Samuel M. Factor

POSTDOCTORAL RESEARCH FELLOW

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Summary and Highlighted Qualifications

Highly motivated researcher and problem-solver seeking to transition into the aerospace industry. Broad expertise in high-resolution space-based remote sensing, novel image processing algorithms, statistical data analysis, physical modeling, and optical & mechanical lab experience acquired through a Ph.D. in Astronomy. Quick learner with a proven ability to efficiently apply and effectively communicate new skills.

- Space-based remote sensing: astronomical image processing and analysis, high-contrast imaging
- Astronomical Instrumentation: design, review & fabrication of optical, mechanical, electronic and interface systems
- Communication: Technical writing and oral presentation
- Statistical analysis and optimization
- Expert python and Linux programmer
- Effective data visualization
- Adaptive and creative problem-solver
- Curious and innovative researcher

Research Experience

Software Engineer & Data Scientist, Postdoctoral Fellow, UT Austin **2023–Present**

- Lead proposal author & principal investigator of a Cycle 1 *JWST* archival program (**$145,090**).
- Assessing 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.

Observational Astronomer & Data Scientist, Graduate Student Researcher, UT Austin **2015–2023**

- Lead author & principal investigator of two *HST* programs (**$255,515**), two publications +1 in prep.
- Developed python-based analysis pipelines run on the Texas Advanced Computing Center (TACC).
- Applied a novel interferometric postprocessing technique (modeling diffraction through the optics of the telescope system) which enabled the detection of faint sources at 2-3 times tighter separations than with classical methods, well below the diffraction limit. Assessed the sensitivity limits of the technique to measure false-positive and false-negative rates.
- Studied the formation of companions to low-mass stars using *Hubble Space Telescope* (*HST*) imaging/remote sensing. Modeled the demographics of companions to investigate their formation mechanism. Found evidence that dynamical evolution sculpts young low-mass binaries.

Software/Electronics Engineer, Grad/Undergrad 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 RF 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: *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: *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

Expert author and oral communicator to diverse audiences: (full list http://smfactor.github.io/publications/)

- Technical/scientific: 13 publications in and referee for peer-reviewed Astronomy & Physics journals, 15+ presentations at domestic & international conferences.
- Non-technical: staff writer for astrobites.org, speaker at outreach events, TA for seven courses

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

Professional Development, Leadership, and Collaboration

- Institute for Scientist & Engineer Educators (ISEE) Professional Development Program (2018)
  Intensive teaching workshop focusing on inquiry, assessment, and equity & inclusion
- Organizing committee of Astronomy on Tap: Austin, TX (2016–present)
  Monthly public talks on cutting edge astronomy to crowds of 200–300 people
- Organized & lead four instructional trips to McDonald Observatory for grad & undergrad students
- Member of the Direct Imaging & Spectroscopy of Exoplanetary Systems JWST ERS collaboration
- Member of the astrobites collaboration (staff writer 2018–2019 and webmaster)
- Computer Officer, Astronomy Graduate Student Executive Committee, UT Austin, (2017–2021)
- Masters rowing coach at Austin Rowing Club, four-year collegiate varsity athlete (Men's Rowing)
- National Outdoor Leadership School (NOLS) alumni, SCUBA certified + dry suit (28 dives, 20 hours)

Honors and Awards

- Lead author & PI of three space telescope programs (*HST* Cycles 24 & 29, *JWST* Cycle 1, $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

Skills

- Fluent in: Python, bash (Linux/Unix), git, LaTeX. Familiar with: C, SQL, Fortran, slurm, Mathematica
- Hierarchical Bayesian modeling and inference (Markov Chain Monte Carlo, nested sampling)
- Selected Astronomy courses: Observational Astronomy, Astronomical Instrumentation (design, review, & fabrication of optical, mechanical, electronic, & interface systems including basic Zemax, LabView, SolidWorks, and machine shop experience), Planetary Astrophysics (incl. orbital dynamics)
- Technical courses: Experimental Optics Lab (including laser safety), Electronics Lab, Computational Physics, Software Engineering, Bayesian Statistical Methods, Algorithms and Complexity

Selected Publications (complete list http://smfactor.github.io/publications/)

- *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)