

# Jyotikrishna Dass

Research Scientist

Data to Knowledge (D2K) Lab, Rice University, Houston, Texas

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## RESEARCH INTERESTS

Machine Learning, Parallel Computing, Systems for Machine Learning

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## 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
- **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

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## 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<sup>th</sup> 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<sup>th</sup> 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<sup>th</sup> 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<sup>th</sup> 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<sup>th</sup> 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.

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## PATENT

System and Method for Identifying a Hairstyle of a Person, *India 3955/MUM/2013*, application resulting from TCS Research internship

- **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 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](#)
- **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](#)
- **Rice 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, Yonggan Zhang (Rice)
  - Responsibility: Led the complete proposal writing, and submission.
  - Status: **Accepted**
- **NSF 22-507: Principles and Practice of Scalable Systems (PPoSS)** Jan. 2022  
*Large: Zero-Touch Relational Systems for Massive Distributed Machine Learning*
  - PIs: Dr. Chris Jermaine (CS), Dr. Ang Chen (CS), Dr. Anastasios Kyrillidis (CS), Dr. Yingyan Lin (ECE), Rice, Dr. Dong Li (CSE), UC Merced
  - Status: Not Funded
- **NVIDIA Academic Hardware Grants Program** Jan. 2022  
*Edge-based Decentralized Incremental Learning System for Streaming Data*
  - PI: Dr. Jyotikrishna Dass (ECE)
  - Status: Not Funded
- **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
- **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
- **NSF 16-512: BIGDATA** Feb. 2016  
*Enabling Multi-Scale Soil Hydroinformatics: A Fusion of Multi-Source Data for Discovery, Dissemination, and Display*
  - PIs: Dr. Binayak Mohanty (HYDRO), Dr. Nick Duffield (ECE), Dr. Rabi Mahapatra (CSE), Dr. Matthias Krazfuss (STAT), Dr. Dan Goldberg (GEO), TAMU
  - Status: Not Funded
- **NSF 15-541: Cyber-Physical Systems (CPS)** May 2015  
*A Software Defined Micro-Fluidic Framework for Automatic Characterization of Cancer Cells*
  - PIs: Dr. Raktim Bhattacharya (AERO), Dr. Debjyoti Banerjee (MECH), Dr. Rabi Mahapatra (CSE), Dr. Tapasree Roy Sarkar (BIOSTAT), TAMU
  - Status: Not Funded

## TEACHING EXPERIENCE

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- **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*
- **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

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- **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) on a side project to build TAMU Bus Commute app as a part of their CSCE 431: Software Engineering course in Spring 2020.

## AWARDS

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- **NSF CISE Core Programs: Proposal** *Aug. 2022*  
Led the ideation, team creation, and proposal writing for *SHF: Medium: DILSE: Codesigning Decentralized Incremental Learning System via Streaming Data Summarization on Edge* which has been awarded \$1,200,000 grant from NSF. [Abstract](#)
- **META Network for AI: Proposal** *Aug. 2022*  
Led the proposal for *MILES: Multi-device Incremental Learning on Edge via Summarization* which has been awarded \$50,000 grant from META. As a winner, I was invited to attend the private, invite-only *Meta 2022 Networking & Communications Summit* held at Meta Office in New York, Oct'22. [News](#) , [Picture](#)

- **IEEE/ACM MICRO 2022: Tutorial**

Led the proposal for *Tutorial on Automated Tools for Fast Development of Deep Learning Networks and Accelerators* which has been selected as among the top-rated proposals to be delivered at MICRO 2022, Chicago, IL.

*Jul. 2022*
- **Rice University Creative Ventures Fund: Conference and Workshop Development**

Led the proposal for *Workshop on Automated AI Tools for Computing and Communication* which has been awarded \$10,000 to foster the development of workshop that enhance the reputation and quality of scholarship across the University. [News](#)

*Mar. 2022*
- **Graduate Teaching Fellowship**

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](#)

*Jan. 2020*
- **Best Ph.D. Thesis Poster Award**

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](#)

*Sep. 2019*
- **Graduate Assistant Lecturer**

Selected **twice** as Instructor of Record to teach CSCE 312: Computer Organization and Design, Dept. of CSE, TAMU (additional \$500 as research support). [Letter](#)

*Sep. 2018, Sep. 2020*
- **Teaching Assistant Excellence Award**

In appreciation of dedicated service, exemplary attitude, and significant contribution, Dept. of CSE, TAMU (\$500). [Certificate](#)

*Mar. 2018*
- **IEEE IPDPS PhD Forum**

Among 38 selected Ph.D. students to present research and network with senior academics and industry people through mentoring sessions. [List](#)

*May 2016*
- **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)

*May 2010*
- **Competitive Engineering Entrance Exams**

  - 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).

*May 2010*
- **Gold Medal for Academic Excellence**

Awarded to the meritorious students who have been declared scholar for 6 years in succession at Delhi Public School, Vasant Kunj, New Delhi, India.

*May 2009*

## PRESENTATIONS

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- 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

## WORK EXPERIENCE

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- **Data to Knowledge (D2K) Lab, Rice University** Houston, TX  
*Research Scientist, [D2K Lab](#)* *Aug. 2022 - Present*
  - I work on data science research, innovation, collaboration, and education. As a member of the leadership team at D2K, I am responsible for leading the development of D2K policies and procedures. I also build relationships with industrial, healthcare, and community partners for 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 Hu (Aug. 2022- Jul. 2023) and Dr. Rudy Guerra (Aug. 2023-Present)
- **Electrical and Computer Engineering, Rice University** Houston, TX  
*Postdoctoral Associate, [EIC Lab](#)* *Sept. 2021 - Aug. 2022*
  - Projects: Multi-accelerator system for incremental learning on edge, Codesigned accelerators for on-device vision transformer models
  - 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

## TECHNICAL SKILLS

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

## SERVICE

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- **Program Committee:** Local Chair ICHI (2023), Session Chair DAC (2022), ICML (2021), NeurIPS (2021)
- **Reviewer:** Reviewed at least 33 papers in top international conferences spanning NeurIPS (2016, 2020, 2021, 2022), ICLR (2021, 2022, 2023), ICML (2021), INDICON (2021), IJCAI (2020), GLSVLSI (2016), ICCD (2015)
- **Volunteering Education Initiatives during COVID-19** Virtual  
*Organizer and Instructor* *Apr. 2020 - May 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](#)
- **TAMUHack** College Station  
*Judge* *2020*
  - Participated as judge in TAMUHack (2020), one of the largest annual hackathons in Texas, hosted at TAMU.
- **Indian Graduate Student Association at TAMU** College Station  
*Vice-President of Advocacy and Student Adviser* *2014 - 2016*
  - Demonstrated ability to recruit, motivate, and lead team from diverse backgrounds in various roles of Vice-President and Student Adviser at Indian Graduate Students Association (IGSA) in Texas A&M. As a core member of the IGSA executive committee, I have designed, developed, and implemented strategic plans resulting in passing a proposal at A&M Transportation Services to change bus route to assist students in daily commute, in leading advocacy efforts at Graduate and Professional Student Council. , in securing sponsorship deals, in organizing numerous events, and in IGSA winning the Best Student Organization among 1000+ student organizations at Texas A&M for three consecutive years (2014-2017).
- **Student Research Week** College Station  
*Judge* *2015*

- SRW (2015) is the largest student run research symposium in the nation highlighting student research at TAMU.

- **The Big Event**  
*Volunteer*

College Station  
2015, 2016

- The Big Event is the largest one-day, student-run community service project in the nation where tens of thousands of TAMU students come together every Spring to show their appreciation towards residents of Bryan and College Station.