HUNTER KRAUKLIS

Position: Undergraduate/Post-Baccalaureate Researcher, University of Wisconsin–Madison
Madison, WI
Research Interests: Exoplanet Dynamics, Galactic Dynamics & Dark Matter, Cosmology, Philosophy of Physics
hkrauklis@wisc.edu
Methods: Observational & Computational Astrophysics, Experimental Instrumentation, Embedded Systems/Control

Statement

I graduated from the University of Wisconsin–Madison in May 2026 with a B.A. in Astronomy–Physics and Philosophy, and I continue at my alma mater as an undergraduate/post-baccalaureate researcher. I work with Professor Juliette Becker on exoplanet dynamics and planetary system formation, and with Professor Victor Brar on condensed matter physics. I also tutored introductory physics students at the Physics Learning Center. Alongside my physics and astronomy training, I bring a background in the philosophy of science, quantum mechanics, and metaphysics, which shapes how I approach open conceptual questions in astrophysics.

Honors & Awards

Dean's List, University of Wisconsin–Madison *Spring 2026*

Research Experience

Undergraduate/Post-Baccalaureate Researcher *January 2026 – Present*
Prof. Juliette Becker, Department of Astronomy, University of Wisconsin–Madison

- Investigate mean-motion resonance in young multi-planet exoplanet systems by testing for two and three body resonance prevalence
- Run N-body simulations over ensembles of realizations drawn from observed orbital-parameter uncertainties, varying inclination assumptions, to test how robust each resonance is
- Analyze resonant-angle evolution with a libration-fraction test to classify each pair or combination as resonant, candidate, or non-resonant
- Extended this work through an independent directed study (ASTRON 699, Spring 2026)

Undergraduate/Post-Baccalaureate Research Assistant *August 2025 – Present*
Prof. Victor Brar, Department of Physics, University of Wisconsin–Madison

- Fabricate high-quality graphene and hexagonal boron nitride (hBN) samples via mechanical exfoliation ("tape peeling") for condensed-matter research
- Design and construct a custom airtight purge enclosure integrating an FTIR spectroscopy system with microscopy equipment for measurements under controlled environmental conditions
- Collaborated with two fellow lab members to design, build, and program an Arduino-controlled, position-encoding xyz stage — including a custom breadboard circuit, linear actuator, and Python/C++ control and real-time position-tracking software — replacing a manual, wobble-prone setup and enabling precise, repeatable displacement testing of quasi-zero-stiffness (QZS) flexures for a cryogenic scanning tunneling microscope vibration-isolation system
- Support experimental setup development, sample preparation, and laboratory instrumentation for nanoscale optical and materials-characterization studies
- Contribute to science-outreach initiatives focused on accessibility for blind and visually impaired audiences

Outreach & Research Volunteer *September 2021 – August 2022*
Geneva Lakes Astrophysics and STEAM (GLAS), Walworth, WI

- Developed foundational proficiency in Python for observational and data-related astronomy applications
- Trained to remotely operate the Stone Edge Observatory telescope for research and educational purposes
- Supported telescope use for astronomical observation and data collection activities
- Delivered public education and outreach on a range of astrophysics topics, communicating complex scientific concepts to diverse audiences

Presentations

"Dancing with the Stars: Measuring the Rotation Curve of the Milky Way Galaxy" *April 2026*

Poster — 2026 UW–Madison Undergraduate Symposium, Madison, WI

Co-authors: A. Alvin, N. Broderick, I. Bubnick, H. Krauklis, P. Kyriopoulos, A. Nelson, N. Talbi

- Used 21-cm HI-line observations from the UW Small Radio Telescope (Galactic longitudes 22–72°) with the tangent-point method to construct the Milky Way's rotation curve and enclosed-mass profile
- Measured a rotation-curve plateau consistent with published results, providing evidence for dark matter and disagreement with the mass distribution predicted by luminous matter alone

Outreach & Public Engagement

WSBVI College & Career Readiness Resource Fair — Invited Presenter *May 2026*

With Prof. Victor Brar and two former Brar Lab members — Wisconsin School for the Blind & Visually Impaired, Janesville, WI

- Co-presented an interactive physics outreach session for blind and low-vision middle and high school students at WSBVI's third annual College and Career Readiness Resource Fair
- Framed physics as a uniquely accessible field of study while leading hands-on tactile demonstrations of atomic structure and interatomic forces
- Drew on the lab's NSF-funded "Haptic Atomic Forces" curriculum (tactile 3D-printed and crocheted electron-cloud models, raised haptic images, and a force-feedback haptic pen) to let students physically experience concepts in atomic physics

Education

B.A. in Astronomy–Physics and Philosophy *2022 – 2026*

University of Wisconsin–Madison — Degree conferred May 2026

Teaching & Mentoring Experience

Peer Mentor Tutor *August 2025 – May 2026*

Physics Learning Center, University of Wisconsin–Madison

- Facilitate weekly peer-led tutoring sessions for a small group of Physics 104 students, reinforcing core introductory physics concepts and problem-solving techniques
- Guide students through active-learning exercises, collaborative problem sets, and exam preparation strategies
- Explain complex physics topics clearly and adaptively, promoting peer-to-peer learning and academic confidence
- Foster an inclusive, supportive learning environment encouraging participation across diverse academic backgrounds

Skills & Courses

Programming & Computation

Python · C++ (Arduino/embedded control systems) · Wolfram Mathematica · REBOUND N-body simulations · IllustrisTNG50 simulation data

Observational Techniques

Optical and radio telescope operation and data acquisition — UW Small Radio Telescope (21-cm HI spectroscopy), Stone Edge Observatory, ASTRON 465 Observational Astronomy Lab

Laboratory & Instrumentation

Mechanical exfoliation (graphene/hBN sample fabrication) · FTIR spectroscopy instrumentation · custom circuit design (breadboard, Arduino, actuators) and position-encoding control systems · experimental setup design and materials characterization

Other

Microsoft Office Suite

Github