Prithwish Jana

: https://jprithwish.github.io/
: prithwish-jana-52ba89148
: Room 2319, Klaus Advanced Computing Building
266 Ferst Drive NW, Atlanta, GA 30332, USA
: +1 (404) 203-9992, : pjana7@gatech.edu

About Me

I am a Ph.D. student in Computer Science at Georgia Tech, advised by Prof. Vijay Ganesh, and also spent a year at the University of Waterloo, Canada. My research lies at the intersection of automated reasoning and machine learning: I combine symbolic reasoning, formal methods, and reinforcement learning with large language models (LLMs) to significantly advance their capabilities in software engineering (code translation, generation, and repair) and mathematical reasoning (proof auto-formalization, synthesis, and discovery in LEAN). My work has appeared at ICSE, ICLR, IJCAI, ECAI, WWW, and received a Distinguished Paper Award at ICSE 2026.

Previously, I earned my Master's degree in Computer Science from IIT Kharagpur (Institute Silver Medalist, 2022) and my Bachelor's degree in Computer Science from Jadavpur University (University Gold Medalist, 2020), graduating at the top of my class at both the institutes. In Summer 2025, I interned at Amazon Science (AWS, Seattle) as an Applied Scientist with the Next Gen DevX team, designing LLM-based coding agents. I am also a recipient of the Reliance Foundation Scholarship for AI & CS (2021), and prestigious national awards JBNSTS, KVPY, and NTSE from the Government of India.

Research Areas: Neuro-Symbolic AI · Formal Methods · AI for SE · AI for Math · Programming Lang. & Compilers · LLM

Technical Skills

- **Languages:** Python, C, C++, Java, LEAN, MATLAB, JavaScript
- **Software Tools:** PyTorch, Huggingface, TRL, DeepSpeed, Scikit-learn, NLTK, lex/flex, yacc/bison, LLVM-IR, Git, LaTeX
- **Operating Systems:** Linux, MacOS, Windows

Languages

- **English:** Full Professional Working Proficiency
- **Hindi:** Full Professional Working Proficiency
- **Bengali:** Native or Bilingual Proficiency

Education

Georgia Institute of Technology (Georgia Tech), Atlanta, USA — Aug 2023–Present
Ph.D. in Computer Science — **GPA: 4.0/4.0**
- *Advisor:* Prof. Vijay Ganesh

University of Waterloo, Ontario, Canada — 2022–2023
Ph.D. in Computer Science (Transferred) — **Grade: 90.33%**
- *Advisor:* Prof. Vijay Ganesh

Indian Institute of Technology (IIT) Kharagpur, India — 2020–2022
M.Tech in Computer Science & Engineering — **CGPA: 9.84/10**
- ★ **Institute Silver Medalist**, Department Rank: 1st/75
- *Thesis:* "Fairness in Virtual Conference Scheduling" [PDF] (*Best Master's Thesis Nomination*)
- *Advisor:* Prof. Niloy Ganguly

Jadavpur University, Kolkata, India — 2016–2020
B.E. in Computer Science & Engineering — **CGPA: 9.57/10**
- ★ **University Gold Medalist**, Department Rank: 1st/70
- *Thesis:* "A Real-Time Semantic Image Segmentation Approach Through Region-Partitioning" [PDF]
- *Advisor:* Prof. Sanjoy K. Saha

Work Experience

Amazon Web Services (AWS), Seattle, USA — May 2025 – Aug 2025
Applied Scientist II Intern · Next Gen DevX (NGDE) Team, Amazon Science
- *Manager:* Bhavana Bhasker · *Mentor:* Sam Davidson
- Led development of a neuro-symbolic coding agent for Infrastructure-as-Code; received the **highest performance rating** (*Exceeded Expectations*) and a **nomination** for Georgia Tech's *Intern of the Year*.
- Published a **first-author paper** at **ICSE 2026** (CORE A* conf.), earning a **Distinguished Paper Award**.

Publications

: Google Scholar (As of Feb 2026: citations = 201, h-index = 7, i10-index = 5)

♦: A or A* venues (prestigious and highly-selective) per the CORE Computer Science Conference Rankings

Peer-Reviewed International Conference Papers

[13] **ProofBridge: Auto-Formalization of Natural Language Proofs in Lean via Joint Embeddings** ♦ ICLR 2026
P. Jana, K. Kale, A. E. Tanriverdi, C. Song, S. Vishwanath, and V. Ganesh
14th International Conference on Learning Representations, Rio de Janeiro, Brazil, 2026. (Accpt. Rate: 28%) [arXiv]

[12] **TerraFormer: Automated IaC with LLMs Fine-Tuned via Policy-Guided Verifier Feedback** ♦ ICSE 2026
P. Jana, S. Davidson, B. Bhasker, A. Kan, A. Deoras, and L. Callot
IEEE/ACM 48th International Conference on Software Engineering, SEIP Track, Rio de Janeiro, Brazil, 2026. [arXiv]
(Distinguished Paper Award)

[11] **RLSF: Fine-tuning LLMs via Symbolic Feedback** ♦ ECAI 2025
P. Jha, P. Jana, P. Suresh, A. Arora, and V. Ganesh
28th European Conf. on Artificial Intelligence, Bologna, Italy, pp. 1687–94, 2025. (Accpt. Rate: 23%) [Link] [arXiv]

[10] **CoTran: LLM-based Code Translator using RL with F/b from Compiler and Symbolic Exec.** ♦ ECAI 2024
P. Jana, P. Jha, H. Ju, G. Kishore, A. Mahajan, and V. Ganesh
27th European Conf. on Artificial Intelligence, Santiago, Spain, pp. 4011–18, 2024. (Accpt. Rate: 23%) [Link] [arXiv]

[9] **NeuroSymbolic LLM for Mathematical Reasoning and Software Engineering** ♦ IJCAI 2024
P. Jana
33rd Int'l Joint Conf. on Artificial Intelligence, Doctoral Consortium, pp. 8492–93, 2024. (Accpt. Rate: 17%) [Link]

[8] **Scheduling Virtual Confs. Fairly: Achieving Equitable Participant and Speaker Satisfaction** ♦ WWW 2022
G. K. Patro, P. Jana, A. Chakraborty, K. P. Gummadi, and N. Ganguly
31st ACM Web Conference, Lyon, France, pp. 2646–2656, 2022. (Accpt. Rate: 17.7%) [Link] [PDF]

[7] **Unsupervised Action Localization Crop in Video Retargeting for 3D ConvNets** TENCON 2021
P. Jana, S. Bhaumik, and P. P. Mohanta
2021 IEEE Region 10 (Asia-Pacific) Conference, Auckland, New Zealand, pp. 670–675, 2021. [Link] [PDF]

[6] **AutoDrone: Shortest Optimized Obstacle-Free Path Planning for Autonomous Drones** ICDC 2021
P. Jana and D. Jana
International Conf. on Computational Intelligence, Data Science & Cloud Computing, pp. 1–13, 2021. [Link] [PDF]

[5] **Two Stage Semantic Segmentation by SEEDS & Fork Net** CALCON 2020
A. Mukherjee, P. Jana, S. Chakraborty, and S. K. Saha
2020 IEEE Calcutta Conference, pp. 283–287, 2020. [Link] [PDF]
(Best Student Paper 2nd Runner-Up Award)

[4] **A Multi-tier Fusion Strategy for Event Classification in Unconstrained Videos** PReMI 2019
P. Jana, S. Bhaumik, and P. P. Mohanta
8th International Conf. on Pattern Recognition & Machine Intelligence, Springer, pp. 515–524, 2019. [Link] [PDF]

[3] **Key-Frame based Event Recognition in Unconstrained Videos using Temporal Features** TENSYMP 2019
P. Jana, S. Bhaumik, and P. P. Mohanta
2019 IEEE Region 10 (Asia-Pacific) Symposium, pp. 349–354, 2019. [Link] [PDF]

[2] **Handwritten Document Image Binarization: An Adaptive K-means based Approach** CALCON 2017
P. Jana, S. Ghosh, S. K. Bera, and R. Sarkar
2017 IEEE Calcutta Conference, pp. 226–230, 2017. [Link] [PDF]

[1] **A Fuzzy C-Means Based Approach Towards Efficient Document Image Binarization** ICAPR 2017
P. Jana, S. Ghosh, R. Sarkar, and M. Nasipuri
*9th International Conference on Advances in Pattern Recognition (***ICAPR***)*, pp. 332–337, 2017. [Link] [PDF]

Journal Papers / Book Chapters

[3] **SALiEnSeA: Spatial Action Localization & Temporal Attention for Video Event Recognition** IJCISIM 2022
P. Jana, S. Bhaumik, and P. P. Mohanta
Int'l Journal of Computer Info. Systems and Industrial Mgmt. Appl., vol. 14, pp. 270–284, MIR Labs, 2022. [Link] [PDF]

[2] **Recent Trends in 2D Object Detection and Applications in Video Event Recognition** River 2022
P. Jana and P. P. Mohanta
Advances of Deep Learning and its Appl. in Object Detection and Recognition, River Publishers, 2022. [Link] [PDF]

[1] **Event and Activity Recognition in Video Surveillance for Cyber-Physical Systems** Springer 2021
S. Bhaumik, P. Jana, and P. P. Mohanta
Emergence of Cyber Physical System & IoT in Smart Automation and Robotics, Springer Nature, 2021. [Link] [PDF]

Preprints / Under Submission

[2] **Abstractions-of-Thought: Intermediate Repr. for LLM Reasoning in Hardware Design** arXiv 2025
M. DeLorenzo, K. Tieu, P. Jana, P. Jha, D. Kalathil, V. Ganesh, and J. Rajendran
arXiv preprint arXiv:2505.15873, 2025. [arXiv]

[1] **Reducing Opinion Echo-Chambers by Intelligent Placement of Moderate-Minded Agents** arXiv 2023
P. Jana, R. R. Choudhury, and N. Ganguly
arXiv preprint arXiv:2304.10745, 2023. [arXiv]

Scholarships and Awards

During Ph.D.

- **ICLR-2026 Financial Assistance** 2026
  Travel grant to attend the 14th International Conference on Learning Representations in person; Rio de Janeiro, Brazil
- **Distinguished Paper Award, ICSE-2026** 2026
  One of 3 papers recognized among 74 accepted in the SEIP track (IEEE/ACM 48th Int'l Conf. on Software Engineering)
- **2nd Place, College of Computing (CoC) Graduate Poster Symposium, Georgia Tech** 2025
  Runner-up at the college-wide graduate research symposium across SCS, SCP, IC, CSE; evaluated by faculty
- **Top Reviewer, NeurIPS-2024** 2024
  Top 8% of reviewers (1,300 out of 15,160); awarded complimentary full conference registration
- **Lunch with a EurAI Fellow Invitee, ECAI-2024** 2024
  Invited by ECAI-2024 for a select Ph.D. lunch discussion with Prof. Mehdi Dastani (EurAI Fellow; Chair, ECAI-2025)
- **IJCAI-2024 Travel Grant** 2024
  Travel grant to attend the 33rd International Joint Conference on AI; Jeju Island, South Korea
- **CAV-2024 Travel Scholarship** 2024
  Full scholarship to attend the 36th International Conference on Computer-Aided Verification; Montréal, Canada

During Master's

- **Institute Silver Medalist, CSE Department Topper** 2022
  Highest GPA in M.Tech. Computer Science, IIT Kharagpur; Rank 1st/75
- **Best M.Tech. Thesis Award Nominee, CSE Department** 2022
  Nominated for Best Thesis, M.Tech. Computer Science, IIT Kharagpur
- **Reliance Foundation Scholarship for AI & Computer Science** 2021
  One of 38 Master's students selected across India; INR 0.6 million in academic funding
- **CSI Young IT Professional Award – East Region Runner-Up** 2021
  Runner-up in the Eastern India Region; youngest participating team in the competition
- **GATE Scholar (Graduate Aptitude Test in Engineering)** 2020
  All-India Rank 188/100,000+ (99.81 percentile); stipend of INR 12,400/month for 2 years

During Bachelor's & High-School

- **University Gold Medalist, CSE Department Topper** — 2020
  Highest GPA in B.E. Computer Science, Jadavpur University; Rank 1st/70
- **Top 6 in TIFR GS-2020 (Computer Science) Nationwide** — 2020
  Among 6 students selected across India for direct Ph.D. admission at TIFR, India via competitive exam and interview
- **CSE Department Annual Gold Medalist** — 2017–2019
  Highest annual GPA in CSE, Jadavpur University, for three consecutive years
- **Summer Research Fellowship Programme (SRFP)** — 2018, 2019
  Selected by the Indian Science Academies among the top 350 undergrads nationwide; two consecutive years
- **Special Mention Award, Computer Vision Summer School (SSCVGIP)** — 2018
  Awarded by the Indian Statistical Institute and IUPRAI for best project at the Computer Vision Summer School
- **JBNSTS Senior Scholar (Jagadis Bose National Science Talent Search)** — 2016
  One of 47 scholars selected across India from Science, Engineering, and Medicine
- **KVPY Awardee (Kishore Vaigyanik Protsahan Yojana)** — 2015
  All-India Rank 143/100,000+ (99.86 percentile); fellowship offered by DST, Govt. of India and IISc Bangalore
- **NTSE Scholar (National Talent Search Examination)** — 2012
  Top 1,000 out of ∼1,000,000 examinees; Government of India national scholarship for academic excellence

Invited Talks

- **Invited Talk at School of Computing Science, Simon Fraser University,** Canada — Nov 2025
  ProofBridge: Auto-Formalization of Natural Language Proofs in Lean via Joint Embeddings
- **Invited Talk at Mathematical AI Seminar, Fields Institute, University of Toronto,** Canada — Oct 2025
  AI for Math: Neuro-Symbolic Auto-Formalization into Lean via Joint Embeddings [Abstract] [YouTube]
- **Technical Track Talk at 25th High Confidence Software & Systems Conference (HCSS),** USA — May 2025
  Neuro-Symbolic Techniques for LLM-based Code Generation and Auto-Formalization of Proofs [Slides] [Proceedings]
- **Invited Talk at ACM Student Chapter, Heritage Institute of Technology, Kolkata,** India — Jan 2025
  Neuro-Symbolic Approaches for Fine-Tuning Code Language Models [Flyer]
- **Invited Talk at Jagadis Bose Scholars Professional Development Forum** — May 2021
  Counterfactual Fairness in Machine Learning [YouTube] [Flyer]

Teaching Experience

Co-Organizer & Instructor, IDEaS One-Day Tutorial on AI4Science [Tutorial Site], Georgia Tech, USA — Oct 2025
Delivered lectures and hands-on sessions on LLMs and formal methods to 80+ Ph.D. students, postdocs, and scientists.

Teaching Assistant, Georgia Tech, USA — Summer 2024
CS 3600: *Introduction to Artificial Intelligence* (Mr. Sourish Dhekane; 120+ students)

Teaching Assistant, University of Waterloo, Canada — Fall 2022 · Spring 2023 · Summer 2023
CS 240: *Data Structures and Data Management* (Prof. Éric Schost; 400+ students)
CS 105: *Introduction to Computer Programming* (Dr. Muddassir Malik; 60+ students)
CS 135: *Designing Functional Programs* (Dr. Byron Weber Becker; 1,200+ students)

Teaching Assistant, IIT Kharagpur, India — Fall 2021
CS 19001: *Programming & Data Structures Lab* (Drs. Abir Das & Saptarshi Ghosh; 100+ students)
CS 60075: *Natural Language Processing* (Prof. Sudeshna Sarkar; 120+ students)

Academic Services & Responsibilities

Lead Student Organizer, Foundations of AI (FoAI) Seminar Series [Seminar Page], Georgia Tech, USA — 2025 – present
Lead organizer for bi-weekly talks hosted by Profs. V. Ganesh, D. Sherrill, and C. Lin; single-handedly manage all logistics: coordinating with visiting faculty and industry researchers, venue, catering, and announcements.

Conference & Journal Services 2020 – present

PC Member / Reviewer: **AAAI** (2026, 2025, 2024, 2023 [AIES]) · **ICLR** (2026, 2025, 2024) · **ICML** (2026, 2025) · **AISTATS** (2026, 2025) · **NeurIPS** (Main + D&B) (2026, 2025, 2024 **[Top Reviewer]**, 2023, 2021) · **LICS** (2026) · **ECAI** (2025) · **CAV** (2025) · **NeSy** (2024, 2023) · **PLDI** (2024) · **SAT** (2024) · **CP** (2024) · **KDD** (2022) · **ACM TOPLAS** (2026) · **TMLR** (2026, 2025) · **Elsevier ASC** (2025) · **Nature SR** (2024) · **IEEE SMC** (2023) · **IEEE Access** (2022) · **Springer JCST** (2020)

Attended: HCSS 2025 (USA) · NeurIPS 2024 (Canada) · ECAI 2024 (Spain) · IJCAI 2024 (South Korea) · NeurIPS 2023 (USA)

IEEE Student Member 2017 – present

Member ID: 92577001

Academic Research Internship Experience

Indian Institute of Technology (IIT) Kharagpur, India Apr 2021 – Aug 2022

Research Intern · Video Action Recognition & Zero-Shot Temporal Detection

- *Advisors:* Dr. Abir Das (IIT Kharagpur), Dr. Rameswar Panda (MIT-IBM Watson AI Lab)
- Extended R-C3D to achieve zero-shot end-to-end temporal activity detection in untrimmed videos; tackled recognition and localization of human activities under open-vocabulary label settings.

University of Alberta, Canada Jun – Dec, 2021

Research Intern · 3D Object Detection & Pose Estimation in Indoor Scenes

- *Advisor:* Prof. Nilanjan Ray (University of Alberta)
- Detected and estimated poses of 3D objects in indoor scenes from RGB-D images and point clouds using PointNet and Transformer architectures.

Indian Statistical Institute & IUPRAI, India May – Jul, 2018 & 2019

Research Project Trainee & Summer Intern · Spatio-Temporal Event/Activity Recognition in Videos

- *Advisor:* Dr. Partha Pratim Mohanta (ISI Kolkata)
- *Awarded:* 'Special-Mention' at the 5th Summer School on CV, Graphics & Image Processing (2018)
- Proposed a hierarchical decision-fusion framework combining frame- and video-level CNN & LSTM features to capture short- and long-term motion; designed a graph-based key-frame selection algorithm.

R. C. Bose Centre for Cryptology & Security, Indian Statistical Institute, India May – Jul, 2018

Summer Research Intern · Carry-less Karatsuba Multiplication over Galois Field in Block Ciphers

- *Advisor:* Dr. Debrup Chakraborty (ISI Kolkata)
- *Supported & funded by:* Microsoft Research India · *Selected among:* 25 students nationwide
- Implemented carry-less Karatsuba multiplication of degree-127 binary polynomials via 64-bit operations and fast polynomial reduction, accelerating AES-GCM in high-performance symmetric-key block ciphers.

Jadavpur University, India May 2017 – Oct 2018

Undergraduate Researcher · Document Analysis & Medical Image Segmentation

- *Advisors:* Dr. Ram Sarkar[(1)], Profs. Mita Nasipuri[(2)] & Subhadip Basu[(3)] (Jadavpur University)
- Proposed background inpainting and fuzzy clustering for binarizing degraded documents[(1,2)]; developed binarization of 3D microscopic mouse brain images[(1,3)] for dendritic spine analysis.

Academic Projects & Presentations

- **Logic in Computer Science**, Georgia Tech, USA [PDF] 2023
  Implemented a DPLL SAT solver; investigated the effect of branching heuristics on compute time and recursive call count
- **Advanced Topics in Requirements Engineering**, University of Waterloo, Canada [PDF] [Slides] 2023
  Designed the requirements engineering process for an LLM-based source code translation system
- **Distributed Systems**, IIT Kharagpur, India [Report] [PDF] 2021
  Analyzed distributed pub-sub event streaming performance of Apache Pulsar, Google Cloud Pub/Sub, and Amazon Kinesis
- **High Performance Computer Architecture**, IIT Kharagpur, India [Report] [PDF] 2021
  Used gem5 to simulate the N-queens problem; analyzed CPI variation across L2, L1-i/d cache sizes, and branch predictors
- **Artificial Intelligence**, IIT Kharagpur, India [YouTube] [Report] [PDF] 2020
  Analyzed perception and route planning algorithms for autonomous vehicles, interpreting multi-modal sensor data

Relevant Coursework Pursued

[During Ph.D.] Georgia Institute of Technology, USA **& University of Waterloo,** Canada — 2022 – 2025

(CS 6241) Advanced Compiler Optimization · Prof. Santosh Pande
(CS 8903-SAT) SAT and SMT Solvers: Theory, Practice, and Applications · Prof. Vijay Ganesh
(CS 6340) Software Analysis and Test · Prof. Qirun Zhang
(CS 6601) Artificial Intelligence · Prof. Thomas Ploetz
(CS 8903-LCS) Logic in Computer Science · Prof. Suguman Bansal
(CS 846) Advanced Topics in Software Engineering: Requirements Engineering · Prof. Daniel Berry
(CS 898) Advanced Special Topics in Computer Science: Computer Vision · Prof. Yuri Boykov
(CS 685) Machine Learning: Statistical & Computational Foundations · Prof. Shai Ben-David

[During Master's] IIT Kharagpur, India *(Total Credit Hours: 49)* — 2020 – 2022

Algorithm Design & Analysis, AI, NLP, Foundations of CS, Info Retrieval, Complex Networks, High-Performance Computer Architecture, Computational Geometry, Deep Learning, Distributed Systems

[During Bachelor's] Jadavpur University, India *(Total Credit Hours: 193)* — 2016 – 2020

Digital Logic & Circuits, Data Structures & Algo, Design & Analysis of Algo, Numerical Methods, OOP, Microprocessors & Assembly Lang, Graph Theory & Combinatorics, Computer Organization & Architecture, Systems Programming, OS, Formal Lang & Automata, Digital Communication, Computer Graphics, DBMS, Principles of Programming Lang, Compiler Design, Computer Networks, Software Engg., AI, Internet Tech, Data Mining, VLSI, Optimization Tech & Operation Research, NLP, Soft Computing