

# ANDREW K. SAYDJARI

NASA Hubble Postdoctoral Fellow | Princeton

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## RESEARCH INTERESTS

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I work at the interface of **data science** and **astrophysics**, developing new statistical tools to analyze large datasets. In terms of methods, I am intrigued by the low-SNR limit, **uncertainty quantification**, and blind signal separation. In terms of astrophysics, I strive to understand the spatial, kinematic, and chemical distribution of **interstellar dust**.

## POSITIONS

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**NASA Hubble Fellow:** Princeton University, Department of Astrophysical Sciences 2024-2027

## EDUCATION

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**Harvard University:** PhD in Physics 2018-2024

Advisor: Douglas Finkbeiner

Thesis: Statistical Models of the Spatial, Kinematic, and Chemical Complexity of Dust

**Yale University:** BSc/MSc in Chemistry, BSc in Mathematics 2014-2018

Thesis: Optimizing the Nickel-Catalyzed Carboxylation of Aryl Halides

## SELECTED AWARDS & HONORS

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NASA Hubble Fellowship 2024-2027

Eric R. Keto Prize (Harvard), Best PhD thesis in theoretical astrophysics 2024

Best Astrostatistics Student Paper Award (ASA/AIG) 2022

Bok Center Certificate of Distinction in Teaching (Harvard) Fall 2021

NSF Graduate Research Fellowship (USA) 2018

Hertz Fellowship Finalist 2018, 2019

Howard Douglass Moore Prize (Yale), Chemistry's highest honor, awarded to a single graduating undergrad 2018

Barry Goldwater Scholar (USA) 2017

Phi Beta Kappa 2017

DAAD-RISE Fellowship (Yale/Germany), Research internship exchange 2016

## PROFESSIONAL ACTIVITIES & SERVICE

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### Architect in SDSS-V

APOGEE pipeline development (Architect status conferred Aug 2024) Jan 2022 – present

### Harvard Astronomy Department

(1/2) Student Representatives to Faculty Search Committee (Elected) Jan - Mar 2023

Organizer for Student Faculty Forum (StuFF) 2022 - 2023

### Institute for Artificial Intelligence and Fundamental Interactions (IAIFI)

Computing Committee June 2022-present

### American Astronomical Society

Chambliss Poster Judge (AAS 240, AAS 241) June 2022-present

### Manuscript Referee

American Astronomical Society Journals (ApJ) 2023-present

Journal of Open Source Software (JOSS) 2024-present

## PUBLICATIONS

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I am an author on **21+ papers** that have **588+** citations (h-index=12). This includes:

**9+ papers** as (co-)lead author with 222+ citations

**5+ papers** with **significant contributions** with 203+ citations

See my [Publication List](#) for details. My ORCID is [0000-0002-6561-9002](#).

Most of my papers can be found online on [ADS](#), though citations outside astronomy are missing.

## SUPERVISION & MENTORSHIP

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I have (co-)supervised/mentored **5 students**:

### Graduate

1. Ana Sofia Uzsoy (Astronomy, Harvard) Fall 2022-Present  
Component Separation of Lyman Alpha Emitters in DESI (w/ Doug Finkbeiner)

### Undergraduate

4. Zack Steine (CS & Statistics, University of Toronto) Summer 2024-Present  
SBI for DESI Stellar Parameters (w/ Josh Speagle)
3. Devisree Tallapaneni (Physics & Statistics, Cornell → OSU Grad) Summer 2023-Present  
Quantifying the Filamentary ISM: Statistical Reconstructions of Reality (w/ Eric Koch & Doug Finkbeiner)
2. Stephanie Yoshida (Astronomy, Harvard) Fall 2023  
Kinetic Tomography of the Intermediate Velocity Arch (w/ Catherine Zucker & Doug Finkbeiner)
1. Ken Michalek (Computer Science, Harvard Extension School → MIT Lincoln Lab) 2020-2021  
Online Blind Deconvolution for Educational Astronomy (w/ Dominic Pesce & Allyson Bieryla)

## TEACHING

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I care passionately about teaching and love ideating new ways of explaining difficult concepts. I emphasize the development of hands-on teaching methods, incorporating active learning through experiment and data-based exploration. I view creating an inclusive atmosphere, in which all students can comfortably learn, as a top priority.

Harvard University, Teaching Fellow Fall 2021

Solid State Physics, Lecture, Undergrad/Grad, 27 students, w/Prof. Julia Mundy

Feedback: [Student Evaluations](#)

Yale University, Peer Tutor 2015-2018

Physical Chemistry, Lab, Undergrad, 30 students, w/Prof. Patrick Vaccaro

Physical Chemistry II, Lecture, Undergrad, 30 students, w/Prof. Patrick Vaccaro

Freshman Organic Chemistry II, Lecture, Undergrad, 100 students, w/Prof. Alanna Schepartz

Sophomore Organic Chemistry I, Lecture, Undergrad, 120 students, w/Prof. Jonathan Ellman

SPLASH/SPROUT @ Yale, Middle School 2015-2018

Peeling Back the Layers of Solar Cells (30 students), Metal Mania: Simple Models of the Material World (4 students), Destressing Tensors (7 students), Abstract Algebra: Questions Teachers Didn't Answer (60, 75 students), Origins of Life: A Chemist's Perspective (16, 35 students)

## SELECTED PRESENTATIONS

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I have given **34+ public science talks**. See my [Talk List](#) for more details. Recent highlights include:

### Invited Conference Talks

NASA NHFP Symposium 2024 September 2024

The Highest Angular Resolution 3D Dust Map (and Why Bayesian Component Separation Methods are Crucial)

Galactic Science with the Nancy Grace Roman Space Telescope June 2024

The DECAM Plane Survey as a Roman Plane Survey Pathfinder

JSM 2022: Astrostatistics Interest Group: Student Paper Award August 2022

Photometry on Structured Backgrounds: Local Pixelwise Infilling by Regression

### Contributed Conference Talks

Sloan Digital Sky Survey V (SDSS-V) Collaboration Meeting June 2024

Diffuse Interstellar Bands in APOGEE: Unlocking Precision Dust Kinematics

Statistical Challenges in Machine Learning and Astrophysics (SCMA) VIII June 2023

Measuring the 8621 Å Diffuse Interstellar Band in Gaia DR3 RVS Spectra:

Obtaining a Clean Catalog by Marginalizing over Stellar Types  
 RAS Specialist Discussion: 1D ML March 2023  
 Measuring the 8621 Å Diffuse Interstellar Band in Gaia DR3 RVS Spectra  
 DECam at 10 Years Workshop September 2022  
 The Dark Energy Camera Plane Survey 2 (DECaPS2): More Sky, Less Bias,  
 and Better Uncertainties

### Seminars, Lunch Talks, & Journal Clubs

CFA: Institute for Theory and Computation (ITC), Keto Award Seminar May 2024  
 The Spatial, Kinematic, and Chemical Complexity of Dust  
 UWSeattle: Astro Lunch April 2023  
 Probabilistic Component Separation: Deconstructing Photometric and Spectroscopic Pipelines  
 University of Toronto: Statistics and MachIne LEarning (SMILE) Journal Club February 2022  
 Photometry on Structured Backgrounds  
 IAS: Pan-Experiment Galactic Science Group July 2021  
 Learning from ISM Texture using the Wavelet Scattering Transform  
 LPENS: AstroLunch December 2020  
 Scattering Transform Methods: Applications to Galactic Dust

## OUTREACH & ENGAGEMENT

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### Public Science Writing

MathStatsBites: [TheSequencer](#), [CycleStarNet](#), [SCMA8](#), [NestedSampling](#) 2022-2023  
 LightSound Workshop, Soldering Solar Eclipse Sonification Instruments Summer 2023  
 Cambridge Science Festival, MIT Museum Presentation Volunteer Fall 2022  
 Latino Initiative Program, Instructor Summer 2021- Summer 2023  
 Harvard Observation Project, Software Mentor 2020-2021

## PRESS

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DECaPS2 Release: [WSJ](#), [Wired](#), [AP](#), [CNN](#), [Register](#), [Salon](#), [Forbes](#), [Space.com](#), [AAS Nova](#) January 2023  
 Grad Student Highlight: [Labroots](#) November 2022  
 Machine Learning & Interstellar Dust Clouds: [Abstract: The Future of Science](#) December 2020

## SELECTED RESEARCH SKILLS

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### Computational

I am a strong advocate of both open-source code and data, and I insist on public reproducibility of all plots in my work (see [my Zenodo](#) deposits accompanying my papers).

Developer: Julia (4 years, primary), Python (7 years), MATLAB (3 years) [[Github](#)]

Developed pipelines and managed >100k core-h runs in both Julia and Python

Managed daily simultaneous multi-instrument measurements in MATLAB

Public Packages: [LowRankOps.jl](#), [KryburyCompress.jl](#), [CloudCovErr.jl](#), [CloudClean.jl](#), [EqWS.jl](#), [crowdsourc](#)

### Laboratory

Fabrication: EBL, RIE, ALD, Photolithography, Thermal/E-beam/Sputtering Deposition

Characterization: (S)TEM/EDX, FIB, SEM, AFM

Spectroscopy: Terahertz-Time Domain, SPR, XPS, NMR (1H, 13C, 31P, NOSEY), EPR