

Kathryn Volk

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EDUCATION

Ph.D. Planetary Sciences, The University of Arizona, 2013
B.S. Physics, Russian Area Studies, Wittenberg University, 2006 *Summa Cum Laude*.

POSITIONS

Associate Staff Scientist , University of Arizona	2018–present
Postdoctoral Research Associate, University of Arizona Supervisor: Renu Malhotra	2015–2018
Postdoctoral Research Fellow, University of British Columbia Supervisor: Brett Gladman	2013–2015
Graduate Research Associate, University of Arizona Advisor: Renu Malhotra Dissertation: Dynamical Studies of the Kuiper Belt and the Centaurs	2006–2013

GRANTS AND FELLOWSHIPS

PI, “Dynamics of sticky resonances and detached Kuiper belt objects”, NASA Solar System Workings (2019-2022)

Co-I, “Distribution of planet masses, planet-planet separations and dynamical lifetimes of planetary systems”, NASA Exoplanet Research Program (2018-2021, PI: R. Malhotra)

Co-I, “Kuiper Belt Dynamics with a Distant Unseen Planet”, NSF (2018-2021, PI: R. Malhotra)

Co-I, “Current dynamics of Neptune’s distant mean motion resonances”, NASA Solar System Workings (2015-2019, PI: R. Murray-Clay)

Canadian Institute for Theoretical Astrophysics National Fellow (2013-2015)

SPACECRAFT MISSION INVOLVEMENT

Co-I/Generational Deputy PI, “Chimera: Orbital Exploration of 29P/Schwassmann-Wachmann as a Gateway to the Centaurs and the Secrets of Small Body Formation” (proposed in response to the 2019 NASA Discovery Mission Announcement of Opportunity, PI Walt Harris, University of Arizona)

PROFESSIONAL LEADERSHIP

Vice-Chair of the AAS Division on Dynamical Astronomy (2019-2020)
AAS Division on Dynamical Astronomy committee member (2017-2019)
AAS Division for Planetary Sciences Meeting Scientific Organizing Committee member (2017)

PUBLICATIONS

- Kareta et al. (2019), “Physical Characterization of the December 2017 Outburst of the Centaur 174P/Echeclus”, submitted to AAS Journals.
- Chen, Gladman, **Volk**, et al. (2019), “OSSOS: constraining migration models with the 2:1 resonance using the outer solar system origin survey”, submitted to AAS journals.
- Ashton et al. (2019), “OSSOS: XI. An upper limit on the number of distant planetary objects in the Solar System”, submitted to Icarus
- Sarid, **Volk**, Steckloff, Harris, Womack, & Woodney (2019), “29P/Schwassmann-Wachmann 1, A Centaur in the Gateway to the Jupiter-Family Comets”, ApJ Letters, in press.
- Alexandersen et al. (2019), “OSSOS: XII. Variability studies of trans-Neptunian objects using the Hyper-Suprime Camera”, ApJS, in press
- Pike et al. (2019), “OSSOS XVI: The missing small members of the Haumea family”, Nature Astronomy.
- Nesvorny et al. (2019), “OSSOS XIX: Testing Early Solar System Dynamical Models using OSSOS Centaur Detections”, AJ.
- Volk** & Malhotra (2019), “Not a simple relationship between Neptune’s migration speed and Kuiper belt inclination excitation”, AJ.
- Van Laerhoven, Gladman, **Volk**, et al. (2019), “OSSOS XIV : The Plane of the Kuiper Belt”, AJ.
- Schwamb, Fraser, Bannister, et al. (2019), “Col-OSSOS: the colours of the Outer Solar System Origin Survey”, ApJS.
- Lawler et al. (2019), “OSSOS: XIII. Fossilized resonant dropouts tentatively confirm Neptune’s migration was grainy and slow”, AJ.
- Marsset et al. (2019), “Col-OSSOS: a distinct inclination distribution for each color seen in the dynamically excited trans-neptunian populations”. AJ.
- Cabral et al. (2019), “OSSOS: XV. No active Centaurs in the Outer Solar System Origins Survey”, A&A.
- Schwamb et al. on behalf of the LSST Solar System Science Collaboration (2019), “A Software Roadmap for Solar System Science with the Large Synoptic Survey Telescope”, RNAAS.
- Schwamb, **Volk**, Lin, et al. (2018), “A Northern Ecliptic Survey for Solar System Science”, LSST Cadence Optimization White Paper (arXiv:1812.01149).
- Volk** et al. (2018), “The Effects of Filter Choice on Outer Solar System Science with LSST”, LSST Cadence Optimization White Paper (arXiv:1812.01149).
- Malhotra, Lan, **Volk**, & Wang (2018), “Neptune’s 5:2 Resonance in the Kuiper Belt”, AJ.
- Yu, Murray-Clay, & **Volk** (2018), “Trans-Neptunian Objects Transiently Stuck in Neptune’s Mean Motion Resonances: Numerical simulations of the current population”, AJ.

Volk et al. (2018), “OSSOS IX : two objects in Neptune’s 9:1 resonance – implications for resonance sticking in the scattering population”, *AJ*.

Lawler et al. (2018), “OSSOS VIII – two size distribution slopes in the scattering disk”, *AJ*.

Bannister, Gladman, Kavelaars, Petit, **Volk**, Chen, Alexandersen, Gwyn, & the OSSOS collaboration (2018), “OSSOS: 800+ trans-Neptunian objects – the complete data release”, *ApJS*.

Volk & Malhotra (2017), “The curiously warped mean plane of the Kuiper belt”, *AJ*.

Pike et al. (2017), “Col-OSSOS: z band photometry reveals three distinct TNO surface types”, *AJ*.

Shankman et al. (2017), “OSSOS VI. Striking biases in the detection of large semimajor axis trans-Neptunian objects”, *AJ*.

Bannister, Shankman, **Volk**, et al. (2017), “OSSOS: V. Diffusion in the orbit of a high-perihelion distant Solar System object”. *AJ*.

Fraser et al. (2017), “All planetesimals born near the Kuiper belt formed as binaries”, *Nature Astronomy*.

Bannister et al. (2016), “OSSOS: IV. Discovery of a dwarf planet candidate in the 9:2 resonance with Neptune”, *AJ*.

Volk et al. (2016), “OSSOS III - Resonant Trans-Neptunian Populations: Constraints from the first quarter of the Outer Solar System Origins Survey”, *AJ*.

Malhotra, **Volk**, & Wang (2016), “Corralling a distant planet with extreme resonant Kuiper belt objects”, *ApJ Letters*.

Bannister et al. (2016), “The Outer Solar System Origins Survey I: design and first-quarter discoveries”, *AJ*.

Shankman et al. (2015), “OSSOS II: A sharp transition in the absolute magnitude distribution of the Kuiper belt’s scattering population”, *AJ*.

Volk & Gladman (2015), “Consolidating and Crushing Exoplanets: Did it Happen Here?”, *ApJ Letters*.

Pike, Kavelaars, Petit, **Volk**, & Shankman (2015), “The 5:1 Neptune Resonance as Probed by CFEPS: Dynamics and Population”, *AJ*.

Volk & Malhotra (2013), “Do Centaurs preserve their source inclinations?”, *Icarus*.

Volk & Malhotra (2012), “Long-term dynamical stability of the Haumea (2003 EL61) collisional family”, *Icarus*.

Volk & Malhotra (2011), “Inclination mixing in the classical Kuiper belt”, *ApJ*.

Volk & Malhotra (2008), “The scattered disk as the source of the Jupiter family comets”, *ApJ*.

Cui, Yelle, & **Volk** (2008), “Distribution and escape of molecular hydrogen in Titan’s thermosphere and exosphere”, *JGR*.

RECENT SEMINARS AND INVITED TALKS

“Solar System Shake-up: how planet migration rearranged our system”, invited talk, Breakthrough Discuss Conference, April 2019, Berkeley, CA.

“Combining theory and observations of trans-Neptunian objects to pin down Neptune’s migration history”, Academia Sinica Institute of Astronomy and Astrophysics Colloquium, March 2019, Taipei, Taiwan.

“Our Evolving Picture of the Kuiper Belt: Unexpectedly Warped Mean Planes and New Observations of Resonant Populations”, Southwest Research Institute Colloquium, December 2017, Boulder, CO.

“Are there planets lurking in the Kuiper belt?”, Public Evening Lecture, Lunar and Planetary Lab, November 2017, Tucson, AZ.

“The curiously warped mean plane of the Kuiper belt”, Lunar and Planetary Institute Seminar, September 2017, Houston, TX.

SELECTED RECENT CONFERENCE PROCEEDINGS

2019: K. Volk & R. Malhotra. ‘Not a simple relationship between Neptune’s migration speed and Kuiper belt inclination excitation’. DDA, Boulder, CO.

2018: K. Volk & R. Malhotra. ‘A statistical exploration of dynamical stability in Kepler and K2 multi-planet systems’. DPS, Knoxville, TN.

2018: K. Volk et al. ‘Two objects in Neptune’s 9:1 resonance – implications for resonance sticking in the scattering population’. DDA, San Jose, CA.

2017: K. Volk et al. ‘OSSOS: constraints on resonant trans-Neptunian populations from the full survey sample’. DPS, Provo, UT.

2017: K. Volk & R. Malhotra. ‘The curiously warped plane of the Kuiper belt’. ACM, Montevideo, Uruguay.

2016: K. Volk & R. Malhotra. ‘Evidence for a distant unseen solar system planet: Assessing the observational biases in the extreme Kuiper belt population’. Joint DPS-EPSC Meeting, Pasadena, CA.

2016: K. Volk, R. Malhotra, & X. Wang. ‘Dynamics of the Most Distant Kuiper Belt Objects’. DDA Meeting, Nashville, TN.

TEACHING

Instructor, University of Arizona, Fall 2015 – PTYS/ASTR 170B2 The Universe and Humanity: Origins and Destiny (general education introductory astronomy course; ~ 120 students)

Graduate Teaching Assistant Instructor/Co-Instructor, University of Arizona, Fall 2009, Spring 2010, Fall 2012 – LASC 297a: Letters, Arts, and Science Specialty Training Workshop (9-week course to improve scientific literacy and help students become peer mentors in their science classes; ~ 20 students per class)

Graduate Teaching Assistant, University of Arizona, Fall 2006, Spring 2008, Spring 2009 – various general education astronomy/planetary science undergraduate courses

PROFESSIONAL SERVICE

Referee for Icarus, Science, A&A, MNRAS, Nature Astronomy, AAS journals

External grant reviewer for NASA Research Programs

Panelist for NASA Research Program grant reviews

2019-present Staff Representative, Dept. of Planetary Sciences, University of Arizona

2018-2019 LPL representative on the Steward Observatory Telescope Allocation Committee

RECENT OUTREACH ACTIVITIES

2018 speaker for Astronomy on Tap, Seattle

2015-2018 invited speaker at several local amateur astronomy associations

2018 Phoenix Comic Fest panelist

2015-2017 volunteer for various Lunar & Planetary Lab outreach events

2016-2017 guest lecturer for the University of Arizona's Osher Lifelong Learning Institute

2017, 2016 Judged the Southern Arizona Research, Science & Engineering Foundation Science Fair

2017, 2015 speaker for Astronomy on Tap, Tucson

2014, 2015 Presenter for 'Girls Excelling in Math and Science' (Olympic College; Bremerton, WA)

SELECTED HONORS & AWARDS

2013 College of Science Outstanding Scholarship Award, University of Arizona

2013 Gerard P. Kuiper Memorial Award, University of Arizona

2011, 2009 Galileo Circle Scholar, University of Arizona

2010 Department of Planetary Sciences Service Award, University of Arizona

2007 College of Science Graduate Teaching Assistant Award, University of Arizona

2006 Department of Planetary Sciences Graduate Teaching Award, University of Arizona

2006 Departmental Honors in Physics, Wittenberg University

2006 Award for Excellence in the Russian Studies Program, Wittenberg University