Satrajit Chakrabarty

4525 Scott Avenue, Workspace 3363B, St. Louis – Missouri – 63110
(314) 295-6100 • satrajit.chakrabarty@wustl.edu

Education

- **Washington University in St. Louis** — **St. Louis**
  Doctoral Candidate in Electrical Engineering — *2017–present*
  CGPA: 3.91/4.0 (after 4^{th} semester)
- **Jadavpur University** — **Kolkata**
  BE (Hons) Electrical Engineering — *2012–2016*
  CGPA: 8.79/10, Rank: 9 (among 112 students)
- **Hare School** — **Kolkata**
  Higher Secondary Examination — *2010–2012*
  Aggregate: 456/500, 95% in Science group, Rank: 21 (among approx. 6 lakh students)
- **Patha Bhavan School** — **Kolkata**
  Secondary Examination — *2008–2010*
  Aggregate: 715/800, 98.33% in Science group, within top 30 among 9 lakh students, Ref: Link

Exam Scores

- **GRE General Test**
  Aggregate: 337/340 — *6th October, 2016*
  Verbal: 167/170 (98%le), Quantitative: 170/170 (97%le), AWA: 4.0 (59%le)
- **TOEFL iBT Test**
  Aggregate: 114/120 — *29th October, 2016*
  Reading: 30/30, Listening: 30/30, Speaking: 24/30, Writing: 30/30

Graduate Research

Advisor: Dr. Daniel Marcus, Dr. Joseph A. O'Sullivan

The overarching goal of my Ph.D. is to develop advanced deep learning based approaches and apply them towards building a completely automatic toolset for pre-processing, segmenting, and tracking of brain tumors from Magnetic resonance imaging (MRI) studies, with an initial focus on brain metastases (BM). I plan to complement the deep learning model with expert interactions for making case-specific fine-tunings which can then be optionally used to retrain the model. I am also developing a dedicated lesion-viewer for BMs to quantitatively characterize the phenotypic changes of each individual lesion over the entire course of treatment and track appearance of new lesions. Additionally, I would like to build a robust tool which can go beyond BMs and expedite as well as improve brain tumor diagnosis and treatment in general. The project requires diverse expertise and I am working at the intersection of Deep Learning, Neuroinformatics, and Image Processing.

Research Interests

- **Medical imaging:** Computer aided diagnosis, image registration, image segmentation
- **Deep learning:** Convolutional Neural Networks
- **Neuroinformatics:** Data management systems, Clinical tools
- **Clinical applications:** Neuro-oncology

Graduate Courses

Optimization, Probability and Stochastic Processes, Linear Dynamic Systems, Convex Optimization, Nonlinear Dynamic Systems, Fundamentals and Applications of Modern Optical Imaging, Introduction to Machine Learning, Principles and Applications of Biological Imaging, Analysis of Imaging Data, Data Mining, Theoretical Imaging Science

Job Experience

- **PricewaterhouseCoopers India** **Kolkata**
  Technological Consultant, Competency: AppTech *2016–2017*
  Worked as a Full Stack Developer with focus on J2EE, AngularJS, JavaScript and Android Studio, also worked on custom Chrome Plugin development for DOM Manipulation

Undergraduate Academic Internships

- **Variable Density Sampling in Compressed Sensing MRI** **Bangalore**
  Indian Institute of Science *2015*
  I attempted to design an optimal subspace for perfect reconstruction of sparse signals using two k-space sampling schemes: Constrained Vehicular Routing Problem and Artificial Bee Colony and investigate their effect on reconstruction. Another goal was to determine if the gradients and slew rate required in such a trajectory would be implementable in hardware.
- **Volumetric Analysis of 3D Solitary Pulmonary Nodules for staging of malignancy** **Kharagpur**
  Indian Institute of Technology *2014–2015*
  I worked on devising a method to characterise Spiculation, Lobulation and Margin Sharpness of Solitary Pulmonary Nodules. I became acquainted with Marching Cube Algorithm, Laplacian smoothing, Gaussian and mean curvatures, Shape Index and quadratic surface fitting at different stages of analyses. I also implemented two existing techniques of margin sharpness computation of breast masses for comparison with the proposed method.

Technical skills

- **Programming Languages:** Matlab, Python
- **Frameworks:** Tensorflow, Keras
- **UI Development Skills:** AngularJS, HTML5, CSS3
- **Scripting Languages:** UNIX Bash, Javascript

Publications

Journal

- **Quantitative Evaluation of Margin Sharpness of Pulmonary Nodules in Lung CT Images**
  Ashis Kumar Dhara, Sudipta Mukhopadhyay, **Satrajit Chakrabarty**, Mandeep Garg, Niranjan Khandelwal
  IET Image Processing, Link: Paper

Conference

- **Preprocessing of clinical neuro-oncology MRI studies for big data applications**
  Satrajit Chakrabarty, Pamela LaMontagne, Daniel S. Marcus, Mikhail Milchenko
  Submitted to SPIE Medical Imaging
- **Stereo Orthogonal Feature-mapping Transform (SOFT) for Stereo Matching**
  Pramit Saha*, **Satrajit Chakrabarty***, Soumya Goswami, Amitava Chatterjee
  *IEEE INDICON 2016, *Equal Contributors*, Link: Paper
- **Artificial Bee Colony (ABC) based Variable Density Sampling Scheme for CS-MRI**
  Akshay Kumar J, Soumya Goswami, Pramit Saha, **Satrajit Chakrabarty**, Kasi Rajgopal
  IEEE TENCON 2016, Link: Paper
- **Performance Evaluation of a Robust Fuzzy Noise Estimation Technique in MRI**
  Soumya Goswami, **Satrajit Chakrabarty**, Pramit Saha, Ronit Chattopadhyay
  IEEE INDICON 2015-Awarded, Link: Paper
- **A Fast Local Gradient based Super-resolution Image Reconstruction Algorithm with Fuzzy Hyperbias Learning and Sparse Monitoring Paradigm**
  Soumya Goswami, **Satrajit Chakrabarty**, Pramit Saha
  IEEE RETIS 2015, Link: Paper
- **Design of Micro-power Semi-implantable Hearing-aid with Hydraulic Amplification Methodology and Simultaneous resonance bandwidth control technique**
  Soumya Goswami, Pramit Saha, **Satrajit Chakrabarty**, Biswendu Chatterjee
  IEEE GHTC-SAS 2014, Link: Paper

- **Determination of transformer Leakage Inductances by Markov Linear Unbiased Estimator (MLUE)**
  Satrajit Chakrabarty, Pramit Saha, Soumya Goswami
  IEEE CALCON 2014-Best Student Paper Award
- **Simulation and Model verification of Shoe-embedded Piezoelectric Energy Harvester**
  Pramit Saha, Soumya Goswami, **Satrajit Chakrabarty**, Sayan Sarkar
  IEEE PIICON 2014, Link: Paper

Academic Accolades

- **Recipient of B.N. Paul Memorial Gold-centered Silver Medal** for *securing the highest marks in the Paper 'Electric Drives' at the Bachelor of Engineering in Electrical Engineering Final Examination, 2016 at Jadavpur University*
- **Recipient of M.N Chakraborty Memorial Bronze Medal** for *securing the highest aggregate marks in the Paper 'Power System Planning and Design' at the Bachelor of Engineering in Electrical Engineering Final Examination, 2016 at Jadavpur University*
- **Best Student Paper Award** in *IEEE INDICON 2015*
- **Best White Paper Award** and **Selected among top 10 in India in 'Innovations in Energy Auditing of University Campus'** among 192 teams in *Blaze 2014, Schneider Electric Pvt. Ltd*
- **Best Student Paper Award** in *IEEE CALCON 2014*
- **Recipient of MHRD Scholarship**, Govt. of India, for *commendable performance in Higher Secondary Examination*
- **Secured Rank 398 in Engg & 566 in Medical** in *WB Joint Entrance Examination* among 1,20,000 candidates
- **Secured Rank 21 in State** in *Higher Secondary Examination* among 6,00,000 candidates
- **Recipient of Award, Merit Scholarship and memento** for highest marks from school in *Secondary Examination*

References

- **Dr. Daniel Marcus**
  Department of Radiology, Washington University in St. Louis
  E-mail: dmarcus@wustl.edu
- **Dr. Aristeidis Sotiras**
  Department of Radiology, Washington University in St. Louis
  E-mail: aristeidis.sotiras@wustl.edu
- **Dr. Clifford Robinson**
  Department of Radiation Oncology, Washington University in St. Louis
  E-mail: clifford.robinson@wustl.edu