

SOUNDARYA KRISHNAN



EDUCATION

Birla Institute of Technology and Science (BITS), Pilani, India

• B.E. Computer Science: **Major GPA: 9.81**

Expected: June 2021

• M.Sc. Physics: **Major GPA: 9.84**

Expected: June 2021

Overall GPA: 9.47

Department Rank 1, Recipient of the Institute Merit Scholarship (fee waiver) for consistent excellent performance in academics (Top 1% in cohort)

PUBLICATIONS AND TALKS

FASCIA: An Open-Source Real-Time Interpretable Sleep Staging Tool for Researchers

Soundarya Krishnan, Varghese Mannampalli, Guillermo Bernal, Pattie Maes

Working Paper — [\[Code\]](#)

Constructing and Evaluating an Explainable Model for COVID-19 Diagnosis from Chest X-rays

Rishab Khincha, Soundarya Krishnan, Krishnan Guru-Murthy, Tirtharaj Dash, Lovekesh Vig, Ashwin Srinivasan

Preprint — [\[Paper\]](#)

CovidDiagnosis: Deep Diagnosis of COVID-19 Patients Using Chest X-Rays

Kushagra Mahajan, Monika Sharma, Lovekesh Vig, Rishab Khincha, Soundarya Krishnan, Adithya Niranjana, Tirtharaj Dash, Ashwin Srinivasan, Gautam Shroff

2nd TIA Workshop, MICCAI 2020. Springer LNCS — [\[Paper\]](#)

A Case Study of Transfer of Lesion-Knowledge

Soundarya Krishnan, Rishab Khincha, Lovekesh Vig, Tirtharaj Dash, Ashwin Srinivasan

2nd MIL3D Workshop, MICCAI 2020. Springer LNCS — [\[Paper\]](#) [\[Talk\]](#) [\[Slides\]](#)

Network Community Analysis Based Enhancement of Online Discussion Forums

Soundarya Krishnan, Rishab Khincha, Neena Goveas

ACM-W India Celebration of Women in Computing 2020 Student Poster Competition- Won 1st Place — [\[Links\]](#)

Young Researchers' Symposium, CODS-COMAD 2021 [[Honourable Mention](#)] — [\[Demo\]](#) [\[Code\]](#)

ECG Signal Analysis on an Embedded Device for Sleep Apnea Detection

Rishab Khincha, Soundarya Krishnan, Rizwan Parveen, Neena Goveas

9th International Conference on Image and Signal Processing- Paper published — [\[Paper\]](#) [\[Code\]](#)

2nd International Conference on Image, Video and Signal Processing- Abstract accepted for oral presentation

Phase Polynomials and Lempel's algorithm

Soundarya Krishnan, Neil Julien Ross

Working Paper — [\[Paper\]](#)

EXPERIENCE

Microsoft Research [[Thesis](#)]

Research Intern — Advised by [Dr. Amit Sharma](#)

Jan 2021 - Jun 2021

Bangalore, Karnataka, India

• Working on the efficient generation of model-agnostic counterfactual explanations. One of the primary contributors to the [DiCE](#) (Diverse Counterfactual Explanations) library.

MIT Media Lab: Fluid Interfaces [[Thesis](#)]

Research Intern — Advised by [Prof. Pattie Maes](#)

Aug 2020 - Dec 2020

Cambridge, Massachusetts, USA

• Working on the project [FASCIA](#): Built CNN-LSTM models (with 1-D saliency maps) for automatic sleep scoring. Accompanied model predictions with Slow waves, Spindles, K-complexes extracted from signals, FFT PSD plots. Integrated the pipeline on a real-time open-source web-based interface using socket programming, Node.js, Express.js for the website, D3.js for the visualization, MongoDB for the database. Currently working on a user study to gauge the efficacy of the interface. — [\[Code\]](#)

Uber

Software Development Intern

May 2020 - Jul 2020
Bangalore, Karnataka, India

- Used ideas in Reinforcement Learning (Bayesian Thompson Sampling for the Multi Arm Bandit problem) to solve the Explore-Exploit Problem in Advertising. Worked with Java, Python, Hive, Apache Spark, SQL, HDFS, Amazon AWS Lambda. Wrote comprehensive tests (90% coverage), and detailed documentation to assist future users. Wrote rigorous Postman API requests, exported them to the codebase for ease of use for future developers.

Dalhousie University- MITACS GRI

MITACS Summer Research Intern — advised by [Prof. Julien Ross](#)

May 2019 - Aug 2019
Halifax, Nova Scotia, Canada

- Worked on ideas from linear algebra to support ‘Secure, fast, and efficient optimization of quantum circuits’. The project demonstrated the steps of reducing the cost of a CNOT Dihedral quantum circuit by reducing the number of T gates and replacing them with less expensive gates such as (S, CS or CCZ) — [\[Paper\]](#).

Central Electronics Engg. Research Institute (CEERI)

Summer Research Intern — advised by [Dr. Sundaresan Balasubramaniam](#)

May 2018 - Aug 2018
Chennai, India

- Developed an automated defect detection and analysis system using Tensorflow for object detection and classification. Used heavy Image Processing in OpenCV for feature extraction, and Visual C++ for GUI, MYSQL for the database. Used a uEye camera compatible with OpenCV API functions for real time classification — [\[Code\]](#)

PROJECTS

Constructing and Evaluating an Explainable Model for COVID-19 Diagnosis from Chest X-rays

[Prof. Ashwin Srinivasan](#), [Dr. Lovekesh Vig](#) — [APPCAIR](#)

Aug 2020 - Present

- Extracted domain-specific features directly from the image data using DNNs, and constructed a symbolic model for the diagnosis of COVID-19 from chest X-ray using these features. Generated visual and textual explanations, and integrated all steps in a web-based [interface](#).

Diagnosis of COVID-19 Patients Using Chest X-Rays

[Prof. Ashwin Srinivasan](#), [Dr. Lovekesh Vig](#) — [APPCAIR](#)

Apr 2020 - Jun 2020

- Built a segmentation model to isolate the lung region from the rest of the X-ray, and built a model to detect COVID-19 from the segmented lung. Employed embeddings of disease symptoms produced by the CheXNet network and created an ensemble to assist the model in classification. ROC - 99.8. Prime Minister’s office is interested in using this tool for mass screening in airports and railway stations.

Transfer Learning for Medical Imaging

[Prof. Ashwin Srinivasan](#), [Dr. Lovekesh Vig](#) — [APPCAIR](#), TCS Research

Jan 2020 - Jun 2020

- Evaluated the efficacy of transfer of a brain-lesion model to the lung, and the transfer of a lung-lesion model to the brain by comparing against a model constructed without model-transfer and using lesion-agnostic transfer.

Peer to Peer AI Tracing App for COVID-19

[Prof. Yoshua Bengio](#) — In Collaboration with MILA, Montreal

Apr 2020 - May 2020

- One of the contributors for the software of a Peer to Peer tracing app for use in Canada. Was mentioned in MILA’s [white paper](#) for the same as a contributor.

Social Networks: Telegram Chatbot To Enhance Question-Answer Chats

[Prof. Neena Goveas](#)

Aug 2019 - Dec 2019

- Built a platform agnostic Social Networks & NLP-based Python interface that scrapes chat data, classifies users as experts or users, and suggests experts (using Betweenness Centrality) and timings for various topics extracted from the chat (using RAKE). Tested on Ubuntu IRC chat logs, and has been implemented for a university chat group.

SCHOLARSHIPS AND AWARDS

- Feb 2021** — Poster at WiDS Cambridge 2021 was selected for a lightning talk (Top 10 among 50 accepted posters).
- Jan 2021** — Submission at Young Researchers’ Symposium at CODS-COMAD 2021 won an Honourable Mention for Best Paper.

- **Nov 2020** — Ranked 2nd globally in the [Adelaide Ingenuity Challenge 2020](#) organized by the University of Adelaide in collaboration with [CAISS 2020](#).
- **Sep 2020** — Ranked 7th among women in India in [Code-Hers 1.0](#), organised by NIT Warangal.
- **Sep 2020** — Awarded 1st place in [ACM-W India Celebrations of Women in Computing Poster Competition](#).
- **Aug 2020** — One of 50 students selected from India for the [Google Research India AI Summer School](#) for the Human Computer Interaction + AI for Social Good track.
- **July 2020** — One of 250 Recipients of the [Grace Hopper Celebration India Scholarship 2020](#) for female students from computing, engineering and IT backgrounds.
- **Nov 2019** — 1st Runner-up in India for [NETAPP's SheCode hackathon](#).
- **Aug 2019** — One of 40 students selected from India for 2020 Summer Internship at Uber, India.
- **Jan 2019** — One of 100 students selected from India for the [MITACS Globalink Scholarship](#) to pursue research in Canada.
- **2017** — Recipient of India's [INSPIRE scholarship](#) (Innovation in Science Pursuit for Inspired Research).
- **2016** — Received medal from the Government of India for scoring in the top 0.1 percentile in India in Physics Board Exams (99/100).
- **2014** — Recipient of the [NTSE Scholarship](#) (National Talent Search Examination scholarship).
- **2013** — Recipient of Gold medal in mathematics (ranked 12th in SE Asia) in APMOPS, Singapore.

TEACHING/MENTORSHIP AND VOLUNTEERING

- **2021** — **Mentor** and **Reviewer** for the [AI for Public Health Workshop](#) at ICLR 2021.
- **2021** — **Instructor** for the Center of Technical Education (CTE) course on '[Introduction to Causal Inference](#)'.
- **2019** — **Teaching Assistant** for Object Oriented Programming. Designed questions, junit tests, and conducted weekly evaluative labs to test **200** students on principles of Object-Oriented Programming in Java.
- **2020** — **Teaching Assistant** for Computer Programming. Designed weekly labs from scratch for **900** first year undergraduate students as a part of their continuous evaluation. Assisted students in completing design projects.
- **2021** — **Co-founder** of BITS Goa Women in Tech (BGWiT). BGWiT is an initiative to reduce the gender gap in technology, and foster interactions, networking, and sharing of ideas among women interested in technology. — [\[Links\]](#)
- **2021** — **Core member and Mentor** at [SAiDI, BITS Pilani](#). SAiDI is a non-profit, professional group of motivated individuals based out of BITS Pilani, working on research and application of Artificial Intelligence and Deep Learning.
- **2020** — **Volunteer** for [WiML workshop](#) at NEURIPS.
- **2019** — **Volunteer** at Teach Zari. Volunteered at Zari village (Goa, India) to teach students school-level math.

MEMBERSHIP

- **2020**: Trustworthy ML Initiative
- **2020**: Women in Machine Learning
- **2020**: ACM-W India
- **2020**: Grace Hopper Celebration India

EXTRA CURRICULARS

- **Founder and Chief Coordinator** — **Synchronoise, The BITS Goa Acapella Crew**: Took music theory lessons for over 100 members. Part of the team that ranked 2nd in South India for Acapella
- **Core member** — **The Literary and Debating Club**: Organised 'Contention', one of India's largest debates. Organised several national level poetry slams for the flagship poetry slam event 'InVerse'.
- **Marketing Manager** — **The Department of Sponsorship and Management (DoSM)**: Raised sponsorship for India's largest cultural festival with a budget of 7.5 Million.