Aarya Patil

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EDUCATION

University of Toronto — Toronto, ON, Canada
PhD (Direct-Entry) in Astronomy & Astrophysics — 2018 - 2023 (expected)
Supervisors: Jo Bovy & Gwendolyn Eadie
Thesis: *Learning the Age-Metallicity Structure of the Milky Way disk with the power of AI*

Savitribai Phule Pune University — Pune, MH, India
B.E. Computer Egineering — 2014 - 2018
Ranked within top 10 among 200 students in my department C.G.P.A. 9.45/10

MAJOR AWARDS

Massey College Junior Fellowship — Awarded 2018, 2019, 2020
Jackman Scholar Bursary: $2,650 per annum for 3 years
Ondaatje Bursary Award: $1,500 for AY 2019-2020
Bursary Award: $1,500 for AY 2020-2021

ABU ROBOCON 2017 - All India Rank 11 — Awarded March 2017
Pune Institute of Computer Technology (PICT) Robotics Team

Junior College Certificate Scholarship — Awarded 2014
Maharashtra State Council of Education (MSCE), India
Scored 90% in the Higher Secondary Certificate examination
Value: INR 20,000

PUBLICATIONS

Peer-Reviewed Journal Articles
Astropy Collaboration et al. (incl. **A. A. Patil**), *The Astropy Project: Building an Open-science Project and Status of the v2.0 Core Package*, The Astronomical Journal, Volume 156, Issue 3, article id. 123, 19 pp., 2018 [1380 citations]

Conference Proceedings
Patil, A.; Bovy, J.; Eadie, G, *Likelihood-free Inference of Chemical Homogeneity in Open Clusters*, 2020 Joint Statistical Meetings (JSM) Proceedings, American Statistical Association (ASA), 2020 *submitted*

RESEARCH & PROFESSIONAL EXPERIENCE

Canadian Institute for Theoretical Astrophysics — Sep 2018 - April 2019
Graduate Researcher — Advisors: M. van Kerkwijk, U. Pen, C. Ng
Developed an automated detection pipeline to detect echoes in the northern hemisphere pulsars observed by the CHIME (Canadian Hydrogen Intensity Mapping Experiment) telescope and detected a new potential echo in B1508+55 pulsar

Google Summer of Code 2017 participant with OpenAstronomy — Summer 2017
Student Developer — Mentors: T. Aldcroft, M. van Kerkwijk, H. M. Guenther
Selected for the prestigious Google Summer of Code program (∼18% proposals selected in 2017)[1] as a developer for The AstroPy Project, a core python package for astronomy, and successfully completed my project
Solved the issue of storing time coordinates in the FITS World Coordinate System standard that was open in AstroPy since Sep 2014

[1] https://opensource.googleblog.com/search/label/statistics+gsoc

Developed the first open source implementation that covers nearly the full FITS time standard in a generic and instrument independent way; now used in several instrument pipelines

Inter-University Centre for Astronomy and Astrophysics Aug 2017 - Aug 2018
Undergraduate Researcher Advisor: R. Gupta
Developed a ladder networks based semi-supervised deep learning technique for stellar spectral classification of the LAMOST survey that outperforms traditionally used supervised deep neural networks

Inter-University Centre for Astronomy and Astrophysics Jan 2017 - June 2017
Undergraduate Researcher Advisor: S. Abraham
Developed a hybrid model using Support Vector Machines and Random Forests to improve accuracy of periodic variable classification and illustrated it using the Catalina Surveys Periodic Variable Catalog

Inter-University Centre for Astronomy and Astrophysics Jan 2017 - June 2017
Undergraduate Researcher Advisor: K. Vaghmare
Acquired and reduced UBV images of the open cluster NGC 2420 and globular cluster M 80, and automated the standard technique of distance modulus calculation using unsupervised clustering in order to provide consistency to a traditionally subjective process

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TECHNICAL SKILLS

Open Source Software Development
Contributor: AstroPy, NumPy, SewPy

Programming Languages
Python, C/ C++, R, Shell Script, JavaScript

Competitive Coding
CodeChef

Frameworks, Tools, Hardware
Git, Emacs, TensorFlow, MATLAB, CUDA, BeagleBone Black

LEADERSHIP EXPERIENCE

Governing Board Risk Committee Student Representative July 2020 - Present
Massey College, University of Toronto
Contributed in the development of a COVID-19 risk plan for AY 2020-21

Diversity Committee Chair Sep 2020 - May 2021
Massey College, University of Toronto
Develop a BIPOC anti-racism plan, create a safe space for racialised community members

Lionel Massey Fund (LMF) Co-chair June 2019 - May 2020
Massey College, University of Toronto
Managed finances of the LMF as the treasurer and organised several events for the Massey Junior Fellowship with an emphasis on multicultural festivities

MasseyScope Committee Co-founder Jan 2019 - Present
Massey College, University of Toronto
Co-founded MasseyScope, a committee that organises astronomy outreach for the Massey community and the general public with a focus on underprivileged communities

Programming Head Feb 2015 - Sep 2018
PICT IEEE Student Branch (PISB)
Coordinated and supervised the programming events of PISB's annual technical fest, Credenz by leading a programming team of 250 students

Programming Head June 2016 - June 2018
PICT ROBOCON TEAM
Programming head of the team representing PICT in the ABU Asia-Pacific Robotics Competition, ROBOCON

Team Leader Aug 2015 - Sep 2018

XOdia: A web application for Artificial Intelligence (AI) based Gaming Competitions
Led a team of 50 students that designed a web application showcasing algorithmically challenging games and received active participation from developers across the globe
Developed an original two-player strategy game, GROW, which received several AI code submissions from participants

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TEACHING EXPERIENCE

Teaching Assistant Fall 2020
AST 221: Stars and Planets

Teaching Assistant Winter 2019, Winter 2020, Summer 2020
AST 201: The Sun and its Neighbours
Responsibilities: Running weekly tutorials to cover lecture material with a typical tutorial size of 40 students, delivering planetarium shows, marking exams, exam invigilation

Teaching Assistant Fall 2018, Fall 2019
AST 101 : Stars and Galaxies
Responsibilities: Running weekly tutorials to cover lecture material with a typical tutorial size of 40 students, assisting observing nights, marking exams, exam invigilation

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CONFERENCE & TRAVEL GRANTS

JSM 2020 Virtual Conference Aug 2020
Talk: Likelihood-free Inference of Chemical Homogeneity in Open Clusters
Session: *Innovations in Statistics for Astronomy & Space Physics*
Received Reinhardt Travel Award, Astronomy & Astrophysics, University of Toronto

SDSS Virtual Meeting 2020 June 2020
Talk: Likelihood-free Inference of Chemical Homogeneity in Open Clusters

CASCA 2019 June 2019
Poster: CHIME Monitoring of Pulsars and the Interstellar Medium towards them
Received Reinhardt Travel Award

Python in Astronomy 2019 Aug 2019
One of the 60 people selected to attend the conference
Received $1,200 (USD) travel award from the Space Telescope Science Institute

Global Radio Scintillometry Astrophysics 2018 Oct 2018
Poster: CHIME Monitoring of Pulsars and the Interstellar Medium towards them
Received Reinhardt Travel Award

Python in Astronomy 2018 Aug 2018
Lightning Talk: Google Summer of Code 2017 - FITS time standard in AstroPy
One of the 60 people selected to attend the conference
Received $2,500 (USD) travel award from Simons Foundation

OUTREACH & VOLUNTEERING

Graduate Student Mentor Sep 2020 - Present
Graduate Astronomy Students Association, University of Toronto
Dang Pham, Incoming graduate student AY 2020-21

Massey Tutoring and Mentorship Program Jan 2020 - Present
Massey College, University of Toronto
Tutoring high school students who wish to pursue post-secondary education in Maths, Physics, Chemistry, Biology and Computer Science; tutored a student in Winter 2020

Course Committee Sep 2018 - Sep 2019
Graduate Astronomy Students Association, University of Toronto

Provided course organisation and scheduling recommendations based on student feedback

Astronomy on Tap T.O. Sep 2018 - Present, 4 times annually
University of Toronto
Helping with set up logistics, answering astronomy questions from the general public with a typical audience of ∼300 people

AstroTours September 2018 - Present, *monthly*
University of Toronto
Oculus Rift Operator, WorldWide Telescope Operator, showing and explaining astronomical phenomena to the general public with a typical audience of ∼150 people

Instrumentation and Machine Learning Talks June 2017
Inter-University Centre for Astronomy and Astrophysics
Initiated weekly talks for discussion of machine learning applications in astronomy and presented a talk on Reinforcement Learning (RL) in Robotics and its prospects for adaptive seismic noise cancellation in Gravitational Wave Interferometers

Volunteer Teaching Jan 2017 - June 2017
Teach for India - Pune
Volunteered to tutor underprivileged youth in Pune to help eliminate educational inequity

Antariksh Astronomy Club Nov 2016
Vishwakarma Institute of Technology
Delivered a public lecture on Astronomical Photometry and introduced students from various schools of Pune to the field of computational astrophysics

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OTHER AWARDS

UofT Astronomy & Astrophysics Graduate Funding Package Awarded 2018
Value: $23,250 + tuition and fees per annum for 5 years

UofT Astronomy & Astrophysics Start-up Funds Award Awarded 2020
Value: $3,000

Quarter Century Fund for MasseyScope Committee Awarded 2018, 2019
Massey College, University of Toronto
Value: $1200 total for 2018-2020

INSPIRE Scholarship for Higher Education (declined) Awarded 2014
Department of Science and Technology, Government of India
Top 1% of the Maharashtra State School Board

High School Certificate Scholarship Awarded 2012
Maharashtra State Council of Education (MSCE), India
Scored 93% in the Secondary School Certificate examination
Value: INR 15,000

Inter-Collegiate Paper Presentation Competition Awarded 2012
Best Speaker Award and First Runner Up Award among 200 participants

High School Merit Scholarship Awarded 2010
Maharashtra State Council of Education (MSCE), India
Ranked within top 5,000 out of 700,000 students across Maharashtra
Value: INR 3,000

LANGUAGES

English Full Professional Proficiency **German** Limited Working Proficiency

Hindi Native or Bilingual Proficiency **Marathi** Native or Bilingual Proficiency

OTHER ACHIEVEMENTS

Actively maintaining an art blog (sketching, poetry, and story writing) since 2014
Participated in competitive coding competitions hosted online (primarily on CodeChef) and offline, and secured a fair ranking
Zonal representative in the Inter-School Lawn Tennis Tournament, 2010 and 2011
State representative in the Inter-School Drawing Competition organised by the TAJ foundation, 2009
Selected for the International Peace Poster Competition organised by the Lions Club International, 2010