# KAREN MARIE LEIGHLY

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## Education:

| | |
|---|---|
| Ph. D. Physics, 1991 | Montana State University, Bozeman MT. Thesis: X-ray Spectra, Variability and Pair Wind Models of Seyfert 1 Nuclei; Supervisor: S. Tsuruta. Co-Advisors: Kenneth Pounds (University of Leicester) and Hideyo Kunieda (Nagoya University) |
| M.S. Physics, 1987 | Montana State University, Bozeman, MT |
| B.S. Physics, 1983 cum laude | New Mexico Institute of Mining and Technology, Socorro, NM |
| B. S. Mathematics, 1983, cum laude | New Mexico Institute of Mining and Technology, Socorro, NM |

## Positions Held:

| | |
|---|---|
| August 2013 – current | The University of Oklahoma, Norman, OK<br>Professor |
| September 2006 – April 2007 | The Ohio State University, Columbus, OH<br>Visiting Professor |
| August 2006 – May 2013 | The University of Oklahoma, Norman, OK<br>Associate Professor |
| August 2000 – June 2006 | The University of Oklahoma, Norman, OK<br>Assistant Professor |
| Jan 1997 – July 2000 | Columbia University, New York, NY<br>Associate Research Scientist<br>Sponsored by Jules Halpern |
| December 1994 – December 1996 | Cosmic Radiation Laboratory, RIKEN, Japan<br>Science and Technology Agency Fellow<br>Sponsored by M. Matsuoka |
| August 1992 – October 1994 | NASA Goddard Space Flight Center, Greenbelt, MD<br>National Research Council Fellow<br>Sponsored by R. Mushotzky |
| January 1992 – August 1992 | Montana State University, Bozeman, MT<br>Research Associate - Supervised by S. Tsuruta |
| April 1992, Nov-Dec 1991, Nov-Dec 1990, Feb-Apr 1990 | Nagoya University, Nagoya, Japan – supervised by H. Kunieda<br>Visiting graduate student, postdoc |
| Jul-Sep 1989, Sep-Oct 1988 | Leicester University - Supervised by K. Pounds<br>Visiting Graduate Student |

## Fellowships and Awards:

1994: Science and Technology Agency Fellow
1992: National Research Council Postdoctoral Fellowship
2020: Regents' Award for Superior Research and Creative Activity

## Professional Societies:

American Astronomical Society (HEAD Division Member)
American Association for Physics Teachers
International Astronomical Union

# TEACHING AND INSTRUCTIONAL ACTIVITIES

## Classroom Teaching:

*I have taught fifteen different courses during the 20 years that I have been at OU. The course level ranges from introductory general education to graduate.*

| Course Number | Course Title | Semesters Taught** |
|---|---|---|
| ASTR 1504/1514 | Exploring the Universe (Undergraduate GenEd) | Sp01: 118UN<br>Sp02: 196UN<br>Fa02: 193UN<br>Sp05: 181UN<br>Fa11: 184UN (2 sections)<br>Fa13: 111UN<br>Sp15: 139UN<br>Sp18: 164UN |
| ★UNIV 1000-002<br>ASTR 3190-001 | Freshman Astronomy Seminar: What is the Universe Made Of?<br>Introduction to the Astrophysics Major: The Stars and Beyond | Sp08: 8UM<br>Sp13: 9UM |
| PHYS 1453 | Musical Acoustics | Sp16: 28UN<br>Sp17: 23UN<br>Sp19: 36UN<br>Sp22: 29UN |
| ★ASTR 1523 | Life in the Universe* (Undergraduate GenEd) | Sp10: 32UN |
| ASTR 2513 | Observatory Methods | Fa08: 11UM,1UN,1Mi<br>Fa09: 6UM, 2UN |
| ASTR 3103 | Stars | Fa04: 4UM, 1 audit<br>Fa07: 6UM, 1Mi, 2I<br>Fa10: 4UM, 1E, 2I<br>Fa16: 7UM, 2I<br>Fa18: 9UM, 2E<br>Fa22: 11UM |
| ASTR 3113 | Galaxies and Cosmology | Sp08: 5UM, 1Mi, 1E |
| ASTR 3190 | Introduction to Research | Sp20: 10UM<br>Sp23 |
| ASTR 3990 | Independent Study | Sp04: 1UM; Fa04: 1UM; Sp09: 3UM; Sp10: 3UM;<br>Fa11: 2UM; Sp12: 1UM;<br>Fa13: 1UM; Sp15: 1UM;<br>Fa15: 1UM; Sp16: 2UM; Sp18: 1UM; Fa18: 3UM |
| ★ASTR 4523/5523 (Previously ASTR 4512) | Advanced Observatory Methods | Sp03: 7UM<br>Sp04: 4UM, 3G<br>Sp06: 3UM, 2G<br>Sp09: 4UM, 2G<br>Sp11: 9UM, 1Mi, 6G<br>Sp13: 5UM, 2G |
| ASTR 5403 | High Energy Astrophysics | Fa03: 5G<br>Fa12: 7G |
| ASTR 5513 | Interstellar Medium | Fa19: 5UM, 8G |
| ASTR 5790/5900 | Seminar on Active Galactic Nuclei | Fa01: 3G<br>Fa05: 4G |
| ASTR 5900 | Nebulae and AGN* | Sp10: 1UM, 6G |
| ★ASTR 5900 | Machine Learning in Astrophysics | Fa15: 2UM, 7G<br>Fa17: 5UM, 10G<br>Fa20: 2UM, 15G |

★ Integrally involved in course development; * Co-taught with Dick Henry

** UN – undergraduate nonmajors; UM – undergraduate majors; Mi – undergraduate minor; G – graduate; E – Engineering; I – international exchange student

## Student and Postdoctoral Research Supervised:

*I have supervised the research projects of 33 undergraduate students, 18 graduate students and a postdoc. My group typically consists of 1-5 students.*

### Postdoc:

1. **Chiho Matsumoto**, OU postdoctoral research associate, May 2001 – June 2004. Supervised analysis of *Chandra* and *XMM-Newton* data from Narrow-line Seyfert 1 Galaxies including Ark 564, a sample of high-luminosity NLS1s, and the Seyfert 2 galaxy NGC 6300. Chiho took a postdoc at Nagoya University, but has now left the field.

### Graduate Students:

1. **Kaylie Green**, Western University graduate student Spring 2020 – present. Supervising research on SimBAL applications to variability in low-luminosity BALQ WPVS 007.
2. **Joseph Hyunseop Choi,** OU graduate student, Spring 2017 – Fall 2022. Supervising research on SimBAL modeling of FeLoBAL spectra, and efforts to model out / account for Lyα forest absorption.
3. **Francis MacInnis**, OU graduate student, Spring 2016 – Spring 2018. Supervising research on spectral synthesis of broad absorption line quasar spectra and development of SimBAL code. Completed the MS in Spring 2018.
4. **Aaron Morris**, OU graduate student, Summer 2012 – Spring 2013. Supervising search for PV absorption in *HST* archival spectra of Seyfert galaxies and quasars.
5. **Erin Cooper**, OU graduate student, Fall 2010 – Spring 2016. Supervising thermal FeII model, analysis of *HST* COS observation of WPVS007, and PV properties in low-redshift quasars. Defended PhD Spring 2016; currently working for AAF.
6. **Sara Barber**, OU graduate student, Summer 2009 – Fall 2011. Supervised observation, reduction and analysis of MDM, LBT and IRTF spectra.
7. **Leah Moribito**, OU graduate student (masters), Fall 2009 – Spring 2011. Supervised (with Xinyu Dai) reduction and time series analysis of quasars observed by *Swift* and *Suzaku*. Began PhD program at Leiden Observatory in Fall 2012
8. **Michele Benesh,** OU graduate student, Summer 2008 – Spring 2009. Supervised analysis of *XMM-Newton* data from luminous Narrow-line Quasars. Completed an MS with David Branch
9. **Maddumage Don P. Hemantha**, OU graduate student, Summer 2007 – Fall 2008, Summer 2010 – Summer 2011. Supervised analysis of sample of XMM-Newton observations of Narrow line Seyfert 1 galaxies (with Curtis McCully). Supervising construction and analysis of a large set of quasar emission line simulations using *Cloudy*. Defended PhD with Yun Wang Fall 2013
10. **Kimberly Prescott**, OU graduate student, Fall 2005 - Summer 2006. Supervised Masters thesis involving optical photometry and spectroscopy of a heterogeneous sample of Narrow-line Seyfert 1 galaxies. Thesis completed July 2006. Currently a radiation technician in the Chalmers Cancer Treatment Center.
11. **Bobby Fleshman**, OU graduate student, Summer 2005 - Spring 2006. Supervising analysis of *XMM-Newton* data from the luminous Narrow-line quasar RX J0439-45. Completed PhD summer 2012 working with faculty at University of Colorado.
12. **Boon-kuan Woo**, OU graduate student, Summer 2003 – Spring 2004. Supervised construction of a database of photoionization results.
13. **Larry Maddox**, OU graduate student, Fall 2002 – Fall 2004. Supervised analysis of the extended X-ray emission and extra-nuclear point sources in the *XMM-Newton* data from the Seyfert 2 galaxy NGC 6300. Completed PhD with John Cowan. Currently working at Boeing in Midwest City, OK
14. **Aida Nava**, OU graduate student, Summer 2002. Supervised analysis of *XMM-Newton* data from the Seyfert 2 nucleus NGC 6300. Completed PhD with Dick Henry. Currently a faculty member at UNAM Ensenada.

15. **Darrin Casebeer**, OU graduate student, Fall 2001 – Spring 2007. Supervising dissertation research (with Eddie Baron), including analysis and modeling of *FUSE* data from the Narrow-line Seyfert 1 Galaxy RE 1034+39, *PHOENIX* modeling of optical—UV spectra of FeII Low-ionization Broad Absorption-line Quasars, and *PHOENIX* modeling of wind acceleration in AGN. Currently working at Boeing in Midwest City, OK
16. **Toshihiro Kawaguchi,** visiting Kyoto University graduate student, Summer 2001 – Fall 2001. Facilitated construction of accretion disk models.
17. **Miranda Jackson**, Columbia University graduate student, June 1999 – December 2000. Supervised analysis of 10 coordinated *RXTE* and *ASCA* observations of Mrk 509.
18. **Karl Forster**, Columbia University graduate student, January 1997 – July 1998. Partial thesis supervision (with J. Halpern). Supervised analysis of *ASCA* observations of intermediate-type Seyfert galaxies.

**Undergraduate Students:**

1. **Charlotte Koteska**, OU undergraduate, Capstone, Fall 2022 – present. Working on reduction and analysis of Gemini GNIRS spectra.
2. **Ryan Abbott**, OU undergraduate, Capstone, Fall 2022 – present. Working on the FeLoNET spectral synthesis convolutional neural net for classification of spectra.
3. **Michael Bartlett**, OU undergraduate, REU Summer 2022 – present. Worked on construction of a convolutional neural net for spectral classification for the 4MOST Infrastructure Working Group for classification (IWG9)
4. **Taryn Fambrough**, REU student from McMurray University. Summer 2022. Worked on reduction and analysis of Gemini GNIRS spectra.
5. **Alexander Parsells,** OU undergraduate, Capstone, Fall 2021 – August 2022. Working on the convolutional neural net method FeLoNet
6. **Julianna Voelker**, OU undergraduate, REU Summer 2020 – present. Working on SimBAL anlaysis of high-redshift FeLoBAL quasars.
7. **Cora DeFrancesco**, OU undergraduate, Summer 2020 – May 2021. Working on SimBAL anlaysis of high-redshift FeLoBAL quasars and construction of the website
8. **Josh Bonner**, OU undergraduate Capstone Student, Fall 2020 - Spring 2021. Worked on investigating the absorption line dependence on the quasar spectral energy distribution.
9. **Ryan Hazlett,** OU undergraduate student Spring 2018 – present. Working on SimBAL analysis of PV quasars and extraction of eigenvectors in the Lyα region of the quasar spectrum. Presented a poster at the 233rd AAS meeting in Seattle, WA January 2019. Currently a graduate student at University of Toledo since Fall 2020.
10. **Suzannah Brodnitz** – REU student from Oberlin College, Summer 2018.
11. **Collin McLeod**, OU undergraduate student, Spring 2018 - present. Worked on SimBAL analysis of PV quasars during Summer 2018; currently working on implementing a variational autoencoder method to generate synthetic quasar emission-line spectra. Currently a graduate student at University of Pittsburgh since Fall 2020.
12. **Amy Griffin,** OU undergraduate student, Spring 2018. Attending group meetings.
13. **Collin Dabbieri,** OU undergraduate student, Spring 2017 – present, including REU Summer 2017. Supervise SimBAL modeling of FeLoBAL spectra and VLT data of SDSS 1106. Currently working on convolutional neural net software to classify FeLoBALs among SDSS quasar spectra. Currrently a graduate student at Vanderbilt University in Fall 2020.
14. **Cassidy Wagner**, OU undergraduate student, Spring 2016 – Spring 2018, including REU Summer 2016, and capstone. Supervising EMPCA and K-means cluster analysis of quasar spectra, and SED fitting. Currently in graduate school at University of Illinois Urbana-Champaign.

15. **Adam Marrs**, OU undergraduate student, Fall 2015 – Spring 2018, including REU Summer 2016, and capstone. Supervising EMPCA and K-means cluster analysis of quasar spectra, and exploratory data analysis. Graduate school at University of Delaware starting Fall 2019.
16. **Catie Raney**, OU undergraduate capstone student, Fall 2013 – Spring 2014. Supervising research on PV and HeI* properties of IRAS 1429+5238 using Gemini, KPNO, and HST spectra. Currently in graduate school at Rutgers University.
17. **Tarryn Kahre**, OU undergraduate student, Fall 2013 – Spring 2016. Supervising search for PV in HST archival spectra of BALQSOs (with Erin Cooper). Graduated with an BS from OU in Spring 2016; currently working for Boeing.
18. **Kenya Davis**, University of North Carolina, Charlotte, Summer 2013. Supervised search for PV in HST archival spectra of BALQSOs (with Erin Cooper)
19. **Adrian Lucy**, OU undergraduate student, Summer 2011 – Spring 2012, Fall 2012 – Spring 2013, Fall 2013 – Spring 2014. Graduated Spring 2014. Supervised reduction and analysis of KPNO spectrum of a HeI* BALQSO. Spent summer 2012 as an intern at GSFC in the USRP program working with Bret Lehmer. Awarded Goldwater Scholarship in Spring 2012. Spent summer 2013 as the NRAO REU working with Al Wooten. PhD in Astronomy from Columbia University Summer 2021. Currently a STScI fellow.
20. **Mallory Getts**, OU undergraduate student, Fall 2010 – Summer 2011. Supervised analysis of SDSS spectra of a sample of weak-line quasar and comparison sample. Will start graduate school at New Mexico Institute of Mining and Technology in Spring 2013.
21. **Don Carmichael**, OU undergraduate, Summer 2010 – Fall 2010. Supervised (with Xinyu Dai) analysis of SDSS quasar spectra and *Swift* X-ray data (with Jacob Teffs)
22. **Jacob Teffs**, REU summer student from University of Central Arkansas, Summer 2010. Supervised (with Xinyu Dai) analysis of SDSS quasar spectra and *Swift* X-ray data (with Don Carmichael). Will start the masters program in the Department of Physics at the University of North Dakota in Fall 2012.
23. **Amanda Truitt,** OU undergraduate student, Fall 2008 – Spring 2011. Supervised analysis of SDSS spectra of CaII-selected quasars. Graduate school in the astrophysics program at Arizona State University, PhD awarded in 2017, currently a postdoctoral fellow at Las Alamos.
24. **Amy Rodgers**, OU undergraduate student, Fall 2007. Supervised analysis of *ROSAT* X-ray data from objects with SDSS spectra.
25. **Kevin Perot**, OU undergraduate student, Fall 2007 – Summer 2008 (REU). Supervised analysis of sample of SDSS spectra of bright quasars, and *XMM-Newton* data of luminous Narrow-line quasars
26. **Curtis McCully**, REU summer student, SNU undergraduate, Summer 2007 – Spring 2008. Supervised analysis of sample of *XMM-Newton* observations of Narrow line Seyfert 1 galaxies (with Hemantha Maddumage). Was awarded Chambliss Astronomy Achievement award for a poster presenting this work at the 212$^{th}$ AAS meeting. Graduated from Rutgers in Spring 2014, and took a postdoc at LCOGT/UCSB in Fall 2014, and currently on staff there.
27. **Jason King**, OU undergraduate student, Fall 2005 - Spring 2006. Supervised Capstone project that tests the influence of the AGN spectral energy distribution on the Baldwin effect using large grids of *Cloudy* models.
28. **Caitlin Finley**, OU undergraduate student, January 2005 – Spring 2007. Supervised analysis of SDSS spectra that will ultimately yield a catalog of near-UV spectral properties of intermediate redshift narrow-line Seyfert 1 galaxies (with Randi Worhatch).
29. **Randi Worhatch**, OU undergraduate student, January 2005 – Spring 2006. Supervised analysis of SDSS spectra that will ultimately yield a catalog of near-UV spectral properties of intermediate redshift narrow-line Seyfert 1 galaxies (with Caitlin Finley). Attended graduate school at University of Texas in the Astronomy Department.

30. **Ryan Biesemeyer** OU undergraduate student, Summer 2004 – Spring 2005. Supervised REU and Capstone project consisting of principal components analysis of SDSS spectra. Football coach at various universities.
31. **Jiehae Choi**, OU undergraduate student, Spring 2004 – Summer 2005. Supervised REU and Capstone project consisting of reduction and time series analysis of *ASCA* data from the long observation of NGC 4395, and analysis of *XMM-Newton* data from the Narrow-line Seyfert 1 quasar PHL 1811. Attended graduate school at New Mexico State University.
32. **Andrea Crews**, OU REU student from Carnegie Mellon, Summer 2003. Supervised analysis of *XMM-Newton* data from the Narrow-line Seyfert 1 galaxy 1H 0707-495.
33. **John Moore**, OU undergraduate, Spring 2002 – July 2005. Supervised reduction and analysis of *HST* UV spectra, SDSS spectra from a large sample of quasars, and *Chandra* data. Attended graduate school at University of Wyoming; currently working in industry.

## Dissertation Committee Membership:

1. **Hyunseop Choi,** OU Ph. D. 2022, committee chair
2. **Nickalas Reynolds,** OU Ph. D. candidate, committee member
3. **Joseph Muse,** OU Ph. D. 2022, committee member
4. **Alekzander Kosakowski,** OU Ph. D. 2021, committee member
5. **Francis MacInnis,** OU MS 2018, committee chair
6. **Jeremy Lusk**, OU Ph. D. 2018, committee member
7. **Jenna Nugent**, OU Ph. D. 2019, committee member
8. **Tim Miller**, OU Ph. D. 2017, committee member
9. **Erin Cooper**, OU Ph. D. 2016, committee chair
10. **Henry Bradsher**, OU M. S. 2012, committee member
11. **Leah Morabito**, OU M. S. 2012, committee member
12. **Maddumage Don P. Hemantha,** OU Ph. D. 2013, committee member
13. **Juliette Dalhed,** OU M. S. 2010, committee member
14. **Melissa Brucker,** OU Ph. D. 2009, committee member
15. **Kimberly Prescott**, OU M. S. 2006, committee chair
16. **Darrin Casebeer**, OU Ph.D. 2007, committee chair
17. **Larry Maddox**, OU Ph. D. 2006, committee member
18. **Chris Stockdale**, OU Ph. D. 2002, committee member

## Instructional Development Activities:

- "DSECOP 2022 Data Science in Physics Workshop", University of Maryland, June 21-24, 2022
- "2019 PICUP Summer Faculty Development Workshop", University of Wisconsin River-Falls, July 8-14, 2019
- "Teaching Science Thought and Practices Workshop (Weekend Intensive)", 233rd AAS meeting, Seattle Washington, January 5 & 6, 2018
- OU Instructional Development Program Faculty Discussion Group "How to Design Courses for More Significant Student Learning", Spring 2003
- OU Professional Development Seminar for New Faculty Members, Fall 2000
- Workshop on Astro 101 at Center for Astrophysics, Harvard University, June 15, 2001
- American Astronomical Society New Faculty Workshop, Rochester, NY, June 2000

# PROFESSIONAL SERVICE

## Departmental Committee and Service Activities:

**Assessment Committee: Fall 2017 – Spring 2018** committee chair, **Fall 2018 – present,** Committee member, **Spring 2022** committee chair

**Physics REU Broader Impact Committee: Fall 2017 – Spring 2018**
Committee member

**Renewable Term Faculty Member Search: Fall 2017 – Spring 2018**
Search committee member – hired Daniel White

**Committee A: Fall 2015 – Spring 2017, Fall 2018 – Spring 2020**

**Homer L. Dodge Chair in Astrophysics Search: Fall 2015 – Spring 2016**
Search committee member – hired John Tobin

**Assistant Professor in Astronomy & Astrophysics Search: Fall 2013 – Spring 2014**
Search committee member – hired Nate Kaib

**Assistant Professor in Astronomy &Astrophysics Search: Fall 2011 – Spring 2012**
Search committee chair – hired John Wisniewski

**Assistant Professor in Astronomy & Astrophysics Search: Fall 2010 – Spring 2011**
Search committee member – hired Mukremin Kilic

**Homer L. Dodge Chair in Astrophysics Search: Fall 2006 – Fall 2007**
Served as a consultant for search committee; contributed to development of candidate short list. Search failed.

**Graduate Studies Committee, Fall 2011 – Fall 2013, Fall 2018**
Graduate student progress toward degree

**Undergraduate Recruiting Committee, Spring 2015**
Assisted in designing strategies to recruit undergraduates to the Astronomy and Astrophysics program

**Undergraduate Advisor for Astrophysics and Astronomy Majors, Fall 2001 – Spring 2006, Fall 2007 – Spring 2011, Fall 2013, Fall 2022 - present**
Advise 20-25 undergraduate astronomy and astrophysics majors on course selection, graduation requirements, and professional development. Talk with prospective students and parents.

**Colloquium Chairperson, Fall 2001 – Spring 2006**
Coordinate colloquium visits, set up audio-video equipment for colloquium. Endeavor to fill colloquium schedule.

**Undergraduate Studies Committee, Fall 2000 – Spring 2006, Fall 2007 – Spring 2011**
Represent astronomy group. Determine departmental scholarships and awards. Assisted in physics and astronomy undergraduate curriculum reform in 2002-2003.

**Faculty Secretary, Fall 2005 – Spring 2006**
Record and distribute minutes and attendance records for faculty meetings.

**Lin Hall Building Committee: Fall 2015 – Spring 2017**
Assisted in designing roof-top observatory

**Nielsen Hall Phase III Addition Building Committee, Fall 2005 – Spring 2006, Fall 2007 – Spring 2008**
Participated in Phase III renovation of Nielsen Hall.

**Nielsen Hall Phase II Addition Building Committee, Fall 2001 – Spring 2005**
Reviewed procedures and plans for new addition. Contributed to choosing furniture and audio-video equipment.

**Faculty Marshall at Arts & Sciences Convocation, 2001, 2002, 2004, 2005, 2006, 2007, 2008, 2009, 2012, 2014, 2018**
One of two faculty marshals representing the Department of Physics and Astronomy.

**Coordinated BAAS Observatory report for Astronomy group, Fall 2001 – Fall 2004**
Collected information and edited observatory report.

**Colloquium speaker host, Fall 2000 – Present**
Hosted Daniel Proga, Randall LaViolette, Joe Shields, Herman Marshall, Mike Loewenstein, Bob Becker, Fred Hamann, Mike Eracleous, Mike Corcoran, Nahum Arav, Smita Mathur, Pat Hall, Martin Elvis, Mike Crenshaw, Laura Kay, Kerry McGruder, Gordon Richards, Andrew Baker, Don Terndrup, Matthias Dietrich, Dirk Grupe, Matt Benacquista, Marc Seigar, Jaqueline van Gorkom, Greg Madejski, Bret Lehmer, Donald Terndrup, Sarah Gallagher, Paola Rodriguez Hidalgo

**AMO Faculty Search, Fall 2000 – Spring 2001**
Contributed to development of candidate short list and helped host candidates. Hired Jim Shaffer.

## College Activities:

**CAS Big Data and Statistics Working Group, Spring 2016 – Spring 2018**
Develop strategies for increasing statistical capabilities and literacy among faculty and students in the College of Arts & Sciences

## University Activities:

**OU Research Council, Fall 2009 – Spring 2012**
Review internal funding proposals, award recommendations

**Participant in OU Speaker Series, Fall 2001 – Spring 2006, Fall 2009 – Spring 2011**
Present on request a public lecture entitled "Looking at the Universe through X-ray Glasses: An Exploration of X-ray Astronomy" or "Black Holes!" at venues throughout the state of Oklahoma

## National Committees and Activities:

**Proposal Peer Review, 1994 – present**

1. Satellite time allocation panels: *ROSAT*, *ASCA*, *Chandra*, *HST*, *FUSE*, *Astro-E, Chandra Fellowship, GALEX, Suzaku, RXTE, NuSTAR, JWST DD ERS (Each review panel meets for 2—3 days and reviews 35—100 proposals)*
2. Fellowship proposal panel: Chandra fellowship (now renamed Einstein)
3. Individual proposals: NSF, Gemini, GWIS, HST, TAP, AS4, Dutch and Chilean research grants
4. Funding proposal panel: NSF AAG (Astronomy funding) and NSF CCLI (Curriculum and Laboratory finding) (*Each review panel meets for 2—3 days and reviews 10-25 proposals.)*
5. Deputy Panel Chair for *Chandra* AO5, AO14
6. Panel Chair *Chandra* AO7, *Suzaku* AO3, *GALEX* Cycle 5, *Suzaku* AO5
7. Participated in US-Japan Merge for Suzaku AO3, AO5 *Representatives from the US and Japan meet in Tokyo to merge the results of separate time allocation reviews.*

**Scientific Publication Referee, 1998 – present**

Reviewed papers for Astrophysical Journal, Astrophysical Journal Letters, Astronomy & Astrophysics, Astronomy & Astrophysics Letters, Monthly Notices of the Royal Astronomical Society, Publications of the Astronomical Society of Japan, Advances in Space Research

**American Astronomical Society Chretien Grant Committee, January 2017 – December 2019**

Review proposals for the Chretien International Research Grants, promoting collaborations on observational research with astronomers in other countries.

**CRESSTII Science Council, Fall 2017 - 2018**

CRESST II is a UMCP-UMBC-Howard-CUA-SURA partnership with UMCP as the lead. The organization serves as a vehicle for hiring soft money space scientists at Goddard Space Flight Center. The science council is a group of 9 scientists, three external to the organization, that will advise CRESST on scientific direction, interactions with the community, etc. I have agreed to serve a term as one of the external members.

***Suzaku* User's Group, 2005 – 2010**

*Suzaku* (http://heasarc.gsfc.nasa.gov/docs/astroe/astroegof.html) is a joint Japanese/US X-ray mission that was launched 10 July 2005. The panel oversees *Suzaku* operations and the interaction between *Suzaku* and the guest investigators. It also helps develop the proposal for the NASA Senior Review.

***FUSE* Observers Advisory Council (FOAC), 2001 – 2004**

*FUSE* (Far Ultraviolet Spectroscopic Explorer; http://fuse.pha.jhu.edu) was a medium-sized satellite mission that was launched 24 June 1999 and was operated by Johns Hopkins University. It observed in the small but critically important bandpass from 900 – 1200 Angstroms, which includes the OVI transitions at 1034 Angstroms. The panel oversaw *FUSE* operations and the interaction between *FUSE* and the guest investigators.

**HEASARC (High Energy Astrophysics Science Archive Research Center) Users Group, 2001 – 2004**

The HEASARC (http://heasarc.gsfc.nasa.gov/) is the largest repository of high-energy (X-ray and Gamma-ray) astronomical data in the world. It also provides analysis tools for these data. The HEASARC Users Group meets once per year to evaluate and monitor the performance of the HEASARC.

# RESEARCH

## Summary:

- *88 publications in refereed journals.*
- *82 accepted observing proposals as PI and author.*
- *Over $2.8M research funding awarded.*
- *Two keynote talks, eleven invited talks, 13 contributed talks, and more than 40 posters presented at international meetings and workshops*
- *Over 40 invited colloquia and seminars presented*
- *Scientific Organizing Committee for 8 international meetings*
- *2021: 568 citations, h-index of 43*

## Published and submitted refereed articles:

1. K. S. Green, S. C. Gallagher, K. M. Leighly, H. Choi, D. Grupe, D. M. Terndrup, G. T. Richards, and S. Komossa, "Investigating the Cause of the Absorption-Line Variability in the Narrow-line Seyfert 1 Galaxy WPVS 007", submitted to ApJ.
2. H. Choi, **K. M. Leig**hly, C. Dabbieri, D. M. Terndrup, S. C. Gallagher, and G. T. Richards, "The Physical Properties of Low Redshift FeLoBAL Quasars. III. The Location and Geometry of the Outflows", ApJ 936, 74 (2022)
3. H. Choi, **K. M. Leig**hly, D. M. Terndrup, C. Dabbieri, S. C. Gallagher, and G. T. Richards, "The Physical Properties of Low Redshift FeLoBAL Quasars. I. Spectral Synthesis Analysis of the BAL Outflows using SimBAL", ApJ, 937, 110 (2022)
4. **K. M.** Leighly, H. Choi, C. DeFrancesco, J. Voelker, D. M. Terndrup, S. C. Gallagher, and G. T. Richards, "The Physical Properties of Low Redshift FeLoBAL Quasars. II. The Rest-Frame Optical Emission Line Properties", ApJ 935, 92 (2022)
5. H. Choi, **K. M. Leighly**, D. M. Terndrup, S. C. Gallagher, and G. T. Richards, "Discovery of a Remarkably Powerful Broad Absorption Line Quasar Outflow in SDSS J135246.37+423923.5", ApJ, 891, 53 (2020)
6. **K. M. Leighly,** D. M. Terndrup, A. B. Lucy, H. Choi, S. C. Gallagher, G. T. Richards, M. Dietrich, and C. Raney, "Spectral Synthesis Analysis of the z=0.54 LoBAL Quasar SDSS J085053.12+445122.5: II. The Nature of Partial Covering", ApJ, 879, 27 (2019)
7. **K. M. Leighly,** D. M. Terndrup, S. C. Gallagher, G. T. Richards, & M. Dietrich, "The z = 0.54 LoBAL Quasar SDSS J085053.12+445122.5. I. Spectral Synthesis Analysis Reveals a Massive Outflow", ApJ, 866, 7 (2018)
8. **K. M. Leighly,** D. M. Terndrup, S. C. Gallagher, & A. B. Lucy, "The Binary Black Hole Model for Mrk 231 Bites the Dust", ApJ, 826, 4 (2016)
9. K**. M. Leighly**, E. Cooper, D. Grupe, D. M. Terndrup, & S. Komossa, "Variable Reddening and Broad Absorption Lines in the Narrow-line Seyfert 1 Galaxy WPVS 007: an Origin in the Torus", ApJ Letters, 809, 13 (2015)
10. C. M. Krawczyk, G. T. Richards, S. C. Gallagher, **K. M. Leighly**, P. C. Hewett, N. P. Ross, & P. B. Hall "Mining for Dust in Type 1 Quasars", AJ, 149, 203 (2015)
11. J. P. U. Fynbo, T. Kruhler, **K. Leighly**, & 40 co-authors, "The Mysterious Optical Afterglow Spectrum of GRB 140506A at z=0.889", A&A, 572, 12 (2014)
12. **K. M. Leighly**, D. M. Terndrup, E. Baron, A. B. Lucy, M. Dietrich, & S. C. Gallagher "Evidence for Active Galactic Nuclei Feedback in the Broad Absorption Lines and Reddening of Mrk 231", ApJ, 788, 123 (2014)
13. Shapee, B. J., et al. (and 46 coauthors), "The Man Behind the Curtain: X-rays Drive the UV through NIR Variability in the 2013 AGN Outburst of NGC 2617", ApJ, 788, 48 (2014)
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3. "A Portfolio of Data Analytics Classes at University of Oklahoma", K. Leighly, C. Dabbieri, A. Kerr, D. Terndrup, American Association of Physics Teachers summer meeting (poster, abstract), (2020)
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37. "X-ray Variability in Active Galactic Nuclei: Two Things that Everybody Should Know", K. M. Leighly, Highlights of Astronomy, Volume 11B, Ed. J. Andersen (IAU), 804 (1998)
38. "The X-ray Spectrum and Variability of NGC 4151", K. M. Leighly, M. Matsuoka, M. Cappi, & T. Mihara, Proc. IAU 23rd General Assembly *The Hot Universe*, Eds. K. Koyama, M. Itoh (Dordrecht: Kluwer Academic), p. 422 (1997)
39. "Evidence for Relativistic Outflows in Narrow-line Seyfert 1 Galaxies", K. M. Leighly, R. F. Mushotzky, K. Nandra, Proc. *Mass Ejection from AGN*, Eds. N. Arav, I. Shlosman, & R. J. Weymann, (San Francisco: ASP), p. 155 (1997)
40. "The *ASCA* Spectrum and Spectral Variability from NGC 4151", K. M. Leighly, M. Cappi, M. Matsuoka, & T. Mihara, Proc. *X-ray Imaging and Spectroscopy of Cosmic Hot Plasmas*, Eds. F. Makino & K. Mitsuda, (Tokyo: UAP), p. 291 (1997)
41. "Results from Monitoring the Broad-Line Radio Galaxy 3C 390.3", K. M. Leighly, et al., Proc. *Roentgenstrahlung from the Universe*, Eds. H. U. Zimmerman, J. Trumper, H. Yorke, MPE report 263, p. 467 (1995)
42. "The X-ray Spectrum and Variability of Mrk 766", K. Leighly, Japanese Astronomical Society conference, Tokyo, Japan (abstract) (1995)
43. "The X-ray Spectral Variability of NGC 7469", K. Leighly, P. Zycki, H. Kunieda, & S. Tsuruta, Proc. *New Horizon of X-ray Astronomy*, Eds. F. Makino & T. Ohashi (Tokyo: UAP), p. 583 (1994)
44. "Long Term Monitoring of Active Galactic Nuclei Using ROSAT", K. Leighly and R. Edelson, BAAS, 184, 59.08 (abstract) (1994)
45. "Temporal and Spectral X-ray Variability from the Seyfert 1 Galaxy NGC 6814", K. Leighly, S. Tsuruta and H. Kunieda, BAAS, vol. 23(4), p. 1469, (abstract) (1991)
46. "Temporal and Spectral X-ray Variability from the Seyfert 1 Galaxy NGC 6814", K. Leighly, H. Kunieda, and S. Tsuruta, Proc. *Testing the AGN Paradigm*, Eds. S. S. Holt, S. G. Neff, & C. M. Urry (New York: AIP) p. 93, (1992)

47. "Electron Positron Pair Winds and the Eddington Limit", K. M. Leighly and S. Tsuruta, Proc. *23rd ESLAB Symp. on Two-Topics in X-ray Astronomy*, Eds. J. Hunt and B. Battrick, p. 969 (1989)
48. "A Search for Iron Features in the EXOSAT Spectral Survey Sources", K. M. Leighly, K. A. Pounds, and T. J. Turner, Proc. *23rd ESLAB Symp. on Two-Topics in X-ray Astronomy*, Eds. J. Hunt and B. Battrick, p. 961 (1989)
49. "Power-law X-ray Emission from Electron-Positron Pair Winds", K. Leighly, B. Tritz, and S. Tsuruta, BAAS, vol. 19 (2), p. 695 (abstract) (1987)

**Student Research Presentations:**

1. "The Properties of Outflow and Black-hole Fueling in FeLoBAL Quasars", H. Choi, K. Leighly, C. Dabbieri, D. Terndrup, S. Gallagher, G. Richards, What Drives the Growth of Black Holes?, Reykyavik, Iceland, September 2022 (poster)
2. "The Properties of Outflow and Black-hole Fueling in FeLoBAL Quasars", H. Choi, K. Leighly, C. Dabbieri, D. Terndrup, S. Gallagher, G. Richards, Gemini Observatory Science Meeting 2022, Seoul, Korea (poster), July 2022
3. "Exploring the Physics and Energetics of FeLoBAL Outflows", H. Choi, S. Gallagher, G. Richards, K. Leighly, D. Terndrup, C. Dabbieri, 43rd COSPAR Scientific Assembly, January (poster, abstract) (2021)
4. "Exploring the Physics and Energetics of Low Redshift FeLoBAL Quasars", H. Choi, K. Leighly, C. Dabbieri, D. Terndrup, S. Gallagher, G. Richards, 237th AAS meeting (poster, abstract) (2021)
5. "Quasar Outflows for Undergraduates and Everyone", C. DeFrancesco, K. Leighly, H. Choi, J. Voelker, D. Terndrup, 237th AAS meeting (poster, abstract) (2021)
6. "Investigating the Cause of Variability of the Low Luminosity Broad Absorption Line Quasar WVPS 007 Using SimBAL", K. Green, K. Leighly, S. Gallagher, H. Choi, D. Terndrup, D. Grupe, 237th AAS meeting (poster, abstract) (2021)
7. "Analysis of a Sample of High Redshift, High Luminosity FeLoBAL Quasars", J. Voelker, H. Choi, K. Leighly, C. Dabbieri, C. DeFrancesco, 2037th AAS meeting (poster, abstract) (2021)
8. "The Physical Properties and Energetics of FeLoBAL Quasar Outflows", H. Choi, K. Leighly, C. Dabbieri, D. Terndrup, S. C. Gallagher, G. Richards, 236th AAS meeting (poster, abstract) (2020)
9. "FeLoNet: Using Synthetic Training Data and a Convolutional Neural Network to Classify Quasar Spectra", C. Dabbieri, K. Leighly, G. Richards, 236th AAS meeting (poster, abstract) (2020)
10. "Investigating Quasar Emission-Line Variance Using a Variational Autoencoder", C. McLeod, A. Kerr, K. Leighly, 236th AAS meeting (poster, abstract) (2020)
11. "Discovery of a Remarkably Powerful Broad Absorption Line Quasar Outflow in SDSS J1352+4239", H. Choi, K. Leighly, D. Terndrup, S. C. Gallagher, G. Richards, AAS 233rd meeting (poster, abstract) (2019)
12. "Massive Outflows in CII Low-Ionization Broad Absorption Line Quasars", R. Hazlett, K. Leighly, C. Dabbieri, C. McLeod, H. Choi, D. Terndrup, AAS 233rd meeting (poster, abstract) (2019)
13. "Measuring the Outflow Properties of FeLoBAL Quasars", C. Dabbieri, H. Choi, F. MacInnis, K. Leighly, & D. Terndrup, AAS, 231st meeting (poster, abstract) (2018)
14. "Constraining Outflow Location in FeLoBALs using Spectral Synthesis Program SimBAL", F. MacInnis, *AGN Winds on the Georgia Coast*, Jekyll Island Club Resort, Georgia. Poster (2017)
15. "EMPCA and Cluster Analysis of Quasar Spectra: Construction and Application to Simulated Spectra", A. Marrs, K. Leighly, C. Wagner, & F. MacInnis, AAS, 229th meeting, Grapevine, TX (poster, abstract) (2017)

16. "EMPCA and Cluster Analysis of Quasar Spectra: Sample Preparation and Validation", C. Wagner, K. Leighly, F. MacInnis, A. Marrs, & G. T. Richards, AAS, 229th meeting, Grapevine, TX (poster, abstract) (2017)
17. "The Rate of Occurrence of PV Absorption in a Low Redshift Sample of BALQSOs", T. Kahre, E. M. Cooper, K. Leighly, & K. L. Davis, AAS, 225th meeting (poster, abstract) (2015)
18. "WPVS 007: Dramatic Broad Absorption Line Variability in a Narrow-line Seyfert 1", E. M. Cooper, K. Leighly, F. W. Hamann, D. Grupe, & M. Dietrich, AAS, 223rd meeting (poster, abstract) (2013)
19. "WPVS 007: Evidence for Accelerating Wind in a Narrow-line Seyfert 1 Galaxy", E. M. Cooper, K. M. Leighly, F. Hamann, & D. Grupe, Poster and Proceedings for "Nuclei of Seyfert Galaxies and QSOs – Central Engine and Conditions of Star Formation", Bonn, Germany (2012)
20. "Constraints on Outflow Properties from MgII in the Broad Absorption-Line Quasar FBQS 1151+3822", A. B. Lucy, K. M. Dietrich, D. M. Terndrup, M. Dietrich, & S. C. Gallagher, AAS, 219th meeting (poster, abstract) (2012)
21. "Strong Iron Emission in Quasars: Testing a Thermal Model", E. M. Cooper, K. Leighly, AAS, 219th meeting (poster, abstract) (2012)
22. "Emission Line Properties of a Low-Redshift Quasar Sample", A. Truitt, K. M. Leighly, AAS, 217th Meeting (poster, abstract) (2011)
23. "Unifying Narrow-line Seyfert 1 Galaxies: X-ray Spectral Analysis", C. McCully, K. M. Leighly, & H. Maddumage, AAS 212th meeting (poster, abstract, Chambliss prize winner) (2008)
24. "The Role of the Spectral Energy Distribution in Determining the FeII/MgII Ratio in Quasars", J. R. Moore, & K. M. Leighly, 9th Meeting of the AAS High Energy Astrophysics Division (poster, abstract) (2006)
25. "A Catalog of Near UV Properties from Narrow-Line Quasars in SDSS", R. Worhatch, K. Leighly, C. Finley, & J. Moore, AAS 207th meeting (poster, abstract) (2006)
26. "X-ray and UV Observations of the Luminous Narrow-line Seyfert 1 Galaxies RX J0439.7-4540 and PHL 1092", B. L. Fleshman, K. M. Leighly, C. Matsumoto, and D. Grupe, AAS 207th meeting (poster, abstract) (2006)
27. "XMM-Newton Observation of the Second Brightest Quasar PHL 1811", J. Choi, K. M. Leighly, & C. Matsumoto, AAS 206th meeting (poster, abstract) (2006)
28. "Near-UV Spectra of Narrow-line Quasars from the SDSS", J. R. Moore, K. M. Leighly, & D. Casebeer, AAS 203rd meeting (poster, abstract) (2003)
29. "An XMM-Newton Observation of the Bright Seyfert 2 Galaxy NGC 6300", A. Nava, L. A. Maddox, C. Matsumoto, K. M. Leighly, & D. Grupe, RmxAC, 18, 72 (2003)
30. "Dependence of Emission Line Ratios and Strengths on the Spectral Energy Distribution", D. Casebeer, & K. Leighly, AAS 201st meeting (poster, abstract) (2002)
31. "An XMM-Newton Observation of the Bright Seyfert 2 Galaxy NGC 6300", L. A. Maddox, K. M. Leighly, A. Nava, C. Matsumoto, D. Grupe, AAS 201st meeting (poster, abstract) (2002)
32. "FUSE Observations of the Narrow-line Seyfert 1 Galaxy RE 1034+39", D. Casebeer, K. Leighly, AAS 199th meeting (poster, abstract) (2001)
33. "X-ray Spectral Variability in the Seyfert 1 Galaxy Mrk 509", M. S. Jackson, K. M. Leighly, & M. Matsuoka, AAS 197th meeting (poster, abstract) (2000)

## Circulars:

1. ATel #7622 "Discovery of the X-ray transient Narrow-Line Seyfert 1 Galaxy WPVS 007 in a very low optical/UV flux state detected by Swift", D. Grupe, S. Komossa, K. Leighly, D. Terndrup

2. GNC #257 "GRB 990123 Optical Observations", J. P. Halpern, Y. Yadigaoglu, K. M. Leighly, & J. Kemp (1999)
3. IAUC 7027 "NGC 7582", J. P. Halpern, L. E. Kay, K. M. Leighly (1998)
4. IAUC 6969 "Supernova 1998bw in ESO 184-G82", L. E. Kay, J. P. Halpern, K. M. Leighly, S. Heathcote, A. M. Magalhaes, & A. V. Filippenko (1998)
5. IAUC 6957 "XTE J2123-058", J. A. Tomsick, J. P. Halpern, & K. M. Leighly (1998)

**Press:**

1. *Gemini Detects Most Energetic Wind from Distant Quasar*, April 14, 2020, http://www.gemini.edu/pr/gemini-detects-most-energetic-wind-distant-quasar
2. *Spotting a Nearby Quasar's Winds,* Sky and Telescope, May 19, 2014, http://www.skyandtelescope.com/astronomy-news/spotting-nearby-quasars-winds/
3. *Astronomers Discover Powerful Wind in Low-Luminosity Quasar,* January 9, 2006, http://casweb.ou.edu/home/news/press/press_20060109.htm

**Books & Publications:**

1. *AGN Winds in Charleston*, Eds. G. Chartas, F. Hamann & K. M. Leighly, published by the Astronomical Society of the Pacific, Volume 460, 2012
2. *Narrow-Line Seyfert 1 Galaxies and Their Place in the Universe*, Eds. L. Foschini, M. Colpi, L. Gallo, D. Grupe, S. Komossa, K. Leighly, & S. Mathur, published online in Proceedings of Science http://pos.sissa.it/cgi-bin/reader/conf.cgi?confid=126
3. *Observational and Theoretical Progress in the Study of Narrow-line Seyfert 1 Galaxies*, Eds. T. Boller, W. N. Brandt, K. M. Leighly, & M. Ward, New Astronomy Reviews, Vol. 44, Numbers 7-9, September 2000

**Meetings organization:**

1. AGN Winds on the Chesapeake, to be held at the Tidewater Inn, in Easton, MD, June 11 – June 16, 2023. Member of SOC
2. *AGN Winds on the Georgia Coast*, held at the Jekyll Island Club Hotel, Georgia, June 25-29, 2017. Member of SOC
3. *AGN Reverberation Mapping: the pc Scale Garden of Massive Black Holes*, held in Lijiang, China, October 24-26 2016. Member of SOC
4. *AGN Winds in Charleston*, held in Charleston, South Carolina, October 15-18 2011, Member SOC, proceedings editor
5. *Narrow-Line Seyfert 1 Galaxies and their place in the Universe*, held in Milano, Italy, April 4-6, 2011, Member SOC, proceedings editor
6. *The Central Engine of Active Galactic Nuclei*, held in Xi'an, China, October 16-21, 2006, Member SOC
7. *AGN Winds in the Carribbean*, held in St. John, The US Virgin Islands, November 28-December 3, 2005. Member of the organizing committee, responsible for local coordination.
8. *Stellar-mass, Intermediate-mass, and Supermassive Black Holes*, held in Kyoto, Japan, October 28-31, 2003. Member SOC
9. *Observational and Theoretical Progress in the Study of Narrow-line Seyfert 1 Galaxies*, held in Bad Honnef, Germany, December 8-11, 1999. Member SOC, proceedings editor.

**Selected Recent Participation in National and International Meetings:**

1. *What Drives the Growth of Black Holes*?, Reykyavik, Iceland, September 2022. **Poster**: Spectral Synthesis Analysis of Broad Absorption Line Quasars",
2. *Gemini Observatory Science Meeting 2022*, Seoul, Korea July 2022. **Poster**: Spectral Synthesis Analysis of Broad Absorption Line Quasars
3. *DSECOP 2022 Data Science in Physics Workshop,* University of Maryland, June 21-24, 2022, in person. **Contributed Talk**: "A Portfolio of Data Analytics Classes at University of Oklahoma"
4. *Black Hole Accretion Disk Winds,* Durham, UK, September 6 – 9, 2021, in person and virtual. **Keynote Talk** (with H. Choi): SimBAL on FeLoBALs
5. *Black Hole Formation, Accretion, and Outflows through Cosmic Time,* Aspen Center for Physics, June 14 – July 2, 2021, in person and virtual. **Contributed Talk:** "FeLoBAL Quasars in Context"
6. *COSPAR-21-E1.5: Accretion on All Scales,* Jan 29 – Jan 31, 2021, virtual. **Poster**: "Outflow and Optical Properties of Low-Redshift FeLoBAL Quasars"
7. American Astronomical Society 237th meeting, January 2021, virtual. **Poster:** "Outflow and Optical Properties of Low-Redshift FeLoBAL Quasars"
8. American Association of Physics Teachers, 2020 Summer Meeting, virtual. **Poster:** "A Portfolio of Data Analytics Classes at University of Oklahoma"
9. American Astronomical Society 236th meeting, June 2020, virtual. **Poster:** "Exploring the Link between Broad-Absorption-Line Outflows and [OIII] Emission in Low-Redshift FeLoBAL quasars"
10. *2019 PICUP Summer Faculty Development Workshop,* University of Wisconson River-Falls, July 8-14, 2019, participant
11. American Astronomical Society 233nd meeting, January 2019, Seattle, WA. **Poster**: "SimBAL: Spectral Synthesis for Broad Absorption Line Quasars"
12. *The Extreme Physics of Eddington and Super Eddington Accretion onto Compact Objects: Simulations meet Observations,* to be held during the 42nd COSPAR Scientific Assembly, July 14-22, 2018. **Invited Talk:** What's in the Wind? Spectral Synthesis for Broad Absorption Line Quasars.
13. *Quasar Winds on the Georgia Coast,* June 25-29, 2017, Jekyll Island Club Resort, Georgia. **Contributed Talk:** SimBAL: Spectral Synthesis for Broad Absorption Line Quasars
14. *AGN Driven Winds: Research Workshop of the Israel Science Foundation,* May 22-26, 2017, Haifa, Israel. **Invited Talk:** Understanding Broad Absorption Line Quasars
15. American Astronomical Society 229th meeting, January 4-7 2017, Grapevine, Texas. **Poster:** EMPCA and Cluster Analysis of Quasar Spectra: Application to SDSS Spectra
16. *Statistical Challenges in Modern Astronomy VI,* June 6-10, 2016, Carnegie Mellon University, Pittsburg, Pennsylvania. **Contributed Poster:** "SimBAL: A spectral synthesis approach to analyzing broad absorption line quasar spectra"
17. *Great Lakes Quasar Symposium*, May 2-4, 2016, University of Western Ontario, London Ontario. **Keynote Talk:** "Using Photoionization to Understand Outflows in AGN and Quasars"
18. American Astronomical Society 227th meeting, January 2016, Kissimmee, Florida. **Poster**: "The Binary Black Hole Model for Mrk 231 Can Not Explain the Observed Emission Lines"
19. *The Inner Regions of Quasars: A Celebration for Bev Wills*, September 12-14, 2014, University of Texas. **Invited talk**: "PV and HeI* Absorption in Low-Redshift BALQSOs"
20. Aspen Summer 2014 Workshop: *Radiation Driven Outflows in Stars and Quasars*, August 31-September 14, 2014, Aspen Center for Physics, **invited participant**
21. *14th Synthesis Imaging Workshop*, May 13-20, 2014, New Mexico Institute of Mining and Technology, **participant**
22. *MidAmerican Regional Astrophysics Conference,* April 4-5, 2014, University of Missouri, Columbia. **Contributed talk**: "Evidence for AGN Feedback in the Broad Absorption Lines and Reddening of Mrk 231"

23. American Astronomical Society 222nd meeting, June 2013, Indianapolis, IN. **Poster**: "Reddening and Absorption in Mrk 231"
24. *Outflows, Winds and Jets,* March 3-6 2012, Charlottesville, VA, **Contributed poster**: "Probing High-column Outflows in BALQSOs Using Metastable Helium"
25. American Astronomical Society 219th meeting, January 2012, Austin, TX. **Poster**: "Investigating the Influence of the Quasar Spectral Energy Distribution on Emission Lines Using Large-scale SOC Models"
26. *AGN Winds in Charleston*, October 15-18 2011, Charleston, SC. **Contributed talk**: "Probing High-column Outflows in BALQSOs Using Metastable Helium"
27. *High Energy View of Accreting Objects: AGN and X-ray Binaries*, October 5-14, 2010, Agios Nikolaos, Crete, Greece. **Contributed talk**: "Probing High-column Outflows in BALQSOs Using Metastable Helium"
28. High Energy Astrophysics Division Meeting, March 1-4, 2010, Big Island, Hawaii. **Poster**: "The First HeI* 10830 Broad Absorption Line Quasar"
29. American Astronomical Society 213th meeting, January 2009, Long Beach, CA. **Poster**: "CaII in Luminous Narrow-line Seyfert 1 Galaxies"
30. *AGN Workshop*, June 2-6, 2008, Agios Nikolaos, Crete, Greece. **Invited talk**: "Emission from the Broad-line Region in Active Galaxies and Quasars"
31. *The Suzaku X-ray Universe*, December 10-12, 2007
32. 9th Meeting of the AAS High Energy Astrophysics Division, October 4-7, 2006. **Contributed poster**: "Emergence of a BAL Flow in the Narrow-line Seyfert 1 Galaxy WPVS 007"
33. American Astronomical Society 207th meeting, January 2006, Washington, DC. **Poster**: "Emergence of a BAL Flow in the Narrow-line Seyfert 1 Galaxy WPVS 007"
34. *AGN Winds in the Caribbean*, St. John, The US Virgin Islands, November 28-December 3, 2005. **Organizer, Invited talk**: "Outflows in Emission"
35. *Physics of Warm Absorber in AGN*, Nicolaus Copernicus Astronomical Center, Warsaw, Poland, October 5-October 7, 2005. **Invited talk:** "AGN Winds: Causes and Consequences"
36. *The 2004 Ringberg Castle Workshop on AGN Physics*, Ringberg Castle, Germany, November 22-25, 2004. **Invited talk**: "AGN Spectral Energy Distribution: its Origin and Influence on Emission-line Ratios and Kinematics"
37. *Astrophysics in the Far Ultraviolet*, Victoria, BC, August 3-6, 2004. **Contributed poster**: "*FUSE* Observations of a Sample of Soft X-ray Selected AGN"
38. *X-ray Binaries to Quasars: Black Hole Accretion on All Mass Scales*, Amsterdam, The Netherlands, July 12-15, 2004. **Invited talk:** "X-ray Periodicity in AGN"
39. *Stellar-Mass, Intermediate-Mass, and Supermassive Black Holes*, Kyoto, Japan, October 28-31, 2003. **Invited talk**: "The Spectral Energy Distribution of Narrow-line Seyfert 1 Galaxies"
40. *AGN Physics with the Sloan Digital Sky Survey*, Princeton University, July 27-31, 2003. **Contributed poster:** "PHL 1811: The Local Prototype of the Lineless High-z SDSS QSOs"
41. *Active Galactic Nuclei: From Central Engine to Host Galaxy*, Observatorie de Paris, Meudon, France, July 23-27, 2002. **Contributed posters**: "*Chandra* HETG Observation of the Ultrasoft Narrow-line Seyfert 1 Galaxy 1H0707-495", and "*FUSE* Observation of the Narrow-line Seyfert 1 Galaxy RE 1034+39"
42. *Workshop on X-ray Spectroscopy of Active Galactic Nuclei with Chandra and XMM-Newton*, Max-Planck Institute für extraterrestriche Physik, Garching, Germany, December 3-6, 2001. **Contributed talk:** "A *Chandra* Observation of the Narrow-line Seyfert 1 Galaxy 1H 0707-495"
43. *X-ray Emission from Accretion onto Black Holes*, Johns Hopkins University, June 20-23, 2001. **Contributed poster:** "X-ray Weak NLS1s: High Eddington Ratio Objects?"
44. *Mass Outflow in Active Galactic Nuclei: New Perspectives*, The Catholic University of America, Washington, DC, March 8-10, 2001. **Contributed poster:** "*HST* STIS Ultraviolet Spectral Evidence of Outflows in Extreme Narrow-Line Seyfert 1 Galaxies"

45. High Energy Astrophysics Division of the American Astronomical Society, Honolulu, Hawaii, November 2000. **Contributed talk**: "*HST* STIS Ultraviolet Spectral Evidence of Outflows in Extreme Narrow-Line Seyfert 1 Galaxies"
46. *Thirty-first Annual Mid-America Regional Astrophysics Conference*, Kansas City, MO October 13-14, 2000. **Invited talk**: "A Quasar Tutorial or What Every Astrophysicist Should Know about Active Galactic Nuclei"
47. *Probing the Physics of Active Galactic Nuclei by Multiwavelength Monitoring*, Greenbelt, MD, June 2000. **Contributed talk**: "*HST* STIS Ultraviolet Spectral Evidence of Outflows in Extreme Narrow-Line Seyfert 1 Galaxies"
48. *Rossi 2000: Astrophysics with the Rossi X-ray Timing Explorer*, March 2000. **Contributed talk**: "X-ray and Optical Observations of the Bright Seyfert 2 Galaxy NGC 6300"
49. *Observational and Theoretical Progress in the Study of Narrow-line Seyfert 1 Galaxies*, Bonn, Germany, December 1999. **Organizer, invited talk**: "*ASCA* (and *HST*) observations of NLS1s", proceedings editor
50. *Winter School on Nonlinear Time Series Analysis*, Dresden, Germany. **Contributed talk**: "Evidence for Nonlinear X-Ray Variability from the Broad-Line Radio Galaxy 3C 390.3"
51. AAS High Energy Astrophysics Division Meeting, Estes Park, Colorado. **Contributed talk**: "A Comprehensive Spectral and Variability Survey of Narrow-line Seyfert 1 Galaxies Observed by *ASCA*"
52. Joint Discussion on *High Energy Transients*, 23rd General Assembly of the International Astronomical Union, Kyoto, Japan. **Invited talk:** "X-ray Variability in Active Galactic Nuclei"
53. *ASCA Cherry Blossom Workshop*, Washington, D. C., April 1997. **Contributed talk**: "X-ray Spectroscopic Evidence for Outflow in Narrow-line Seyfert 1 Galaxies"
54. *Mass Ejection from AGN*, Pasadena, California; February 1997. **Contributed talk**: "Evidence for Relativistic Outflows in Narrow-line Seyfert 1 Galaxies"
55. *X-rays and Gamma-rays from Accreting Black Holes*, Kolninki, Poland, June 1996. **Invited participant**

## Selected Recent Colloquia and Seminars:

1. "Broad Absorption Line Quasars: A New Approach to an Old Problem", NOIRLab Friday Lunch Astronomy Seminar Hour, March 18, 2022
2. "SimBAL: Spectral Synthesis Analysis of Broad Absorption Line Quasars", University of Kentucky, November 12, 2020, (Host: Dirk Grupe)
3. "ML & Me: An Astronomer's Story", University of Oklahoma AI/ML OU Research Group, November 6, 2020, (Host: Andrew Fagg)
4. "What's in the Wind? Spectral Synthesis for Broad Absorption Line Quasars", Ohio University, October 3, 2018 (Host: Joe Shields)
5. "What's in the Wind? Spectral Synthesis for Broad Absorption Line Quasars", Ohio State University, October 4, 2018 (Host: Don Terndrup)
6. "What's in the Wind? Spectral Synthesis for Broad Absorption Line Quasars", Durham University, UK, September 13, 2017 (Host: Chris Done)
7. "Using Photoionization to Understand Outflows in AGN and Quasars", University of Tulsa, April 8, 2016 (Host: Scott Noble)
8. "Fun and Games with HeI* Absorption Lines in Quasars", Jila, University of Colorado, March 21, 2014 (Host: Mitch Begelman)
9. "Broad Absorption Line Quasars: New Results in the High-Column Regime", University of Florida, December 5, 2012 (Host: Fred Hamann)
10. "Broad Absorption Line Quasars: New Results in the High-Column Regime", Virginia Tech, April 27, 2012 (Host: Nahum Arav)

11. "The Influence of the Spectral Energy Distribution on Emission Lines in AGN", Drexel University, January 25, 2010 (Host: Gordon Richards)
12. "The Astrophysics of Broad Absorption Line Quasars", University of Texas Brownsville, December 4, 2009 (Host: Matt Benacquista)
13. "The Influence of the Spectral Energy Distribution on the Emission and Absorption Lines in AGN", Georgia State University, November 13, 2008 (Host: Mike Crenshaw)
14. "The Influence of the Spectral Energy Distribution on the Emission and Absorption Lines in AGN", George Mason University, September 19, 2008 (Host: Mario Gliozzi)
15. "The Influence of the AGN Spectral Energy Distribution on Broad-line Region Emission and Kinematics", University of Texas, November 13, 2007 (Host: Greg Shields)
16. "The Influence of the AGN Spectral Energy Distribution on Broad-line Region Emission and Kinematics", University of Kentucky, April 25, 2007 (Host: Gary Ferland)
17. "The Influence of the AGN Spectral Energy Distribution on Broad-line Region Emission and Kinematics", Ohio University, April 18, 2007 (Host: Joseph Shields)
18. "Quasar Broad-line Region and Kinematics", Ohio State University Astronomy Club, April 16, 2007 (Host: Megan Comins)
19. "The Influence of the AGN Spectral Energy Distribution on Broad-line Region Emission and Kinematics", University of Minnesota, March 23, 2007 (Host: Liliya Williams)
20. "Quasar Broad-line Region and Kinematics", Marquette University, March 20, 2007 (Host: Christopher Stockdale)
21. "Low-ionization Line Emission in Quasars", University of Wyoming, December 8, 2006 (Host: John Moore)
22. "Current and Recent AGN Emission- and Absorption-line Research", The Ohio State University, September 21, 2006 (Host: Rick Pogge)
23. "AGN Winds: Causes and Consequences", OU, September 1, 2005 (Host: Eddie Baron)
24. "AGN Spectral Energy Distribution: its origin and influence on emission-line ratios and kinematics", The Pennsylvania State University, March 16, 2005 (Host: Mike Eracleous)
25. "Looking at the Universe Through X-ray Glasses: An Exploration of X-ray Astronomy", The Tulsa Astronomy Club, February 18, 2005. Invited public lecture as part of the OU Speakers Series
26. "The Highs and Lows of Narrow-line Seyfert 1 Galaxies (Alternative title: The Wind Comes Sweeping Down the Plane)", Montana State University, October 22, 2004 (Host: Sachiko Tsuruta)
27. "The Highs and Lows of Narrow-line Seyfert 1 Galaxies (Alternative title: The Wind Comes Sweeping Down the Plane)", ISAS, November 5, 2003 (Host: Hideyo Kunieda)
28. "The Highs and Lows of Narrow-line Seyfert 1 Galaxies (Alternative title: The Wind Comes Sweeping Down the Plane)", RIKEN, November 4, 2003 (Host: Kazuo Makishima)
29. "The Highs and Lows of Narrow-line Seyfert 1 Galaxies (Alternative title: The Wind Comes Sweeping Down the Plane)", Harvard-Smithsonian Center for Astrophysics Lunch Seminar, June 26, 2003 (Host: Fabrizio Nicastro)
30. "The Highs and Lows of Narrow-line Seyfert 1 Galaxies (Alternative title: The Wind Comes Sweeping Down the Plane)", Ohio State University, May 15, 2003 (Host: Dirk Grupe)
31. "The Highs and Lows of Narrow-line Seyfert 1 Galaxies (Alternative title: The Wind Comes Sweeping Down the Plane)", Ohio University, May 14, 2003 (Host: Joe Shields)
32. "The Highs and Lows of Narrow-line Seyfert 1 Galaxies (Alternative title: The Wind Comes Sweeping Down the Plane)", Columbia University, May 12, 2003 (Host: Jules Halpern)
33. "Narrow-line Seyfert 1 Galaxies: The Most Active of Galactic Nuclei", Institut d'Astrophysique et de G'eophysique, Liege, Belgium, July 18, 2002 (Host: Guy Munhoven)
34. "Looking at the Universe Through X-ray Glasses: An Exploration of X-ray Astronomy", the Shawnee Lions Club, January 24, 2002, and Bridge Creek Middle School, April 9, 2002 - Invited public lecture as part of the OU Speakers Series

35. "Narrow-line Seyfert 1 Galaxies: A Key for Understanding Active Galactic Nuclei", OSU Physics Department Colloquium, October 18, 2001 (Host: Peter Shull)
36. "Looking at the Universe Through X-ray Glasses: An Exploration of X-ray Astronomy", The Oklahoma City Astronomy Club, April 13 2001- invited public lecture
37. "Narrow-line Seyfert 1 Galaxies: Still Crazy After All These Years", NASA Goddard Space Flight Center, March 22. 2000 – invited seminar (Host: Mike Corcoran)
38. "Looking at the Universe Through X-ray Glasses", October 20, 2000, invited public lecture, part of the OU "Friday Night at the Observatory" series
39. "Narrow-line Seyfert 1 Galaxies: A Laboratory for AGN Astrophysics", University of Delaware Astronomy Colloquium, March 2000 (Host: J. MacDonald)
40. "Narrow-line Seyfert 1 Galaxies: A Laboratory for AGN Astrophysics", University of Oklahoma Astronomy Colloquium, February 2000 (Host: D. Branch)
41. "Narrow-line Seyfert 1 Galaxies: A Laboratory for AGN Astrophysics", University of Texas Austin Astronomy Colloquium, May 1999 (Host: B. Wills)
42. "Narrow-line Seyfert 1 Galaxies: A Laboratory for AGN Astrophysics", University of Nebraska Lincoln Physics & Astronomy Colloquium, January 1999 (Host: M. Gaskell; Supported by UNL Research Council)
43. "Narrow-line Seyfert 1 Galaxies: A Laboratory for AGN Astrophysics", LLNL Institute of Geophysics & Planetary Physics, Seminar, November 1998 (Host: Nahum Arav)
44. "Narrow-line Seyfert 1 Galaxies: A Laboratory for AGN Astrophysics", NMIMT Colloquium, November 1998 (Host: J. Weatherall)
45. "AGN X-ray Variability", MPE, February 1998 (Host: D. Grupe)

## Research Support

*A total of $2,889,078 has been awarded to me and to members of my group.*

**1992-present (PI and author):**

1. Gemini Observatory: "Feeding and Feedback in Luminous Broad Absorption Line Quasars", 2023a. (CoIs: S. Gallagher, H. Choi, D. Terndrup, K. Green, G. Richards, L. Morabito, M. Eracleous. 5.2 hours band 2 (Canadian side)
2. Large Binocular Telescope: "Mapping the Outflow Properties of Broad Absorption Line Quasars: The Effects of Luminosity, Blackhole Mass, and Accretion Rate", 2023a (PI: D. Terndrup, Co. Is: S. Gallagher, H. Choi, K. Green, G. Richards, L. Morabito, M. Eracleous, 12 hours
3. Large Binocular Telescope: "Mapping the Outflow Properties of Broad Absorption Line Quasars: The Effects of Luminosity, Blackhole Mass, and Accretion Rate", 2022b (PI: D. Terndrup, Co. Is: S. Gallagher, H. Choi, K. Green, G. Richards, L. Morabito, M. Eracleous, 12 hours
4. Gemini Observatory: "Mapping the Outflow Properties of Broad Absorption Line Quasars: The Effects of Luminosity, Blackhole Mass, and Accretion Rate", 2022a. (CoIs: S. Gallagher, H. Choi, D. Terndrup, K. Green, G. Richards, L. Morabito, M. Eracleous. 11.4 hours band 2 (US side), 5.4 hours band 3 (Canadian side)
5. Large Binocular Telescope: "Mapping the Outflow Properties of Broad Absorption Line Quasars: The Effects of Luminosity, Blackhole Mass, and Accretion Rate", 2022a (PI: D. Terndrup, Co. Is: S. Gallagher, H. Choi, K. Green, G. Richards, L. Morabito, M. Eracleous, 12 hours
6. NSF AAG: "Collaborative Research: Spectral Synthesis for Broad Absorption Line Quasars – Feedback and Physics for Everyone" 8/1/2020 – 7/30/2023, Co-PI: D Terndrup, $333,542 to OU and $140,940 to Ohio State University
7. STScI Guest Investigator (Cycle 25), "What's in the Wind? Determining the Properties of Outflowing Gas in Powerful Broad Absorption Line Quasars" 12/1/2017 – 11/20/2020, (CoIs: S. Gallagher, F. MacInnis, G. Richards, D. Terndrup) $84,102

8. STScI Guest Investigator (Cycle 24), "Testing the Torus Origin of the Broad Absorption Line Outflow in WPVS 007" 3/1/2717 – 2/29/2021, (Cols: D. Grupe, S. Komossa, D. Terndrup), $34,040
9. NSF AAG, "BALSims: a Spectral Synthesis Approach to Understanding Broad Absorption Line Quasar Outflows" 09/01/2015 – 08/31/2018, $250,644 + $19,000 supplement
10. STScI Guest Investigator (Cycle 23, Director's Discretionary Time), "Using the WPVS 007 Occultation Event to Constrain the Astrophysics of Quasar Outflows" (CoIs: D. Grupe, S. Komossa, D. M. Terndrup) 07/01/2015 – 06/30/2018, $21,547
11. NASA Infrared Telescope Facility (Spring 2015), "Quasar Feedback: The Special Case of Broad NaI Absorption Quasars" (CoIs: D. M. Terndrup, Sarah Gallagher, Xinyu Dai), 4 nights
12. KPNO 4-meter (Spring 2015), "Probing the Physics of Quasar Outflows using Mini-LoBALs", (Co-Is: D. M. Terndrup, S. Gallagher), 3 nights
13. XMM-Newton Guest Investigator (Cycle 14), "Unifying X-ray Weak Quasars: Is there a Highly Absorbed Component in PHL 1811?" (Co-I: Xinyu Dai) 50ks + 50ks NuSTAR
14. NASA Infrared Telescope Facility (Fall 2014), "Quasar Feedback: The Special Case of Broad NaI Absorption Quasars" (CoIs: D. M. Terndrup, Sarah Gallagher, Xinyu Dai), 2 nights
15. Chandra Guest Investigator (Cycle 16), "Probing the Physics of Quasar Outflows using Mini-LoBALs" (Co-Is: S. Gallagher, D. M. Terndrup, C. Raney), 72.1ks, $66,348, 01/16/2015 – 01/31/2017
16. STScI Guest Investigator (Cycle 20), "WPVS 007: Acceleration or Evolution in a Broad Absorption Line Outflow" (Co-Is: F. Hamann, E. Cooper, M. Dietrich, D. Grupe) 4 orbits awarded, $36,728, 06/01/13 – 5/31/17
17. STScI Guest Investigator (Cycle 20), "The Nature of Partial Covering in Broad Absorption Line Quasars" (Co-Is: M. Dietrich, S. Gallagher, D. M. Terndrup, F. W. Hamann), 15 orbits awarded, $38,739, 06/01/13 – 5/31/17
18. KPNO 4-meter (Spring 2011), "The First Systematic Study of Column Density and Covering Fraction in BALQSOs" (Co-Is: D. Terndrup, M. Dietrich, S. Gallagher, S. Barber) 4 nights
19. NASA Infrared Telescope Facility (Spring 2010), "HeI*10830: A Powerful Probe of Column Density in Broad Absorption Line Quasars" (Co-Is: M. Dietrich, S. Barber), 3 nights
20. Chandra Guest Investigator (Cycle 11), "Weak-line Quasars: Always X-ray Weak?", (Co-I: Xinyu Dai, Matthias Dietrich), 09/20/09 – 12/22/12, $35,721
21. NASA Infrared Telescope Facility (Fall 2008), "Low-ionization IR Lines in Luminous Narrow-line Seyfert 1 Galaxies", (Co-I: M. Dietrich), 3 nights
22. Chandra Guest Investigator (Cycle 10), "WPVS 007: the little AGN that could", (Co-I: F. Hamann, D. Grupe), 06/14/10 – 06/13/12, $1,671
23. STScI Guest Investigator (Cycle 17), "WPVS 007: the little AGN that could", (Co-I: F. Hamann, D. Grupe), 06/01/10 – 05/31/13, $23,199
24. XMM-Newton Guest Investigator (AO5), "XMM-Newton Observations of the Luminous NLS1 RX J0134.2-4258", (Co-I: D. Grupe), 03/09/09 – 03/08/11, $46,200
25. NASA Infrared Telescope Facility (Spring 2008), "Low-ionization IR Lines in Luminous Narrow-line Seyfert 1 Galaxies", (Co-I: M. Dietrich), 3 nights
26. NSF AAG, "Understanding the Physical Conditions in the Low-Ionization Line-Emitting Region in Quasars", 06/15/07 – 05/31/12, $209,168
27. MDM Observatory (Spring 2007), "Low-Ionization IR Lines in Luminous NLS1s", (Co-I: M. Dietrich), 4 nights
28. Spitzer Space Telescope (Cycle-3), "Spitzer Observations of the Second Brightest Quasar, PHL 1811", (Co-I: D. Casebeer), 8/1/06 – 7/30/09, $11,078
29. NASA Far Ultraviolet Spectroscopic Explorer (*FUSE*) (Cycle 7), "Tropical Storm to Hurricane: The Emergence of a BAL Wind", (Co-I: D. Casebeer & F. Hamann), $30,000, pending observation

30. American Physical Society: 2005-2005 Travel Grants for Women Speakers, support of up to $500 for one of two women speakers in Fall 2005
31. STScI Guest Investigator (Cycle 13), "Accurate Accelerations in AGN Outflows", (Co-Is: E. Baron, D. Casebeer); 7/01/05 – 06/30/08, $65,000
32. NASA Far Ultraviolet Spectroscopic Explorer (*FUSE*) (Cycle 3) "Survey Observations of Soft X-ray Selected AGN", (Co-Is: D. Grupe, D. Casebeer), 9/15/03 – 9/14/05, $63,800
33. STScI Guest Investigator (Cycle 12), "UV Spectroscopic Observations of Luminous Narrow-line Seyfert 1 Galaxies", 8/1/03 – 7/31/05; $60,000
34. *XMM-Newton* Guest Observer (AO4), "*XMM-Newton* Observation of the Extreme NLS1 RX J0439-45", (Co-I: C. Matsumoto), 1/15/05 – 1/14/06; $35,697
35. *XMM-Newton* Guest Observer (AO4), "*XMM-Newton* Observation of the Second-Brightest Quasar, PHL 1811", (Co-I: C. Matsumoto), 11/15/04 – 11/14/05, $35,697
36. NASA Far Ultraviolet Spectroscopic Explorer (*FUSE*) (Cycle 4), "Where is the Wind in 1H 0707-495?", (Co-I: D. Casebeer), 2/1/05 – 1/31/07, $48,100
37. STScI Guest Investigator (Cycle 13), "Where is the Wind in 1H 0707-495", (CoI: D. Casebeer), 1/1/05 – 12/31/07, $56,718
38. *Chandra* X-ray Observatory Guest Investigator (Cycle 6), "The Spectral Energy Distribution and FeII Emission in Intermediate-Redshift Narrow-line Seyfert 1 Galaxies", (CoI: J. R. Moore), 12/13/2004 – 12/12/2005, $60,998
39. NASA Long-term Space Astrophysics Research Program (1998), NAG5-10171, "Narrow-line Seyfert 1 Galaxies", (CoIs: J. Halpern, L. E. Kay, D. Grupe, F. Paparella), 1/01/01 – 3/31/04, $377,567
40. American Physical Society: 2004-2005 Travel Grants for Women Speakers, support of up to $500 for one of two women speakers in Fall 2004
41. NASA Astrophysics Data Program (2002), "Testing for X-ray Periodicities in Active Galaxies", (Co-I: C. Matsumoto), 3/15/03 – 3/14/05, $25,009
42. STScI Guest Observer (Cycle 10), "Exploratory Observations of a New Bright Quasar", (CoIs: J. Halpern, E. B. Jenkins, D. J. Helfand, & R. Becker), 12/01/01 – 11/30/04, $19,762
43. American Physical Society: 2002-2003 Travel Grants for Women Speakers, support of up to $500 for one of two women speakers in Spring 2003
44. NASA *FUSE* Guest Observer (AO2), "Wind Emission in Narrow-line Seyfert 1 Galaxies", (CoI: J. Halpern), 2/15/01 – 2/14/04, $70,000
45. *Chandra* Guest Observer (Cycle 3), "Exploratory Observations of a New Bright Quasar", (CoIs: J. Halpern, E. B. Jenkins, D. J. Helfand, & R. Becker), 12/18/01 – 12/17/03, $25,490
46. *XMM-Newton* Guest Observer (AO1), "NGC 6300: a New, Bright, Compton-thick Seyfert 2 Galaxy", (CoIs: J. Halpern, H. Awaki, M. Cappi, S. Ueno, J. Siebert), 9/01/00 – 8/31/03, $25,433
47. NASA *Chandra* Guest Observer (AO1), "HETG Observations of Extreme Narrow-line Seyfert 1 Galaxies", (CoIs: J. Halpern, K. Forster), 2/02/01 – 2/01/03, $55,510
48. NASA Astrophysics Data Program (1999), "X-ray Spectral and Variability Studies of AGN", (CoIs: J. Halpern, D. Grupe) 8/15/00 – 8/14/02, $50,400
49. NASA *RXTE* Guest Observer (AO4), "Continued RXTE Monitoring of 3C 390.3: Confirmation of Nonlinear Variability", (Co-Is: J. P. Halpern, M. C. Eracleous, R. R. Remillard), accepted, observations concluded
50. NASA *FUSE* Guest Observer (AO1), "Far UV Spectroscopy of Narrow-line Seyfert 1 Galaxy RE 1034+39", (CoIs: J. Halpern, D. Grupe), 8/16/00 – 8/15/02, $35,500
51. NASA *Chandra* Guest Observer (AO1), "HETG Observation of Unusual Features in the Narrow-line Seyfert 1 Galaxy Akn 564", (CoIs: J. Halpern, C. Otani, H. Marshall, K. Forster), 6/29/00 – 6/28/01, $47,496
52. NASA *ASCA* Guest Observer (AO7), "Coordinated *ASCA* and *FUSE* Observations of the Narrow-line Seyfert 1 Galaxy RE 1034+39", (CoIs: J. Halpern, D. Grupe), observed

53. NASA *ASCA* Guest Observer (AO7), "*ASCA* Observation of the Reflection Dominated Seyfert 2 Galaxy NGC 6300", (CoIs: J. Halpern, J. Siebert), accepted
54. STScI Guest Observer (Cycle 7), STScIGO 07360, "A Search for Broad Absorption Lines in Narrow-line Seyfert 1 Galaxies", (CoIs: J. Halpern, C. Otani), 2/99 – 1/01, $44,736
55. NASA *ASCA* Guest Observer (AO8), "The Most Extremely Variable AGN: IRAS 13224-3809", (CoI: J. Halpern), observed
56. *Beppo-SAX* Guest Observer (AO4), "The First X-ray Observation of the Second Brightest Quasar", (CoI: J. Halpern, D. J. Helfand, R. H. Becker), observed
57. VLA Guest Observer (CnB array 1998), "A Search for Definitive Evidence for Deflection of a Radio Jet by a Galaxy", (Co-Is: J. Van Gorkom, D. E. Harris), observed
58. NOAO CTIO 4-m, "Searching for a Link Between Narrow-line Seyfert 1 Galaxies and Broad Absorption Line Quasars", (Co-Is: L. E. Kay, A. M. Magalhaes, J. P. Halpern) First Semester 1998 and 1999
59. Lick Observatory 3-m, "Spectroscopy and Spectropolarimetry of Narrow-line Seyfert 1 Galaxies", (Administrative PI: J. Halpern), Second Semester 1997; "Searching for a Link Between Narrow-line Seyfert 1 Galaxies and Broad Absorption Line Quasars", (Administrative PI: E. Moran; Co-Is: L. E. Kay, J. P. Halpern), Second Semester 1998, First Semester 1999
60. NASA *EUVE* Guest Investigator (EUVE-98), "Coordinated *EUVE* and *FUSE* Observations of the Narrow-line Seyfert 1 Galaxy RE 1034+39", (CoIs: J. Halpern, D. Grupe), and "Coordinated *EUVE* and Hard X-ray Observations of Soft X-ray Selected AGN", (CoIs: D. Grupe, J. Halpern), 5/99 – 4/00, $10,000
61. NASA *ASCA* Guest Observer (AO7), "*ASCA* Observations of a Complete Soft X-ray Selected Sample of AGN", (Co-Is: D. Grupe, J. P. Halpern)
62. *Beppo-SAX* Guest Observer (AO3), "NGC 6300: a New, Bright, Compton-thick Seyfert 2 Galaxy", (Co-Is: J. P. Halpern, M. Cappi, J. Siebert)
63. NASA *RXTE* Guest Observer (AO4), "*RXTE* Monitoring of 3C 390.3: Confirmation of Nonlinear Variability", (Co-Is: J. P. Halpern, M. C. Eracleous, R. R. Remillard)
64. NASA *ROSAT* Guest Observer (AO8), "Monitoring Observations of Narrow-line Seyfert 1 Galaxies", (Co-Is: J. P. Halpern, H. Marshall, K. Forster)
65. NASA *ASCA* Guest Observer (AO6), "Spectroscopic Observations of Steep Spectrum Narrow-Line Seyfert 1 Galaxies", (Co-Is: D. Grupe, C. Otani)
66. NASA *ASCA* Guest Observer (AO6), "*ASCA* Observation of the Highly Polarized Seyfert 1 Galaxy Mrk 704", (Co-Is: L. Kay, D. Grupe, C. Otani)
67. NASA *ASCA* Guest Observer (AO6), "*ASCA* Observations of a Complete Soft X-ray Selected Sample of AGN", (Co-Is: D. Grupe, J. P. Halpern, K. Forster, C. Otani, H. Marshall)
68. NASA *ASCA* Guest Observer (AO5), "*ASCA* Observation of Active Galactic Nuclei with Extreme Optical FeII Emission", (Co-Is: Y. Ikebe, M. Matsuoka)
69. NASA *ASCA* Guest Observer (AO5), NAG5-7261, "Spectroscopic Observations of Steep Spectrum Narrow-Line Seyfert 1 Galaxies", (Administrative PI: T. Yaqoob; Co-Is: D. Grupe, C. Otani), 7/98 – 6/99, $15,100
70. NASA *RXTE* Guest Observer (AO2), NAG5-6959, "Hard X-ray Observations of PKS 0558-504: A Test of Models for Narrow-Line Seyfert 1 Galaxies", (Co-Is: A. Comastri, J. Halpern), 2/98 – 1/99, $23,428
71. NASA *RXTE* Guest Observer (AO2), NAG5-4112, "Variability and Spectral Studies of Luminous Seyfert 1 Galaxy Fairall-9" (Co-Is: C. Otani, H. Marshall, J. Halpern, T. Kii) and "Search for the Reflection Component in a Quasar - *RXTE* and *ASCA* Observations of a Nearby Radio-quiet Quasar MR 2251-178", (PI: C. Otani; Co-I: T. Kii), $27,142
72. *IUE* Guest Observer (AO19), "Monitoring Mrk 509: the Origin of the Reprocessor", (CoIs: R. Edelson, J. M. Shull, H. Kunieda, B. Peterson, M. Matsuoka, T. Kii, C. Otani)
73. NASA *EUVE* Guest Observer (EUVE-95), "Coordinated *EUVE* and *ASCA* Observation of the Ultra-soft Variable Narrow Line QSO Ton S 180", (CoIs: A. Comastri, H. Marshall, T. Yaqoob)

74. NASA *ROSAT* Guest Observer (AO6), "Variability Studies of Narrow-line Seyfert 1 Galaxy 1H 0419-577", (CoIs: R. Mushotzky, H. Marshall, R. Edelson, C. Otani)
75. NASA *ASCA* Guest Observer (AO4), "Monitoring Mrk 509: the Origin of the Reprocessor", (Administrative PI: M. Matsuoka; CoIs: H. Kunieda, T. Kii, C. Otani, R. Edelson, B. Peterson)
76. NASA *ASCA* Guest Observer (AO4), "Hard X-ray Observation of the Ultra-soft Variable Narrow Line QSO Ton S 180", (Administrative PI: T. Yaqoob; CoIs: A. Comastri, H. Marshall)
77. NASA *ASCA* Guest Observer (AO4), "Broad Band X-ray Spectrum of NLS1 Akn 564", (Administrative PI: R. Edelson; CoIs: R. Mushotzky, H. Kunieda)
78. NASA *RXTE* Guest Observer (AO1), NAG5-3307, "Monitoring Mrk 509: The Origin of the Reprocessor" (Administrative PI: J. Halpern; CoIs: R. Edelson, H. Kunieda, M. Matsuoka, T. Kii, C. Otani, B. Peterson) and "Broad-Band X-ray Spectrum of Narrow-line Seyfert 1 Akn 564", (Administrative PI: J. Halpern; CoIs: R. Mushotzky, H. Kunieda, C. Otani), 8/96-7/97, $60,700
79. NASA *RXTE* Guest Observer (AO1), "The Hard X-ray Spectrum of Two Seyfert 2s Detected During Ginga Maneuvers", (CoIs: H. Awaki, M. Cappi, S. Ueno)
80. NASA *ROSAT* Guest Investigator (AO5), "Intermediate Time Scale Monitoring of the Broad Line Radio Galaxy 3C 390.3", (CoIs: R. Edelson, R. Mushotzky, M. Malkan)
81. NASA *ASCA* Guest Observer (AO3), "Monitoring the Broad Line Radio Galaxy 3C 390.3", (CoIs: R. Mushotzky, M. Malkan, I. George, R. Edelson, B. Peterson, M. Matsuoka), 1994, $10,536
82. NASA *ASCA* Guest Observer (AO2), "The Nature of the Absorption and Soft X-ray Spectrum of ESO 103-G35", (CoIs: M. Matsuoka, I. George), 1994, $10,536
83. *Ginga* Visiting Investigator, "Analysis of a Complete Flux Limited Sample of AGN", (CoIs: H. Kunieda, R. Mushotzky, R. Edelson), 1993, $20,000
84. NASA *ROSAT* Guest Observer (AO4), "Coordinated *ROSAT* and *ASTRO-D* Observation of Temporal and Spectral Variability in Mkn766", (CoIs: H. Kunieda, T. Yaqoob, R. Mushotzky, R. Edelson), 1993, $16,194
85. NASA *ASCA* Guest Observer (AO1), "Coordinated *ASCA* and *ROSAT* Observation of Temporal and Spectral Variability from Mkn766", (CoIs: H. Kunieda, T. Yaqoob, R. Mushotzky, R. Edelson), 1993, $10,536

**Internal Awards:**

1. APO 2022Q1, "Mapping the Outflow Properties of Broad Absorption Line Quasars: The Effects of Luminosity, Blackhole Mass, and Accretion Rate", CoIs: S. Gallagher, H. Choi, D. Terndrup, K. Green, G. Richards, L. Morabito, M. Eracleous, 2 half-nights
2. APO 2021Q4: "Using FeLoBAL Absorption Properties to Predict Seyfert Type", K. M. Leighly, D. M. Terndrup, H. Choi, 1.5 half-nights
3. APO 2021Q3: "Using FeLoBAL Absorption Properties to Predict Seyfert Type", K. M. Leighly, D. M. Terndrup, H. Choi, 1 half-night
4. APO 2021Q2: "Using FeLoBAL Absorption Properties to Predict Seyfert Type", K. M. Leighly, D. M. Terndrup, H. Choi, 1 half-night
5. APO 2020Q1, "Using FeLoBALs to Probe Outflow Demographics", K. M. Leighly, D. M. Terndrup, H. Choi, C. Dabbieri, 1 half-night
6. APO 2019Q4, "On the Trail of the Most Energetic Broad Absorption Line Quasar Outflows", H. Choi, C. Dabbieri, K. M. Leighly, D. M. Terndrup, S. C. Gallagher, 4 hours
7. Bush Lectureship in Computational Physics, 2019-2022, $45,000
8. APO 2019Q2, "High-velocity Broad Absorption Lines of the Nearby Quasar Mrk 231", K. M. Leighly, D. M. Terndrup, S. Gallagher, G. Privon, 4 hours
9. Spring 2018, Norman Campus Research Council Faculty Investment Program, $3,250
10. APO 2018Q2, "High-velocity Broad Absorption Lines of the Nearby Quasar Mrk 231", K. M. Leighly, D. M. Terndrup, G. Calhoun, S. Gallagher, G. Privon, 4 hours

11. APO 2018Q1, "High-velocity Broad Absorption Lines of the Nearby Quasar Mrk 231", K. M. Leighly, D. M. Terndrup, G. Calhoun, S. Gallagher, G. Privon, 4 hours
12. APO 2018Q1, "Infrared Photometry of FeLoBAL Quasars", K. M. Leighly, D. M. Terndrup, H. J. Choi, and C. Wagner, 1 half night.
13. APO 2017Q4, "Infrared Photometry of FeLoBAL Quasars", K. M. Leighly, D. M. Terndrup, H. J. Choi, and C. Wagner, 1 half night.
14. APO 2017Q1, "High-velocity Broad Absorption Lines of the Nearby Quasar Mrk 231", K. M. Leighly, D. M. Terdnrup, G. Calhoun, S. Gallagher, G. Privon, 4 hours
15. Apache Point Observatory 2015, "Quasar Feedback: The Special Case of Broad Na I Absorption Quasars", (CoIs: D. M. Terndrup, Xinyu Dai, Sarah Gallagher), 7-9 hours
16. Apache Point Observatory 2014, "Sodium Absorption in BALQSO Outflows", (CoIs: A. Lucy, D. Terndrup), 4 hours
17. Travel grant: invited talk at *AGN Workshop*, June 2-6, 2008, Agios Nikolaos, Crete, Greece. Invited talk: "Emission from the Broad-line Region in Active Galaxies and Quasars" $3,600
18. CAS Instructional Computing Grant Proposal (2003) (PI: William Romanishin) Funding for the purchase of four computers for the OU Observatory $4,600
19. OU 2001 Junior Faculty Research Program (01-JF-19), "Narrow-line Seyfert 1 Galaxies", $6,000
20. Startup: $55,000

**Recent Proposals as Co-Investigator:**

1. ESO, "The 4MOST-Gaia Purely Astrometric Quasar Survey" (PI: Jens-Kristian Krogager, large number of CoIs), 80,000 fiber hours
2. Gemini Observatory (Spring 2021), "Determining the Redshift of Variable FeLoBAL Quasars" (PI: Kaylie Green, Co-Is H. Choi, S. Gallagher, D. Terndrup, V. Khatu), 3.2 hours
3. XMM-Newton Guest Investigator (Cycle 20), "The Underlying X-ray Spectrum of the X-ray Transient NLS1 WPVS 007", (PI: D. Grupe, Co-I S. Komossa), 38ks ToO
4. ESO Public Spectroscopic Survey Phase 1 LoI, Spring 2020, "The 4MOST-Gaia Unbiased Quasar Legacy Survey", Survey type: Participating Community Survey. PI: Jens-Kristian Krogager. My role: Tentative Team Leader: Quasar and BAL Properties
5. XMM-Newton Guest Investigator (Cycle 19), "The Underlying X-ray Spectrum of the X-ray Transient NLS1 WPVS 007", (PI: D. Grupe, Co-I S. Komossa), 38ks ToO
6. MDM Spring 2017, "High-velocity Broad Absorption Lines of the Nearby Quasar Mrk 231", (PI: D. M. Terndrup; Co-Is G. Calhoun, G. Privon, S. C. Gallagher, 4 nights and 4.5 hours
7. Chandra Guest Investigator (Cycle 18) "Are High-Redshift Spectroscopic Black Hole Estimates Biased?" (PI: Gordon Richards, Co-Is: S. Gallagher, O. Shemmer, K. Leighly, Y. Shen, R. Plotkin, P. Hewett, K. Denney, R. Smith), 82ks
8. Hubble Space Telescope (Cycle 23) "Are High-Redshift Spectroscopic Black Hole Estimates Biased?" (PI: Gordon Richards, Co-Is: Yue Shen, Sarah Gallagher, Joseph Hennawi, Paul Hewett, Richard Plotkin, Ohad Shemmer, Michael Vogeley), 25 orbits
9. Large Binocular Telescope (Spring 2015) "Probing the Physics of Quasar Outflows using Mini-LoBALs" (PI: D. M. Terndrup, Co-I: Sarah Gallagher), 8 hours
10. Gemini-N, Spring 2015, "Looking for Feedback Signatures in Quasar Outflows", (PI: S. Gallagher, Co-Is D. M. Terndrup, Xinyu Dai), 14.9 hours
11. XMM-Newton Guest Investigator (Cycle 12), "The Relationship between UV and X-ray Absorption in the BAL NLS1 WPVS 007", (PI: D. Grupe, Co-Is S. Komossa & F. Hamann), 136ks
12. LBT 2012b, "The Nature of Partial Covering in Broad Absorption Line Quasars", (PI: D. M. Terndrup, Co-Is: M. Dietrich, S. C. Gallagher & F. Hamann), 5 hours, Band 3
13. LBT 2012b, "He I* Absorption in BALQSOs", (PI: D. M. Terndrup, Co-Is M. Dietrich & S. C. Gallagher), 13.5 hours, Band 2

14. Chandra Guest Investigator (Cycle 14): "Using X-rays to Test for Black Hole Mass Biases", (PI: G. T. Richards, Co-Is P. Hall, S. Gallagher, P. Hewett, N. Brandt, Y. Shen & R. Plotkin) (archival)
15. LBT MODS Spring 2012 "The First Systematic Study of Column Density and Covering Fraction in BALQSOs", (PI: M. Dietrich, Co-Is D. Terndrup and S. Gallagher), 7.25 hours
16. *Swift* Guest Investigator (Cycle 7), "Monitoring of the X-ray transient NLS1 WPVS 007 with *Swift*", (PI: D. Grupe, Co-I: S. Komossa), 205ks
17. MDM Spring 2011, "Probing BALQSO Properties using HeI* Absorption", (PI: M. Dietrich, Co-I: S. Barber), 3 nights
18. Gemini-N, Spring 2011, "Probing Quasar Outflows with GNIRS HeI* Spectroscopy", (PI: S. Gallagher, Co-Is: M. Dietrich, S. Barber), 13.3 hours
19. LBT Lucifer Spring 2011, "Probing BALQSO Properties using HeI*", (PI: M. Dietrich; Co-I: S. Barber), 8 hours
20. *Swift* Guest Investigator (Cycle 6), "Monitoring the X-ray Transient NLS1 WPVS 007 with *Swift*", (PI: D. Grupe; Co-I: S. Komossa)
21. XMM-Newton (Cycle 9), "The X-ray Absorber of the X-ray Transient BAL NLS1 WPVS 007", (PI: D. Grupe; Co-I: S. Komossa)
22. LBT Lucifer Science Demonstration Time, December 2009, "AGN Outflows and HeI* Absorption", (PI: M. Dietrich), 42 minutes on LBT using Lucifer
23. MDM Spring 2010, "Optical HeI Absorption to Probe AGN Outflows", (PI: M. Dietrich; Co-I: S. Barber), 3 nights on the 2.4 meter telescope
24. *Spitzer* Guest Investigator (Cycle 5), "Seeing the Unseen: MIR Spectroscopic Constraints on Quasar Big Blue Bumps", (PI: Sara Gallagher; Co-Is: G. Richards, D. Hines, P. Ogle), 01/08/09 – 09/30/11, $48,130 to OU
25. MDM Spring 2009, "Low Ionization CaII and FeII Emission Lines in Seyfert Galaxies", (PI: M. Dietrich), 3 nights on the 2.4 meter telescope
26. *Chandra* X-ray Observatory Guest Investigator (Cycle 9), "Deconstructing the Accretion Disk Wind in Quasars", (PI: Gordon Richards; Co-Is: Sarah Gallagher, Patrick Hall, Martin Elvis, John Everett, Daniel Proga)
27. NASA Far Ultraviolet Spectroscopic Explorer (FUSE) (Cycle 8) "Probing the Origin of High-ionization Emission Lines in AGNs with BLRGs", (PI: Mary Beth Kaiser), pending observation
28. *XMM-Newton* Guest Observer (AO6) "Mkn 1239: A Highly Polarized NLS1 Galaxy with Strong X-ray Emission Lines", (PI: D. Grupe; Co-Is: S. Komossa, A. Pradhan, S. Mathur, L. Gallo), pending observation
29. *XMM-Newton* Guest Observer (AO5) "The Unusual X-ray Transient: NLS1 WPVS 007 in a High State", (PI: D. Grupe), pending observation
30. *XMM-Newton* Guest Observer (AO5) "Study of X-ray Weakness among Luminous Narrow-line Quasars", (PI: C. Matsumoto), 2/15/07 – 2/14/09, $12,578
31. *XMM-Newton* Guest Observer (AO4), "*XMM-Newton* Observation of IRAS 17020+4544: A Host of a Dusty Warm Absorber", (PI: C. Matsumoto), 11/15/04 - 11/14/05, $43,648
32. MDM Spring 2005, "Coronal Lines in Soft X-ray Selected AGN", (PI: D. Grupe; Co-Is: S. Mathur, J. Moore), 4 nights on the 2.4 meter telescope
33. MDM Spring 2004, "Coronal Lines in Soft X-ray Selected AGN", (PI: D. Grupe; Co-Is: S. Mathur, J. Moore), 4 nights on the 2.4 meter telescope
34. MDM Fall 2004, "Optical Monitoring of the NLS1 PHL 1092", (PI: D. Grupe; Co-Is: L. Gallo, T. Boller, R. Biesemeyer), 7 nights on the 1.3 meter telescope
35. MDM Spring 2003 "Coronal Lines in Soft X-ray Selected AGN", (PI: D. Grupe; Co-Is: S. Mathur, J. Moore), 6 nights on the 2.4 meter telescope
36. *XMM-Newton* Guest Observer (Cycle 2) "Study of the UV-X-ray Properties of Luminous Narrow-line Quasars", (PI: C. Matsumoto; CoI: T. Kawaguchi), 4/1/03 - 3/31/05, $56,410

37. *XMM-Newton* Guest Observer (Cycle 2) "PG 1448+273: The Hottest Accretion Disk among Active Galactic Nuclei", (PI: T. Kawaguchi; Co-I: C. Matsumoto), 4/1/03 - 3/31/05, $8,800
38. STScI Guest Observer (Cycle 10), "Tidal Disruption of Stars by Massive Black Holes in Galaxy Nuclei: After the Flare", (PI: J. P. Halpern; CoIs: D. Grupe, S. Komossa), observed
39. STScI Guest Observer (Cycle 11), "STIS/UV Snapshot Survey of Bright AGN", (PI: N. Arav; large number of CoIs), accepted
40. NASA *RXTE* Guest Observer (AO2), NAG5-6921, "Search for Obscured Nucleus in Luminous IRAS Galaxy NGC6240", (PI: Y. Ikebe; Co-Is: T. Nakagawa, C. Otani, M. Matsuoka, Y. Terashima), 2/98-1/99, $5,804
41. NASA *RXTE* Guest Observer (AO2), "Investigating the Extraordinary X-ray Variability of the Infrared Quasar IRAS 13349+2438", (PI: J. Siebert; Co-I: J. P. Halpern), 2/98-1/99, $3,870