

SANUP S. ARABALLI

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EDUCATION

PhD Candidate, Computer Science & Engineering

2020 – Aug 2026 (Expected)

Syracuse University, Syracuse, NY

Dissertation: “Bilevel Optimization on Large Scale Non-Convex, Constrained Combinatorial Problems”

Advisors: Dr. Chilukuri K. Mohan & Dr. Venkata Gandikota

Master of Science, Computer Science

2018 – 2020

Syracuse University, Syracuse, NY

WORK EXPERIENCE

Summer PhD Research Intern

Summer 2024

Air Force Research Laboratory (AFRL), Rome, NY

- Developed and published an interpretable Hierarchical Takagi–Sugeno–Kang Fuzzy Classifier System achieving high-fidelity predictions and enabling safety certified decisions in continuous control systems

Solutions Architect / Development Team Lead

Feb 2017 – July 2018

Accenture India, Bangalore

- Led cross-team solution architecture and API development at Accenture, delivering scalable, reusable systems for 30+ ecosystems with zero UAT defects.

Senior Developer

June 2009 – Jan 2017

Deloitte LLP, Bangalore

- Led Agile delivery and development of APIs and systems, serving as SME across multiple domains while delivering secure, PII-sensitive, and award winning solutions with zero production defects.

RESEARCH EXPERIENCE

PhD Research Assistant

2024 – Present

Dr. Venkata Gandikota's Lab, Syracuse University, NY

- Designed a hybrid evolutionary–surrogate framework for NP-hard optimization (validated on Max-Cut, extended to GRNs) and co-authored research on bilevel meta-modeling and neural network compression.

PhD Research Assistant

2021 – 2024

Dr. Chilukuri K. Mohan, Syracuse University, NY

- Developed a surrogate assisted coevolutionary framework achieving >96% computation cost reduction with orders-of-magnitude performance gains, and introduced a dual Gaussian Process architecture for constraint aware optimization in ML systems.

Graduate Research Assistant

Summer 2019 – Summer 2021

Syracuse University – ComScore / Newhouse School, NY

- Led the Machine Learning development for a ComScore collaboration, building models achieving 80%+ accuracy in ad retention prediction, and published award-winning research recognized in industry press.

PUBLICATIONS

[1] “Distilling Deep Reinforcement Learning into Interpretable Fuzzy Rules: An Explainable AI Framework”

S. Araballi, C. K. Mohan, S. Khan. *AAAI Spring Symposium Series (SSS)*.

2026

[2] “A Surrogate-Assisted Co-Evolutionary Framework for Bilevel Optimization”

S. Araballi, V. Gandikota, P. Sharma, P. Khanduri, C. Mohan. *ECTA/IJCCI*. 2025

[3] “Developing an ad viewing retention model for TV comedy through machine learning” **Open Paper Winner**
S. Araballi, Q. Ni, F. Chew, B. Egan, C. Mohan. *BEA Conference*. 2021

[4] “Stay tuned: Predicting ad viewing retention in TV programs using machine learning”
F. Chew, B. Egan, C. Mohan, D. Xu, S. Araballi. *BEA Conference*. 2020

[5] “Predicting effective ad curation with neural networks and statistical analyses to maximise audiences during TV ad breaks”
F. Chew, B. Egan, C. Mohan, S. Araballi, D. Xu. *ARF Audience xScience Conference*. 2020

Under Review / In Preparation

[1] “T-RIS: Temporal Reverse Influence Sampling for Large-Scale Temporal Networks.”
S. Araballi & V. Gandikota. *ACM Knowledge Discovery and Data Mining* 2026

[2] “Crisp Distance Metrics for Fuzzy Rules”
S. Araballi, C. Mohan & S. Khan. *FUSION* 2026

[3] “1-Bit Retrieval-Augmented Generation”
S. Araballi & V. Gandikota. *In preparation* 2026

SELECTED ACADEMIC PROJECTS

- **Aerodynamic Shape Optimization via Genetic Algorithms.** Evolved minimum-drag geometries with Blender as physics simulator; drag coefficient as fitness signal. Applied demonstration of the EA-surrogate paradigm central to the dissertation.
- **Reinforced Trading Bot (C51 DQN).** Categorical Deep Q-Network on live candlestick data; agent learned stop-loss, buy/sell, and long/short strategies achieving consistent profitability without human labelling.
- **Information Cascade Prediction via Graph Embeddings.** Depth First Search-biased node2vec outperforms state-of-the-art CasFlow for cascade popularity prediction; establishes depth-first structural priors as superior for diffusion modelling.

TEACHING

- Primary Instructor – CPS196: Introduction to Programming with Python** *Fall 2023*
Syracuse University, Dept. of Electrical Engineering & Computer Science
- Independently designed and delivered the complete course: syllabus, lectures, labs, and exams. Managed a teaching assistant of my own.
- Teaching Assistant** *2020 – 2026*
Syracuse University, Dept. of Electrical Engineering & Computer Science
- CIS 453 Software Specification & Design**
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| Fall '20, Fall '21 | <i>Dr. Chilukuri K. Mohan</i> |
| Fall '22 | <i>Dr. Edmund Yu</i> |
| Fall '24, Fall '25, Spring '26 | <i>Prof. Joseph Waclawski</i> |
- CIS 454 Software Implementation**
- | | |
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| Spring '20, Spring '21, Spring '22 | <i>Dr. Chilukuri K. Mohan</i> |
| Spring '23 | <i>Dr. Edmund Yu</i> |
| Spring '25 | <i>Prof. Joseph Waclawski</i> |
- CIS 600 Introduction to Machine Learning**
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| Spring '24 | <i>Dr. Natarajan Gautam</i> |
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**PRESENTATIONS
&
INVITED TALKS**

- “Combinatorial Optimizations Under Bilevel Framework with Evolutionary Algorithms,”
Poster, SU ECS Research Day. *Spring 2026*
- “Fuzzy Rule-Based Framework for Explainable Reinforcement Learning,”
Poster, SU ECS Research Day. *Spring 2025*
- “Malware Generation and Detection Avoidance using GANs and EAs,”
Poster, Cybersecurity Symposium, University at Albany. *2019*
- “Retrieval-Augmented Generation,”
Invited Talk, CIS731 Artificial Neural Networks, Syracuse University. *Spring 2026*
- “Graph Embeddings,”
Invited Talk, CIS731 Artificial Neural Networks, Syracuse University. *Fall 2023*

**PROFESSIONAL
SERVICE****Peer Reviewer**

- Tapia Conference *2026, 2025*
- World Congress on Computational Intelligence - IEEE *2026*
- NeurIPS - Main Track, Ethics, Datasets & Benchmarks *2025*
- International Joint Conference on Neural Networks *2025*
- NeurIPS - New Paradigms in Graph Machine Learning *2025*

Mentorship

- Mentor to 15 graduate and undergraduate students *2020 - 2024*
- Team Mentor - Hack Upstate Competition *2019*

**AWARDS &
RECOGNITION**

- **Open Paper Competition Winner**, Broadcast Education Association (BEA) Conference. *2021*
Research recognised in a ComScore industry press release.
- **SURE Grant**, Syracuse University. *2025 – 2026*
- **Graduate Summer Fellowship**, Syracuse University. *2022*
- **CUSE Grant** (ComScore collaboration), Syracuse University. *2019 – 2020*
- **Outstanding Employee of the Business Unit**, Deloitte LLP; Multiple Applause & SPOT Awards.

SKILLS**Programming Languages**

Python, Julia, C++, SAP ABAP *Languages*

Machine Learning

PyTorch, TensorFlow, Scikit-learn, Keras, NetworkX, Gymnasium *Frameworks*

Pandas, NumPy, Matplotlib, Seaborn *Data Libraries*

Tools

SQL, Git / GitHub, L^AT_EX, Visual Paradigm *Core*

Jira, Taiga *Project Management*

Research Domains

Bilevel Optimization, Evolutionary Algorithms, Reinforcement Learning *Optimization*

Explainable AI, Graph Neural Networks,
Information Cascades, Surrogate Modelling *AI & Graphs*