

## Curriculum Vitae: *Saeqa Dil Vrtilek*

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### EDUCATION:

1982-1985 D.Phil, M.Phil Astronomy, Columbia University  
1977-1978 M.A. Physics, Brandeis University  
1970-1974 B.S. Physics, Massachusetts Institute of Technology

### CURRENT POSITIONS:

1988- Astrophysicist, High Energy Astrophysics Division, SAO  
1988- Associate, Harvard College Observatory

### PREVIOUS POSITIONS:

2005-2007 Director, NSF Research Experiences for Undergraduates (REU) and Teachers (RET) programs at SAO  
1995-1996 NSF Visiting Associate Professor of Astronomy, Harvard University  
1993-1995 NSF 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 Senior Programmer, Radio & Geo Division, SAO  
1979 Sponsored Research Staff, Center for Space Research, MIT  
1975-1977 Research Assistant, Earth and Planetary Physics, Harvard University

### HONORS/AWARDS:

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

### PROFESSIONAL SOCIETIES:

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

## **CITIZENSHIP:**

US

## **MEMBERSHIP ON ADVISORY COMMITTEES**

### *External:*

2015-2017 Member, Committee on Fellows, American Association for the Advancement of Science (AAAS)

2015-2018 Member, Organizing Committee of IAU Commission B.3 Astroinformatics and Astrostatistics

2013 Panel Chair, Hubble Space Telescope Cycle 21, member of TAC

2011-2013 Member, Committee on Sections, AAAS

2011-2012 Chair, APS Maria Goeppert Mayer Fellowship Selection Committee.

2010-2018 Secretary-Treasurer, Astronomy Section, AAAS.

2009-2016 Member, Committee on the Status of Women in Physics, American Physical Society (Guest editor for Summer 2010 Newsletter, article “Quality & Quantity: Participation of Women and Minorities in Science. (Chair, subcommittee on site visits; visits to physics departments of Los Alamos, UCSB, Argonne, NCSU, Drexel, Waterloo, Institute for Quantum Computing)

2006 Nominating Committee of the AAAS.

2004 Chandra Cycle 6 Peer Review, Panel Chair

2003 RXTE Cycle 9 Peer Review, Panel Chair

2001 NASA Headquarters ADP/LTSA Review, Panel Chair.

1998 NASA Senior Review

1997-2009 Secretary-treasurer AAAS Section D (Astronomy).

1995-1998 American Astronomical Society representative to the American Association for the Advancement of Science.

1995-1997 AAUW Educational Foundation International Fellowships Awards Panel.

1995-1996 Nominating Committee for the High Energy Astrophysics Division of the AAS.

1995 Member of Panel, NASA Mission Concepts Review

### *Internal:*

2009-2013 Member, Center for Astrophysics Telescope Allocation committee

2005 Lead for Compact Objects section 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 Committee

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.

I have served as member on an additional 21 NASA and NSF peer review panels.

## **REFEREEING:**

- 1988- Referee for *Astrophysical Journal (Letters)*, *Astrophysical Journal*, *Astrophysical Journal (Supplement)*, *Nature*, *Publications of the Astronomical Society of the Pacific*, *Astronomical Journal*, *Monthly Notices of the Royal Astronomical Society*, *Astronomy & Astrophysics*

## RESPONSIBILITY FOR MEETINGS/SCIENTIFIC CONFERENCES

- 2012 Member of Program Committee, APS March 2012 meeting.  
2012 “STEM outreach to underrepresented minorities”. Session organizer. APS 2012 March meeting.  
2007 “Population Explosion: The Nature and Evolution of X-ray Binaries in Diverse Environments,” Scientific Organizing Committee. St. Petersburg Beach, Florida, 28 Oct - 2 Nov, 2007.  
2006 “Astronomy Nexus: Connecting with Colleagues and the Cosmos. Special event at the AAAS Annual Meeting, St. Louis, MO, Feb 19, 2006.  
2006 “Great Space Observatories: Challenges and Rewards” scientific session for the AAAS Annual Meeting, St. Louis, MO, Feb 19, 2006.  
2005 “Astrotomography: New Techniques for Imaging Objects in Space” scientific session for the AAAS Annual Meeting, Washington, DC, Feb 19, 2005.  
2002 “Women of Science: Shattering the Glass Ceiling” scientific session for the AAAS Annual Meeting, Boston, MA, Feb 15, 2002.  
2001 “The X-ray Universe at Sharp Focus”, Scientific Organizing Committee and co-editor of the proceedings, St. Paul, MN., July 16-18, 2001.  
1999 “New Views of the Invisible Universe: First Light from Chandra” co-organizer, scientific session for the AAAS Annual Meeting, Washington, DC, Feb. 17-22, 2000.  
1997 “Taking the Pulse of the Universe: The First Year of Results from the Rossi X-ray Timing Explorer” scientific session for the AAAS Annual Meeting in Seattle, Washington February 13-18, 1997.  
1996 “All Eyes on the Universe: Multiwavelength Astrophysics” scientific session for the AAAS Annual Meeting, Baltimore, MD, February 8-13, 1996.

## EDUCATIONAL ACTIVITIES

### *Formal courses taught:*

Fall 2014 Phy 1111 (Introduction to Astronomy) Science requirement for non-science majors at Northeastern University.

Spring 2014 Phy 1111 (Introduction to Astronomy) Science requirement for non-science majors at Northeastern University.

Fall 2013 Phy 1111 (Introduction to Astronomy) Science requirement for non-science majors at Northeastern University.

Fall 2012 Phy 1111 (Introduction to Astronomy) Science requirement for non-science majors at Northeastern University.

Spring 2012 Phy 1111 (Introduction to Astronomy) Science requirement for non-science majors at Northeastern University.

Fall 2011 Phy 1111 (Introduction to Astronomy) Science requirement for non-science majors at Northeastern University.

Fall 2010 Phy U111 (Introduction to Astronomy) Science requirement for non-science majors at Northeastern University.

Spring 2010 Phy U111 (Introduction to Astronomy) Science requirement for non-science majors at Northeastern University.

Fall 2009 Phy U111 (Introduction to Astronomy) Science requirement for non-science majors at Northeastern University.

Spring 2009 Phy U121 (Introduction to Science) Science requirement for non-science majors at Northeastern University.

Fall 2008 Phy U111 (Introduction to Astronomy) Science requirement for non-science majors at Northeastern University.

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.

1978-1979. Physics 18a/19a: Introductory laboratory. Full responsible for section as graduate teaching fellow.

1972-1973. Physics 8.01 (Mechanics) and 8.02 (E&M) Undergraduate teaching assistant.

*Guest lectures in formal courses:*

October 26, 2013. Seminar for Statistics 310 Harvard University and Statistics 281 (by video), University of California, Irvine.

Summer 2013. Seminar for Harvard Department of Continuing Education.

Summer 2011. Seminar for Harvard Department of Continuing Education

Summer 2008. Seminar for Harvard Department of Continuing Education.

Summer 2006. Seminar for Harvard Department of Continuing Education.

Summer 2005. Seminar for Harvard Department of Continuing Education.

Summer 2004. Seminar for Harvard Department of Continuing Education.

Spring 1996. Two seminars as part of Astronomy 97hf (Sophomore Tutorial) at Harvard University as Visiting Associate Professor.

*Students and postdoctoral fellows supervised*

**Undergraduate students**

Summer 2016, Kaley Brauer (Brown University). SAO REU intern. "Tomograms of X-ray Binary System V801 Ara from Optical Spectroscopy." (Brauer, Vrtilik, Peris, & McCollough), submitted to ApJ.

Summer 2009, Li-Wei Hung (Ohio State). SAO REU intern. "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.

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. Adriene 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 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, Vrtilik, 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.

Summer 1999. Diana Maxwell (Open University). Visiting student. Diana completed her PhD in Astronomy from the Open University (UK) in 2002.

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, & Vrtilik) 2002 PASP, 2002, 340.

### **Graduate students**

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

Spring 2016 Nazma Islam Supervisor of visit to CfA as COSPAR Fellow. Received PhD from Raman Research Institute in October 2016. Currently a postdoctoral fellow at Copernicus Astronomical Centre, Warsaw.

Summer 2014; Summer 2015 Giridhar Gopalan (Harvard University, Cambridge) 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.

2012-2014 Joshua Schroeder (Columbia University, New York) Smithsonian pre-doctoral fellow. Black widow pulsars; finding the heaviest neutron star. Josh successfully defended his Thesis on May 9th and is currently a research scientist at the University of Santiago. A paper on Magellan/Megacam data obtained in May 2-5 2014 is under preparation.

Academic year 2012-2013: Stewart Buchan (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 (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.

2011-2016 Charith Peris (Northeastern University, Boston) Smithsonian pre-doctoral fellow “Tomographic study of V691 CrA” (Peris & Vrtilik) 2012 MNRAS, 427, 1043. “Variability of the accretion disk of V926 Sco inferred from tomographic analysis.” (Calvelo, Peris, & Vrtilik) 2013, ApJ, 177, 761. 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, Remillard, Steiner, Vrtilik et al) 2016, submitted to ApJ. Successfully defended his PhD thesis on March 29, 2016 and is currently working at a start-up.

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, & Vrtilek) 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).

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, Vrtilek, Neilsen, Torres, Steeghs, Hernandez, & Filipenko) 2009, MNRAS, 399, 539. Dan received his his PhD in 2012 from Southampton and is currently a postdoctoral fellow there.

Summer 2006: Joey Neilsen (Harvard University), 2nd year Research project “The eccentric accretion disk of the black hole A0620-00” (Neilsen, Steeghs, & Vrtilek) 2008 MNRAS, 384, 849. “Spectroscopic signatures of the superorbital period in the neutron star binary LMC X-4” (Neilsen, Lee, Nowak, Dennerl, & Vrtilek) 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 2004: Ryan Hickox (Harvard University). “Pulse-phase spectroscopy of SMC X-1 with Chandra and XMM: reprocessing by a precessing disk?” (Hickox & Vrtilek) 2005 ApJ, 637, 1148. Ryan received his PhD from Harvard in 2007 and is currently on the faculty at Dartmouth.

1994-2001. Damian Audley (UMd). Chair of 2nd year project: “Pulse phase spectroscopy of Cen X-3.”

1994-2001. Chun Xu (UMd). Chair of 2nd year project: “Pulse Phase Spectroscopy of Her X-1 and LMC X-4 with ASCA”.

Academic year 1994-1995. Scott Miller (UMd). Chair of 2nd year project: “Rosat observations of discrete X-ray sources in NGC 1313.” Scott is currently on the faculty at Sam Houston State University.

I have worked with 11 **high school students**, 7 went on to undergraduate programs in science. I have supervised 4 **post-doctoral fellows** (Andrew Silber, FuHua Chang, Bram Boroson (tenured faculty at Clayton State University), and Hannah Quaintrell).

### **PUBLIC OUTREACH:**

In addition to these professional educational activities, I have also participated in programs to introduce a broader public to science, and especially to encourage primary and secondary school students to consider careers in science. I have given numerous talks at high schools in Massachusetts, Maryland, and Virginia.

As a member of the APS Committee on the Status of Women in Physics (2009-2012), and as Chair of their Site Visit Committee, I take every opportunity to mentor and advance the cause of underrepresented groups. As secretary-treasurer of the Astronomy section of the AAAS since 1997 I have organized many symposia for general audiences.

Served as judge for the FIRST (For Inspiration & Recognition of Science & Technology) Robotics Competition held Boston, MA, 2006-2010.

Served on a panel discussing Minority Women in Science for Cambridge Cable Television. Aug 9, 2006 Cambridge, MA.

Member of Consulting Service for Young Astronomers' at the 26th General Assembly of the IAU. Aug 17-25, 2006 Prague, Czech Republic.

Judge for the World Year of Physics Talent Search sponsored by the APS, 2005.

Panelist for ICAN Career Advice and Networking Event March 1, 2005, MIT.

"My career as a scientist", MIT Alumni Panel, MIT, Monday, January 26, 2004.

As astronomy department representative to the UMD outreach program I organized a symposium for High School women and minorities on Careers in the Physical Sciences and Engineering at the University of Maryland that took place on March 11, 1995. 25 speakers and panel members (including NASA Chief Scientist France Cordova, the Deans for Undergraduate Studies and the College of Science, and professors and scientists from the University of Maryland, Goddard Space Flight Center, NSF, and the Space Telescope Science Institute) gave talks on their experiences in pursuing science and science-related careers. Over 150 high school students, teachers, and parents attended this event.

In collaboration with the Women's Program Committee at the CfA I organized a workshop on Astronomy for high school women held on May 16, 1992. Approximately 80 students and teachers attended this meeting.

As chair of the Women's Program Committee at the CfA I organized series of colloquia (called "Summer Stars") in 1991 and 1992 that were primarily aimed for an undergraduate audiences. Summer lecture series for undergraduates continues at the CfA.

For two years (1990-1991) I was a member of Science-By-Mail, a program organized by the Boston Museum of Science which teams scientists with elementary school students.