

Nithun Selva

Curriculum Vitæ

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EDUCATION

Colby College, Waterville, ME

Expected May 2025

Bachelor of Arts in Computer Science (AI) and Astrophysics

GPA: 4.0/4.0

Honors: Dean's List (Spring 2022 – Spring 2024)

Relevant Coursework: Deep Learning, Neural Networks, Algorithm Design and Analysis, Computational Modeling and Simulation, Data Analysis and Visualization, Statistical Mechanics, Vector Calculus, Quantum Mechanics

Research Interests: Reinforcement Learning, Computer Vision, Multimodal ML, Agentic AI, Foundational LLMs/Transformers, Computational Astronomy, Physics-based Simulations, Image Processing

RESEARCH EXPERIENCE

Research Assistant (Reinforcement Learning)

Feb 2023 – Present

Colby College Department of Computer Science

PI: Prof. Ying Li

- Leveraged Python and TensorFlow to design and simulate a network of collaborative drone agents.
- Improved task success rates using advanced reinforcement learning algorithms like Proximal Policy Optimization (PPO).
- Tackled the curse of dimensionality by limiting information sharing to adjacent/local drone agents, achieving comparable performance to global sharing, optimizing code to enhance execution speed and scalability.
- Co-authored a conference paper submitted to ICCCN 2025 (under review).

Research Assistant (Computer Vision)

Feb 2023 – Present

Colby College Department of Physics and Astronomy

PI: Prof. Dale Kocevski

- Built contrast-invariant ML models to classify galaxy morphologies across redshifts using James Webb Space Telescope (JWST) data from the CEERS collaboration—being developed into an Honors Thesis.
- Curated and manually classified an extensive galaxy morphology dataset from JWST for optimal model training, improving accuracy over existing Hubble-based classifications—to be made publicly available.
- Integrated multi-wavelength JWST and Chandra X-Ray Telescope data to assist in identifying new Active Galactic Nuclei (AGN) candidates.
- Optimized code to run on the Colby HPC GPU cluster, significantly reducing training time for models.

Summer Research Assistant

June 2024 – August 2024

Colby College Department of Computer Science

PIs: Prof. Ying Li, Prof. Hong Zhang

- Engineered textual and image analysis solutions for a digital archiving project of Chinese magazines from the 1950s–1970s for the East Asian Studies department, with the Davis Institute for AI.
- Filtered 500+ magazine pages to improve OCR accuracy for mixed traditional/simplified Chinese text and rectify scan issues.
- Employed the OpenAI API and prompt engineering to integrate images and transcribed text to generate descriptions and tags for each magazine page.
- Created a comprehensive list of identified objects/themes enhancing search functionality and accessibility.

Research Assistant

Feb 2022 – Feb 2023

Colby College Department of Physics and Astronomy

PI: Prof. Elizabeth McGrath

- Analyzed galaxy evolution based on local environments using data from the Hubble CANDELS sky survey.
- Migrated 10+ astronomical IDL scripts to Python.
- Built brand new image processing pipelines for FITS data reduction and analysis, including bias, dark, and flat field corrections, as well as calibration and astrometric alignment using Astropy and PixInsight.

PUBLICATIONS & PRESENTATIONS

Distributed Energy-Aware Multi-Agent K-hop Proximal Policy Optimization for Mission-Oriented Drone Networks

Conference Article, ICCCN 2025 (under review)

Ying Li, Nithun Selva, Ruihan Zhu

Privacy-Focused Raspberry Pi-based AI Assistant Leveraging On-Device Machine Learning

Unpublished Report, and Poster Presentation

May 2024

Nithun Selva, Clio Zhu

Modern Astrophotography Methods (Imaging & Processing)

Presentation, Colby Liberal Arts Symposium

April 2024

Nithun Selva

Distributed K-hop Energy-Aware Multi-Agent Reinforcement Learning for Mission-Oriented Drone Networks

Presentation, Colby Undergraduate Summer Research Retreat

July 2024

Nithun Selva, Clio Zhu, Prof. Ying Li

PROJECTS

stylsavant

Feb 2025 – Present

(JavaScript, LangChain) | Chrome Web Store

- Developed an AI-powered browser extension to analyze users' clothes shopping cart and automatically recommend complementary fashion pairings from the same website, released on the Chrome Web Store.
- Optimized data retrieval and used prompt engineering techniques, reducing token usage by 75-90%.
- Implemented a Retrieval-Augmented Generation (RAG) system to enhance recommendation accuracy and personalization.

Raspberry Pi AI Assistant

Mar 2024 – May 2024

(Python, PyTorch, C, Qt5) | GitHub

- Developed a privacy-centric voice assistant leveraging HuggingFace open-source models on a Raspberry Pi.
- Implemented a few-shot trained classifier to intelligently recognize voice commands for features like a conversational AI, translation, note-taking/reminders and image generation, and open source it on GitHub.
- Designed a user-friendly, intuitive touch GUI and created a sleek, portable 3D-printed enclosure.

FITSOpen

Aug 2023 – Present

(Swift, SwiftUI) | GitHub

- Developed a first-of-its-kind iOS app for analyzing astronomical FITS images and data on mobile devices.
- Enabled real-time viewing and editing of astrophotography data, streamlining workflow for astronomers.

ColbyTrails

Aug 2024 – Present

(Swift, SwiftUI) | GitHub

- Created an iOS navigation app using MapKit for the Perkins Arboretum Trail System at Colby College.
- Integrated GeoJSON overlays for real-time location tracking, displaying trail lengths and difficulty levels.

SKILLS

Programming Languages: Python, MATLAB, C/C++, SQL, IDL, Swift, VHDL, Java, Javascript, HTML/CSS

Frameworks/Software: TensorFlow, PyTorch, NumPy, SciPy, Matplotlib, PIL, JAX, LLMs, Transformers, Git, Linux/Unix, Arduino, L^AT_EX, Socket Programming, PixInsight, SketchUp 3D

Languages: Tamil (native/bilingual), Mandarin Chinese (elementary), Hindi (elementary)

REFERENCES

Prof. Dale Kocevski

Associate Professor of Physics and Astronomy; Chair of Physics and Astronomy

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