

Dr. Adam F. Kowalski

Assistant Professor

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Professional Preparation

University of Chicago, Chicago, IL, Physics, BA, 2006

University of Washington, Seattle, WA, Astronomy, PhD, 2012

ORAU NASA Postdoctoral Program, NASA/GSFC, Heliophysics Science Division, 2012–2014

University of Maryland, Research Associate, GSFC/UMD, Department of Astronomy and the Heliophysics Science Division, 2014–2016

Appointments

8/2016 – current: Joint 50/50 position as Assistant Professor at the University of Colorado Boulder, Department of Astrophysical and Planetary Sciences (APS) and tenure track astronomer at the National Solar Observatory (NSO); rostered in the Laboratory for Atmospheric and Space Physics (LASP)

Awards and Honors

I was awarded 2022 American Astronomical Society/Solar Physics Division Karen Harvey Prize, which is awarded in recognition of a significant contribution to the study of the Sun early in a person's professional career. According to the AAS/SPD website (<https://spd.aas.org/prizes/harvey/previous>):

[Adam Kowalski] is awarded the Karen Harvey Prize for his innovative research into stellar flares towards resolving long-standing problems relating to flares on both the Sun and other stars. Dr. Kowalski has made substantial contributions to understanding the response of lower stellar atmospheres to stellar flares using a combination of computer modeling, ground- and space-based observations, and theory. Dr. Kowalski's research bridges the solar and stellar communities; this cross-cutting approach continues to yield important innovations on long-standing problems relating to flares on both the Sun and other stars. His early career research has advanced the understanding of continuum emission from flares, the interpretation of spectroscopic observations, and the timely subject of exoplanetary habitability.

The award plaque reads: *For his innovative research into stellar flares towards resolving long-standing problems relating to flares on both the Sun and other stars, and for bridging the solar and stellar communities by making substantial contributions to understanding the response of lower stellar atmospheres to stellar flares using a combination of computer modeling, ground- and space-based observations, and theory.*

Expertise

Solar and stellar flares, optical and ultraviolet observational astronomy, optical spectroscopy and photometry, data reduction and analysis, stellar atmosphere (chromosphere and photosphere) models, radiation-hydrodynamics, forward modeling, spectral line broadening, statistics and probability theory, modeling and interpretation of the Balmer jump and hydrogen lines in solar and stellar flare spectra, programming in Python, IDL, and Fortran.

Research Summary

I am an observational astronomer with extensive experience observing at ground-based telescopes, such as the ARC 3.5m telescope at the Apache Point Observatory and the Dunn Solar Telescope at Sac Peak. My research focuses on optical and ultraviolet observations and modeling of solar and M star flares. I employ a unique combination of data analysis techniques and radiative-hydrodynamic modeling to answer questions about the fundamental physical

processes that generate the near-ultraviolet/blue/optical radiation in stellar flares. Answers to these questions enable more accurate characterization of the high-energy radiation environment of potentially habitable planets orbiting M stars. My short-term goals include the publication of the first-generation grid of RADYN models of M star flares. A major long-term goal is to serve as scientific lead for a Small Explorer Mission (or equivalent) that observes solar flares with broadband spectra from 180 – 480 nm, finally providing clear answers to the origin of “white-light” flares on the Sun and other stars.

Selected Recent Career Highlights (details follow)

- Awardee of the 2022 AAS/SPD Karen Harvey Prize.
- 71 refereed publications: 13 as first author, eight as first author since joining CU/NSO, four as second author since joining CU, primary mentor of two visiting students (Namekata, Zhu) who wrote first author papers based on their work at CU/NSO; h-index = 32.
- Invited sole author of a review article on “Stellar Flares” for the *Living Review in Solar Physics* journal (in preparation)
- Invited author of the solar-stellar connection section (Section 7; pp. 70 – 74) in the review article by De Pontieu et al. 2021.
- One APS graduate student (Butler) successfully defended their PhD dissertation (2022) under my supervision.
- 27 CU students have been trained on the 3.5m at Apache Point Observatory due to field trips (through 3520 and through my own funding) and remote observing sessions that I organized and led.
- Mentor for one postdoctoral researcher (Notsu) at CU.
- Three Masters degrees conferred to APS graduate students (Butler, Tristan, Tamburri; two are solar-focused and one works on the Neupert effect in stellar flares) and one in the Physics department at CU (Simmons; solar-focused) under my supervision.
- Instructor for six classes at CU (ASTR 1200, ASTR 3520, ASTR 5550) covering all division levels (lower-undergrad, upper-undergrad, grad).
- Invited lecturer on Solar Flares and Solar Energetic Particles at the Boulder Space Weather Summer School three years in a row.
- Co-taught additional course loads in ASTR seminar (twice) and the Hale Graduate COLLAGE program (twice)
- Invited speaker 15 times since joining CU/NSO; invited colloquium speaker twice in Spring 2023.
- Awarded 466 ks XMM-Newton Large Programme in Oct 2018, which has been the basis of the work of this postdoc and graduate student at CU.
- Member of the Panel on Physics of the Sun and Heliosphere for the National Academies of Science Decadal Survey on Solar and Space Physics (Oct 2022 - current)

Refereed Publications (Total = 71, h-index = 32)

Kowalski, A. F. 2023, *The Astrophysical Journal Letters*, 943, L23. doi:10.3847/2041-8213/acb144. <https://ui.adsabs.harvard.edu/abs/2023ApJ...943L..23K/abstract>

Kowalski, A. F. 2022, “Near-Ultraviolet Continuum Modeling of the 1985 April 12 Great Flare of AD Leo”, *Frontiers in Astronomy and Space Sciences* vol. 9, id. 1034458, DOI: 10.3389/fspas.2022.1034458. <https://ui.adsabs.harvard.edu/abs/2022FrASS...934458K/abstract>

- Kowalski**, A. F., Allred, J. C., Carlsson, M., Kerr, G. S., Tremblay, P.-E., Namekata, K., Kuridze, D., Uitenbroek, H. 2022. The Atmospheric Response to High Nonthermal Electron-beam Fluxes in Solar Flares. II. Hydrogen-broadening Predictions for Solar Flare Observations with the Daniel K. Inouye Solar Telescope. *The Astrophysical Journal* 928, 190. DOI: 10.3847/1538-4357/ac5174; <https://ui.adsabs.harvard.edu/abs/2022ApJ...928..190K>
- Kowalski**, A. F., Butler, E., Daw, A. N., Fletcher, L., Allred, J. C., De Pontieu, B., Kerr, G. S., Cauzzi, G. 2019. Spectral Evidence for Heating at Large Column Mass in Umbral Solar Flare Kernels. I. IRIS Near-UV Spectra of the X1 Solar Flare of 2014 October 25. *The Astrophysical Journal* 878, 135. DOI: 10.3847/1538-4357/ab1f8b; <https://ui.adsabs.harvard.edu/abs/2019ApJ...878..135K>
- Kowalski**, A. F., Wisniewski, J. P., Hawley, S. L., Osten, R. A., Brown, A., Fariña, C., Valenti, J. A., Brown, S., Xilouris, M., Schmidt, S. J., et al. 2019. The Near-ultraviolet Continuum Radiation in the Impulsive Phase of HF/GF-type dMe Flares. I. Data. *The Astrophysical Journal* 871, 167. DOI: 10.3847/1538-4357/aaf058; <https://ui.adsabs.harvard.edu/abs/2019ApJ...871..167K>
- Kowalski**, A. F., Allred, J. C. 2018. Parameterizations of Chromospheric Condensations in dG and dMe Model Flare Atmospheres. *The Astrophysical Journal* 852, 61. DOI: 10.3847/1538-4357/aa9d91; <https://ui.adsabs.harvard.edu/abs/2018ApJ...852...61K>
- Kowalski**, A. F., Allred, J. C., Uitenbroek, H., Tremblay, P.-E., Brown, S., Carlsson, M., Osten, R. A., Wisniewski, J. P., Hawley, S. L. 2017. Hydrogen Balmer Line Broadening in Solar and Stellar Flares. *The Astrophysical Journal* 837, 125. DOI: 10.3847/1538-4357/aa603e; <https://ui.adsabs.harvard.edu/abs/2017ApJ...837..125K>
- Kowalski**, A. F., Allred, J. C., Daw, A., Cauzzi, G., Carlsson, M. 2017. The Atmospheric Response to High Nonthermal Electron Beam Fluxes in Solar Flares. I. Modeling the Brightest NUV Footpoints in the X1 Solar Flare of 2014 March 29. *The Astrophysical Journal* 836, 12. DOI: 10.3847/1538-4357/836/1/12; <https://ui.adsabs.harvard.edu/abs/2017ApJ...836...12K>
- Kowalski**, A. F., Mathioudakis, M., Hawley, S. L., Wisniewski, J. P., Dhillon, V. S., Marsh, T. R., Hilton, E. J., Brown, B. P. 2016. M Dwarf Flare Continuum Variations on One-second Timescales: Calibrating and Modeling of ULTRACAM Flare Color Indices. *The Astrophysical Journal* 820, 95. DOI: 10.3847/0004-637X/820/2/95; <https://ui.adsabs.harvard.edu/abs/2016ApJ...820...95K>
- Kowalski**, A. F., Hawley, S. L., Carlsson, M., Allred, J. C., Uitenbroek, H., Osten, R. A., Holman, G. 2015. New Insights into White-Light Flare Emission from Radiative-Hydrodynamic Modeling of a Chromospheric Condensation. *Solar Physics* 290, 3487-3523. DOI: 10.1007/s11207-015-0708-x; <https://ui.adsabs.harvard.edu/abs/2015SoPh...290.3487K>
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- Kowalski**, A. F., Hawley, S. L., Holtzman, J. A., Wisniewski, J. P., Hilton, E. J. 2010. A White Light Megafare on the dM4.5e Star YZ CMi. *The Astrophysical Journal* 714, L98-L102. DOI: 10.1088/2041-8205/714/1/L98; <https://ui.adsabs.harvard.edu/abs/2010ApJ...714L..98K>
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Selected Non-Refereed Articles

- Kowalski**, A., Schrijver, K., Pillet, V., Criscuoli, S. 2019. Developing a vision for exoplanetary transit spectroscopy: a shared window on the analysis of planetary atmospheres and of stellar magnetic structure. *Bulletin of the American Astronomical Society* 51, 149. DOI: <https://ui.adsabs.harvard.edu/abs/2019BAAS...51c.149K>

Kowalski, A. F., Mathioudakis, M., Hawley, S. L. 2018. The Evolution of $T = 10,000$ K Blackbody-Like Continuum Radiation in the Impulsive Phase of dMe Flares. *20th Cambridge Workshop on Cool Stars, Stellar Systems and the Sun* 42. DOI: 10.5281/zenodo.1463140; <https://ui.adsabs.harvard.edu/abs/2018csss.confE..42K>

Invited Talks and Colloquia

- **Upcoming** invited colloquia on “Solar Flare Observations and Model Predictions for the Next Solar Magnetic Activity Maximum” at the Flatiron Institute at the Center for Computational Astrophysics, New York, New York (March 24th, 2023) and at George Mason University (March 31st, 2023).
- Colloquium on “Solar Flare Observations and Model Predictions for the Next Solar Magnetic Activity Maximum” at the University of Colorado (tenure talk); Oct 2022.
- Invited Colloquium on “Solar Flare Observations and Model Predictions for the Next Solar Magnetic Activity Maximum” at the University of Washington Astronomy Department, April 21, 2022.
- Invited talk at the Royal Astronomy Society Specialist Discussion Meeting: 3D Structure of the Flare Chromosphere (Dec 10, 2021). Talk title: Spectroscopic Signatures of Explosive Phenomena in the 3D Flaring Chromosphere (from Particles to Pixels to Point Sources).
- Division-wide (virtual) astrophysics Code 667 colloquium at NASA/GSFC on “Near-Ultraviolet and Optical Connections in Solar and Stellar Flares: Seeing into the Deep”, November 23, 2020.
- Invited talk on “Response of the lower solar atmosphere (in particular chromosphere) to the energy released during solar flares” in Session A14 “Advances and Upcoming Developments in Solar and Heliospheric Physics” at the 27th General Assembly of the International Union of Geodesy and Geophysics (IUGG), Montreal, Quebec, July 16 2019.
- Invited science talk on “Peering into the Surface Features of Stars” at the Associated Universities for Research in Astronomy (AURA) member representative meeting, Tucson, AZ, April 30, 2019.
- Invited talk on “Similarities and Differences in Solar and Stellar Flares”, European Week for Astronomy and Space Sciences, April 3, 2018, Special Session 12 “Flares in the lower atmosphere of the Sun and stars”.
- Invited speaker on “Optical/UV Emission and Variability of Exoplanet Host Stars” at the SORCE 2018 Sun-Climate Symposium (session on Stellar Variability and Connections to the Sun), March 19-23, 2018, Lake Arrowhead, CA.
- Invited talk at “High resolution solar physics: past, present, future”, Sunspot, NM, August 10, 2017, on “Flare Observations at High Resolution”.
- Colloquium Minnesota Institute for Astrophysics at the University of Minnesota on “The Spectral Signatures of Deep Atmospheric Heating in Solar and Stellar Flares” on May 5, 2017.
- Invited talk on “A Superflare from DG CVn (the characteristics of secondary flares on the Sun and stars)” at Boulder Solar Day on April 4, 2017 Boulder, CO.
- Colloquium on “The Spectral Signatures of Deep Atmospheric Heating in Solar and Stellar Flares” at the High Altitude Observatory on March 15, 2017, Boulder, CO.
- Talk at the AURA Observatory Council meeting October 12, 2016, on “Flare Science with the DKIST”, Las Cruces, New Mexico, Boulder, CO, Oct 25, 2016.
- Talk at the DKIST Working Group meeting October 12, 2016, on “Flare Science with the DKIST”, Las Cruces, New Mexico.
- Talk at the Space Science Institute “The White-Light Flares of Proxima Centauri” on Oct 3, 2016, Boulder, CO.

- Plenary session review talk on a “Advances in Understanding Solar and Stellar Flares” in the plenary session “Solar/Stellar Magnetic Activity and the Impact on Planetary Environments” at the 19th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun (6/9/2016), Uppsala, Sweden.
- Colloquium “The Optical and Near-Ultraviolet Continuum Emission in Stellar Flares” at the University of Colorado Boulder Astrophysics and Planetary Sciences department and the National Solar Observatory on March 30th 2016.
- “Modeling of Optical and NUV Continuum during Stellar Flares”, Invited talk at the “Superflares on Solar-type Stars and Solar Flares, and Their Impacts on Exoplanets and the Earth”, Kyoto University, March 1st, 2016.
- “New Constraints from IRIS on the Origin of White-Light Flare Emission”, Invited seminar at the University of Cambridge, January 18th, 2016.
- “The Optical and Near-Ultraviolet Continuum Emission in Stellar Flares”, University of Maryland Department of Astronomy Colloquium (11/4/2015).
- “White-Light Continuum in M Dwarf Flares”, Invited Review Talk at the International Astronomical Union Symposium 320, “Solar and Stellar Flares and their Effects on Planets”, Honolulu, Hawaii (8/3/2015).
- “New Spectral Constraints from IRIS on Models of White-Light Flare Emission” NASA Heliophysics Director’s Seminar at the NASA Goddard Space Flight Center on June 19, 2015.
- “Recent Observations and Modeling of Flares on dMe Stars” (06/26/2014) Invited talk at “Solar and Stellar Flares”, Prague, Czech Republic.
- “Recent Observations and Modeling of Optical Flares on Red Dwarf Stars” (10/7/2014), Invited Seminar at the University of Delaware Astronomy Department.
- “Flares on Red Dwarf Stars” (10/3/2013) Colloquium at the University of Oklahoma Department of Physics and Astronomy.
- “State-of-the-Art Observations and Modeling of Stellar Flares” (8/20/2012) Invited Keynote Talk at the IAU General Assembly Joint Discussion 3, “3D Views of the Cycling Sun in Stellar Context”, Beijing, China

Teaching

Summary of Courses Taught at CU Boulder

Spring	2017	ASTR 1200: Stars and Galaxies	lower-division undergrad	68 students
Fall	2017	ASTR 1200: Stars and Galaxies	lower-division undergrad	98 students
Spring	2019	ASTR 3520: Observations and Instrumentation II	upper-division undergrad	12 students
Fall	2020	ASTR 3520: Observations and Instrumentation II	upper-division undergrad	12 students
Spring	2021	ASTR 5550: Observations, Data Analysis, and Statistics	grad (core curriculum)	14 students
Spring	2022	ASTR 5550: Observations, Data Analysis, and Statistics	grad (core curriculum)	11 students

All Teaching Activities

- Organized and led a 3-night observing training run at Apache Point Observatory for 3 CU graduate students, 1 CU postbac, and 1 CU postdoc, Oct 29 – Nov 2, 2019.
- Organized and led a 5-night observing training run at Apache Point Observatory for 11 CU undergraduate students, March 9 – 13, 2019.

- Instructor for ASTR 5550: Observations, Data Analysis, and Statistics, a graduate level class in the core curriculum for the Astrophysical and Planetary Sciences Department; CU Boulder, Spring 2022
- Instructor for ASTR 5550: Observations, Data Analysis, and Statistics, a graduate level class in the core curriculum for the Astrophysical and Planetary Sciences Department; CU Boulder, Spring 2021
- Instructor for ASTR 3520: Observations and Instrumentation II at CU Boulder, Spring 2020.
- Instructor for ASTR 3520: Observations and Instrumentation II at CU Boulder, Spring 2019.
- Instructor for ASTR 1200 Stars and Galaxies at CU Boulder, Fall 2017.
- Instructor for ASTR 1200 Stars and Galaxies at CU Boulder, Spring 2017.
- Lecturer at the HAO/NCAR Boulder Space Weather Summer School, 2018 & 2019. I taught two 1-hour classes on "Solar Flares" and "Solar Energetic Particles" on July 18, 2018 and July 11, 2019. I was invited as lecturer for the 2022 Summer School, but I could not attend in person this year.
- Co-Instructor for PHYS 7810 George Ellery Hale COLLAGE course (Collaborative Graduate Education Program) "Solar Spectral Line Diagnostics" in Spring 2021 at CU Boulder.
- Co-Instructor for the Astrophysics Graduate Seminar, ASTR 6000 Fall 2018.
- Co-Instructor for the Astrophysics Graduate Seminar, ASTR 6000 Fall 2017, on "State of the art stellar atmospheric modeling". 19 students took the seminar, which was co-taught by Prof. Tom Ayres. The syllabus is available at https://www.dropbox.com/s/ihgzug4xd96d2cz/ASTR6000_Syllabus_Final.pdf?dl=1.
- Co-Instructor for ASTR 7500 George Ellery Hale COLLAGE course (Collaborative Graduate Education Program) "Solar Flares CMEs: Physics and Observations" in Spring 2017 at CU Boulder.
- Developed and presented a tutorial on "RADYN Flare Simulations" with Joel Allred, IRIS-4 Workshop, Boulder, CO (May 28th, 2015). This was stored on YouTube and was also developed into a graduate student lab in ASTR 7500 "Solar Flares: their Physics and Observation" (Univ. Colorado, May 2017). https://www.youtube.com/watch?v=uvmSQ3VMx_0&index=2&list=PLUJIX4Fd9acgUw8gGiNYtMGgvtDeshuta. I host an updated version of the tutorials on my website: afkowalski.bitbucket.io. This has evolved (2021) into a series of three lectures on flare radiative-hydrodynamics with an accompanying hands-on, Python-only, Jupyter notebook tutorial on the analysis of one impactful model from the literature.
- Wrote a Python-only (using *pyqtgraph*) replacement for IRAF's combined *imexam* and DS9 functionality for on-the-fly raw data inspection at a telescope (for student use). Works for a large variety of solar and stellar .FITS data (longslit and echelle spectroscopy, and photometry). This software can be downloaded from my professional website and was the first utility developed for *SpecLab*, a sophisticated Python-only replacement of IRAF's *apall*, *identify*, *sensfunc*, and *calibrate* packages. Unlike all other attempts at Python replacements that have been developed by the astronomy community, *SpecLab* is designed with pedagogy and classroom use as a priority. *SpecLab* includes a full reduction pipeline for data from the Horizontal Spectrograph, which I use for mentoring graduate students in longslit solar spectroscopy.
- Developed a Python-only Jupyter notebook tutorial on the analysis of longslit solar spectra from NASA's IRIS mission. This is used in all of my classes where solar observational astronomy is taught.
- Teaching Assistant for Astronomy 101 and Astronomy 150: Six quarters at the University of Washington (2006 - 2007, 2009, 2010).
- Developed curricular material on accessing and using Sloan Digital Sky Survey (SDSS) spectra for the graduate Astronomy class, ASTR 581. I taught this tutorial (a 3-hour session) in 2010 and 2011.

Leadership & Service Positions

- External reviewer on the 2022 Time Allocation Committee for the Hubble Space Telescope.
- George Ellery Hale proposal review committee for CU Graduate fellowship and Postdoc Prize Fellowship (2022).

- Served as a panel member of proposal review committee for the NASA's Heliophysics Guest Investigator – Open (HGIO-20) Program (Oct 2020).
- Chair of Time Allocation Committee for observing time at the Apache Point Observatory and User's Committee Member, CU/APS, June 2021 - present.
- Chair of Observatories Oversight Committee, CU/APS, June 2021 - present.
- Chair of the Scientific Review Committee (SRC) for panel 2 on Flares and Eruptive Activity for the first proposal call for DKIST observations; Oct 27, 28, and Nov 4, 2020.
- Chair of a Chandra Observatory Time Allocation Committee (TAC) panel (2020).
- Chair of Apache Point Observatory Data Analysis Working Group, 2019 - 2020.
- Member of Sunspot Solar Observatory Advisory Council, 2020.
- Science Organizing Committee Chair for e-Workshop on “Exoplanet Transit Spectroscopy” at the NSO at the Univ. Colorado (East Campus); 20 science talks on Oct 23-24, 2019; 80 remote + 20 local participants.
- Science Organizing Committee member for Cool Stars 20 ”Cambridge Workshops of Cool Stars, Stellar Systems and the Sun”, July 29-Aug 3, 2018, Boston, MA.
- Lead organizer on the Science Organizing Committee for the splinter session “Solar Physics with the DKIST” at Cool Stars 20 ”Cambridge Workshops of Cool Stars, Stellar Systems and the Sun”, July 29-Aug 3, 2018, Boston, MA.
- Lead organizer on the Science Organizing Committee for the splinter session “Flares in Time-Domain Surveys” convened at the 19th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun (6/7/2016), Uppsala, Sweden
- Science Organizing Committee for Committee on Space Research (COSPAR) 2016 session “Multiwavelength Observations and Simulations of Solar and Stellar Flares”
- Co-leader with Alexander Warmuth of the Working Group “Coronal Influences to the Lower Atmosphere/Seismic Waves” at “Solar in Sonoma: Tracing the Connections in Solar Eruptive Events”, Nov 27, 2012 – Dec 2, 2012, Petaluma, CA
- Co-organizer of “Seismology of Stellar Coronal Flares” Lorentz Center Workshop, May 21 – 24, 2013, Leiden, The Netherlands
- Committee member on eight Comprehensive II Exams in APS department (one as primary research mentor): Elizabeth Butler, Sam Van Kouten, Evan Anders, Amanda White, Loren Matilsky, Ryan Hoffman, Avery Schiff, Connor Bice
- With Prof. Erica Ellingson, I organized faculty presentations for APS undergraduates before each APS colloquium in Spring 2017. I gave two of these 15 minute introductory presentations and attended all faculty presentations.
- Titular advisor for APS graduate student Amanda White for one year (2018/2019), academic advisor for APS graduate student Girish Duvvuri for one year (2018).
- Member of SDSS V Collaborative Council (CoCo), January 2019 - 2020.
- APS Social Committee, APS Department, Fall 2018.
- Fiske Planetarium Oversight Committee, APS Department, Fall 2018 - Spring 2019.
- Instructor Hiring Committee, APS Department, Fall 2018 - Spring 2019.
- APS Undergraduate Curriculum Concerns Committee, Fall 2018 - Spring 2019.
- Colloquium Committee, APS Department, Fall 2017 and Spring 2018.
- Graduate Admissions Committee, APS Department, Spring 2017.
- Referee for 14 articles for ApJ, 2 article for PASJ, 2 articles in AA, 1 article for AN, 1 article for Astrophysics and Space Science, 1 article for Nature Communications.
- Served as primary reviewer on two National Science Foundation proposal review panels.
- Served as primary reviewer on three NASA TAC panels (Chandra, Swift, Kepler).
- Served as external reviewer for two NASA panels and one HST TAC panel (prior to 2020).

Participation in Collaborations

- Member of Vanessa Polito’s and Graham Kerr’s Team at workshop on “Interrogating Field-Aligned Solar Flare Models” at the International Space Science Institute (ISSI); Jan 2020 – present.
- Scialog Fellow, Time-Domain Astrophysics Scialog May 2018 and May 2019, Research Corporation for Advancement in Astrophysics.
- Member of Paola Testa’s Solar Chromospheric Heating Workshop at the International Space Science Institute (ISSI) in Bern, Switzerland; January 2016, February 2018.
- Member of Louise Harra’s ‘Energy Transformation in Solar and Stellar Flares’ Workshop at the International Space Science Institute (ISSI) in Bern, Switzerland; February 2014, May 2015, January 2016.
- Young Scientist participant in S. Wedemeyer’s ‘Magnetic Activity of Dwarf Stars and Habitability of Extra-solar Planets’ Workshop at the International Space Science Institute (ISSI) in Bern, Switzerland; January 2013.
- Young Scientist participant in L. Fletcher’s ‘Solar Chromospheric Flares’ Workshop at the International Space Science Institute (ISSI) in Bern, Switzerland; November 2009, June 2010, March 2011, January 2013.
- Member of LSST Transients Working Group.

Press Releases

- Co-author on the study (MacGregor et al. 2018, ApJL) that was featured in the press release here: <https://public.nrao.edu/news/2018-alma-flare-proxima/>
- Press release on ‘Optical Flares on Dwarf Stars: Implications for Exoplanet Habitability’ at the 2011 Winter American Astronomical Society meeting in Seattle, WA, January 10. Our press release resulted in articles in National Geographic, the BBC, Astronomy, NASA’s website, and Hubblesite
- Quoted in a NASA Press release on superflare on DG CVn, Sept 30th 2014: <http://www.nasa.gov/content/goddard/nasas-swift-mission-observes-mega-flares-from-a-mini-star/> I presented this press release as a Science Nugget presentation at the NASA/GSFC Code 600 Town Hall Meeting; October 2, 2014

Outreach

- Author of a RHESSI Nugget summarizing the results from Kowalski Allred 2018, ApJ. (published January 17, 2018). http://sprg.ssl.berkeley.edu/~tohban/wiki/index.php/Parameterized_Flare_Models_with_Chromospheric_Compressions
- Author of NSO blog post on the research findings in Kowalski Allred 2018, ApJ: <https://www.nso.edu/blog/uv-explosions-flares/> (published January 31, 2018).
- Author of a large fraction of the Space Weather section on NSO’s new website: <https://www.nso.edu/research/science-research/space-weather/>
- Public lecture on “The Stellar Flares of Proxima Centauri” to the Longmont Astronomical Society on February 16, 2017
- Presentation on “Violent Suns” to Basis DC (charter school) AP Calculus Class May 27th, 2015; developed a worksheet to show calculus students how to use integrals to calculate energies from a flare light curve from the Hubble Space Telescope
- Public talk on stellar flares at the Tacoma Astronomical Society meeting, Tacoma, Washington, July 2010

- Interview for Solar Eclipse Webcast, “Introducing your star” at the National Solar Observatory (two recordings, November 10, 2016 and November 14, 2016: <http://www.nso.edu/eclipse2017/webcasts>)
- Talk on “Stellar Flares” to the CU Undergraduate Astronomy Club at Fiske Planetarium on December 2, 2016.
- Developed project overview descriptions (for undergrads, grads, and post-docs who are interested in doing research with me) for my professional website: afkowalski.bitbucket.io

Contributed Talks

- Talk on “Narrowband Filter Observations of Stellar Flares with ARCTIC and Flarecam” at the 2021 Apache Point Observatory Science Symposium (July 26-28, 2021)
- Poster on “Preparing for spectroscopic data reduction in a PyRAF / IRAF-less future” at the Apache Point Observatory Science Symposium (July 26-28, 2021) NSO Seminar, Dec 8, 2018, on “What’s new in the physics and observations of flares?”
- I attended and gave a talk on “Very Broad Hydrogen Lines in Response to High-Flux Electron Beam Heating in Solar Flares” at the RHESSI 16 / MinXSS 1 Workshop in Boulder, CO on June 22, 2017.
- Brown bag talk at the National Solar Observatory on “The hydrogen line broadening in solar and stellar flares”, April 11, 2017.
- “NUV and Optical Continuum Emission in Stellar Flares” to the Solar Physics group at Stockholm University on June 13th, 2016 in Stockholm, Sweden.
- Talk at the NASA/GSFC Spectroscopy club, “Modeling the near-ultraviolet line and continuum emission in solar flare spectra from IRIS”, April 12, 2016.
- “The Spectral Energy Distribution of White-Light Emission in Solar and Stellar (dMe) Flares”, Hinode 9 Science Meeting, Queen’s University Belfast, UK (9/15/2015)
- “Optical and Near-Ultraviolet (White-light) Flares on Red Dwarf Stars”, Seminar at the Keck Headquarters, Waimea, HI (9/3/2014)
- “Optical Flares on Red Dwarf Stars and the Sun”, Seminar at the Carnegie Institution, Department of Terrestrial Magnetism, Washington, DC (11/7/2014)
- “A Deep Rapid Archival Flare Transients Search (DRAFTS) of the Galactic Bulge”, Invited talk at the Cool Stars 18 splinter session on the solar-stellar connection, Flagstaff, AZ (6/2014)
- “Hot-Wiring flare stars: optical flare rates and properties from time-domain surveys”, invited talk at Hot-Wiring the Transient Universe III”, Santa Fe, New Mexico (11/13/2013)
- “Flares on low-mass stars”, Invited talk at IAU General Assembly Special Session 13, “High-precision tests of stellar physics from high-precision photometry”, Beijing, China (8/29/2102)
- “Non-thermal heating in M dwarf flares: new radiative hydrodynamic models and constraints from observations”, Contributed Talk at Cool Stars 17 Splinter Session “Non-thermal processes in coronae and beyond”, Barcelona, Spain (6/26/2012)
- “Time-Resolved Properties of White Light Emission During Stellar Flares”, University of Wisconsin-Madison (11/22/2011)
- “Time-Resolved Properties of White Light Emission During Stellar Flares”, National Solar Observatory Colloquium, Sac Peak (8/11/2011)
- “UV Spectroscopy of Stellar and Solar Flares”, AAS Meeting 218, Meeting-in-a-Meeting “What’s New Under the Suns”, Boston MA (5/24/2011)
- “Time-Resolved Properties of White Light Emission During Stellar Flares”, ING/NOT La Palma Colloquium (2/17/2011)

- “Overview of Stellar Flare Observations”, 16th Workshop on Cool Stars, Stellar Systems, and the Sun, ‘Solar and Stellar Flares’ Splinter Session (8/29/2010)
- “Towards Understanding White Light Emission in Stellar Flares”, IAUS 273, Physics of Sun and Star Spots, Ventura, California 22-26 (8/2010)
- “Towards Understanding White Light Emission in Stellar Flares”, ‘The Origin, Evolution, and Diagnosis of Solar Flare Magnetic Fields and Plasmas: Honoring the Contributions of Dick Canfield’, HAO/NCAR in Boulder, CO (8/9/2010)
- “A White Light Megaflare on the dM4.5e Star YZ CMi”, CTIO Colloquium, Chile (5/18/201)
- “M Dwarfs in Sloan Digital Sky Survey Stripe 82: Photometric Light Curves and Flare Rate Analysis”, Gemini North Observatory Colloquium, Hawaii (7/24/09)

Space-Based Telescope Observing/Planning Experience

- XMM-Newton; EPIC-pn/RGS/OM; 466 ks (130 hours) Large Program (executed in Oct 2018)
- Hubble Space Telescope; COS; 8 orbits (Aug 31/Sep 1 2014)
- Herschel; PACS; 30 hours
- Interface Region Imaging Spectrograph; Flare watch observations (Sep 2015, Dec 2015)

Ground-Based Telescope Observing Experience (as active observer)

- Keck I; LRIS; 0.5 nights
- ARC 3.5m at APO; DIS; 75 half nights[†]
- ARC 3.5m at APO; ARCES; 7 half nights
- ARC 3.5m at APO; ARCTIC; 6 half nights
- ARCSAT 0.5m at APO; Flarecam; 30+ half nights[†]
- Dunn Solar Telescope; ROSA + IBIS; 26 days
- Dunn Solar Telescope; HSG + IBIS; 9 days
- WHT at La Palma; ISIS; 2 nights
- WHT at La Palma; ULTRACAM; 2 nights
- NTT at La Silla; ULTRACAM; 3 nights
- Subaru; IR Coronagraph; 3 nights
- UKIRT; IR Coronagraph; 4 nights
- 2.1m and 0.9m at KPNO; IR and optical phot; 8 nights
- 1.8m at DAO; Spectrograph; 11 nights

[†]18 of these half-nights involved operating the 3.5m and 0.5m simultaneously