

# Atharv Sonwane

🌐 [threewisemonkeys-as.github.io](https://threewisemonkeys-as.github.io) | 🌐 [threewisemonkeys-as](https://threewisemonkeys-as.github.io) | Google Scholar  
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## RESEARCH INTERESTS

★ Robotics ★ Neurosymbolic AI ★ Representation Learning ★ Reinforcement Learning ★ Program Synthesis  
★ Cognitive Science ★ Meta Learning ★ Automated Reasoning ★ Hierarchical Planning ★ Distributed Systems

## EDUCATION

★ **Birla Institute of Technology and Science, Pilani** *2018 - 2022 (Expected)*  
Bachelor in Engineering, Computer Science. CGPA = 8.89 / 10 *India*

## PUBLICATIONS

2. **Atharv Sonwane**, Gautam Shroff, Lovekesh Vig, Ashwin Srinivasan, Tirtharaj Dash.  
Solving Visual Analogies Using Neural Algorithmic Reasoning. *AAAI-22 Student Abstract and Poster Program*.  
Finalist in the Oral Presentation Competition. 2021. [Link](#).
1. **Atharv Sonwane\***, Sharad Chitlangia\*, Tirtharaj Dash, Lovekesh Vig, Gautam Shroff, Ashwin Srinivasan.  
Using Program Synthesis and Inductive Logic Programming to solve Bongard Problems. *Work in Progress Report*  
at the *10th International Workshop on Approaches and Applications of Inductive Programming*. 2021. [Link](#)

## EXPERIENCE

- ★ **Robot Vision and Learning Lab, University of Toronto** *Sept 2021 - Present*  
Research Intern | Advisor: [Dr. Florian Shkurti](#)  
▷ Developing a task and motion planning approach for robotic arms that integrates learning from experience.
- ★ **TCS Research & Innovation** *June 2021 - Sept 2021*  
Research Intern | Primary Advisor: [Dr. Gautam Shroff](#)  
▷ Investigated the use of neural algorithmic reasoning approach to perform analogical reasoning in a visual domain.  
▷ Demonstrated that search over learned neural primitives can perform equivalently to symbolic ones.
- ★ **APP Centre for Artificial Intelligence Research & TCS Research** | [WEB](#) *Jan 2021 - June 2021*  
Undergraduate Researcher | Primary Advisor: [Prof Ashwin Srinivasan](#)  
▷ Developed an Inductive Programming approach to solve visual reasoning problems using program synthesis for representation and Inductive Logic Programming for concept identification.  
▷ Explored integration of logical automata as memory into reinforcement learning
- ★ **Centre of Robotics and Machine Intelligence IIIT Allahabad** | [WEB](#) *Summer 2020*  
Research Intern | Advisor: [Prof G.C. Nandi](#)  
▷ Implemented and tested performance of various Deep RL algorithms from scratch in PyTorch
- ★ **Council of Scientific and Industrial Research - CEERI** | [WEB](#) | [CODE](#) *Summer 2020*  
Research Intern | Advisors: [Samarth Singh](#) and [Dr. Rakesh Warier](#)  
▷ Built a drone controller module and OpenAI Gym Environment on top of the MAVROS and PX4 frameworks

## TECHNICAL SKILLS

<b>Programming</b>	Python, C/C++, MATLAB, SQL, Bash
<b>Deep Learning</b>	PyTorch, NumPy, JAX, pandas, scikit-learn
<b>Robotics</b>	Robot Operating System (ROS), Gazebo, MAVROS, PX4
<b>Tools</b>	Git, $\LaTeX$ , Unix, CI, Docker, AutoCAD

## SELECTED PROJECTS

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- ★ **GenRL | PyTorch Reinforcement Learning Library | [CODE](#)** *June 2020 – Jan 2021*  
*Society for Artificial Intelligence and Deep Learning (SAiDL)*
  - ▷ Contributed implementations of various Deep Contextual Bandits
  - ▷ Core Maintainer and worked on implementation of distributed RL using RPC
- ★ **Trotbot | Autonomous Delivery Robot | [CODE](#)** *Sep 2018 – Dec 2020*  
*Electronics and Robotics Club, BITS Goa (ERC)*
  - ▷ Built obstacle detection and path planning stack using Robot Operating System (ROS) in Python
  - ▷ Implemented Rapidly Exploring Random Trees (RRT) for path planning in complex indoor environments
- ★ **GenNav | Python library for Robotics Navigation | [CODE](#)** *March 2020 – Dec 2020*  
*Electronics and Robotics Club, BITS Goa (ERC)*
  - ▷ Co-author and Lead Maintainer working with a team of 10+ student contributors
  - ▷ Modular collection of navigation algorithms and utilities commonly used in Robotics with a ROS wrapper
- ★ **Causal Reasoning from Meta-Reinforcement Learning Exploration | [CODE](#)** *March 2021 - May 2021*  
*Final Project for Meta Learning course (BITS G513)*
  - ▷ Implemented methods described in the paper and reproduced results on various experiments.
  - ▷ Devised, performed and documented additional experiments to further evaluate the central claim that Meta RL agents can perform Causal Inference.
- ★ **Structure and Inductive Biases in Reinforcement Learning | [CODE](#)** *July 2020 – Dec 2020*
  - ▷ Implemented methods which used graph representations in RL to explore structural inductive biases

## LEADERSHIP AND TEACHING ROLES

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- ★ **Hardware Lead - Curem Biotech | [WEB](#)** *June 2021 – Present*
  - ▷ Raised pre-seed funding worth \$10,000 for diagnosis of Neglected Tropical Diseases
  - ▷ Designing and writing firmware for prototype blood sample imaging device with ML integration
- ★ **Teaching Assistant - Deep Learning (CS F425) | [WEB](#)** *Aug 2021 – Dec 2021*
  - ▷ Conducting weekly labs and tutorials for course taught by Prof Tirtharaj Dash
- ★ **Teaching Assistant - Machine Learning (BITS F464) | [WEB](#)** *Jan 2021 – May 2021*
  - ▷ Conducted weekly labs and organised final project for course taught by Prof Ashwin Srinivasan
- ★ **Teaching Assistant - Discrete Structures for Computer Science (CS F222)** *Aug 2020 – Dec 2020*
  - ▷ Mentored undergraduate students in weekly problem solving sessions for course taught by Prof AB Matthews
- ★ **Organising Co-Lead - APPCAIR AI Symposium 2021 | [WEB](#)** *October 2021*
  - ▷ Organised an event with 500+ attendees aimed at bringing together the AI community in India. Included a social along with talks from a mix of senior researchers and early career practitioners in the field of AI.
- ★ **President - Society for Artificial Intelligence and Deep Learning | [WEB](#)** *June 2021 – Present*
  - ▷ Organising research, open-source projects, student-run courses and regular reading sessions for a group of talented undergraduates interested in AI
- ★ **Student Coordinator - Electronics and Robotics Club | [WEB](#)** *Aug 2020 – July 2021*
  - ▷ Organising research projects, funding, work exhibitions and holding regular discussion sessions for a large (100+) group of undergraduates interested in Robotics
- ★ **Instructor for Student Run Courses on Robotics and Deep Learning** *April 2020 – Dec 2020*
- ★ **Committee Member - SandBox Innovation Laboratory | [WEB](#)** *Aug 2020 – Aug 2021*

## RELEVANT COURSEWORK

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**Meta Learning<sup>#\*</sup>, Machine Learning, Artificial Intelligence,** Linguistics, Probability and Statistics, Graphs and Networks, Intro to Cognitive Neuroscience, Theory of Computation, Data Structures and Algorithms, Linear Algebra, Calculus, Computational Physics, Quantum Informatics and Computing  
# = graduate level, \* = ranked as top student