Dr. Josh Walawender

Instrument/Research Specialist at Subaru Telescope, NAOJ

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EDUCATION

- **Ph.D.** in Astrophysical & Planetary Sciences (2006) -- University of Colorado at Boulder
- **M.S.** in Astrophysical & Planetary Sciences (2002) -- University of Colorado at Boulder
- **B.A.s** in Physics and in Astrophysics (2000) -- University of California at Berkeley
  - Graduated with "high honors in physics and distinction in general scholarship"
  - Awarded the Chancellor's Scholarship (1996-2000)

SKILLS

- **Systems Engineering**: Designed, implemented, and maintained optical, mechanical, electrical, and computer systems for Subaru Telescope, the Hoku Ke'a Telescope, and the VYSOS Project.
- **Instrumentation**: I have broad knowledge of the various systems which make up an astronomical instrument including optics, mechanical systems, vacuum systems, cryogenics, communications and control. Much of my work has focused on improving reliability of complex instruments.
- **Project Management**: Managed the nuMOIRCS instrument upgrade project at Subaru Telescope.
- **Programming:** I have written and maintain a python module for automated performance analysis for robotic telescopes[1], contributed to the observatory control system for Project PANOPTES[2], and designed a new instrument control system for the MOIRCS instrument at the Subaru Telescope. I am familiar with version control and collaborative coding practices using git.
- **Data Analysis/Scientific Research**: I have authored numerous papers on the topic of star formation and protostellar feedback.
- **Technical Communication**: I have taught upper division classes in astrophysics, mentored students, written software tutorials and technical documentation for instrumentation. I have presented numerous public talks on astronomy to lay audiences and also spent over 1000 hours volunteering with the Maunakea Visitor Information Station introducing the public to science though their nightly observing program.

EXPERIENCE

Instrumentation/Research Specialist at Subaru Telescope, NAOJ (10/2012-current)

- Responsible for the maintenance of the Fiber Multi Object Spectrograph (FMOS) prime focus instrument. I implemented several projects to improve reliability of the instrument.
- Project manager for the nuMOIRCS project to upgrade the MOIRCS instrument.

Interim Director of Hoku Ke'a Telescope and Assistant Professor of Astronomy at the University of Hawaii at Hilo, Hilo, HI (3/2011 - 5/2012)

- While director of the Hoku Ke'a Telescope, I undertook a program to thoroughly evaluate all components of the observatory to determine why the system was not operational. I then made

[1] *IQMon: https://github.com/joshwalawender/IQMon*

[2] *POCS: https://github.com/panoptes/POCS*

retrofit plans for the telescope and observatory systems and formulated a budget. Once funding was secured, I began the commissioning process by implementing projects to repair or upgrade numerous observatory systems.

Postdoctoral Fellow at the University of Hawaii Institute for Astronomy, Hilo, HI (5/2006 - 3/2011 & 8/2012-10/2012)

- I led the commissioning project for a telescope (VYSOS-16N) which involved evaluation and troubleshooting of all telescope systems. My work included a complete redesign of the optical system, and testing which revealed mechanical problems in the polar axis assembly.
- I designed, installed, and commissioned both of the second generation telescopes: a wide field survey telescope (VYSOS-5) and a larger survey telescope (VYSOS-20). This included all components of the observatory system (the enclosure, telescope, camera, and mount) as well as the infrastructure (computers, communication, safety systems, and control software).

Research Assistant at the University of Colorado at Boulder (2000-2006)

- Stars form via the gravitational collapse of giant molecular clouds, however, only about 5-10% of the mass in the clouds forms a star. Why is star formation so inefficient? In my research, I studied the effect of protostellar outflows (high velocity jets of gas launched out of the poles of stars as they accrete material) on the surrounding cloud. We performed the first ever survey searching for Herbig-Haro objects (shocked regions where the protostellar outflows slam against ambient material) over an entire giant molecular cloud. By comparing their momentum content to the turbulent momentum content of the cloud itself, we were able to determine that protostellar outflows can shred high density regions of star formation from the inside out, significantly altering the star formation process in that region, however, they do not have a significant net effect on the entire giant molecular cloud[3].

Research Assistant at the University of California at Berkeley (1998-2000)

- Examined the structure of the galactic magnetic field using the polarization of starlight with Dr. Carl Heiles of the Astronomy Department as my Senior Honors Thesis.
- Calibrated gamma ray detectors for a balloon borne experiment at the Space Sciences Lab.
- Evaluated the performance of MOSFET transistors at small length scales at Lawrence Berkeley National Lab for the ATLAS particle detector project for the Large Hadron Collider.

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[3] *see Walawender, et al. publication in Astronomical Journal: http://adsabs.harvard.edu/abs/2005AJ....129.2308W*