Samuel M. Factor

POSTDOCTORAL RESEARCH FELLOW

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Summary and Highlighted Qualifications

Highly motivated and independent researcher seeking to transition into the aerospace industry. Aiming to leverage broad expertise in space-based observational techniques, novel image processing algorithms, statistical data analysis, physical modeling, and lab experience acquired through a Ph.D. in Astronomy. Learns quickly and can apply and communicate new knowledge efficiently and effectively.

- Programing languages & tools:
  - Fluent in: Python, bash (Linux/Unix), git
  - Familiar with: C, SQL, Fortran, slurm
- Space-based imaging (*HST*, *JWST*), data processing and analysis, high-contrast imaging
- Fourier analysis, interferometric data processing (optical, near-infrared, and radio)
- Statistical analysis and optimization: hierarchical Bayesian modeling and inference (MCMC, nested sampling)
- Data visualization (python/matplotlib)
- Technical writing and oral communication
- Laboratory optics, electronics, basic CAD and machine shop experience

Research Experience

Postdoctoral Research Fellow, The University of Texas at Austin **2023 – Present**

- Assessing the strengths, weaknesses, and best practice observing strategies for *JWST* high-resolution kernel-phase imaging (using detection limit metrics) to maximize the yield of valuable telescope time.
- PI of a Cycle 1 *JWST* archival program which is funding this work (**$145,090**)

Graduate Student Researcher, The University of Texas at Austin **2015 – 2023**

- Developed python-based software pipelines run on the Texas Advanced Computing Center (TACC).
- Studied the formation of companions to low mass stars using *Hubble Space Telescope* (*HST*) imaging.
- Applied a novel interferometric postprocessing technique which considered the intricacies of optical propagation and diffraction through the telescope. Detected faint companions at previously inaccessible separations below the diffraction limit and assessed the detection limits of the technique.
- Modeled the demographics (frequency, orbit, mass ratio) of companions to study their formation mechanism. Found evidence that dynamical evolution sculpts young low-mass binary systems.
- PI of two *HST* archival programs which funded this work (**$255,515**), two associated publications.

Undergraduate & Graduate Student Researcher, Wesleyan University **2012 – 2015**

- Modeled the structure of a planet-forming disk using interferometric observations of molecular gas.
- Built & tested the scattering properties of electronic oscillator circuits modeling optical systems.

Education

Ph.D. in Astronomy The University of Texas at Austin, Austin, TX **2023**
Concentration in Communicating Science
Dissertation Title: *Kernel-Phase Interferometry for Detection of Close in Companions: Demographics of Binary Brown Dwarfs from Birth to Maturity*

M.A. in Astronomy Wesleyan University, Middletown, CT **2015**
Thesis Title: *ALMA Observations of Molecular Gas Emission from a Protoplanetary Disk in the Orion Nebula*

B.A. in Physics and Computer Science Wesleyan University, Middletown, CT **2014**
ΦBK Honor Society, GPA: 3.93/4.0

Communication

Efficient and effective verbal and written communication skills to a wide range of audiences:

- Technical/scientific: presented at domestic and international conferences (full list here), multiple publications in and referee for peer-reviewed Astronomy & Physics journals (see below or here)
- Non-technical: speaker at outreach events, staff writer for astrobites.org, TA for seven courses

Proven track record of proposing innovative science programs: lead author and science-PI of 3 highly competitive space telescope programs (*HST* & *JWST*) as a graduate student including securing significant funding ($400,605) and culminating in presentations and publications.

Professional Development

- Selected Graduate and Undergraduate Coursework:
  - Astronomy: Observational Astronomy, Planetary Astrophysics (incl. orbital dynamics), Astronomical Instrumentation (design, review, & fabrication of optical, mechanical, electronic, & interface systems)
  - Technical tools: Bayesian Statistical Methods, Computational Physics, Software Engineering, Algorithms and Complexity, Electronics Lab, Experimental Optics
- Institute for Scientist & Engineer Educators (ISEE) Professional Development Program (2018)
  Intensive teaching workshop focusing on inquiry, assessment, and equity & inclusion

Leadership & Collaboration

- Organizing committee of Astronomy on Tap: Austin, TX (2016–present)
  Monthly public talks on cutting edge astronomy in a bar, drawing crowds of 200–300 people
- Teaching Assistant for seven courses at UT Austin and Wesleyan University
- Organized & lead four instructional trips to McDonald Observatory for graduate & undergrad students
- Computer Officer, Astronomy Graduate Student Executive Committee, UT Austin, (2017–2021)
- Member of the Direct Imaging and Spectroscopy of Exoplanetary Systems JWST ERS collaboration
- Member of the astrobites collaboration (staff writer and webmaster 2018–2019)
- Masters rowing coach at Austin Rowing Club, 4 year collegiate varsity athlete (Wesleyan University)
- National Outdoor Leadership School (NOLS) alumni, SCUBA certified (28 dives, 20 hours)

Honors and Awards

- *HST* (Cycles 24 & 29) and *JWST* (Cycle 1) archival program grants totaling: $400,605
- University Graduate Continuing Fellowship, UT Austin ($40,804)
- Board of Visitors Graduate Student Second Year Research Defense Award, UT Austin
- Frank N. Edmonds, Jr. Memorial Fellowship in Astronomy, UT Austin
- ΦBK, Wesleyan University
- Barry M. Goldwater Scholarship, Honorable Mention

Selected Publications (+10 non first author publications, complete list can be found here)

- *NICMOS Kernel-Phase Interferometry II: Demographics of Nearby Brown* Dwarfs (Samuel M. Factor & Adam L. Kraus, 2023, *The Astronomical Journal*, 165, 130)
- *NICMOS Kernel-Phase Interferometry I: Catalogue of Brown Dwarfs Observed in F110W and F170M* (Samuel M. Factor & Adam L. Kraus, 2022, *The Astronomical Journal*, 164, 244)
- *ALMA Observations of Asymmetric Molecular Gas Emission from a Protoplanetary Disk in the Orion Nebula* (Samuel M. Factor, A. M. Hughes, et al., 2017, *The Astronomical Journal*, 153, 233)