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Location: San Diego, CA

## Education

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- 2017–Exp 07/24 **PhD in Computer Science**, University of California, San Diego.  
2016–2017 **MSc in Computer Engineering**, Columbia University, New York.  
2011–2015 **BE in Electrical & Electronics Engineering**, Anna University, India.

## Scholastic Achievements

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|------|---------------------------------|------|------------------------------|
| 2022 | Best Demo Award   SenSys        | 2016 | Google Research Pilot Award  |
| 2017 | Best Paper Runner Up   BuildSys | 2016 | Best Dev Tool Award   HackRU |
| 2017 | Best Poster Award   BuildSys    | 2014 | Best Poster Award   MIT IoT  |
| 2017 | Best use of AWS   HackRU        | 2014 | Winner   MIT IoT Hackathon   |
| 2016 | Best Demo Runner Up   SenSys    |      |                              |

## Industry Internships

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- Summer 2021 **Research Intern** | ARM Research, Austin  
Developed Deep Learning models to predict malicious code using hardware performance counters. Assisted in developing methods for identifying models polluted by data poisoning attacks, using Hyperdimensional Computing.  
Secured a **Patent** for detecting unknown-unknowns in Time Series Forecasting applications.
- Summer 2018 **Research Intern** | Huawei Research, Santa Clara  
Designed Fast Machine Learning algorithms for inertial activity recognition using smartphone. Provided optimized implementation for real-time activity recognition on smartphones. Implementation was integrated into Huawei smartphones.

## Research Experience

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- 2017–Present **PhD Candidate** | SEELab | *University of California, San Diego*  
**Thesis:** *Pioneering Compute Efficiency for Deep Learning using Hyperdimensional Computing*  
Designed and implemented hybrid ML architectures using Deep Learning and Hyperdimensional Computing for efficient learning.  
Proposed novel methods for Federated Learning for efficient intelligence on the edge with 22× improved efficiency.  
Developed novel architectures for large scale text classification that are 200× smaller.  
Built sparse hierarchical deep learning models for activity recognition for efficient inference on edge.
- 2016–2017 **Graduate Research Assistant** | Intelligent and Connected Systems Lab | *Columbia University*  
Built custom headphones for pedestrian safety using Machine Learning to warn users of approaching vehicles.  
Implemented an energy footprinting system to provide occupants personalized actionable real-time insights into their energy usage  
Deployed a building sensor network, backend and a dashboard for providing real-time insights on personal energy consumption
- 2013–2015 **Undergraduate Research Assistant** | Solarillion Foundation, India  
Implemented a 10\$ Intelligent Prepaid Energy Meter, which monitored consumption and provided recommendations to save  
Developed a 5\$ Gesture Recognition Glove, using custom designed flex sensors reducing cost by 100x

## AI Skillset

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Deep Learning  
Time Series Forecasting  
Image Classification

Federated Learning  
Text Classification  
Computer Vision

Hyperdimensional Computing  
TinyML  
Bayesian Methods

## Dev Skillset

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Python  
PyTorch  
Jax  
C

Kubernetes  
Bash  
Tensorflow  
Embedded Systems

Svelte  
PySpark  
Git  
Docker

Go  
Flask  
CI/CD  
HTML/CSS

## Publications

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- 2024 **Multi-Model Inference Composition of Hyperdimensional Computing Ensembles.**  
ICCD 2024 (Under Review).  
R Chandrasekaran; F Ponzina; V Wang; S Minowada; S Sharma; T Rosing.
- 2024 **A Neuro-Symbolic Architecture for Efficient Classification using Hyperdimensional Computing.**  
ISLPED 2024 (Under Review).  
R Chandrasekaran; T Rosing.
- 2023 **Federated Hyperdimensional Computing.**  
ACM Transactions on Internet of Things (Under Review) Preprint: [10.48550/arXiv.2312.15966](https://arxiv.org/abs/10.48550/arXiv.2312.15966).  
K Ergun; R Chandrasekaran; T Rosing.
- 2023 **Multi-Label Classification with Hyperdimensional Representations.**  
IEEE Access Journal DOI: [10.1109/ACCESS.2023.3299881](https://doi.org/10.1109/ACCESS.2023.3299881).  
R Chandrasekaran; F Asgareinjad; J Morris; T Rosing.
- 2022 **Fhdnn: Communication Efficient and Robust Federated Learning for AIoT networks.**  
Proceedings of the 59th ACM/IEEE Design Automation Conference DOI: [10.1145/3489517.3530394](https://doi.org/10.1145/3489517.3530394).  
R Chandrasekaran; K Ergun; J Lee; D Nanjunda, J Kang, T Rosing.
- 2022 **Hdnn-pim: Efficient in memory design of hyperdimensional computing with feature extraction.**  
Proceedings of the Great Lakes Symposium on VLSI DOI: [10.1145/3526241.3530331](https://doi.org/10.1145/3526241.3530331).  
A Dutta, S Gupta, B Khaleghi, R Chandrasekaran, W Xu, T Rosing.
- 2021 **A drone-based system for intelligent and autonomous homes.**  
Proceedings of the 19th ACM Conference on Embedded Networked Sensor Systems DOI: [10.1145/3485730.3492881](https://doi.org/10.1145/3485730.3492881).  
S Xia, R Chandrasekaran, Y Liu, C Yang, TS Rosing, X Jiang
- 2019 **Efficient Sparse Processing for Smart Home Applications.**  
Proceedings of the 17th ACM Conference on Embedded Networked Sensor Systems DOI: [10.1145/3362743.3362963](https://doi.org/10.1145/3362743.3362963).  
R Chandrasekaran, Y Guo, A Thomas, M Menarini, M Ostertag, T Rosing
- 2018 **A Scalable System for Apportionment and Tracking of Energy Footprints in Commercial Buildings.**  
ACM Transaction on Sensor Networks (TSN) DOI: [10.1145/3218582](https://doi.org/10.1145/3218582).  
P Wei, X Chen, J Vega, S Xia, R Chandrasekaran, X Jiang
- 2018 **PAWS: A Wearable Acoustic System for Pedestrian Safety.**  
IEEE/ACM Third International Conference on Internet-of-Things Design and Implementation (IoTDI) DOI: [10.1109/IoTDI.2018.00031](https://doi.org/10.1109/IoTDI.2018.00031).  
D de Godoy, B Islam, S Xia, MT Islam, R Chandrasekaran, YC Chen, S Nirjon, P Kinget, X Jiang
- 2017 **ePrints a real-time and scalable system for fair apportionment and tracking of personal energy footprints in commercial buildings**  
ACM International Conference on Systems for Energy-Efficient Built Environments (BuildSys) DOI: [10.1145/3137133.3137150](https://doi.org/10.1145/3137133.3137150)  
P Wei, X Chen, J Vega, S Xia, R Chandrasekaran, X Jiang

- 2016 **Adaptive and Personalized Energy Saving Suggestions for Occupants in Smart Buildings**  
ACM International Conference on Systems for Energy-Efficient Built Environments (BuildSys) DOI: [10.1145/2993422.2996412](https://doi.org/10.1145/2993422.2996412)  
P Wei, X Chen, R Chandrasekaran, F Song, X Jiang
- 2016 **SEUS: A Wearable Multi-Channel Acoustic Headset Platform to Improve Pedestrian Safety**  
ACM Conference on Embedded Network Sensor Systems (SenSys) DOI: [10.1145/2994551.2996547](https://doi.org/10.1145/2994551.2996547)  
R Chandrasekaran, D de Godoy, S Xia, MT Islam, B Islam, S Nirjon, P Kinget, X Jiang
- 2016 **Personal energy footprint in shared building environment**  
International Conference on Information Processing in Sensor Networks (IPSN) DOI: [10.1145/2993422.2996412](https://doi.org/10.1145/2993422.2996412)  
P Wei, X Chen, R Chandrasekaran, F Song, X Jiang
- 2014 **Low-cost intelligent gesture recognition engine for audio-vocally impaired individuals**  
Global Humanitarian Technology Conference (GHTC) DOI: [10.1109/GHTC.2014.6970349](https://doi.org/10.1109/GHTC.2014.6970349)  
C Rishikanth, H Sekar, G Rajagopal, R Rajesh, V Vijayaraghavan

## Teaching

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<i>CSE 255</i>	Data Mining and Analytics
<i>CSE 151</i>	Intro to A.I. Stats Approach
<i>CSE 150A</i>	AI: Probabilistic Models
<i>CSE 152A</i>	Intro to Computer Vision
<i>CSE 101</i>	Design and Analysis of Algorithm
<i>W4701</i>	Artificial Intelligence
<i>E4764</i>	Intelligent and Connected Systems