

# SOMNATH BASU ROY CHOWDHURY

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## Education

**Indian Institute of Technology (IIT) - Kharagpur, India**

July 2013 - May 2018

*Bachelor & Master of Technology (Dual Degree Honors) in Electrical Engineering*

*Minor in Computer Science & Engineering Micro-specialization in Embedded Wireless Systems*

**Department Rank - 3**

## Work Experience

**Apple Inc., India**

(June 2018 - present)

*Software Engineer, Apple Security Engineering*

Part of the Security Engineering team working on products and services critical to provision identity & access management catering to consumers across the globe.

## Relevant Experience

**Accenture Technologies Lab (ATL) - Bangalore, India**

(Summer 2017)

*Research Intern, Guide: [K. M. Annervaz](#) (ATL) and [Prof. Ambedkar Dukkipati](#), (IISc)*

*“Incorporating Prior Domain Knowledge for Natural Language Processing Tasks.”*, is an efficient way of using Knowledge Graph based prior knowledge to enhance deep-learning based NLP tasks.

- Used Knowledge Graph embedding techniques like DKRL (CNN), ProjE and HolE.
- Developed a novel *Convolution-based fact retrieval* for Knowledge Graphs.
- Outcome: *First-authored* long paper (*Oral*) [P1] published at **NAACL’18**. US-Patent [US-P1] is being filed.

**Indian Institute of Science, Bangalore - Bangalore, India**

(May 2017 - April 2018)

*Statistical Machine Learning Group, Research Intern, Guide: [Prof. Ambedkar Dukkipati](#)*

Developed a novel instance-based deep learning technique involving similarity search using hashing.

- Developed a Locality Sensitive Hashing based learning module, achieving an improvement of over 10%.
- Outcome: *First-authored* long paper [P6] based on this work has been submitted to PAKDD, 2019.

**Indian Institute of Technology, Kharagpur - WB, India**

(Aug 2016 - May 2018)

*Undergraduate Researcher*

- Designed novel deep learning models to solve computer vision problems related to feature identification + classification, and improving safety in autonomous vehicles with generative adversarial networks (GANs)
- Collaborated with 3 students and published 4 *research papers* [P2-P5] (2 *first-author*)

**Lung Cancer Segmentation in 3D CBCT Images - IIT Kharagpur**

(Aug 2016- May 2018)

*Bachelor’s & Master’s Thesis Project, advised by [Prof. Jayanta Mukhopadhyay](#)*

Developed an end-to-end segmentation technique on 3D CBCT lung images to identify cancer. Developed a novel cancer localization technique which localizes tumor region without any learning. Introduced a novel feature descriptor for pixel-wise classification. *Best Project grade* in both semesters.

**CredR Research (CRR) - Mumbai, India**

(Summer 2016)

Smart Inventory Tracking System (SITS), a wireless systems for online tracking of inventory and Deep Learning based Tyre-Rating system, for autonomous tyre condition detection.

**National Brain Research Centre - Gurgaon, India**

(Summer 2015)

*IAS Summer Fellow, Guide: [Prof. Pravat Mandal](#)*

Compressed Sensing in medical image formation. Implemented several image processing techniques to study characteristics and importance of K-Space in MRI & MRSI image formation.

## Patents

[US-P1] **System and method to incorporate prior domain knowledge for NLP tasks.** (US Patent)

Inventors: **Somnath Basu Roy Chowdhury**, K. M. Annervaz, Ambedkar Dukkipati, Shubhashis Sengupta  
*In preparation at Accenture Solutions Pvt. Ltd., To be filed with US PTO.*

## Selected Publications

(Google Scholar: [xGbyrIUAAAAJ](#))

## Refereed Conference Papers

[P1] K. M. Annervaz\*, Somnath Basu Roy Chowdhury\*, Ambedkar Dukkipati. **Learning beyond datasets: Knowledge Graph Augmented neural networks for Natural Language Processing.** Proceedings of the 16<sup>th</sup> Annual Conference of the NAACL HLT, 2018 at New Orleans, USA. (*Oral*)

## Refereed Workshop & Short Papers

- [P2] Arna Ghosh, Biswarup Bhattacharya\*, Somnath Basu Roy Chowdhury\*. **AdGAP: Advanced Global Average Pooling** (Student Abstract). Proceedings of the 32<sup>nd</sup> AAAI Conference on Artificial Intelligence (AAAI), 2018 at New Orleans, USA.
- [P3] Biswarup Bhattacharya, Arna Ghosh\*, Somnath Basu Roy Chowdhury\*. **Training Autoencoders in Sparse Domain** (Student Abstract). Proceedings of the 32<sup>nd</sup> AAAI Conference on Artificial Intelligence (AAAI), 2018 at New Orleans, USA.
- [P4] Arna Ghosh\*, Biswarup Bhattacharya\*, Somnath Basu Roy Chowdhury\*. **Handwriting Profiling using Generative Adversarial Networks** (Student Abstract). Proceedings of the 31<sup>st</sup> AAAI Conference on Artificial Intelligence (AAAI), 2017 at San Francisco, USA.
- [P5] Arna Ghosh\*, Biswarup Bhattacharya\*, Somnath Basu Roy Chowdhury\*. **SAD-GAN: Synthetic Autonomous Driving using Generative Adversarial Networks**. Proceedings of the 30<sup>th</sup> Neural Information Processing Systems (NIPS), Deep Learning for Action and Interaction Workshop, 2016 at Barcelona, Spain.

## Pre-prints & Working Papers

- [P6] Somnath Basu Roy Chowdhury, K.M. Annervaz, Ambedkar Dukkipati. **Instance-based Inductive Deep Transfer Learning by Cross-Dataset Querying with Locality Sensitive Hashing**. 23<sup>rd</sup> Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD), 2019. (Submitted)
- (\* = equal contribution)

## Academic Achievements

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- Secured **EECS All India Rank 7** in the Nationwide Education & Scholarship Test (NEST - II). (2017)
- **ACM-ICPC Asia-Chennai Regionals**: Ranked 33<sup>rd</sup> among 1100+ participating teams. (2015)
- Recipient of the **Science Academies Summer Research Fellowship**, fellowship awarded only to 342 Engineering students and teachers across the nation by *Indian Academy of Science*. (2015)
- Secured a **Department Change** from Chemical Engineering to Electrical Engineering, awarded to **top 3** students of the department subject to a high GPA. (2014)
- Nominated for **INSPIRE Scholarship** for being in **top 1 percentile** in ISC (Grade 12). (2013)
- Secured **top ranks** in various competitions. (notable: WBJEE: 151, JEE (Mains, Advanced): 99.9+ percentile, IMO State Rank 11<sup>th</sup>, NSO State Rank 12<sup>th</sup>, Top 1% in ISCE & ISC) (2013)

## Technical Skills

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- **Programming**: Python, C++, C, JAVA, L<sup>A</sup>T<sub>E</sub>X
- **Web Development**: HTML, CSS, PHP, SQL, Spring, Spring Boot, JPA, JUnit
- **Machine Learning**: TensorFlow, PyTorch, Torch7

## Teaching & Leadership Experience

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**Teaching Assistant** (*Signals and Networks & Electrical Technology Lab.*)

Responsible for guiding sophomores towards successful completion of experiments, providing academic support and evaluating assignments related to lab experiments.

**Associate Member** (*Entrepreneurship Cell, IIT Kharagpur*)

Responsible for organizing of several events and enhancing visibility of Global Entrepreneurship Summit in the city Kolkata.

## Miscellaneous Activities

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- Awarded Special Mention for contributions in Technology General Championship, LBS Hall. (2018)
- *Member of the Silver-medal winning Data Analytics team, LBS Hall in General Championship.* (2017)
- Secured 5<sup>th</sup> position among 450+ teams in *Code-o-Shuffle, Kshitij*, IIT Kharagpur. (2016)
- *Member of the Gold-medal winning Hardware Modeling team, LBS Hall in GC.* (2015)
- *Member of Technology Transfer Group (TTG), responsible for events like TED IIT Kharagpur.* (2014)
- Awarded 5<sup>th</sup> year distinction in Fine Arts and Painting by All India Art and Crafts Society. (2010)