

MANAS NAIR

3rd Floor, #543, ◇ 3rd Cross, 4th Main Road

RT Nagar, Bengaluru ◇ Karnataka 560032

(+91) · 80950 · 15233 ◇ manas@congruencesystems.com ◇ manasnair.net

EDUCATION

Carnegie Mellon Univeristy

2019 - 2021

Master of Science In Information Security

Pittsburgh, Pennsylvania

- Sample Coursework: Computer Systems, Machine Learning, Advanced Real World Networks, Network Security

PES University

2015 -2019

B.Tech. in Electronics and Communication, Signal Processing Specialization

Bangalore, India

- Minor degree in **Computer Science**
- CS Minor coursework: Data Structures, Database Management Systems, Algorithm Design

Massachusetts Institute of Technology

2025 - ongoing

Micromasters in Statistics and Data Science

MITx

- Coursework: Probability, Fundamentals of Statistics, Machine Learning with Python, Data Analysis: Statistical Modeling and Computation

Rochester Institute of Technology

2018 -2019

Micromasters in Cybersecurity

RITx

- Coursework: Cybersecurity Fundamentals, Cybersecurity Risk Assessment, Network Security, Computer Forensics, Cybersecurity Capstone Course

RESEARCH INTERESTS

Topic

Sustainable Development and Technology, Marketing and Consumer Behavior

Methodology

Deep Learning, Reinforcement Learning, Physics Informed Machine Learning
Signal Processing and Spectral Analysis

PUBLICATIONS

Journal Papers

1. "Feature importance analysis using ensemble decision tree models for aspirational luxury purchase intention of young cohorts in emerging markets", *Journal of Decision Systems*
2. "The impact of the COVID-19 pandemic on e-learning adoption in an emerging market: a longitudinal study using the UTAUT model ", *Journal of Asia Business Studies*

Working Papers

1. "A Zero-Shot Sentiment Analysis of the Value-Action Gap between Sustainability and Fast Fashion Purchase ", *Business and Society Review*

Working Patent

1. Method for Feature Set Extraction from Sequence Data for Data Driven Digital Twin Towards Condition Monitoring and Anomaly Detection.

- Developed a technology that facilitates condition monitoring through data driven and Physics Informed identification of the characteristics of a system or process. Working with the patent agent for patent landscaping analysis, PCT filing of the technology and identification of the application space of this technology.
- Responsibilities as lead inventor also included an initial in-house patent search that revealed the novelty of the technology. Further, a series of multiple jugular experiments were conducted to prove the viability of the technology considering potential application spaces.

PROFESSIONAL EXPERIENCE

Congruence Systems

Lead Technologist

November 2022 – Present

Bangalore, India

- Congruence Systems is a research-intensive lean startup with its core focus dedicated to the development of an cloud-based analytics platform for system identification, condition monitoring and anomaly detection.
- Instrumental in the development of proprietary IP that integrates physics-based domain characteristics with a feature set extracted using data-driven machine learning for system identification, parameter extraction and model development. The engineered MVP solutions hold leap of faith technology assumptions towards real world applications that include battery modeling and ECG anomaly detection.
- Spearheaded ongoing development of a prototype for the cloud based platform capable of extracting sensor data and efficiently uploading it into a cloud based backend for storage, retrieval and analytics.
- Key contributor towards receiving approval towards acceptance into Government of India's Start Up program the development of a proposal to receive GoI seed funding.

Modelicon Infotech LLP

Consultant - AR Training Module Development

March 2024 – July 2024

Bangalore, India

- Consulted on enhancements to help improve course visual design and overall learner experience of AR-based teaching modules by refining layouts, graphics, and instructional flow.
- The additions improved content engagement by polishing course materials and improving user experience creating visually appealing learning assets.
- Helped develop and produced introductory videos that simplified complex concepts, making the AR modules more accessible and appealing to new users.

GBCS Group

Design Consultant

July 2022 – November 2022

Remote, Calgary, Alberta

- Developed business proposals for RFPs that highlight the organization's sustainability-based approach to Fleet Management.
- Worked with a core group that included senior leadership to design proposals for long term projects such as fleet management for a major city's public transport and revamping a city's sewage system to improve its sustainability.

Sunlux Technovations

Software Architect

February 2022 – July 2022

Bangalore, India

- Lumiczar is Sunlux's proprietary commercial emergency/exit lighting IoT platform and includes built-in-test architecture to deploy and monitor mandated automated scheduled safety mandated tests.
- Designed and developed backend architecture to support data querying with efficient data storage and retrieval from edge devices in the IoT network for cloud deployment. Edge device data includes detailed remote test results and health status indicators.
- Developed backend authentication and permission management for different actors in the system with a clean API library for seamless data upload data and retrieval. Closely worked with frontend developers and UI/UX engineers to integrate the system which is currently deployed in the field.

Carnegie Mellon University – TEEL Lab

Research Assistant

Aug 2020 – May 2021

Pittsburgh, Pennsylvania

- Researched development of Carnegie Mellon University TEEL Lab's *Sail()* platform for social and interactive learning.
- Designed coursework for the Fundamentals of Programming (in Python) course aimed at teaching programming to those with no prior experience in programming in the US Army. Developed course assignments and projects as well as automated testers and graders to evaluate student submissions.
- Served as a Teaching Assistant for the virtual course where responsibilities involved interacting with students, answering student doubts and reviewing automatically graded submission scores.

ERMProtect

Information Security Consultant Intern

June 2020 – August 2020

Remote, Miami, Florida

- Apprenticeship program consisting of an Information Security consultancy bootcamp for future onboarding. Worked with open-source pen-testing tools like BurpSuite, Metasploit, nmap, nessus and Dirbuster.
- Carried out projects designed to equip InfoSec consultants with the tools to perform real world analysis of penetration testing and forensics.

Angelgrad

Software Engineering Intern

May 2020 – July 2020

Remote, Irving, Texas

- Angelgrad is a platform designed to allow University students and alumni to book time with alumni for mentorships, network for job opportunities and host campus events.
- Worked on developing the backend architecture for Angelgrad's events module used to manage new creation and RSVP to Angelgrad app-hosted events from scratch. The architecture was developed using NestJS with Sequelize as an ORM for MySQL.

Juniper Networks

Software Engineering Intern

Jan 2019 – July 2019

Bengaluru, India

- Selected as part of Juniper Networks India's University Talent Program.
- Developed a software routine framework that automates testing of Juniper's containerized Routing Protocol Daemon (cRPD) using TOBY, Juniper's proprietary testing platform based on the ROBOT Framework which is written in Python. The framework includes resilience testing using ixia traffic generators
- The routines to develop fully automated tests remove the need for future manual tests of standard router operations and robustness.
- Developed similar automated testing framework suites for the PCEP-cli used in Juniper's Northstar SDN Controller.

Modelicon Infotech LLP

Software Developer Intern

April 2017 – July 2017

Bengaluru, India

- Remote Vehicle Monitoring via On-Board Diagnostics (OBD) and GPS: OBD refers to a vehicle's self-diagnosing platform where data collected from the ECU and other various sensors congregate at a single point.
- Designed, developed and tested working Python libraries that facilitate bleeding of vehicle data from its OBD-II port as well as attached GPS sensors. The blend of data collected from the vehicle shows potential applications in driver safety, fleet monitoring and tracking.
- The codebase testing and integration of involved live runs of the working code in a vehicles operated in different traffic conditions

CONFERENCE PROCEEDINGS

1. "An End-to-End Analysis of Sustainable Fashion Benefits and How Fast Fashion Practices Impact Consumers: A Zero-Shot Sentiment Analysis", ICTO 2025: Reimagining is Research and Practice for an Evolving Digital World, Excelia Business School, La Rochelle.
2. "PLS-SEM Analysis to Investigate the Impact of COVID-19 Interruptions on E-Learning Platform Adoption", ICTO 2023: Ethical & Responsible Artificial Intelligence for Sustainable Societies, Sorbonne Université, Paris, France

SELECTED MASTER'S PROJECTS

myFTL

Fall 2020

- Designed, developed and tested a flash translation layer (FTL) for an emulated solid state drive (SSD) in C++. Features developed:
 1. Translation Logic - Reduces the mapping table size by associating logic to deriving a physical block address (PBA) from an (LBA).
 2. Garbage Collection - The action of tracking live data, copying it to some other location, erasing the block, and restoring the live data in that block is called garbage collection.
 3. TRIM - TRIM is used by the layers above the SSD to inform the SSD that certain LBAs do not contain live data. This improves garbage collection efficiency.
 4. Wear Leveling - This is the process of ensuring that we do not erase a few blocks too many times, while the others are erased much less often.

Selective Jamming Attacks on Zigbee Networks

Spring 2020

- Configured and set up a testbed containing home automation devices that communicate using the Zigbee protocol. The testbed included both Zigbee and Zigbee 3.0 devices. The goals of the project are as follows:
 1. Selectively jam all MAC layer commands
 2. Selectively jam some Network layer commands
 3. Observe and document the effects of selective jamming attacks against individual commands and specific combinations of commands.

Dynamic Memory Allocator

Fall 2019

- Designed, wrote and tested code for a general purpose dynamic storage allocator for C programs i.e.a custom version of the malloc, free, realloc, and calloc functions. Achieved a perfect score that denotes an allocator that is optimally correct, efficient, and fast. The utility of the key functions are:
 1. **malloc**: Returns a pointer to an allocated block payload which must always return 16-byte aligned pointers.
 2. **free**: Frees memory in the block pointed to by a given pointer.
 3. **realloc**: Returns a pointer to an allocated region of a given size bytes depending on conditions determined by the input pointer.
 4. **calloc**: Allocates memory for an array of elements of a given byte size each and returns a pointer to the allocated memory which is set to zero before returning.

TECHNICAL STRENGTHS

Programming Languages

Python, C, C++, Java, Typescript, JavaScript

Machine Learning Frameworks

PyTorch, TensorFlow, scikit-learn, XGBoost, NumPy, Pandas

Tools

LaTeX, SmartPLS, MERN Stack, NestJS, SQL, ROBOT Framework

SERVICES AND HONORS

Reviewer

1. *Communications of the Association for Information Systems*
2. *Information Technology & People, Emerald Publishing*
3. *ICTO 2024: Augmented Intelligence for Smarter Societies, DVRC, Paris*

Carnegie Mellon University INI Scholarship

- Awarded scholarship upon acceptance into Carnegie Mellon University by the Information Networking Institute.

Juniper Networks Talent Search Program

- Selected for Juniper Networks India's six month undergraduate internship program leading to a full-time offer by qualifying past a nationwide talent search program.

Prof CNR Rao Merit Scholarship Awardee across Semesters

- Undergraduate merit award presented to students with distinction level grades at PES University.

Infosys Spark Program

- Selected as one of 50 students nationally through an aptitude test selectively held for top high school students across the country to undergo a Summer Program designed to inspire young students towards Computer Science at Infosys India's corporate office in Bengaluru, India.

Abacus All India Ranked Competitor

- Graduate in certification in Abacus. Ranked 13 and 19 in the country.