

Curriculum Vitae: *Saeqa Dil Vrtilek*

EDUCATION:

1982-1985 Ph.D., M.Phil Astronomy, Columbia University
1977-1978 M.A. Physics, Brandeis University
1970-1975 B.S. Physics, Massachusetts Institute of Technology

GENERAL FIELDS OF INTEREST:

Machine learning classification of X-ray binaries
Physics of accretion disks and jets
Multi-Channel studies of X-ray binaries
Science education/public outreach

PREVIOUS POSITIONS:

2016-2020 WAE, High Energy Astrophysics Division, SAO
2010-2015 Astrophysicist, High Energy Astrophysics Division, SAO (50% FTE)
1988-2009 Astrophysicist, High Energy Astrophysics Division, SAO
2005-2007 Director, NSF Research Experiences for Undergraduates (REU) and Teachers (RET) programs at SAO
1988- Associate, Harvard College Observatory
1995-1996 Visiting Associate Professor of Astronomy, Harvard University
1993-1995 Visiting Associate Professor of Astronomy, University of Maryland
Spring 1990 MPE Fellow, Max-Planck Institute for Extraterrestrial Physics.
1986-1988 National Academy of Sciences/National Research Council Resident Research Associate, Laboratory for High Energy Astrophysics, NASA/GSFC
Fall 1983 Visiting Scientist, Department of Astronomy, Oxford University.
1983 Summer Faculty, Department of Astronomy, Columbia University.
1979-1982 Programmer, R&G, SAO
1979 Sponsored Research Staff, Center for Space Research, MIT
1975-1977 Research Assistant, Earth and Planetary Physics, Harvard University

PROFESSIONAL SOCIETIES:

1994- **American Association for the Advancement of Science**
1991- **International Astronomical Union**
1991- **American Association of University Women**
1984- **American Physical Society**
1982- **American Astronomical Society**
1986-1990 New York Academy of Sciences
2001-2006 Astronomical Society of the Pacific
1984-1991 Royal Astronomical Society

CITIZENSHIP:

US

BIBLIOGRAPHY

Separate Document

HONORS/AWARDS

2014	AAS Shapley Lecturer, Newfoundland
2012	AAS Shapley Lecturer, Indiana
2009	Elected Fellow, American Association for the Advancement of Science.
2005-2006	AAS Shapley Lecturer.
1993-1996	Visiting Professorship for Women, National Science Foundation (\$169,000.00).
1991-1992	Marie Curie Fellow, American Association of University Women (\$20,000.00).
1988-1989	Science Scholar, Bunting Institute, Radcliffe College (\$20,000.00)
1983-1984	Amelia Earhart Fellow, Zonta International (\$5,000.00)
1984-1985	Amelia Earhart Fellow, Zonta International (\$5,000.00)

MEMBERSHIP ON ADVISORY COMMITTEES

External:

2020-2022	Member, AAAS Standing Committee on Fellows
2016	Chair, APS/CSWP Site visits to Waterloo University and Institute for Quantum Computing, Waterloo, Canada.
2015-2021	Member, Organizing Committee of IAU Commission B.3 Astroinformatics and Astrostatistics
2015-2019	Member, AAAS Ad hoc Committee on Fellows
2010-2022	Secretary-Treasurer, Astronomy Section, AAAS.
2009-2016	Member, Committee on the Status of Women in Physics, American Physical Society
2015	Chair, APS/CSWP Site visit to Drexel University
2013	Chair, APS/CSWP Site visit to North Carolina State University
2013	Panel Chair, Hubble Space Telescope Cycle 21, member of TAC
2012	Member, APS/CSWP Site visit to Argonne National Laboratory: Photon Science and Physical Science & Engineering Directorates.
2011	Member, APS/CSWP Site visit to UCSB
2011-2013	Member, Committee on Sections, AAAS
2011-2012	Chair, APS Maria Goeppert Mayer Fellowship
2010	Member, APS/CSWP Site visit to LANL, Physics Division.
2010	Guest editor of APS/CSWP Newsletter, article "Quality & Quantity: Participation of Women and Minorities in Science.
2006-2009	Section Secretary & Treasurer of AAAS Section D (Astronomy).
2004	Chandra Cycle 6 Peer Review, Panel Chair
2003	RXTE Cycle 9 Peer Review, Panel Chair
2001	NASA Headquarters ADP/LTSA Review, Panel Chair.
2001-2005	Astronomy Section Secretary & Treasurer AAAS.

1998 Member of NASA Senior Review Committee
 1997-2001 Appointed Section Secretary by the Steering Committee of AAAS Section D (Astronomy).
 1995-1996 Nominating Committee for the High Energy Astrophysics Division of the AAS.
 1995-1998 AAS representative to the AAAS (American Association for the Advancement of Science) (Selected by the Council of the AAS).
 1995-1997 Member, AAUW Educational Foundation International Fellowships Awards Panel (2-year term).

Internal:

2009-2013 Member, Center for Astrophysics Telescope Allocation Committee
 2005 Lead for Compact Objects section of HEAD input for CfA Science Strategic Planning Committee.
 2004-2005 Chair, CfA Pre-doctoral Oversight Committee
 2003-2004 Chair, CfA Fellowship Selection Committee
 2003-2004 Chair, CfA Pre-doctoral Selection Committee
 2002-2003 Member, CfA post and pre-doctoral selection committees.
 2001 Assignment of proposals for Binary Stars panel for the CXO Cycle 3 peer review. Was awarded a 'Certificate of Commendation' for this effort by Roger Brissendon.
 1994 Astronomy Advisory Committee, University of Maryland. (Members: M. Leventhal (Dept. Chair), R. Bell, S. Vogel, S. Vrtilek, J. Stone) the purpose of this committee was the design of a 10-year strategic plan for the Department as requested by the Dean of the College of Mathematics and Sciences to be incorporated into a 10-year plan for the College (10 departments).
 1993-1995 Astronomy Department Representative, UMD Outreach Program.
 1991-1993 Co-chair, CfA Colloquium Series.
 1990-1992 Coordinator, SAO Women's Program, CfA.

PEER REVIEW AND REFEREEING ACTIVITIES

Note: I consider being Chair of a panel an advisory position (listed above). Being a member of a panel is listed under peer review.

2020 Panel Member, HST Cycle 28 peer review, Stellar Panel.
2020 Panel Member, NUSar peer review
2019 Panel Member, Chandra Cycle 21 peer review
2018 Panel Member, HST Cycle 26 Stars and Stellar Populations Panel
2018 Panel Member, NuStar peer review
 2006 NASA Swift Cycle 3 Peer Review
 2005 Suzaku Cycle 1 Peer Review
 2004 GALEX Cycle 1 Peer Review
 2003 NASA LTSA/ADP review; Interstellar Medium and Planetary Nebulae panel
 2001 Co-Editor, proceedings of the symposium 'Sharp Focus', PASP conference series.
 2000 Astrophysics Theory Program Review
 1998 Peer review AXAF (Chandra) Cycle 1.
 1998 Peer review HST Cycle 8
 1998 Panel member, NASA Senior Review

1997 Reviewer for NASA RXTE proposals.
 1995,1996 Reviewer for NASA ASCA proposals (AO4,AO5).
 1995 Reviewer for NASA New Mission Concepts Proposals.
 1994 Reviewer for NSF proposals.
 1994 Reviewer for AAUW American Fellowship proposals.
 1993,1994 Reviewer for NASA ASCA proposals (AO1, AO2, AO3).
 1992 Reviewer for NASA Long-Term Space Astrophysics proposals.
 1992 Reviewer for NASA Astrophysics Data Program proposals.
 1992 Reviewer for NASA Long-Term Space Astrophysics proposals.
 1988- Referee for papers submitted to: *Astrophysical Journal (Letters)*, *Astrophysical Journal*, *Astrophysical Journal (Supplement)*, *Nature*, *Astronomical Society of the Pacific*, *Astronomical Journal*, *Monthly Notices of the Royal Astronomical Society*, *Astronomy & Astrophysics*

EDUCATIONAL ACTIVITIES

Formal Courses Taught (salaried)

Academic years 2008-2012. Physics 1111 (Astronomy Survey Course) and Physics 1110 (Science Survey Course) at Northeastern University.

Summers 2004-2013. Seminars for Harvard Summer School. Department of Continuing Education.

Spring 1995. Astronomy 440: Stellar Structure. University of Maryland Visiting Associate Professor. A senior level course for astronomy majors.

Fall 1994. Astronomy 688: X-ray Astronomy. University of Maryland Visiting Associate Professor. A graduate course on X-ray astronomy including in particular the radiative processes of importance in X-ray production. This was a new course offering that I designed.

Summer 1983. Astronomy 100: Introduction to Astronomy. Columbia University Summer Faculty. Science requirement for non-science majors.

Students and postdoctoral fellows supervised

April 2020. External thesis committee member for McKinley Brumback, Dartmouth. McKinley is currently a post-doctoral fellow at CalTech.

Summer 2019- Zoe de Beurs, SAO REU intern (University of Texas) Statistical analysis of multi-dimensional data. “Comparative Study of Machine Learning Methods for X-ray Binary Classification” (de Beurs, Islam, Gopalan, Vrtilik; submitted to ApJ in 2020) de Beurs awards received in 2020: Goldwater Scholar; Mitchell Outstanding Undergraduate Research. Currently applying for Graduate schools.

2018- Dr. Nazma Islam; currently postdoctoral fellow at NASA/GSFC. “Comparing X-ray color selection in separating X-ray binary classes using Color-Color-Intensity diagrams” (Islam, Vrtilik, Boroson, et al; New Astronomy, 2020 in press)

Summer 2017. External thesis committee member for Jun Yang. U.Mass, Lowell. Jun Yang is currently a post-doctoral fellow at MIT.

Academic Year 2016-2017 Chair of Post-doctoral Research Review Committee for Yanli Qui (National Astronomical Observatory of China).

Summer 2016, Kaley Brauer SAO REU intern (Brown University). Tomograms of X-ray Binary System V801 Ara from Optical Spectroscopy. Brauer, Vrtilik, Peris, & McCollough), MNRAS, 478, 4894. Kaley is currently a graduate student at MIT.

Spring 2016 Nazma Islam, Graduate student (Tata Institute) Supervisor of visit to CfA as COSPAR Fellow. Received PhD from Raman Research Institute in October 2016. She is currently a post-doctoral fellow at NASA/Goddard Space Flight Center (2019-2021).

2014-2016: Charith Peris (Northeastern University) Smithsonian pre-doctoral fellow Awarded 2 nights of Magellan/IMACS for early May 2014. “Tomography of X-ray Nova Muscae 1991: Evidence for ongoing mass transfer and stream-disc overflow” (Peris et al) MNRAS, 2015, 449, 1584. “X-ray Spectral Analysis of the Steady States of GRS 1915+105” (Peris et al) 2016, ApJ, 822, 60. Successfully defended his PhD thesis on March 29, 2016 and is currently a Research Scientist at Alexa AI.

Summer 2014; Summer 2015 Giridhar Gopalan (Graduate student, Harvard University) Statistical analysis of multi-dimensional data. “A Bayesian Model for the Detection of X-ray Binary Black Holes.” (Gopalan, Bornn, & Vrtilik) 2015, AAS, 22522501. “Classifying X-ray binaries: A Probabilistic Approach” (Gopalan, Vrtilik, & Bornn) 2015, ApJ, 809, 40. Giri is currently a Professor of Statistics at California Polytechnic State Institute.

Academic year 2012-2013: Stewart Buchan (Masters student, University of Southampton). Masters student: Multivariate study of XRBs Stewart received his Masters in 2013 and is currently in the PhD program at Southampton.

Academic year 2012-2013: Jan Cechura (Graduate student, Charles University, Prague) Smithsonian pre-doctoral fellow. Completed PhD in 2014. Currently a postdoctoral fellow at the Astronomical Institute of the Academy of Sciences of the Czech Republic. “Interpreting the X-ray state transitions of Cygnus X-1.” (Cechura, Vrtilik, & Hadrava) 2015, MNRAS, 450, 2410.

2011-2014: Charith Peris (Northeastern University, Boston) Completed Masters thesis under my supervision. “Tomographic study of V691 CrA” (Peris & Vrtilik) 2012 MNRAS, 427, 1043. “Variability of the accretion disk of V926 Sco inferred from tomographic analy-

sis.” (Calvelo, Peris, & Vrtilik) 2013, ApJ, 177, 761.

Academic year 2011-2012: Sam Connolly (University of Southampton). Masters student (degree received 2012). “Variability of the accretion disk of V926 Sco inferred from tomographic analysis.” (Calvelo, Peris, & Vrtilik) 2013, ApJ, 177, 761. Sam finished his PhD from Southampton in 2015 and is currently a post doctoral fellow there.

2011-2012: Petri Savolainen (Aalto University). SAO Pre-doc. Member of PRRC.

2009-2012: Herbert Paolo (Iowa State). SAO Pre-doc. Chair of pre-doctoral research review committee (PRRC).

Summer 2009, Li-Wei Hung SAO REU intern (Ohio State). “Suzaku X-ray spectra and pulse profile variations during the superorbital cycle of LMC X-4” (Hung, Hickox, Boroson, & Vrtilik), 2010 *Astrophysical Journal* (ApJ), 720, 1202. Li-Wei won an award for best student poster at the meeting “Chandra’s Decade of Discovery”, 22-25 Sept, 2009 Bos, MA. She received her PhD from UCLA (where she was a NSF Graduate Research Fellow) in 2016. She works at the Natural Sounds and Night Skies Division of the National Park Service.

2008-2009: Karri Kaljonen (Aalto University). SAO Pre-doc. Member of PRRC. Karri received his PhD in 2013.

Academic year 2008-2009: Dan Calvelo (University of Southampton). Masters student (degree received 2009). “Doppler and modulation tomography of XTE J1118+480 in quiescence” (Calvelo, Vrtilik, Neilsen, Torres, Steeghs, Hernandez, & Filipenko) 2009, MNRAS, 399, 539. Dan received his PhD in 2012 from Southampton and is currently a postdoctoral fellow there.

Academic year 2006-2008 Joey Neilsen (Graduate student, Harvard University). I was supervisor of his 2nd year Research project “The eccentric accretion disk of the black hole A0620-00” (Neilsen, Steeghs, & Vrtilik) 2008 MNRAS, 384, 849. “Spectroscopic signatures of the superorbital period in the neutron star binary LMC X-4” (Neilsen, Lee, Nowak, Dennerl, & Vrtilik) 2009 ApJ, 696, 182. Neilsen received the AAS Chambliss award for his poster on this topic. He received his PhD from Harvard in 2011, served one year as a postdoctoral fellow at MIT and is currently a post-doc at Boston University.

Summer 2006. Adrienne Hunacek (MIT). SAO REU intern. “UV observations of the X-ray photoionized wind of Cyg X-1” (Vrtilik, Boroson, Hunacek, Geiss, & Bolton) 2008 ApJ, 678, 1248. Adrienne obtained a law degree in 2010 from Boston College.

Summer 2004, Joey Neilsen (Kenyon College). SAO REU intern. “Phase variations in the pulse profile of SMC X-1” (Neilsen, Hickox, & Vrtilik) 2004 ApJ Letters, 616, 135. Joey received his PhD from Harvard University 2011, and is currently a postdoctoral fellow at Boston U.

Summer 2004: Ryan Hickox (Graduate student, Harvard University). I was on his 2nd year project review committee. “Pulse-phase spectroscopy of SMC X-1 with Chandra and XMM: reprocessing by a precessing disk?” (Hickox & Vrtilik) 2005 ApJ, 637, 1148. Ryan

received his PhD from Harvard in 2007 and is currently on the faculty at Dartmouth.

Summer 2002, Holly Maness (Grinnel College). SAO REU intern. “Nebular vs. Stellar Wind Abundances in NGC 654”, 2003 Publications of the Astronomical Society of the Pacific (PASP), 115, 1002. “Abundance Anomalies in the X-ray Spectra of the planetary nebulae NGC7027 and BD+30 3639” (Maness, Vrtilek, Kastner, & Soker) 2003 ApJ, 589, 439. Holly was a Barry Goldwater Scholar from 2002-2004 and received her PhD from UC Berkeley in 2010. She is currently a postdoctoral fellow at UCB.

Spring 2001, Visting postdoctoral fellow Hannah Quaintrell was supported for work on Chandra/HST data of SMC X-1. “Simultaneous Chandra and Hubble Space Telescope Observations of SMC X-1” (Vrtilek, Raymond, Boroson, Kallman, Quaintrell, McCray), ApJ, 563L, 139.

Summer 1999, Visiting postdoctoral fellow Hannah Quaintrell and student Diana Maxwell undertook observations with the Tillinghast 60-inch on Mt. Hopkins. HQ was also supported for observations at the South African Astronomical Observatory in Oct and Nov of 2000. “Spectral signatures of reprocessing on Hercules X-1/HZ Hercules” (Quaintrell, Still, Vrtilek) AIPC, 2001, 599, 878. “Multiwavelength Studies of Hercules X-1 during Short High and Anomalous Low States: On-again, Off-again” (Vrtilek, Quaintrell, Boroson, and five more) ApJ, 2001, 549, 522. Hannah was co-author on an additional four refereed papers between 2000-2001.

Summer 1999, Michael Preciado (Tufts University). Smithsonian Institution minority intern. “The UV light curve of LMC X-4: X-ray heating of the star and accretion disk” (Preciado, Boroson, & Vrtilek) 2002 PASP, 2002, 340.

1996-1999, Bram Boroson, post-doctoral fellow at SAO. Resulted in seven papers; Boroson as first author on five

1994-1997, Chun Xu, Astronomy graduate student at UMd, ASCA observations of 4U1254-69. Supervisor of 2nd year project.

1994-1997, Damian Audley physics graduate student at UMd, Physics, Pulse Phase Spectroscopy of Cen X-3. Supervisor of 2nd year project.

1994-1995 Scott Miller, Astronomy graduate student at UMd, Supervisor of 2nd year project.

1994-1995, Fuhua Cheng, post-doctoral fellow at UMd. Resulted in five refereed papers; Cheng as first author on two; Vrtilek as first author on three.

1992-1993, Andrew Silber, post-doctoral fellow at SAO. Resulted in four refereed papers; Silber as first author on one; Vrtilek as first author on two; Zucker as first author on one

GRANTS/CONTRACTS: Principal Investigator

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|-----------|--|
| 2014-2015 | “The Disk-Jet Connection in X-ray Binaries” Smithsonian Competitive Grants for Science. (\$80,000.00 at SAO) |
| 2010-2011 | “Increasing the Visibility of Women in Science” Smithsonian Women’s Program |

Committee. (\$10,000.00 at SAO).

2010-2011 “Modulation tomography: imaging black hole binaries.” Smithsonian Scholarly Studies. (\$36,900.00 at SAO).

2007-2010 “The Spectral Energy Distribution of X-ray Binaries” Smithsonian Endowment Fund. (\$41,113.00 at SAO).

2007-2010 “Inflows and outflows in X-ray Binaries: Getting the Big Picture” NASA ROSES ADP. (\$223,100.00 at SAO).

2007-2010 “Superorbital Variation of LMC X-4: Exploring the Accretion Flow” NASA Suzaku Cycle 2. (\$23,199.00 at SAO).

2006 “Spectral Energy Distribution of X-ray Binaries.” SI Endowment Program. (\$132,125 at SAO).

2006 “Multiwavelength Atlas of X-ray Binaries in the RXTE Era.” NASA ADA Program. (\$296,351 at SAO).

2005 “The Location and Spatial Structure of X-ray Emitting Plasma” Chandra AO6. \$30,289 (replacing FRH).

2005 “X-ray Emission from Fast Moving Shocks in the Protostellar Jet HH154.” Chandra AO6. \$22,353 (replacing FRH).

2005 “The Issue of Coronal Abundances.” Chandra AO5. \$19,472 (replacing FRH).

2005 “Activity Cycles and Maunder Minima Stars” XMM AO5. \$13,453 (replacing FRH).

2005 “X-ray Monitoring of Saturated M Dwarfs” XMM AO4. \$9,629 (replacing FRH).

2005-2008 “Modulation Tomography of X-ray Binaries” 3-year NSF grant. \$236,618.

2004 “Coronal Emission from Saturated Stars” XMM AO3. \$8,684 (replacing FRH).

2001 “Chandra Grating Spectroscopy of X-ray Binaries” Chandra AO3 Archival, (\$70,000.00 at SAO).

2000 “X-ray Spectra of Newly-Detected DQ Her objects” ASCA AO5. (\$19,000 at SAO).

2000 “High Resolution UV/X-ray Spectroscopy of SMC X-1”, Chandra AO2 (granted through HST review), (\$54,000.00 at SAO).

2000 “High Resolution UV/X-ray Spectroscopy of SMC X-1”, HST Cycle 9, (\$80,396.00 at SAO).

2000 “Spectral Variability of a supergiant X-ray Binary” AXAF AO1. \$9,900.

1999 “Spectroscopy of Low Mass X-ray Binaries: New Insights Into Accretion” XMM AO1, (\$44,700.00 at SAO).

1999 “High Resolution X-ray Spectroscopy of Compact Binaries”. AXAF AO1 (\$58,700.00 at SAO).

1997 “Spectroscopy of Hercules X-1/HZ Herculis” NASA (XTE AO4), (\$9,896.00 at SAO).

1997-2002 “The Physics of Accretion in Compact Objects”, NASA (Long-Term Space Astrophysics Program, Senior) (\$567,000.00 at SAO)

1996 “4U1700-37 with ASCA/STIS/XTE: Wind Instabilities in a Supergiant Binary” (ASCA A05), (\$19,000.00 at SAO); This observation was delayed a year for coordination with HST but ASCA died before this could be arranged.

1996 “High Resolution Ultraviolet Spectroscopy of Hercules X-1/HZ Herculis”, (HST Cycle 7), (\$173,000.00 at SAO).

1996 “UV Echos of X-ray Pulsars: LMC X-4”, (HST Cycle 5), (\$51,332.00 at SAO).

1995 “UV/X-ray Spectroscopy of Cyg X-2”, (HST Cycle 5), (\$47,524.00 at SAO).

1995 “The UV Energy Distribution of White Dwarfs: DP Leo, U Gem, and OY Car”, (HST Archival), (\$46,560.00 at UMD).

- 1995 “UV Echos of X-ray Pulsars: LMC X-4”, NASA (ASCA AO3), (\$18,635.00 at UMD).
- 1995 “X-ray/UV Spectroscopy of Cyg X-2”, NASA (ASCA AO3), (\$18,635.00 at UMD).
- 1994 “Accretion Disk Dynamics of Her X-1”, NASA (ASCA AO2) (\$10,000.00 at UMD).
- 1993 “Lines and Edges in the Spectra of X-ray Binaries”, NASA (ASCA AO1), (\$10,000.00 at UMD).
- 1994 “Accretion Disk Dynamics of Her X-1”, NASA (ASCA AO2) (\$10,000.00 at UMD).
- 1993 “Pulse Phase Spectroscopy of LMC X-4”, NASA (ASCA AO1), (\$5,000.00 at UMD).
- 1993 “Multiwavelength Observations of Her X-1”, NASA (IUE), (\$15,000.00 at UMD).
- 1993 “Multiwavelength Studies of Her X-1”, NASA (R OSAT AO4), (\$22,000.00 at UMD).
- 1993-1996 “Multiwavelength Studies of X-ray Binaries”, NSF, (\$169,800.00 at UMD).
- 1993 “EUV Observations of Her X-1”, NASA (EUVE), (\$44,478.00 at UMD).
- 1991-1996 “Multiwavelength Spectroscopy of X-ray Binaries”, NASA (Long-Term Space Astrophysics Data Program), (\$453,900.00 at SAO).
- 1991 “Soft X-ray Emission from Boundary Layers in Cataclysmic Variables”, NASA (ROSAT AO2), (\$18,000.00 at SAO).
- 1990 “Soft X-ray Emission from Boundary Layers in Cataclysmic Variables”, NASA (ROSAT AO1), (\$22,742.00 at SAO).
- 1989 “Multiwavelength Studies of Sco X-1”, NASA (IUE), (\$15,800.00 at SAO).
- 1988 “Multiwavelength Studies of Cyg X-2”, NASA (IUE), (\$36,500.00 at SAO).
- 1987 “Circumsource Structure of Her X-1 and Cen X-3”, NASA (Astrophysics Data Program), (\$5,000.00 at NASA/GSFC).

GRANTS/CONTRACTS: Co-Investigator

- 2006 “A Chandra HETGS Study of LMC X-4 : Binary Disk and Wind Properties and Studies of Grain Distribution at Small Angles” Chandra AO8, (PI=J.C.Lee).
- 2005 “The star-forming region: NGC 1893” Chandra AO7, (PI=G. Micela; replacing FRH).
- 2002 “X persei: The X-ray Halo and Spectrum of a High latitude X-ray Binary.” XMM AO3, (PI=R. Smith).
- 2001 “High Resolution Observations of X-Per” XMM AO2, (PI=R. Smith).
- 2001 “Understanding the Engine of Growth in Planetary Nebulae” Chandra AO3, (PI=J. Kastner).
- 2000 “Far-UV Spectroscopy of Hercules X-1” FUSE Cycle 2, (PI=B. Boroson).
- 2000 “Far-UV Spectroscopy of Scorpius X-1” FUSE Cycle 2, (PI=B. Boroson).
- 1999 “X-ray Emission from Planetary Nebulae” AXAF AO1, (PI=J. Kastner).
- 1999 “X-ray/UV Echo Mapping of Cygnus X-1”, RXTE Cycle 5, (PI=Boroson).
- 1998 “Wind Ionization in High Mass X-ray Binaries” FUSE Cycle 1, (PI=B. Boroson).
- 1998 “Spectroscopy of Hercules X-1/HZ Herculis”, EUVE (AO6), (PI-B. Boroson).
- 1998 “Spectroscopy of Hercules X-1/HZ Herculis”, XTE (AO4), (PI-M. Still).
- 1996 “Simultaneous STIS/XTE monitoring of 4U1700-37”, (XTE AO2), (PI-M. Corcoran at GSFC).
- 1995 “X-ray/UV Spectroscopy of Cyg X-2; a Coordinated Campaign with XTE, HST and ASCA”, (XTE AO1), (PI-A. Smale at GSFC).
- 1995 “UV Spectroscopy of Sco X-1”, (HST AO5), (PI-T. Kallman at GSFC).

- 1994 “The Spectrum of the Low Mass X-ray Binary Serpens X-1”, (ASCA AO2), (PI-T. Kallman at GSFC).
- 1993 “Study of the Soft X-ray Spectrum of Hercules X-1”, (ROSAT AO4), (PI-P. Kahabka at MPE).
- 1993 “The Boundary Layer Emission of Nova-like Variables”, NASA (EUVE), (PI-J. Raymond) (\$37,254.00 at SAO).
- 1992-1993 “Accretion Geometries of Long-Period Am Her Stars”, NASA (IUE),(PI-J. Raymond) (\$14,000.00 at SAO).
- 1984 “A Search for X-ray Pulsars”, NASA (EXOSAT), (PI-J. Patterson) (\$10,000.00 at Columbia).