Jyotikrishna Dass

Assistant Professor, Dept. of Electrical and Computer Engineering
University of Arizona, Tucson, AZ
https://jyotikrd.github.io/
jdass@arizona.edu

Research Interests

Machine Learning, Parallel and Distributed Computing, System Architecture for High-Performance ML

Education

- **Texas A&M University (TAMU)** — College Station, TX
  Doctor of Philosophy (Ph.D.); Dept. of Computer Science and Engineering (CSE) — *August 2021*
  - Dissertation: Efficient and Scalable Machine Learning for Distributed Edge Intelligence
  - Advisor: Prof. Rabi N. Mahapatra
  - Dissertation Committee: Dr. Xia "Ben" Hu, Dr. Eun Jung (EJ) Kim, Dr. Raktim Bhattacharya
- **Indian Institute of Technology (IIT)** — Guwahati, India
  *Bachelor of Technology (B.Tech.); Electronics and Communication Engg., **Minor** in CSE* — *May 2014*
  - Bachelor Thesis Project: Object Detection in Videos
  - Advisor: Dr. Prithwijit Guha

Work Experience

- **Department of Electrical and Computer Engineering, University of Arizona** — Tucson, AZ
  Assistant Professor — *Aug. 2024 - Present*
  - As a Tenure-track faculty, my duties comprise research in distributed machine learning algorithms and computer systems for edge computing, teaching undergraduate and graduate courses, mentoring students, professional outreach activities, and service to the department, college, and the university.
- **Data to Knowledge (D2K) Lab, Rice University** — Houston, TX
  Research Scientist, D2K Lab — *Aug. 2022 - Jul. 2024*
  - I work on data science research, innovation, collaboration, and education. As a member of the leadership team at D2K, I am responsible for developing D2K policies and procedures. I also build relationships with industrial, healthcare, and community partners for the D2K capstone program and raise sponsorship funds for the capstone program. In addition, I oversee the management of administrative functions in the center and direct the day-to-day financial, research, and academic administration
  - Manager: Dr. Xia "Ben" Hu (Aug. 2022- Jul. 2023) and Dr. Rudy Guerra and Dr. Chad Shaw (Aug. 2023-Jul. 2024)
- **Electrical and Computer Engineering, Rice University** — Houston, TX
  Postdoctoral Associate, EIC Lab — *Sept. 2021 - Aug. 2022*
  - I authored two papers published in IEEE HPCA'23 (first-author) and IEEE Micro'23 (co-author). In addition, I led research grant and workshop development proposals (NSF, META, Rice, and MICRO) which were awarded.
  - Mentor: Dr. Yingyan Lin
- **Transaction Risk Management Systems (TRMS), Amazon** — Seattle, WA
  Applied Scientist - Intern — *Jun. 2017 - Aug. 2017*
  - Project: Customer Behavioral Data and Modeling
  - Mentors: Bilal Fadlallah, Zhiguo Li, Christopher Jones
- **Multimedia, Graphics and Robotics Group, TCS Research and Innovation Lab** — Gurugram, India
  Research - Intern — *May 2013 - Jul 2013*
  - Project: Automatic Hairstyle Discovery and Recognition
  - Mentor: Dr. Hiranmay Ghosh

Publications

1. S. Zhang, Y. Fu, S. Wu, **J. Dass**, H. You; Y. Lin, NetDistiller: Empowering Tiny Deep Learning via In-Situ Distillation, IEEE Micro 2023, **Impact factor: 3.6** in the *Special Issue on tinyML*
2. **J. Dass**, S. Wu, H. Shi, C. Li, Z. Ye, Z. Wang, and Y. Lin, ViTALiTy: Unifying Low-rank and Sparse Approximation for Vision Transformer Acceleration with Linear Taylor Attention, in 29^{th} IEEE International Symposium on High-Performance Computer Architecture (HPCA 2023), Montreal, Canada, **Acceptance rate 25%**.
3. **J. Dass**, R. N. Mahapatra, Householder Sketch for Accurate and Accelerated Least-Mean-Squares Solvers, in 38^{th} International Conference on Machine Learning (ICML 2021), Virtual, **Acceptance rate 21.47%**.
4. **J. Dass**, Y Narawane, R. N. Mahapatra and V. Sarin, Distributed Training of Support Vector Machine on a Multiple-FPGA System, in IEEE Transactions on Computers (TC 2020), **Impact factor: 3.131**, **Acceptance rate 21%** in the *Special Issue on Machine Learning Architectures and Accelerators.*
5. **J. Dass**, Y Narawane, R. N. Mahapatra and V. Sarin, FPGA-based Distributed Edge Training of SVM, in ACM/SIGDA 27^{th} International Symposium on Field Programmable Gate Arrays (FPGA 2019), Seaside, CA.
6. **J. Dass**, V. Sarin and R. N. Mahapatra, Fast and Communication-Efficient Algorithm for Distributed Support Vector Machine Training, in IEEE Transactions on Parallel and Distributed Systems (TPDS 2018), **Impact factor: 3.402**
7. D. Dang, **J. Dass** and R. Mahapatra, ConvLight: A Convolutional Accelerator with Memristor Integrated Photonic Computing, in IEEE 24^{th} International Conference on High Performance Computing (HiPC 2017), Jaipur, **Acceptance rate 23%**.
8. **J. Dass**, V. N. S. P. Sakuru, V. Sarin and R. N. Mahapatra, Distributed QR Decomposition Framework for Training Support Vector Machines, in IEEE 37^{th} International Conference on Distributed Computing Systems (ICDCS 2017), Atlanta, GA, **Acceptance rate 16.9%**.
9. K. Lee, R. Bhattacharya, **J. Dass**, V. N. S. P. Sakuru and R. N. Mahapatra, A Relaxed Synchronization Approach for Solving Parallel Quadratic Programming Problems with Guaranteed Convergence, in IEEE International Parallel and Distributed Processing Symposium (IPDPS 2016), Chicago, IL, **Acceptance rate 23%**.
10. **J. Dass**, M. Sharma, E. Hassan and H. Ghosh, A density based method for automatic hairstyle discovery and recognition, in Fourth National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG 2013), Jodhpur.

Patent

System and Method for Identifying a Hairstyle of a Person, *India 3955/MUM/2013*, resulting from research internship and publication done as a summer intern at TCS Research.

Teaching Experience

- **Department of CSE at TAMU** — College Station
  Graduate Assistant Lecturer — *Fall 2020*
  - **Instructor of Record** for CSCE 312:Computer Organization (Hybrid), introductory lab-based course with 40 undergraduate students from various majors
  - Mean rating of **4.2/5** on student course evaluation, where, 5 means *Deserves an Award, Excellent*
- **Volunteering Education Initiatives during COVID-19** — Virtual
  Organizer and Instructor — *Summer 2020*
  - Designed and taught a free online Python course ShiP.py:Learning to Py while Shelter-in-Place with a team of undergraduate and PhD student volunteers
  - Organized a free online Machine Learning course SHALA:Stay Home and Learn AI with a team of volunteers comprising professors, industry professionals, and students. Taught lectures on Linear Models and Kernelization
- **Department of CSE at TAMU** — College Station
  Graduate Teaching Fellow (Mentor: Dr. Dylan Shell) — *Spring 2020*
  - **Instructor of Record** for CSCE 483:Computer System Design (Hybrid), a project-oriented capstone course with 25 senior undergraduate students
  - Mean rating of **3.3/5** on student course evaluation
- **Department of CSE at TAMU** — College Station
  Graduate Assistant Lecturer — *Fall 2018*

- **Instructor of Record** for CSCE 312: Computer Organization, an introductory lab-based course with 35 junior and senior undergraduate students from various majors (including 3 international exchange students).
- Mean rating of **4.6/5** on student course evaluation

- **Department of CSE at TAMU** College Station
  Graduate Assistant Teaching *2014 - 2021*
  - Held multiple TA appointments as lab instructor to **1000+** undergraduate students across various semesters
    - CSCE 312: Computer Organization for *Dr. Aakash Tyagi* (**6 times**)
    - CSCE 206: Structured Programming in C++ for *Dr. Joseph Hurley* (**6 times**)
    - CSCE 111: Introduction to Computer Science and Programming (JAVA) for *Dr. Joseph Hurley* (**twice**)
    - CSCE 121: Introduction to Program Design and Concepts (C++) for *Dr. Michael Quinn* (**once**)
  - Managed a team of **50+** peer teachers and graders across various semesters.

Mentoring Experience

- **Graduate Students, Rice University:** Mentoring following students in research
  - *Shang Wu* (Masters) Vision Transformer models, *co-author* at HPCA 2023
  - *Daniel Puckett* (PhD student) Co-designed accelerator
  - *Jayeeta Jagannath* (Masters) Distributed machine learning
- **Graduate Students, TAMU:** Involved following Masters students in my PhD research resulting in their thesis and multiple co-authored works published separately in peer-reviewed venues.
  - *V.N.S. Prithvi Sakuru* (MS Thesis, 2016, now at Amazon, Seattle) at IEEE IPDPS 2016 and IEEE ICDCS 2017.
  - *Yashwardhan Narawane* (MS Thesis, 2018, now at NVIDIA, Santa Clara) at ACM FPGA 2019 and IEEE TC 2020.
- **Undergraduate Students, TAMU:** Mentored several CSE students to provide research and team-project experience
  - *Nathan Purwosumarto* (Sophomore), research in Spring 2021
  - *Rengang Yang* (Sophomore), research in Summer 2020
  - *Erik Swanson*, *Cole Bui*, *Alizain Ali*, *Edgardo Garcia Lopez*, and *Jose Garza* (Seniors), capstone project CSCE 431: Software Engineering course in Spring 2020.

Grants/Proposals Writing Experience

FEDERAL

- **NSF 22-572: Pathways to Enable Open-Source Ecosystems (POSE- Phase II)** *May. 2023*
  AutoKeras-OSE - Building an Open-Source AutoML Ecosystem Based on AutoKeras towards Healthcare Applications
  - PIs: Dr. Xia "Ben" Hu, **Dr. Jyotikrishna Dass**, Dr. Xinjie Lan (Rice University), Dr. Fei Wang (Cornell University)
  - Status: Not Funded
- **NSF 21-616: CISE Core Programs** *Aug. 2022*
  Medium: DILSE: Codesigning Decentralized Incremental Learning System via Streaming Data Summarization on Edge
  - PIs: Dr. Yingyan Lin, Dr. Anshumali Shrivastava, Dr. César A Uribe, Rice University
    Senior Personnel: **Dr. Jyotikrishna Dass**
  - Responsibility: Led the ideation, team creation, and proposal writing.
  - Status: ***Approved Funding*** **($1,200,000)** , Abstract
- **NSF 19-566: Real-Time Machine Learning (RTML)** *Jun. 2019*
  Large:Algorithm/Hardware Co-Design for Real-Time Deep Learning on Heterogeneous Systems-on-Chips
  - PIs: Dr. Eun Jung Kim (CSE), Dr. Rabi Mahapatra (CSE), Dr. Shuiwang Ji (CSE), TAMU
  - Status: Not Funded

INDUSTRY

- **META Networking Request for Proposals: Network for AI** *Aug. 2022*
  MILES: Multi-device Incremental Learning on Edge via Summarization
  - PI: Dr. Yingyan Lin, **Dr. Jyotikrishna Dass**, (Rice University)
  - Responsibility: Led the ideation and complete proposal writing with budget plan

- Status: ***Approved Funding*** **($50,000)**, News

- **NVIDIA Academic Hardware Grants Program** *Jan. 2022*
  Edge-based Decentralized Incremental Learning System for Streaming Data
  - PI: Dr. Jyotikrishna Dass (ECE)
  - Status: Not Funded

- **Facebook Research: Hardware and Software Systems** *Dec. 2017*
  Efficient Techniques and Hardware Architecture for Scalable and Distributed Kernel Methods
  - PI: Dr. Rabi Mahapatra (CSE), TAMU
  - Status: Not Funded

WORKSHOP

- **Rice University Creative Ventures Fund: Conference and Workshop Development** *Mar. 2022*
  A2C2: Workshop on Automated AI Tools for Computing and Communication
  - Organizers: Dr. Jyotikrishna Dass, Chaojian Li, Dr. Yingyan Lin, (Rice University)
  - Responsibility: Led the ideation and complete proposal writing with budget plan
  - Status: ***Approved Funding*** **($10,000)**, News

- **IEEE/ACM MICRO 2022 Tutorial** *Jul. 2022*
  Tutorial on Automated Tools for Fast Development of Deep Learning Networks and Accelerators
  - Organizers: Dr. Yingyan Lin, **Dr. Jyotikrishna Dass**, Chaojian Li, Yang Zhao, Yonggan Fu, Yongan Zhang
  - Responsibility: Led the complete proposal writing and submission.
  - Status: ***Accepted***

Awards

- **Graduate Teaching Fellowship** *Jan. 2020*
  Among 18 fellows selected from across 15 departments in Texas A&M College of Engineering to teach as Instructor of Record. Winners of the competitive fellowship were chosen by the awards committee comprising several department heads and faculty members. Letter

- **Best Ph.D. Thesis Poster Award** *Sep. 2019*
  Winner among 40 CSE Ph.D. candidates representing 14 Southeastern Conference (SEC) member institutions at the Annual Computing@SEC Conference, University of Alabama, Tuscaloosa ($100). Certificate

- **Graduate Assistant Lecturer** *Sep. 2018, Sep. 2020*
  Selected **twice** as Instructor of Record to teach CSCE 312: Computer Organization and Design, Dept. of CSE, TAMU (additional $500 as research support). Letter

- **Teaching Assistant Excellence Award** *Mar. 2018*
  In appreciation of dedicated service, exemplary attitude, and significant contribution, Dept. of CSE, TAMU ($500). Certificate

- **IEEE IPDPS PhD Forum** *May 2016*
  Among 37 selected Ph.D. students, to present research and network with senior academics and industry people through mentoring sessions. List

- **Travel Grants**
  IEEE HiPC 2019, Hyderabad, India (TAMU: $500); ACM FPGA 2019, Seaside, CA (ACM: $950); IEEE ICDCS 2017, Atlanta, GA (NSF + TAMU: $1500); IEEE IPDPS 2016, Chicago, IL (NSF: $568); IEEE NCVPRIPG 2013, Jodhpur, India (TCS)

- **Competitive Engineering Entrance Exams** *May 2010*
  ◦ Secured All India Rank 2076 (among 455,571 candidates: **top 0.41%**) in the highly competitive Indian Institutes of Technology-Joint Entrance Examination (IIT-JEE 2010) for admission to the B.Tech. program.
  ◦ Secured All India Rank 1246 (among 1,065,100 candidates: **top 0.11%**) in All India Engineering Entrance Exam (AIEEE 2010).

- **Gold Medal for Academic Excellence** *May 2009*
  Awarded to the meritorious students who have been declared scholar for 6 years in succession at Delhi Public School, Vasant Kunj, New Delhi, India.

Presentations

- IEEE HPCA 2023, Montréal, Canada
- ICML 2021, Virtual
- Rice NeurIPS Workshop 2021, Ken Kennedy Institute, Rice University, USA
- Computing@SEC 2019, University of Alabama, Tuscaloosa, USA
- ACM FPGA 2019, Seaside, CA, USA
- IEEE ICDCS 2017, Atlanta, GA, USA
- CSE-Industrial Affiliates Program 2017, TAMU, College Station, TX, USA
- Amazon Summer Internship Project 2017, Seattle, WA, USA
- IEEE IPDPS 2016 PhD forum, Chicago, IL, USA
- Bachelor Thesis Project 2014, IIT Guwahati, India
- NCVPRIPG 2013, IIT Jodhpur, India

Technical Skills

- **Programming**: C/C++, Python, JAVA, MATLAB, R, HDL, Assembly
- **Technologies and Frameworks**: MPI, OpenCV, Tensorflow, PyTorch, GitHub, LaTeX, Unix scripting, HTML

Service

- **Program Committee:** Local Chair ICHI (2023), Session Chair DAC (2022), ICML (2021), NeurIPS (2021)
- **Reviewer:** Reviewed **at least** 40 papers in top international venues spanning ICLR (2021, 2022, 2023, 2024), ICML (2021, 2024), NeurIPS (2016, 2020, 2021, 2022), TC (2024), INDICON (2021), IJCAI (2020), GLSVLSI (2016), ICCD (2015)

- **Rice D2K Showcase** — Houston
  Lead Organizer — *Fall 2022-Present*
- **TAMUHack** — College Station
  Judge — *2020*
- **Indian Graduate Student Association at TAMU** — College Station
  Vice-President of Advocacy and Student Adviser — *2014 - 2016*
- **Student Research Week at TAMU** — College Station
  Judge — *2015*
- **The Big Event at TAMU** — College Station
  Volunteer — *2015, 2016*