Nipun Choubey Aug 2018 - Present  
*Co-supervisor with Prof. A. Verma, IISc*
- Sonu Sudhikumar Seena Sep 2023 - Present  
*Co-supervisor with Dr. Lin Ma, University of Manchester*
- Gaurav K. Nayak (Graduated) Aug 2017 - Sep 2023  
*Current: Post-doc associate, CRCV, UCF*

**M.Tech. (Research) Thesis Students**

- Arka Haldi Aug 2023 - Present
- Gohil Rahul Pradeep Jyoti Aug 2023 - Present
- Sai Dharma Srinidhi Sheryala Aug 2023 - Present
- Chaitra S. Jambigi (Graduated) Aug 2019 - Jun 2023  
*Current: Data Scientist, Flipkart*

- Vikash Kumar (Graduated) Aug 2019 - Jun 2023  
*Current: Research Scientist, Amazon*
- Siddharth Seth (Graduated) Aug 2018 - Dec 2022  
*Current: Ph.D. student, UC Merced*
- Shreya Roy (Graduated) Aug 2017 - Sep 2022  
*Current: Data Scientist, Publicis Sapient*
- Surbhi Aggarwal (Graduated) Aug 2017 - Sep 2020  
*Current: Data and Applied Scientist 2, Microsoft*

#### M.Tech. (Course) Dissertation Students

- Desilva Roy Aug 2023 - Present
- Bhil Nikunjibhai Babubhai Aug 2023 - Present
- Vikramaditya Mishra Aug 2022 - Present
- Batakala Ashok Aug 2022 - Present
- Supriya Mandal Aug 2021 - Jul 2023  
*Current: Software Engineer, Chargebee*
- Sai Shankar Patro Aug 2021 - Jul 2023  
*Current: PGTE, Bajaj Auto Ltd.*
- Shaurya Tiwari Aug 2020 - Jul 2022  
*Current: Senior Associate - ML, Ernst & Young*
- Aditya K. Pal Aug 2019 - Jul 2021  
*Current: SDE-III, Walmart Global Tech*
- Sunny Anand Aug 2019 - Jul 2021  
(co-supervisor with Prof. Y. Simmhan, IISc)  
*Current: Data Scientist, ARKRAY, Inc.*
- Sourav Mishra Aug 2018 - Jul 2020  
*Current: Subject Matter Expert, Toppr*
- Utkarsh Shreemali Aug 2017 - Jul 2019  
*Current: Senior R&D ML Engineer, Qualcomm*
- Bibrat R. Pradhan Aug 2017 - Jul 2019  
*Current: Data Science Engineer, Mercedes-Benz R&D*
- Shivansh Srivastava Aug 2017 - Jul 2019  
*Current: Senior Associate, JPMorgan Chase & Co.*

#### TEACHING EXPERIENCE

- Instructor Aug - Dec 2023  
DS 215 - Introduction to Data Science  
Dept. of Computational and Data Sciences  
IISc Bangalore
- Instructor Aug - Dec 2022  
DS 215 - Introduction to Data Science  
Dept. of Computational and Data Sciences  
IISc Bangalore
- Instructor Jan - Apr 2022  
DS 294 - Data Analysis and Visualization  
Dept. of Computational and Data Sciences  
IISc Bangalore

<p>Instructor  DS 263 - Video Analytics  (Co-instructor with Prof. R. Venkatesh Babu)  Dept. of Computational and Data Sciences  IISc Bangalore</p>	<p>Aug - Dec 2021</p>
<p>Instructor  DS 294 - Data Analysis and Visualization  Dept. of Computational and Data Sciences  IISc Bangalore</p>	<p>Jan - Apr 2020</p>
<p>Instructor  DS 265 - Deep Learning for Computer Vision  (Co-instructor with Prof. R. Venkatesh Babu)  Dept. of Computational and Data Sciences  IISc Bangalore</p>	<p>Jan - Apr 2020</p>
<p>Instructor  DS 263 - Video Analytics  (Co-instructor with Prof. R. Venkatesh Babu)  Dept. of Computational and Data Sciences  IISc Bangalore</p>	<p>Aug - Dec 2019</p>
<p>Instructor  DS 294 - Data Analysis and Visualization  Dept. of Computational and Data Sciences  IISc Bangalore</p>	<p>Jan - Apr 2018</p>
<p>Teaching Assistant  EE 215 - Stochastic Processes  Instructor: Prof. Ertem Tuncel  Electrical Engineering, UC Riverside</p>	<p>Fall 2013</p>

REFERENCES Available upon request.