Kellen D. Lawson

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Education

PhD (Physics), Spring 2022 (anticipated) — University of Oklahoma, Norman, Oklahoma
Advisor: John Wisniewski

BSc (Astrophysics), Fall 2014 — College of Charleston, Charleston, South Carolina

Research Interests

- High-contrast imaging of circumstellar disks & exoplanets
- Integral field spectroscopy and polarimetry
- Software development
- Optimization algorithms

Research Experience

Graduate Research Assistant (2018–Present) — University of Oklahoma
Advisor: John Wisniewski; dissertation work reducing, analyzing, and modeling high-contrast integral field spectroscopic and polarimetric imagery from the Subaru observatory's SCExAO/CHARIS to study circumstellar disks and exoplanets.

Graduate Research Assistant (2017–2018) — Univ. of Oklahoma & Univ. of Washington
Advisor: John Wisniewski & coadvisor: Eric Bellm; developed techniques for the identification of flare star candidates in sparsely sampled time-series photometry from the Palomar Transient Factory (PTF).

Undergraduate Researcher (2013–2015) — College of Charleston
Advisor: Joe Carson; worked to identify and assess planet candidates in high-contrast imagery from the Subaru Observatory's HiCIAO as part of the Strategic Exploration of Exoplanets and Disks with Subaru (SEEDS) survey.

Refereed Publications

1. **Lawson, K.**, Currie, T., Wisniewski, J., et al. 2021, *"Multiband imaging of the HD 36546 debris disk: a refined view from SCExAO/CHARIS"*, submitted to AJ
2. **Lawson, K.**, Currie, T., Wisniewski, J., et al. 2021, *"High-contrast integral field spectropolarimetry of planet-forming disks with SCExAO/CHARIS"*, Proc. SPIE 11823, Techniques and Instrumentation for Detection of Exoplanets X, 118230D
3. Currie, T., Olivier, G., Lozi, J., ... **Lawson, K.**, et al. 2020, *"On-sky performance and recent results from the Subaru coronagraphic extreme adaptive optics system"*, Proc. SPIE 11448, Adaptive Optics Systems VII, 114487H
4. Currie, T., Brandt, T., Kuzuhara, M., ... **Lawson, K.**, et al. 2020, *"SCExAO/CHARIS Direct Imaging Discovery of a 20 au Separation, Low-mass Ratio Brown Dwarf Companion to an Accelerating Sun-like Star"*, ApJL, 904, L25
5. **Lawson, K.**, Currie, T., Wisniewski, J., et al. 2020, *"SCExAO/CHARIS Near-IR Integral Field Spectroscopy of the HD 15115 Debris Disk"*, AJ, 160, 163
6. Schutte, M., **Lawson, K.**, Wisniewski, J., et al. 2020, *"Discovery of a Nearby Young Brown Dwarf Disk"*, AJ, 160, 156
7. Silverberg, S., Wisniewski, J., Kuchner, M., **Lawson, K.**, et al. 2020, *"Peter Pan Disks: Long-lived Accretion Disks Around Young M Stars"*, ApJ, 890, 106
8. **Lawson, K.**, Wisniewski, J., Bellm, E., Kowalski, A., & Shupe, D. 2019, *"Identification of Stellar Flares Using Differential Evolution Template Optimization"*, AJ, 158, 119
9. Blunt, S., Endl, M., Weiss, L., ... **Lawson, K.**, et al. 2019, *"Radial Velocity Discovery of an Eccentric Jovian World Orbiting at 18 au"*, AJ, 158, 181

10. Wisniewski, J., Kowalski, A., Davenport, J., ... **Lawson, K.**, et al. 2019, *"High-fidelity Imaging of the Inner AU Mic Debris Disk: Evidence of Differential Wind Sculpting?"*, ApJL, 883, L8

11. Currie, T., Marois, C., Cieza, L., ... **Lawson, K.**, et al., 2019, *"No Clear, Direct Evidence for Multiple Protoplanets Orbiting LkCa 15: LkCa 15 bcd are Likely Inner Disk Signals"*, ApJL, 877, L3

Presentations

1. *"'High-contrast integral field spectropolarimetry of planet-forming disks with SCExAO/CHARIS"*, SPIE Optical Engineering + Applications, Aug 2021

2. *"SCExAO/CHARIS High-Contrast Integral Field Spectropolarimetry of Planet-Forming Disks"*, Subaru Users Meeting FY2020, Mar 2021

3. *"SCExAO/CHARIS High-Contrast Integral Field Spectropolarimetry of Planet-Forming Disks"*, Bay Area Exoplanet Meeting #36, Mar 2021

4. *"SCExAO/CHARIS High-Contrast Imaging and Integral Field Polarimetry/Spectroscopy of Planet-Forming Disks"*, 237$^{\text{th}}$ AAS Meeting, Jan 2021

5. *"SCExAO/CHARIS Near-IR Integral Field Spectroscopy of the HD 15115 Debris Disk"*, ExSoCal 2020, Sept 2020

6. *"SCExAO/CHARIS Near-IR Integral Field Spectroscopy of the HD 15115 Debris Disk"*, Univ. of Michigan – Star & Planet Formation Journal Club, Aug 2020

7. *"SCExAO/CHARIS Near-IR Integral Field Spectroscopy of the HD 15115 Debris Disk"*, 236$^{\text{th}}$ AAS Meeting, Jun 2020

8. *"The Subaru SEEDS Direct Imaging Survey for Planets of Early-Type Stars"*, 225$^{\text{th}}$ AAS Meeting, Jan 2015

9. *"The Subaru SEEDS Direct Imaging Survey for Planets of Early-Type Stars"*, South Carolina Academy of Sciences Meeting, Apr 2014

Public Service and Outreach

Lunar Sooners (2016–Present) University of Oklahoma

A student organization that introduces under-represented Oklahoma communities to astronomy using a portable planetarium, public telescope observing, discussion panels, and demonstrations. Selected Lunar Sooners events that I co-hosted:

- SW OKC Public Library (Jun. 4, 2019) – Demos and Q&A with children ages 5-12 as part of the library's summer camp program
- "Soonertarium" at Jay Elementary (Oct. 9, 2018) – All-day event for elementary school groups using our inflatable planetarium
- Boys and Girls Club of Norman (Jun. 26, 2018) – Astronomy demonstrations for K-12 students

PyVAN github.com/kdlawson/pyvan

A publicly available Python package for assessing variability of candidate lightcurves, especially suited to irregularly sampled light-curves of ground based astronomical surveys.

Grants & Awards

Bullard Dissertation Completion Fellowship ($15000) – 2021 OU Graduate College

Funding to cover my tuition and stipend for a semester while I complete my doctoral dissertation.

Grants in Aid of Research ($3933) – 2020 Sigma Xi

Funding for purchase of a computer workstation with a modern GPU in order to develop and apply GPU-optimized data analysis tools for direct imaging studies of exoplanets and circumstellar disks.

Research Presentation Grant ($450) – 2014 College of Charleston
Funding for travel to Seattle to present a poster on my senior research project at the 2015 AAS meeting.

Major Academic Year Support Grant ($1000) – 2014 College of Charleston
Funding for my research on the SEEDS exoplanet survey with advisor Joe Carson.

Dunlap Institute Summer School, Tuition & Travel Grant (800 CAD) – 2014 Univ. of Toronto
Funding for tuition and travel to Univ. of Toronto's Dunlap Institute instrumentation summer program.

Richard Petit Award for Outstanding Undergraduate Research ($100) – 2014 Sigma Xi
Awarded for my 15 minute presentation on my undergraduate work as part of the SEEDS survey.

Summer Undergraduate Research with Faculty Grant ($2000) – 2014 College of Charleston
Funding for my research on the SEEDS exoplanet survey with advisor Joe Carson.

Major Academic Year Support Grant ($1000) – 2013 College of Charleston
Funding for my research on the SEEDS exoplanet survey with advisor Joe Carson.