Jamila Taaki

Schmidt AI in Science Postdoctoral Fellow, University of Michigan — Exoplanet Detection, Signal Processing, Optical Simulation
xiaziyna.github.io

Education

Schmidt AI in Science Postdoctoral Fellow | **University of Michigan** 2024 –
Michigan Institute for Data & AI in Society
Advisors: Prof. Lia Corrales and Prof. Alfred Hero

PhD | **Electrical and Computer Engineering** | **University of Illinois Urbana-Champaign** 2017 – 2024
Thesis: Signal Models and Computational Methods for Robust Exoplanet Detection
Advisors: Prof. Farzad Kamalabadi and Prof. Athol Kemball

M.Sc. (UK equivalent of MS+BS) | **Astrophysics** | **Royal Holloway University of London** 2011 – 2015
Thesis: Extracting Stellar Properties from Images of Star Clusters
Advisors: Prof. Glen Cowan and Prof. Stewart Boogert

Refereed Publications

Identifiability of Rotating Stellar Surfaces from Astrometric Jitter 2026
Taaki, Corrales, Hero | *International Conference on Acoustics, Speech, and Signal Processing 2026*

Efficient Exoplanet Imaging Simulations of the Habitable Worlds Observatory 2025
Taaki, Kamalabadi, Kemball, Corrales, Hero | *Astronomical Journal* 171(1)

PyStarshade: Simulating High-Contrast Imaging of Exoplanets with Starshades 2025
Taaki, Kamalabadi, Kemball | *Journal of Open Source Software*, doi:10.21105/joss.07917

A Search for Exoplanet Candidates in TESS 2min Light Curves Using Joint Bayesian Detection 2025
Taaki, Kamalabadi, Kemball | *Astronomical Journal* 170(1)

Robust Detrending of Spatially Correlated Systematics in Kepler Light Curves Using Low-Rank Methods 2024
Taaki, Kemball, Kamalabadi | *Astronomical Journal* 167(2)

Bayesian Methods for Joint Exoplanet Transit Detection and Systematic Noise Characterization 2020
Taaki, Kamalabadi, Kemball | *Astronomical Journal* 159(6)

Under Review

Using Astrometry to Break Degeneracies in Stellar Surface Mapping 2026
Taaki, Corrales, Hero | *The Astrophysical Journal* (submitted)

Starshade: A Broad-Band, High-Throughput Mission for ExoEarth Discovery and Characterization 2025
S. Seager, K. A. Bennett, **J. Taaki**, G. Kaur, R. Hu, S. Shaklan | NASA DARES whitepaper (submitted)

Proposals

Schmidt Sciences Model Zoo: A Collaborative Repository for AI in Science 2025
PI: N. Fox; Co-Is: **J. Taaki**, S. Temple $100,000

Search for New Exoplanets in the TESS Data using Joint Signal Estimation 2021
Illinois Blue Waters supercomputer allocation: PI: A. Kemball; Co-Is: **J. Taaki**, F. Kamalabadi 250K node hours ($155,075)

Software Projects

PyStarshade (github.com/xiaziyna/PyStarshade) 2023
Fourier optical modelling of external occulters for direct exoplanet imaging

spatial-detrend (github.com/xiaziyna/spatial-detrend) 2023
Python library for detrending spatially correlated Kepler light curves

Outreach and Service

WoCCode Hackathons 2025
(October 2025) Project lead: NASA Space Apps, global nominee: Hunting for Exoplanets with AI
(April 2025) Mentor: Titan City minigame

NASA Panel 2023
Served as student executive secretary on a NASA review panel

Graduate GPU-Programming Class (ECE 508) Mentor 2023
Mentored CUDA transit detection kernel optimisation project

Teaching Assistant: Digital Imaging (ECE 558) 2023
Delivered lectures, office hours, and grading

Presentations

Electronic Imaging (IS&T) 2026
(upcoming) Arbitrary Spatial Sampling with the B-FFT for Efficient Exoplanet Imaging Simulations CA

Trottier Space Institute at McGill; University of Chicago; Northwestern University; STScI 2025
Breaking Degeneracies in Stellar Surface Mapping with Astrometry

University of Michigan Astronomy 2024
Colloquium: Finding Low SNR Exoplanets in Data with Complete Signal Models Ann Arbor, MI

Indiana University 2024
Teatalk: Finding Hidden Exoplanets in Noisy Data with Complete Signal Models Bloomington, IN

Posters

Keck Workshop: Hybrid Space-Ground Observatories 2026
Flight Tolerancing the Hybrid Observatory for Earthlike Exoplanets with PyStarshade Caltech

Great Lakes Exoplanet Area Meeting 2025
Breaking Degeneracies in Stellar Surface Mapping with Astrometry Wisconsin-Madison

SciFM: Scientific Discovery in the Age of AI 2025
Fourier Spectral Zoom for Efficient ExoEarth Imaging Simulations Ann Arbor, MI

NASA Sagan Summer Workshop 2024
PyStarshade: A Python Starshade Simulation Tool for Modelling Contrast with Exoplanetary Scenes Pasadena, CA

Internships

Internship: Mars Climate Lab (The Open University) 2015
Advised by Prof. Stephen Lewis; simulated entry, landing, and descent profiles for Mars landers

Technical Skills

Programming: Python (NumPy, SciPy, PyTorch, JAX, scikit-learn, SymPy, Matplotlib, Pandas, Astropy, Lightkurve), CUDA, C, Bash, Git, IDL; HPC experience on Blue Waters (400K node hours).
Graduate Coursework: Random processes; detection and estimation theory; computational inference; Fourier optics; advanced signal processing; vector-space signal processing; deep learning theory; statistical learning theory; information theory; pattern recognition.

Travel Awards

HWO Spectral Retrieval Workshop 2024
STScI Baltimore, MD

NASA Heliophysics Summer School 2024
Living with a Star: Comparative Heliophysics Boulder, CO

NASA Sagan Summer Workshop 2024
Advances in Direct Imaging: From Young Jupiters to Habitable Earths Pasadena, CA

Exoplanet of the Day (twitter.com/exoplanet_day): Twitter bot posting daily light-curve animations and associated star–planet systems, illustrating transit detection and the exoplanet catalogue.