

## RENU MALHOTRA

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### APPOINTMENTS

- 2016 to present* Louise Foucar Marshall Science Research Professor,  
and Regents' Professor, The University of Arizona, Tucson, AZ
- 2004 to present* Professor, Department of Planetary Sciences  
The University of Arizona, Tucson, AZ
- 2011-2016* Chair, Theoretical Astrophysics Program,  
The University of Arizona, Tucson, AZ
- 2010-2011* (on sabbatical leave from the UA)  
Visiting scholar: Planetary Science Institute, Tucson, AZ,  
Institute for Advanced Study, Princeton NJ, and  
Institute for Theory & Computation, Harvard-Smithsonian Center  
for Astrophysics, Cambridge, MA.
- 2000 to 2004* Associate Professor, Department of Planetary Sciences,  
The University of Arizona, Tucson, AZ
- 1991 to 2000* Staff Scientist, Lunar and Planetary Institute, Houston, TX
- 1989 to 1991* Research Associate, Planetary Sciences, Caltech, Pasadena, CA
- 1988 to 1989* Research Associate, Astronomy Department, Cornell University
- 1983 to 1988* Graduate Assistant, Physics Department, Cornell University

### EDUCATION

Ph.D., Physics, Cornell University, Ithaca, NY, August 1988.  
M.S., Physics (5 year program), Indian Institute of Technology,  
Delhi, India, 1983.

### HONORS and AWARDS

National Academy of Sciences, 2015  
American Academy of Arts and Sciences, 2015  
Celestial Mechanics Institute, 2014  
Galileo Circle Fellow, The University of Arizona, 2010  
Distinguished Alumnus, Indian Institute of Technology, Delhi, India–2006  
Kavli Frontiers of Science Fellow, National Academy of Sciences, 2000  
Harold C. Urey Prize, American Astronomical Society–Division for  
Planetary Sciences, 1997  
Asteroid 6698 named “Malhotra”, International Astronomical Union, 1997  
President’s Gold Medal for Physics, IIT-Delhi, 1983

PUBLICATIONS

- Malhotra, R., Lan, L., Volk, K., Wang, X., Neptune's 5:2 Resonance in the Kuiper Belt, *AJ*, 156, article id. 55 (2018)
- Trilling, D.E., Bellm, E.C., Malhotra, R., *AJ*, 155, article id. 243, 5 pp. (2018)
- Cambioni, S., Malhotra, R., The mid-plane of the main asteroid belt, *AJ*, 155, article id. 143, 10 pp. (2018)
- Malhotra, R., Prospects for unseen planets beyond Neptune, to appear in the proceedings of the symposium, "Serendipities in the Solar System and Beyond", Publications of the Astronomical Society of the Pacific (2018); ArXiv:1711.03444
- Strom, R.G., Marchi, S., Malhotra, R., Ceres and the terrestrial planets impact cratering record, *Icarus*, 302:104-108 (2018)
- Su, K.Y.L., MacGregor, M.A., Booth, M., Wilner, D.J., Flaherty, K., Hughes, A.M., Phillips, N.M., Malhotra, R., Hales, A.S., Morrison, S., Ertel, S., Matthews, B.C., Dent, W.R.F., Casassus, S., ALMA 1.3 mm Map of the HD 95086 System, *AJ*, 154, article id. 225 (2017)
- Volk, K., Malhotra, R., The curiously warped plane of the Kuiper Belt, *AJ*, Volume 154, Issue 2, article id. 62, 16 pp. (2017)
- Wang, X., Malhotra, R., Mean motion resonances at high eccentricities: the 2:1 and the 3:2 interior resonances, *AJ*, Volume 154, article id. 20 (2017)
- JeongAhn, Y., Malhotra, R., Simplified derivation of the collision probability of two objects in independent Keplerian orbits, *AJ* 153, article id. 235, 11 pp. (2017)
- Malhotra, R., Wang, X., Eccentricity distribution in the main asteroid belt, *MNRAS* 465:4381-4389 (2017)
- Malhotra, R., Volk, K., Wang, X., Corraling a distant planet with extreme resonant Kuiper belt objects, *ApJ* 824:L22 (2016)
- Yoshida, F., Ito, T., ..., Malhotra, R., et al., Lightcurves of the Karin family asteroids, *Icarus* 269:15-22 (2016)
- Malhotra, R., The mass distribution function of planets, *ApJ*, 808, 71 (2015).
- JeongAhn, Y., Malhotra, R., The current impact flux on Mars and its seasonal variation, *Icarus*, *Icarus*, 262, 140-153 (2015)
- Su, K.Y.L., Morrison, S., R. Malhotra, et al., 2014, Debris distribution in HD 95086: A young analog of HR 8799, *ApJ*, 799, article id. 146 (2015).
- Morrison, S., and Malhotra, R., Planetary chaotic zone clearing: destinations and timescales, *ApJ*, 799, article id. 41 (2015).
- Strom, R.G., Malhotra, R., Xiao, Z., Ito, T., Yoshida, F., and Ostrach, L.R., The inner solar system cratering record and the evolution of impactor populations, *Research in Astronomy and Astrophysics*, 15(3):407-434 (2015).
- Malhotra, R., 2015, Orbital resonances in planetary systems, in *Celestial Mechanics*, [Ed. Alessandra Celletti], in *Encyclopedia of Life Support Systems (EOLSS)*, Developed under the Auspices of the UNESCO, Eolss Publishers, Oxford, UK. ISBN 978-1-78021-519-8 (print), 978-1-78021-019-3 (e-Book).
- JeongAhn, Y., Malhotra, R., 2014, On the Non-uniform Distribution of the Angular Elements of Near-Earth Objects, *Icarus*, 229:236-246.

- Rodigas, T.J., Malhotra, R., Hinz, P.M., 2014, Predictions for Shepherding Planets in Scattered Light Images of Debris Disks, *ApJ*, 780, 65.
- Petrovich, C., Malhotra, R., Tremaine, S., 2013, Planets near mean motion resonances, *ApJ*, 770(1), article id. 24.
- Volk, K., Malhotra, R., 2013, Do Centaurs Preserve their Source Inclinations?, *Icarus*, 224:66-73.
- Su, K.Y.L., G.H. Rieke, R. Malhotra, et al., 2013, Asteroid belts in debris disk twins: Vega and Fomalhaut, *ApJ*, 763:118(14pp).
- Belbruno, E., Moro-Martín, A., Malhotra, R., Savransky, D., 2012, Chaotic Exchange of Solid Material between Planetary Systems: Implications for Lithopanspermia, *Astrobiology*, v. 12 n. 8. DOI: 10.1089/ast.2012.0825.
- Volk, K., Malhotra, R., 2012, The effect of orbital evolution on the Haumea (2003 EL<sub>61</sub>) family, *Icarus*, 221, 106:115.
- Knezevic, Z., Morbidelli, A., Burns, J.A., Athanassoula, E., Laskar, J., Malhotra, R., Mikkola, S., Peale, S.J., Roig, F., 2012, Commission 7: Celestial Mechanics and Dynamical Astronomy, Transactions IAU, Volume 7, Issue T28A, p. 15-20.
- Katz, B., Dong, S., Malhotra, R., Long-Term Cycling of Kozai-Lidov Cycles: Extreme Eccentricities and Inclinations Excited by a Distant Eccentric Perturber, *Phys. Rev. Lett.*, 107, 181101 (2011).
- Malhotra, R., Strom, R.G., 2011, Comment on “Constraints on the Source of Lunar Cataclysm Impactors (Cuk et al, 2010, *Icarus* 207:590-594)”, *Icarus*, 216, 359-362.
- Volk, K., Malhotra, R., 2011, Inclination Mixing in the Classical Kuiper Belt, *ApJ*, 736(1), article id. 11.
- Minton, D.A., Malhotra, R., 2011, Secular resonance sweeping of the main asteroid belt during planet migration, *ApJ*, 732, 53.
- Ito, T., and Malhotra, R., 2010, Asymmetric impacts of near-Earth asteroids on the Moon, *Astron. & Astrophys.*, 519, A63.
- Moro-Martín, A., Malhotra, R., et al., 2010, Locating planetesimal belts in the multiple-planet systems HD 128311, HD 202206, HD 82943 and HR 8799, *ApJ*, 717:1123-1139.
- Minton, D.A., Malhotra, R., 2010, Dynamical erosion of the main asteroid belt and implications for large impacts in the inner solar system, *Icarus*, 207:744-757.
- Burns, J. A., et al., 2010, Commission 7: Celestial Mechanics and Dynamical Astronomy, Transactions of the International Astronomical Union, Series B, 27, 120
- Su, K.Y.L., G.H. Rieke, K.R. Stapelfeldt, R. Malhotra, et al., 2009, The Debris Disk Around HR 8799, *ApJ*, 705:314-327.
- Tiscareno, M.S., Malhotra, R., 2009, Chaotic diffusion of resonant Kuiper Belt objects, *AJ*, 138:827-837.
- Bailey, B., Malhotra, R., 2009, Two dynamical classes of Centaurs, *Icarus*, 203:155-163.
- Minton, D.A., Malhotra, R., 2009, A record of planet migration in the main asteroid belt, *Nature*, 457:1109-111
- Ford, E., et al., 2009, From Discovery to Understanding: Principles for Maximizing Scientific Return on Exoplanet Research, Astro2010: The Astronomy and Astrophysics Decadal Survey, Science White Papers, no. 80

- Volk, K., Malhotra, R., 2008, The Scattered Disk as the source of the Jupiter family comets, *ApJ*, 687:714-725.
- Malhotra, R., Minton, D.A., 2008, Prospects for the habitability of OGLE-2006-BLG-109L, *ApJ-Letters*, 683:L67-L70.
- Moro-Martín, A., M.C. Wyatt, R. Malhotra, D.E. Trilling, 2008, Extra-Solar Kuiper Belt Dust Disks, in *The Solar System Beyond Neptune*, M. A. Barucci, H. Boehnhardt, D. P. Cruikshank, and A. Morbidelli (eds.), University of Arizona Press, Tucson, 592 pp., p. 465-480.
- Moro-Martín, A., R. Malhotra, et al., 2007, The dust, planetesimals and planets of HD 38529, *ApJ*, 668:1165-1173.
- Minton, D.A., Malhotra, R., 2007, Assessing the massive young Sun hypothesis to solve the warm young Earth puzzle, *ApJ*, 660:1700-1706.
- Moro-Martín, A., J.M. Carpenter, M.R. Meyer, L.A. Hillenbrand, R. Malhotra, et al., 2007, Are Debris Disks and Massive Planets Correlated?, *ApJ*, 658:1312-1321.
- Meyer, M.R., et al., 2006, The Formation and Evolution of Planetary Systems: Placing Our Solar System in Context with Spitzer, *PASP*, 18(850):1690-1710.
- Ito, T., and Malhotra, R., 2006, Dynamical transport of asteroid fragments from the  $\nu_6$  resonance, *Advances in Space Research*, 38:817-825
- Pascucci, I., U. Gorti, D. Hollenbach, J. Najita, M.R. Meyer, J.M. Carpenter, L.A. Hillenbrand, G.J. Herczeg, D.L. Padgett, E.E. Mamajek, M.D. Silverstone, W.M. Schlingman, J.S. Kim, E.B. Stobie, J. Bouwman, S. Wolf, J. Rodmann, D.C. Hines, J. Lunine, R. Malhotra, 2006, Formation and Evolution of Planetary Systems: Upper Limits to the Gas Mass in Disks Around Sun-like Stars, *ApJ*, 651:1177-1193
- Strom, R.G., Malhotra, R., Ito, T., Yoshida, F., Kring, D.A., 2005, The origin of planetary impactors in the inner solar system, *Science*, 309, p. 1847-1850
- Hahn, J.M., Malhotra, R., 2005, Neptune's migration into a stirred-up Kuiper Belt: A detailed comparison of simulations to observations, *AJ*, 130:2392-2414
- Moro-Martín, A., and Malhotra, R., 2005, Dust outflows and inner gaps generated by massive planets in debris disks, *ApJ*, 633:1150-1167
- Kim, J.S., Hines, D.C., Backman, D.E., Hillenbrand, L.A., Meyer, M.R., Rodmann, J., Moro-Martín, A., Carpenter, J.M., Silverstone, M.D., Bouwman, J., Mamajek, E.E., Wolf, S., Malhotra, R., Pascucci, I., Najita, J., Padgett, D.L., Henning, R., Brooke, T.Y., Cohen, M., Strom, S.E., Stobie, E.B., Engelbracht, C.W., Gordon, K.D., Missett, K., Morrison, J.E., Muzerolle, J., Su, K.Y.L., 2005, Formation and evolution of planetary systems: cold outer disks associated with sun-like stars, *ApJ*, 632:659-669
- Moro-Martín, A., Wolf, S., and Malhotra, R., 2005, Signatures of planets in spatially unresolved debris disks, *ApJ*, 621:1079-1097.
- Moro-Martín, A., Wolf, S., and Malhotra, R., Rieke, G.H., 2005, Signatures of Planets in Debris Disks, in 'The Dusty and Molecular Universe: A Prelude to Herschel and ALMA', Eds.: A. Wilson. ESA SP-577, Noordwijk, Netherlands: ESA Publications Division, p. 163-166
- Moro-Martín, A., Meyer, M.R., Hillenbrand, L.A., Backman, D.E., Beckwith, S.V.W., Bouwman, J., Brooke, T.Y., Carpenter, J.M., Cohen, M., Gorti, U., Henning, T., Hines, D.C., Hollenbach, D., Kim, J.S., Lunine, J., Malhotra, R., Mamajek, E.E.,

- Metchev, S., Morris, P., Najita, J., Padjett, D.L., Rodmann, J., Silverstone, M.D., Soderblom, D.R., Stauffer, J.R., Stobie, E.B., Strom, S.E., Watson, D.M., Weidenschilling, S.J., Wolf, S., Young, E., 2005, Formation and Evolution of Planetary Systems: first results from a Spitzer legacy science program, in ‘The Dusty and Molecular Universe: A Prelude to Herschel and ALMA’, Eds.: A. Wilson. ESA SP-577, Noordwijk, Netherlands:ESA Publications Division, p. 469–470
- Moro-Martín, A., and Malhotra, R., 2004, Kuiper Belt Dust: Spatial Distribution and Spectral Energy Distribution, in ‘Debris Disks and the Formation of Planets: A Symposium in Memory of Fred Gillett’, eds. L. Caroff, L.J. Moon, D. Backman, and E. Praton, ASP Conference Series 324:274-276. Pub: Astronomical Society of the Pacific, San Francisco.
- Michtchenko, T.A., and Malhotra, R., 2004, Secular dynamics of the three-body problem: application to the  $\nu$  Andromedae planetary system, *Icarus*, 168:237-248
- Kortenkamp, S., Malhotra, R., and Michtchenko, T.A., 2004, Survivability of Neptune’s Trojans during planetary migration, *Icarus*, 167:347-359
- Bernstein, G.M., Trilling, D.E., Allen, R.L., Brown, M.E., Holman, M., and Malhotra, R., 2004, The size distribution of trans-Neptunian bodies, *AJ*, 128, 1364-1390; Erratum: *AJ*, 131, 2364-2364 (2006).
- Yoshida, F., Dermawan, B., Ito, T., Sawabe, Y., Haji, M., Saito, R., Hirai, M., Nakamura, T., Sato, Y., Yanagisawa, T., and Malhotra, R., 2004, Photometric observation of a very young family-member asteroid (832) Karin, *Publ. Soc. Astron. Japan*, 56(6):1105-1113
- Zurbuchen, T.H., P. Prashant, A. Gallimore, D. Scheeres, N. Murphy, G. Zank, R. Malhotra, H. Funsten, and the NASA Interstellar Probe Vision Mission Team, Interstellar Probe: Breakthrough Science Enabled by Nuclear Propulsion, The 55th International Astronautical Congress, Vancouver, Canada, 2004, paper no. IAC-04-IAA.3.6.4.08,
- Meyer, M.R., Hillenbrand, L.A., Backman, D.E., Beckwith, S.V.W., Bouwman, J., Brooke, T.Y., Carpenter, J.M., Cohen, M., Gorti, U., Henning, T., Hines, D.C., Hollenbach, D., Kim, J.S., Lunine, J., Malhotra, R., Mamajek, E.E., Metchev, S., Moro-Martín, A., Morris, P., Najita, J., Padjett, D.L., Rodmann, J., Silverstone, M.D., Soderblom, D.R., Stauffer, J.R., Stobie, E.B., Strom, S.E., Watson, D.M., Weidenschilling, S.J., Wolf, S., Young, E., Engelbracht, C.W., Gordon, K.D., Misselt, K., Morrison, J., Muzerolle, J., Su, K., 2004, The Formation and Evolution of Planetary Systems: First Results from a Spitzer Legacy Science Program, *ApJS*, 154, 422–427
- Backman, D., Beckwith, S., Carpenter, J., Cohen, M., Henning, T., Hillenbrand, L., Hines, D., Hollenbach, D., Lunine, J., Malhotra, R., Meyer, M., Najita, J., Padjett, D., Soderblom, D., Stauffer, J., Strom, S., Watson, D., Weidenschilling, S., Young, E., Morris, P., The formation and evolution of planetary systems: placing our solar system in context, Proceedings of the Conference on Towards Other Earths: DARWIN/TPF and the Search for Extrasolar Terrestrial Planets, 22-25 April 2003, Heidelberg, Germany. Edited by M. Fridlund, T. Henning, compiled by H. Lacoste. ESA SP-539, Noordwijk, Netherlands: ESA Publications Division, ISBN 92-9092-849-2, 2003, p. 349–354
- Moro-Martín, A., and Malhotra, R., 2003, Dynamical models of Kuiper Belt Dust in the

- inner and outer Solar system, *AJ*, 125:2255-2265.
- Tiscareno, M.S., and Malhotra, R., 2003, The dynamics of known Centaurs, *AJ*, 126:3122-3131
- Allen, R.L., Bernstein, G.M., and Malhotra, R., 2002, Observational Limits on a Distant Cold Kuiper Belt, *ApJ*, 124:2949-2954
- Malhotra, R., 2002, A dynamical mechanism for establishing apsidal resonance, *ApJ-Letts.*, 575:L33-L36
- Moro-Martín, A., and Malhotra, R., 2002, A Study of the Dynamics of Dust from the Kuiper Belt: Spatial Distribution and Spectral Energy Distribution, *AJ*, 124:2305-2321.
- Meyer, M.R., D. Backman, S.V.W. Beckwith, T.Y. Brooke, J.M. Carpenter, M. Cohen, U. Gorti, T. Henning, L.A. Hillenbrand, D. Hines, D. Hollenbach, J. Lunine, R. Malhotra, E. Mamajek, P. Morris, J. Najita, D.L. Padgett, D. Soderblom, J. Stauffer, S.E. Strom, D. Watson, S. Weidenschilling, E. Young, 2002, The Formation and Evolution of Planetary Systems: SIRTf Legacy Science in the VLT Era, In ‘The Origins of Stars and Planets: The VLT View’, Proceedings of the ESO Workshop held in Garching, Germany, 24-27 April 2001, p. 463.
- Allen, R.L., Bernstein, G.M., and Malhotra, R., 2001, The edge of the Solar system, *ApJ-Letts.*, 549:L241-L244
- Malhotra, R., Holman, M., and Ito, T., 2001, Chaos and stability in the Solar system, *PNAS*, 98(22):12342-12343
- Stepinski, T.F., Malhotra, R., Black, D.C., 2000, The Upsilon Andromedae system: models and stability, *ApJ*, 545:1044-1053.
- Malhotra, R., Duncan, M., Levison, H., 2000, Dynamics of the Kuiper Belt, in *Protostars and Planets IV*, V. Mannings, A.P. Boss and S.S. Russell, eds., University of Arizona Press-Tucson, 1231-1254.
- Showman, A., and Malhotra, R., 1999, The Galilean satellites, *Science*, 286:77-84.
- Hahn, J.M., and Malhotra, R., 1999, Orbital evolution of planets embedded in a massive planetesimal disk, *Astron. J.*, 117:3041-3053.
- Malhotra, R., 1999, Migrating Planets, *Scientific American*, 281(3):56-63.
- Malhotra, R., 1999, Chaotic planet formation, *Nature*, 402:599-600.
- Malhotra, R., 1998, Orbital resonances and chaos in the Solar system, in *Solar System Formation and Evolution*, eds. D. Lazzaro, *et al.*, ASP Conference Series 149:37-63. Pub: Astronomical Society of the Pacific, San Francisco.
- Malhotra, R. and J. Williams, 1997. The heliocentric motion of Pluto, in *Pluto and Charon*, D.J. Tholen and S.A. Stern, eds., Arizona Space Science Series, Univ. of Arizona Press, Tucson.
- Malhotra, R., 1997, Implications of the Kuiper Belt for the Solar system, Planetary and Space Science, in press
- Showman, A., D.J. Stevenson and R. Malhotra, 1997, Coupled orbital and thermal evolution of Ganymede, *Icarus* 129:367-383.
- Showman, A. and R. Malhotra, 1997, Tidal evolution into the Laplace resonance and the resurfacing of Ganymede, *Icarus* 127:93-111.
- Liou, J.C. and R. Malhotra, 1997, Depletion of the outer asteroid belt, *Science* 275:375-377.

- Malhotra, R. 1996, The phase space structure near Neptune resonances in the Kuiper Belt, *Astron. J.* 111:504-516.
- Malhotra, R. 1995, Dynamical model of pulsar-planet systems, in *Millisecond Pulsars – A Decade of Surprise*, M. Tavani, D. Backer & A. Fruchter, eds. Pub.: Astronomical Society of the Pacific. p. 399-410.
- Malhotra, R. 1995, The origin of Pluto’s orbit: implications for the Solar system beyond Neptune, *Astron. J.* 110:420-429.
- Malhotra, R. 1994, Nonlinear Resonances in the Solar System, *Physica D*, 77:289-304 (special issue on ‘Modelling the forces of Nature’).
- Malhotra, R. 1994, A mapping method for the gravitational few-body problem with dissipation, *Cel. Mech. & Dyn. Astron.* 60:373-385.
- Malhotra, R. 1993, The origin of Pluto’s peculiar orbit, *Nature* 365:819-821.
- Malhotra, R. 1993, Orbital resonances in the Solar Nebula: strengths and weaknesses, *Icarus* 106:264-73. (Special issue on Planet Formation.)
- Malhotra, R. 1993, Three-body effects in the planetary system of PSR1257+12, *Astrophys. J.* 407:266-275.
- Malhotra, R. 1992, Orbital Dynamics of PSR1257+12 and its Two Planetary Companions, in *Planets Around Pulsars*, eds. J.A. Phillips, S.E. Thorsett, and S.R. Kulkarni, ASP Conference Series 72:399-410. Pub.: Astronomical Society of the Pacific, San Francisco.
- Malhotra, R., D. Black, A. Eck and A. Jackson, 1992, Resonant orbital evolution of the putative planetary system of PSR1257+12, *Nature* 356:583-35.
- Malhotra, R. 1991, Tidal origin of the Laplace resonance and the resurfacing of Ganymede, *Icarus* 94:399-412.
- Malhotra, R. and S.F. Dermott, 1990, The role of secondary resonances in the orbital history of Miranda, *Icarus* 85:444–480.
- Malhotra, R. 1990, Capture probabilities for secondary resonances, *Icarus* 87:249–264.
- Dermott, S.F., P.D. Nicholson, R. Gomes and R. Malhotra, 1990, Modelling the IRAS Solar System dust bands, *Advances in Space Research* 10(3):171–180.
- Malhotra, R., K. Fox, C.D. Murray and P.D. Nicholson, 1989, Secular perturbations of the Uranian satellites: Theory and practice, *Astron. & Astrophys.* 221:348–358.
- Dermott, S.F., R. Malhotra and C.D. Murray, 1988, Dynamics of the Saturnian and Uranian satellites: A chaotic route to melting Miranda? *Icarus* 76:295–334.

#### ABSTRACTS/CONTRIBUTED CONFERENCE PRESENTATIONS

- Lan, L., Malhotra, R., 2018, Neptune’s 5:2 mean motion resonance in the Kuiper Belt, American Astronomical Society, DDA meeting #49, id. #103.03
- Su, K.Y.L., MacGregor, M.A., Booth, M., Wilner, D.J., Malhotra, A.S., Morrison, OST STDT, 2018, ALMA 1.3 Millimeter Map of the HD 95086 System – A Young Analog of the HR 8799 System, American Astronomical Society, AAS Meeting #231, id. #147.08
- Cambioni, S.; Malhotra, R.; Hergenrother, C. W.; R.; Rizk, B.; Kidd, J. N.; Drouet d’Aubigny, C.; Chesley, S. R.; Shelley, F.; Christensen, E.; Farnocchia, D.; Lauretta, D. S., 2018, An upper limit on Earth’s Trojan Asteroid population from OSIRIS-REx,

- 49th Lunar and Planetary Science Conference, March 2018, at The Woodlands, Texas. LPI Contribution No. 2083, id. 1149
- Malhotra, R., Volk, K., 2017, The Midplane of the Kuiper Belt and Its Unexpected Warps, American Astronomical Society, DPS meeting #49, #405.11
- Cambioni, S., Malhotra, R., 2017, The Midplane of the Asteroid Belt and Its Warps, American Astronomical Society, DPS meeting #49, #201.04
- Reddy, V., Kuhm, O., Thirouin, A., Conrad, A., Malhotra, R., Sanchez, J.A., Veillet, C., Ground-based Characterization of Earth Quasi Satellite (469219) 2016 HO3, American Astronomical Society, DPS meeting #49, #204.07
- Malhotra, R., 2017, Evidence for distant Earth(s) in the Solar System, Earths in Other Solar Systems–All Hands Meeting, Tucson AZ, September 2017.
- Hergenrother, C. W.; Malhotra, R.; Rizk, B.; Kidd, J. N.; Drouet d'Aubigny, C.; Chesley, S. R.; Lauretta, D. S., A Search for Earth Trojan Asteroids with the OSIRIS-REx Spacecraft, 48th Lunar and Planetary Science Conference, March 2017, at The Woodlands, Texas. LPI Contribution No. 1964, id. 2892
- Malhotra, R., Volk, K., Wang, X., 2016, Corraling a distant unseen planet with extreme resonant Kuiper belt objects, American Astronomical Society, DPS meeting #48, #200.04
- JeongAhn, Y., Malhotra, R., et al., 2016, Spatial distribution of steep lunar craters may be linked to size-dependent orbital distribution of impactors, American Astronomical Society, DPS meeting #48, #215.07
- Volk, K., Malhotra, R., 2016, Evidence for a distant unseen solar system planet: Assessing the observational biases in the extreme Kuiper belt population, American Astronomical Society, DPS meeting #48, #120.11
- Malhotra, R., 2016, The mass distribution function of planets in the Galaxy, American Astronomical Society, DDA meeting #47, #204.01
- Volk, K., Malhotra, R., Wang, X., 2016, Dynamics of the most distant Kuiper belt objects, American Astronomical Society, DDA meeting #47, #105.03
- Wang, X., Malhotra, R., 2016, High eccentricity MMRs in the circular planar restricted three-body problem, American Astronomical Society, DDA meeting #47, #103.04
- Malhotra, R., JeongAhn, Y., Mars/Moon Impact Rate Ratio of Kilometer-Size Impactors, 47th Lunar and Planetary Science Conference, March 2016, The Woodlands, Texas. LPI Contribution No. 1903, p. 2935
- Malhotra, R., Oort Cloud Comet Encounters with Mars, Earth, Venus and Mercury, 46th Lunar and Planetary Science Conference, March 2015, The Woodlands, Texas. LPI Contribution No. 1832, p. 2467
- McEwen, A., Daubar, I., Ivanov, B., Oberst, J., Malhotra, R., JeongAhn, Y., Byrne, S., 2015, Current Impact Rate on Earth, Moon, and Mars, 46th Lunar and Planetary Science Conference, March 2015, The Woodlands, Texas. LPI Contribution No. 1832, p. 1854
- Jones, R.L., Zeljko, I., Malhotra, R., et al., 2014, Solar System Science with LSST, American Astronomical Society, DPS meeting #46, #214.13
- Morrison, S.J., Malhotra, R., Su, K.Y.L., 2014, The Planetary System of HD 95086 — A Young Analog of HR 8799?, American Astronomical Society, DPS meeting #46,



- #204.03
- Su, K.Y.L., Morrison, S.J., Malhotra, R., et al., 2014, The Debris Structures of HD 95086 — A Young Analog of HR 8799, American Astronomical Society, DPS meeting #46, #204.02
- JeongAhn, Y., Malhotra, R., 2014, The current impactor flux on Mars and its seasonal variation, American Astronomical Society, DPS meeting #46, #203.08
- Malhotra, R., 2014, A few points on the dynamical evolution of the young solar system, American Astronomical Society, DDA meeting #45, #400.01
- Morrison, S.J., Malhotra, R., 2014, Planetary chaotic zone clearing: destinations and timescales, American Astronomical Society, DDA meeting #45, #400.02
- Malhotra, R., Petrovich, C., Tremaine, S., 2013, In-situ Planet Formation: Implications for Planets near Resonances, American Astronomical Society, DPS meeting #45, #300.05
- Volk, K., Malhotra, R., 2013, Ordering Mean Motion Resonances with the Farey Tree: Application to the Kuiper Belt, American Astronomical Society, DPS meeting #45, #414.01
- JeongAhn, Y., Malhotra, R., 2013, The non-uniform distribution of the perihelia of near-Earth objects, American Astronomical Society, DPS meeting #45, #106.01
- Petrovich, C., Malhotra, R., Tremaine, S., 2013, In-situ Planet Formation: Implications for the orbital distribution around resonances, Exoplanets in Multi-body Systems in the Kepler Era, Conference at the Aspen Center for Physics.
- Belbruno, E., Moro-Martin, A., Malhotra, R., Savransky, D., 2012, Chaotic exchange of solid material between planetary systems: implications for lithopanspermia, European Planetary Science Congress EPSC2012–139.
- Volk, K., Malhotra, R., 2012, The Origin Of Resonant Kuiper Belt Objects, American Astronomical Society, DPS meeting #44, #405.06
- Volk, K., Malhotra, R., 2012, The Origin of Resonant Kuiper Belt Objects, American Astronomical Society, DDA meeting #43, #5.02
- JeongAhn, Y., Malhotra, R., 2012, On The Distribution Of Angular Orbital Elements Of Near-earth Objects, American Astronomical Society, AAS Meeting #220, #128.01
- Volk, K., Malhotra, R., 2011, Libration amplitude distributions of resonant Kuiper belt objects, Joint EPSC-DPS meeting, #2011-1517
- Malhotra, R., Jeongahn, Y., 2011, Dynamical investigations on the leading/trailing asymmetry of lunar rayed craters, Joint EPSC-DPS meeting, #2011-1215
- Minton, D.A., Malhotra, R., 2011, The sweeping  $\nu_6$  secular resonance during giant planet migration: implications for models of the primordial excitation and depletion of the asteroid belt, Joint EPSC-DPS meeting, #2011-591
- Volk, K., Malhotra, R., 2011, Long-term dynamical stability of the Haumea (2003 EL61) collisional family, Joint EPSC-DPS meeting, #2011-346
- Volk, K., Malhotra, R., 2011, The Effect of Planetary Encounters on the Inclination Distribution of the Centaurs, American Astronomical Society, DDA meeting #42, #9.06
- Ito, T., Malhotra, R., Asymmetric cratering due to a steady-state NEA flux on the Moon, AOGS 2010, PS12-D1-AM2-1.02-008
- Volk, K., Malhotra, R., 2010, The Effect of Planetary Encounters on the Inclination Distribution of the Centaurs, American Astronomical Society, DPS meeting #42, #40.08

- JeongAhn, Y., Malhotra, R., 2010, Co-orbital Asteroids of Earth as Candidates for Asymmetric Impactors on the Moon, American Astronomical Society, DPS meeting #42, #13.03
- Volk, K., Malhotra, R., 2010, Resonant Pathways to the Distant Kuiper Belt, TNO Conference, Philadelphia, PA.
- Volk, K., Malhotra, R., 2010, Orbital inclination evolution and correlations with physical properties of KBOs, American Astronomical Society, DDA meeting #41, #2.03
- Malhotra, R., Ito, T., 2009, Asymmetric Impacts Of Near-earth Asteroids On The Moon, American Astronomical Society, DPS meeting #41, #27.01
- Malhotra, R., Minton, D.A., 2009, Dynamical Erosion of the Asteroid Belt and Implications for the Rate of Large Impacts on the Terrestrial Planets, American Astronomical Society, DPS meeting #41, #27.02
- Volk, K., Malhotra, R., 2009, Resonant Channels to the Distant Kuiper Belt, American Astronomical Society, DPS meeting #41, #62.03
- Malhotra, R., Minton, D.A., 2009, Speculating on Additional Planets and Debris in the OGLE-2006-BLG-109L System, AAS Meeting #214, #306.06
- Minton, D.A., Malhotra, R., 2009, Dynamical Erosion of the Asteroid Belt, American Astronomical Society, DDA meeting #40, #12.05
- Volk, K., Malhotra, R., 2009, Dynamical Pathways to the High-Perihelion Scattered Disk, American Astronomical Society, DDA meeting #40, #5.03
- Belbruno, E., Moro-Martin, A., Malhotra, R., 2009, Minimal Energy Transfer of Solid Material Between Planetary Systems, American Astronomical Society, DDA meeting #40, #2.05
- Minton, D.A., Malhotra, R., 2008, Evidence for Planet Migration in the Main Asteroid Belt: Implications for the Duration of the Late Heavy Bombardment, Workshop on the Early Solar System Impact Bombardment, held November 19-20, 2008 in Houston, Texas. LPI Contribution No. 1439., p.41-42
- Minton, D.A., Strom, R.G., Malhotra, R., 2008, Can Impactors from the Main Asteroid Belt Erase a Cometary Cratering Record on the Moon? Workshop on the Early Solar System Impact Bombardment, held November 19-20, 2008 in Houston, Texas. LPI Contribution No. 1439., p.43-44
- Malhotra, R., 2008, The Kuiper Belt of Four Gigayears Ago, American Astronomical Society, DPS meeting #40, #38.01.
- Volk, K., Malhotra, R., 2008, Reassessing the Classical Kuiper Belt as a Source of the Jupiter Family Comets, American Astronomical Society, DPS meeting #40, #47.01
- Minton, D.A., Malhotra, R., 2008, Patterns Of Depletion In The Asteroid Belt, American Astronomical Society, DPS meeting #40, #52.02
- Bailey, B., Malhotra, R., 2008, The Centaur–Jupiter Family Comet Link, American Astronomical Society, DPS meeting #40, #38.04
- Ito, T., Malhotra, R., Asymmetric Impacts of Near-Earth Asteroids on the Moon, Asteroids, Comets, Meteors 2008 held July 14-18, 2008 in Baltimore, Maryland.
- Malhotra, R., and Minton, D.A., 2008, The OGLE-2006-BLG-109L Planetary System: Prospects for a Habitable Planet American Astronomical Society, DDA meeting #39, #6.05

- Minton, D., Malhotra, R., 2008, Sweeping Resonances in the Main Asteroid Belt and the Late Heavy Bombardment, American Astronomical Society, DDA meeting #39, #14.03.
- Minton, D.A., Malhotra, R., 2008, Secular Resonance Sweeping of Asteroids During the Late Heavy Bombardment, 39th Lunar and Planetary Science Conference, (Lunar and Planetary Science XXXIX), held March 10-14, 2008 in League City, Texas. LPI Contribution No. 1391., p.2481
- Malhotra, R., 2007, A Planetesimal Belt in the HD 38529 Planetary System, American Astronomical Society, DPS meeting #39, #32.02; Bulletin of the American Astronomical Society, Vol. 38, p.474
- Volk, K., Malhotra, R., 2007, The Scattered Disk as a Source of the Jupiter Family Comets, American Astronomical Society, DPS meeting #39, #64.09; Bulletin of the American Astronomical Society, Vol. 38, p.1043
- Bailey, B., Malhotra, R., 2007, Orbital Evolution of Centaurs, American Astronomical Society, DPS meeting #39, #52.02; Bulletin of the American Astronomical Society, Vol. 38, p.517
- Malhotra, R., Dynamical cause of the Late Heavy Bombardment, 38th Lunar and Planetary Science Conference, March 12-16, 2007, League City, Texas. LPI Contribution No. 1338, p. 2373
- Minton, D., Malhotra, R., A young massive Sun may not solve the young warm Earth puzzle, Annual Meeting of the Division for Planetary Sciences–American Astronomical Society, October 8-13, 2006, Pasadena, CA.
- Malhotra, R., Strom, R.G., Ito, T., Yoshida, F., Kring, D.A., Bombardment History of the Inner Solar System, Annual Meeting of the Division for Planetary Sciences–American Astronomical Society, October 8-13, 2006, Pasadena, CA.
- Malhotra, R., Strom, R.G., Ito, T., Yoshida, F., Kring, D.A., Bombardment History of the Inner Solar System, Astrobiology Science Conference, March 26-30, 2006, Washington D.C.
- Moro-Martín, A., and Malhotra, R., 2005, Signatures of Planets in Debris Disks, in Proceedings of the conference on ‘Dust in Planetary Systems’, held September 26-28, 2005 in Kaua’i, Hawaii. LPI Contribution No. 1280., p. 122
- Strom, R.G., Malhotra, R., Ito, T., Yoshida, F., Kring, D.A., 2005, The Origin of Impactors During the Inner Solar System Cataclysm, Meteoritics & Planetary Science, Vol. 40, Supplement, Proceedings of 68th Annual Meeting of the Meteoritical Society.
- Strom, R.G., Malhotra, R., Ito, T., Yoshida, F., Kring, D.A., 2005, Origin of impacting objects in the inner solar system, American Geophysical Union, Fall Meeting 2005, abstract #P42A-01
- Hahn, J.M., Malhotra, R., 2004, Neptune’s smooth migration into a hot Kuiper Belt, AAS–DDA Annual Meeting #35, #07.03
- Moro-Martín, A., and Malhotra, R., 2004, Signatures of Planets in Circumstellar Debris Disks, AAS Meeting 204, #82.02
- Malhotra, R., 2004, Locating sub-jovian planets and debris in exo-planetary systems, AAS–DPS Annual Meeting #36, #42.04
- Ito, T., Malhotra, R., Near-Earth orbital distribution of asteroid fragments coming from

- the  $\nu_6$  resonance, 35th COSPAR Scientific Assembly, 18–25 July 2004, Paris, France, p.3622
- Tiscareno, M.S., and Malhotra, R., 2004, Chaotic diffusion of resonant Kuiper Belt objects, AAS–DPS Annual Meeting #36, #17.08
- Hahn, J.M., Malhotra, R., 2004, A detailed comparison of simulations of Neptune’s migration to observations of the Kuiper Belt, AAS–DPS Annual meeting #36, #08.08
- Holman, M.J., Allen, R.L., Bernstein, G.M., Brown, M.E., Malhotra, R., Trilling, D.E., 2003, HST/ACS limits on a distant Kuiper belt, AAS–DPS Annual meeting #35, #39.09
- Tiscareno, M.S., and Malhotra, R., 2003, The Effects of Planet-Size Resonant KBOs, AAS–DPS Annual meeting #35, #39.22
- Trilling, D.E., Allen, R.L., Bernstein, G.M., Brown, M.E., Holman, M.J., Malhotra, R., 2003, KBO light curves derived from the HST/ACS survey, AAS–DPS Annual meeting #35, #39.23
- Kortenkamp, S.J., Malhotra, R., Michtchenko, T., 2003, Survival of Trojan-Type Companions of Neptune During Primordial Planet Migration, AAS–DPS Annual meeting #35, #49.11
- Ito, T., and Malhotra, R., 2003, Near-Earth orbital distribution of asteroid fragments coming from the  $\nu_6$  secular resonance zone, AAS–DPS Annual meeting #35, #36.06
- Moro-Martín, A., and Malhotra, R., 2003, Dust Outflows from Planetary Systems, AAS Meeting 203, #17.11
- Tiscareno, M.S., and Malhotra, R., 2003, The Dynamics of Known Centaurs, AAS–DDA Annual meeting #34, #02.06
- Soderblom, D., Meyer, M.R., Backman, Dana, Beckwith, S.V.W., Brooke, T.Y., Carpenter, J.M., Cohen, M., Gorti, U., Henning, T., Hillenbrand, L. A., Hines, D., Hollenbach, D., Kim, S., Lunine, J., Malhotra, R., Mamajek, E., Moro-Martín, A., Morris, P., Najita, J., Padgett, D. L., Stauffer, J., Strom, S.E., Watson, D., Weidenschilling, S., Wolf, S., Young, E., 2003, Formation and Evolution of Planetary Systems: A SIRTFF Legacy Science Program Progress Report, AAS Meeting 201, #21.15
- Malhotra, R., Allen, R.L., Bernstein, G.M., Brown, M.E., Holman, M.J., Trilling, D.E., 2003, The origin of short period comets, AAS–DPS Annual meeting #35, #49.13
- Bernstein, G.M., Allen, R.L., Brown, M.E., Holman, M.J., Malhotra, R., Trilling, D.E., 2003, The Size Distribution of Kuiper Belt Objects from a Deep HST/ACS Survey, AAS–DPS Annual meeting #35, #49.03
- Hahn, J.M., Malhotra, R., 2003, Neptune’s Migration into a Hot Kuiper Belt, AAS–DPS Annual Meeting #35, #39.08
- Allen, R. L., Bernstein, G.M., Malhotra, R., 2001, A Deep Kuiper Belt Survey, AAS Meeting 199, #63.10.
- Malhotra, R., 2002, Eccentricity excitation and apsidal alignment in exo-planetary systems, AAS–DPS Annual Meeting #34, #42.05
- Tiscareno, M.S., and Malhotra, R., 2002, Centaurs: The Transition Between the Kuiper Belt and Jupiter-Family Comets, AAS–DPS Annual Meeting #34, #09.02
- Moro-Martín, A., and Malhotra, R., 2002, Kuiper Belt dust in the inner and outer Solar System, AAS–DPS Annual Meeting #34, #09.08

- Hahn, J., Malhotra, R., 2000, Planet Migration Via Numerous Stochastic Scattering Events, *BAAS*, May 2000, AAS–DDA Annual Meeting, #32,#01.10
- Hahn, J., Malhotra, R., 2000, Shepherding the Kuiper Belt Via Ragged Planet-Migration, *BAAS*, October 2000, AAS–DPS Annual Meeting, #19.06
- Meyer, M.R., Backman, D., Beckwith, S.V.W., Brooke, T.Y., Carpenter, J.M., Cohen, M., Gorti, U., Henning, T., Hillenbrand, L.A., Hines, D., Hollenbach, D., Lunine, J., Malhotra, R., Mamajek, E., Morris, P., Najita, J., Padgett, D.L., Soderblom, D., Stauffer, J., Strom, S.E., Watson, D., Weidenschilling, S., Young, E., The Formation and Evolution of Planetary Systems: SIRTf Legacy Science in the VLT Era The Origins of Stars and Planets: The VLT View, ESO Workshop held in Garching, Germany, 24-27 April 2001
- Malhotra, R., Allen, R.L., Bernstein, G.M., 2001, The Edge of the Solar System, *LPSC XXXI*, paper no. 1204.
- Allen, R.L., Bernstein, G.M., Malhotra, R., 2001, Observational Limits on a Distant Thin Disk, *AAS–DPS Annual Meeting #33*, #06.0
- Malhotra, R., Stepinski, T.F., Black, D.C., 2000. Dynamical constraints on the Upsilon Andromedae system, *LPSC XXXI*, paper no. 1425.
- Malhotra, R., 1999. Neptune’s 2:1 orbital resonance in the Kuiper Belt, *LPSC XXX*, paper no. 1998.
- Malhotra, R., 1999. Kuiper Belt objects 1997 SZ10 and 1996 TR66, *LPSC XXX*, paper no. 1810.
- Malhotra, R., 1998. Pluto’s inclination excitation by resonance sweeping, *LPSC XXIX*, paper no. 1476.
- Hahn, J. and Malhotra, R., 1998. Orbital evolution of planets embedded in a massive debris disk, *LPSC XXIX*, paper no. 1398.
- Hahn, J. and Malhotra, R., 1998. Radial migration of planets embedded in a massive planetesimal disk, AAS–DDA Annual Meeting. *BAAS* 30(4):1389.
- Malhotra, R., 1998. Outer planet orbital migration in the early Solar system, *BAAS* 30(4):1389.
- Malhotra, R., 1997. The Kuiper Belt: a window on the early Solar system, AAS–DDA Annual Meeting.
- Malhotra, R., 1997. Inclination excitation by resonance sweeping of the Kuiper Belt, AAS–DPS Annual Meeting, *BAAS*, July 1997, 29(3):1020
- Malhotra, R., 1996. Implications of the Edgeworth-Kuiper Belt structure for the Solar system. AAS–DPS Annual Meeting, *BAAS* 28(3):1082.
- Liou, J.C. and Malhotra, R., 1996. Depletion of the outer asteroid belt, AAS–DPS Annual Meeting, *BAAS* 28(3):1079.
- Malhotra, R. 1996. The fate of Neptune planetesimals. *LPSC XXVII*, 801-802.
- Malhotra, R., 1995. Resonance dynamics in the Kuiper Belt, AAS–DPS Annual Meeting, *BAAS* 27(4):1448.
- Malhotra, R. 1995. The origin of Pluto’s peculiar orbit, *LPSC–XXVI*, 887-888.
- Ojakangas, G.W. and R. Malhotra, 1995, Thermal and orbital history of a blocky Enceladus. *LPSC XXVI*, 1077-1078.

- Malhotra, R. 1994. The origin of Pluto's orbit: implications for the "Kuiper Belt". AAS–DPS Annual Meeting, *Bull. Am. Astron. Soc.* 26:1126-1127.
- Showman, A., R. Malhotra and D. Stevenson, 1994. Coupled orbital and thermal history of Ganymede, AAS–DPS Annual Meeting, *Bull. Am. Astron. Soc.* 26:1159-1160.
- Malhotra, R. 1993. On the delivery of planetesimals to a proto-planet in the Solar nebula. *LPSC-XXIV*, 925-926.
- Malhotra, R. 1993. On the capture of Pluto into the 3:2 Neptune resonance, AAS–DPS Annual Meeting, *Bull. Am. Astron. Soc.* 25(3):1137-1138.
- Ojakangas, G.W. and R. Malhotra, 1993. Possible thermal and orbital states of Enceladus. AAS–DPS Annual Meeting, *Bull. Am. Astron. Soc.* 25:1113.
- Malhotra, R., D. Black, A. Eck and A. Jackson, 1992. Constraints on the putative companions to PSR1257+12, *LPSC-XXIII*, 829-830.
- Malhotra, R. 1991. Tidal origin of the Laplace resonance and the resurfacing of Ganymede, AAS–DPS Annual Meeting, *Bull. Am. Astron. Soc.* 23(3):1170.
- Malhotra, R. 1990. Analytical theory for secondary resonances, AAS–DPS Annual Meeting, *Bull. Am. Astron. Soc.* 22(3):1082.
- Malhotra, R. and S.F. Dermott, 1988. The stability of orbit-orbit resonances in the Uranian and Saturnian satellite systems, AAS–DPS Annual Meeting, *Bull. Am. Astron. Soc.* 20(3):880.
- Malhotra, R. 1988. Satellite dynamics on the supercomputer, Astronomical Society of New York, Feb. 1988.
- Malhotra, R., Dermott, S.F., and Murray, C.D., 1987. A chaotic route to melting Miranda, AAS–DPS Annual Meeting, *Bull. Am. Astron. Soc.* 19(3):820.
- Murray, C.D., K.Fox, Malhotra, R. and P.D. Nicholson, 1987. Secular perturbations of the Uranian satellites: theory and practice, AAS–DPS Annual Meeting, *Bull. Am. Astron. Soc.* 19(3):820.
- Malhotra, R., Dermott, S.F., and Murray, C.D., 1986. Tidal heating of the Uranian satellites, AAS–DPS Annual Meeting, *Bull. Am. Astron. Soc.* 18(3):785.

#### INVITED CONFERENCE PRESENTATIONS

- "Bombardment History of the Planets", Pop-Up Institute on Planetary Habitability at The University of Texas at Austin, June 2018
- "Dynamics of Planetary Systems", Pop-Up Institute on Planetary Habitability at The University of Texas at Austin, June 2018
- "Resonant Kuiper Belt Objects - a Review", Planetary Sciences Distinguished Lecture, AOGS Conference, Honolulu HI, June 2018
- "Planet migration in the Solar system: a new paradigm and its LPI origins", LPI 50th Anniversary Science Symposium, Houston, TX, March 2018
- "Prospects for Unseen Planets Beyond Neptune", Symposium: Serendipities in the Solar System and Beyond, IANCU-Taiwan, July 2017
- "The mass function of planets", Inner Solar Systems meeting, American Astronomical Society, AAS Meeting #230, id.#111.01, June 2017
- "Earth Trojan Asteroid Survey with the OSIRIS-REx Spacecraft–Science motivations, Science Team Meeting, Tucson AZ, April 2017

- “A few points on the dynamical evolution of the young solar system”, Planet Day, Center for Planetary Science, University of Toronto, March 2017
- “The Solar System Beyond Neptune”, Keynote talk for Workshop on Solar System Puzzles, IANCU-Taiwan, July 2016.
- “The mass function of planets in the Galaxy”, Earths in Other Solar Systems–All Hands Meeting, Tucson AZ, September 2015.
- “The Galaxy is teeming with small planets”, Lunar and Planetary Laboratory Conference, Tucson AZ, August 2015.
- “A few points on the dynamical structure of planetary systems”, SPF 1: Star and Planet Formation in the Southwest, March 2015, Biosphere 2 Center, AZ.
- “The dynamical history of our solar system”, 39th COSPAR Scientific Assembly, 14-22 July 2012, in Mysore, India.
- “The solar system in time”, Women in Science and Technology, Indian Institute of Technology, New Delhi, India, March 8, 2011
- “Planet migration”, AOGS 2010 – 7th Annual Meeting, Hyderabad, India, July 5-9, 2010.
- “Planet migration in the solar system”, ‘Putting our Solar System in Context’, European Science Foundation Conference, Obergurgl, Austria, April 25-30, 2010.
- “Planet migration in the solar system”, ‘Exoplanets Rising’ – a conference at the Kavli Institute for Physics, Santa Barbara CA, Mar 29–April 2, 2010.
- “Basics of planet migration theory”, UCF Winter School 2010: Exoplanets for Planetary Scientists, Orlando FL, Jan 6-8, 2010.
- “On the importance of a few dwarf planets”, AAS meeting, June 8-11, 2009
- “Finding order in Kuiper Belt chaos”, Theoretical Institute for Advanced Research in Astrophysics, Hsinchu, Taiwan, December 12-16, 2008
- “Planetary scattering and migration: lessons from Pluto”, and “Dynamical clearing”, Great Planet Debate: a Scientific conference and Educator workshop, Applied Physics Laboratory, Laurel, MD, August 14-16, 2008
- “Bombardment of the Terrestrial Planets and Migration history of the giant planets”, Formation, Composition and Early Evolution of Outer Giant and Dwarf Planets and of their Satellites, conference at NASA-Ames, December 6-7, 2007
- “Secular resonances in planetary systems”, Annual Meeting of the AAS Division for Dynamical Astronomy–American Astronomical Society, Halifax, Nova Scotia, June 25-29, 2006.
- “Planets in debris disks”, May Symposium: A decade of extra-solar planets around normal stars, Space Telescope Science Institute, May 1-5, 2005.
- “Exo-planetary debris disks”, Planet Formation Conference, Aspen Institute for Physics, Aspen, CO, Feb 8-12, 2005.
- “The Kuiper Belt”, TPF/Darwin Conference, San Diego CA, July 26-29, 2004.
- “Dynamics of exo-planetary systems”, Astrophysics of Planetary Systems, Cambridge MA, May 17-20, 2004.
- “Asteroids, KBOs and other debris in planetary systems”, Planet Formation Conference, Kavli Institute for Theoretical Physics, UC–Santa Barbara, CA, March 15–19, 2004.
- “Outer Solar System Science with the InterStellar Probe”, *Exploring the Outer Heliosphere*, National Academies, Beckman Institute, UC-Irvine, 6–7 May 2003.

- “Kuiper Belt Dust”, *First Decadal Review of the Edgeworth-Kuiper Belt*, Antofagasta, Chile, March 10-14, 2003.
- “Chaos and Stability in Planetary Systems”, *American Physical Society – April 2002 Meeting*, Albuquerque, NM, April 20-23, 2002.
- “Stability of Planetary Systems”, *Gordon Research Conference on Origins of Solar Systems*, Connecticut College, New London, CT, June 17-22, 2001.
- “Separatrix crossing phenomena in the Solar system”, *Workshop on Nonlinear Astrophysics*, University of Florida, Gainesville, FL, 15-17 February 2001
- “Chaos and stability in the Solar system”, *Frontiers of Science*, National Academy of Sciences, Irvine, CA, 22-23 September 2000
- “Kuiper Belt Dynamics”, *Kuiper Belt Workshop*, 3-4 September 1998, Lowell Observatory, Flagstaff, AZ.
- “Orbital Resonances and Chaos in the Solar System”, *International Workshop on Planetary Sciences*, 3-6 November 1997 in Rio de Janeiro, Brazil.
- “The Kuiper Belt: a review”, *23rd General Assembly of the International Astronomical Union*, 18-26 August 1997 in Kyoto, Japan.
- “The Kuiper Belt: A window on the early Solar system”, *Harold C. Urey Prize Lecture*, Annual Meeting of the Division for Planetary Sciences of the American Astronomical Society, July 28-August 1, 1997, Cambridge, MA.
- “Dynamical structure in the Kuiper Belt”, *28th Annual Meeting of the Division of Dynamical Astronomy*, 13–16 April 1997, Flagstaff, AZ.
- “Implications of the Kuiper Belt for the Solar system”, *Asteroids, Comets and Meteors Conference*, July 10 1996, Versailles, France.
- “The Origin of Pluto’s orbit and implications for the Kuiper Belt”, *Kuiper Belt Workshop*, June 8 1996, Toronto, Canada.
- “Orbital dynamics and tidal evolution of the Icy Galilean satellites”, *Icy Galilean Satellites Conference*, Feb 1 1994, San Juan Capistrano, CA.
- “Dynamical models for pulsar-planet systems”, *Aspen Winter Conference on Astrophysics: Millisecond Pulsars*, Jan 3-7, 1994, Aspen, CO.
- “Heliocentric motion of Pluto”, *Pluto–Charon Conference*, July 5-9, 1993, Flagstaff, AZ.
- “Orbital resonances and chaotic dynamics in the Solar System”, *Marlar Graduate Lectures*, August 10-14, 1992, Department of Space Physics and Astronomy, Rice University.
- “Tidal Evolution of the Galilean Resonances: Implications for the Ganymede-Callisto Dichotomy”, *American Geophysical Union Spring Meeting*, May 11-16, 1992, Montreal
- “Orbital Dynamics of PSR1257+12 and its Two Planetary Companions”, *Workshop on Planets around Pulsars*, April 30-May 1, 1992, Caltech, Pasadena, CA.

#### COLLOQUIA/SEMINARS

- Cornell University, Thomas Gold Lecture, Ithaca, NY, May 2018
- Cornell University, Joint Physics-Astronomy Colloquium, Ithaca, NY, April 2018
- Raman Research Institute, Bengaluru, India, January 2018
- Herzberg Institute for Astronomy, Victoria, BC, 25 April 2017
- University of British Columbia, Astronomy, 24 April 2017
- National Optical Astronomy Observatories, December 02, 2016



University of Chicago, Astronomy, February 24, 2016.  
 University of Florida, Astronomy, January 28, 2016.  
 UCLA iPLEX, Los Angeles, CA, November 20, 2015.  
 SETI Institute, Mountain View, CA, July 21, 2015.  
 Southwest Research Institute, Boulder, CO, April 23, 2015.  
 University of California–Berkeley, March 17, 2015  
 University of California–Berkeley, March 15, 2015  
 Institute for Advanced Studies, April 8, 2014.  
 Colorado State University, Physics, October 7, 2013.  
 Canadian Institute for Theoretical Astrophysics, April 22, 2013.  
 UNAM, Ensenada, Mexico, April 16-18, 2012, Lecture series on Solar System Dynamics.  
 The University of Arizona, Astrobiology, Oct 21, 2011.  
 Ohio State University, Columbus, OH, Sep 22, 2011.  
 Institute for Theory and Computation, Harvard-Smithsonian Center for Astrophysics,  
 Cambridge, MA, Apr 7, 2011.  
 Tata Institute for Fundamental Research, Mumbai, India, March 9, 2011.  
 Southwest Research Institute, Boulder, CO, Feb 15, 2011.  
 Rutgers University, New Brunswick, NJ, Oct 8, 2010.  
 Institute for Advanced Study, Princeton, NJ, Sep 23, 2010.  
 Joint NOAO-SO Colloquium, Tucson, AZ, Nov 05, 2009.  
 Lunar and Planetary Institute, Houston, TX, Dec 5, 2008.  
 Lowell Observatory, Flagstaff, AZ, September 11, 2008.  
 LaPLace Center for Astrobiology, The University of Arizona, March 28, 2008.  
 Arizona State University, School for Earth and Space Exploration, August 29, 2007)  
 The University of Arizona, Theoretical Astrophysics (February 20, 2006).  
 Harvard University, Center for Astrophysics (September 15, 2005)  
 Harvard University, Institute for Theory and Computation (September 13, 2005)  
 Southwest Research Institute, Boulder (May 23, 2005)  
 Caltech (April 26, 2005)  
 University of California, Santa Cruz (April 8, 2005)  
 National Optical Astronomy Observatories, Tucson, AZ (April 01, 2005)  
 Planetary Science Institute (2004)  
 The University of Arizona, Mathematics (2004)  
 University of California, Berkeley (2002)  
 The University of Arizona, Theoretical Astrophysics (2002)  
 Northwestern University, Evanston IL, (2002)  
 The University of Arizona, Mathematics (2002)  
 Ohio State University, Columbus (2002)  
 The University of Arizona, Dept. Mathematics (2001)  
 University of Colorado, Boulder (2001)  
 Carnegie Institution of Washington, Washington DC (2001)  
 Planetary Science Institute, Tucson (2001)  
 National Optical Astronomy Observatories, Tucson (2000)  
 University of Michigan, Ann Arbor (1999)

The University of Arizona, Tucson (1999)  
 California Institute of Technology (1999)  
 University of Washington, Seattle (1997)  
 The University of Arizona, Tucson (1997)  
 Massachusetts Institute of Technology (1997)  
 Institute for Astronomy, Honolulu, HI (1996)  
 University of Colorado, Boulder (1996)  
 Lunar and Planetary Institute, Houston (1996)  
 University of Florida, Gainesville (1994)  
 Meudon Observatory, Meudon, France (1994)  
 Lunar and Planetary Institute, Houston (1994)  
 NASA-Ames Space Science Division, CA (1993)  
 Colorado State University, Fort Collins (1993)  
 Johnson Space Center, Houston, TX (1993)  
 SouthWest Research Institute, San Antonio (1993)  
 Institute for Theoretical Physics, UC-Santa Barbara (1992)  
 University of Illinois, Urbana-Champaign, IL (1992)  
 Lunar and Planetary Institute, Houston (1991)  
 University of Maryland, College Park (1991)  
 California Institute of Technology (1990)  
 California Institute of Technology (1989)  
 Cornell University, Ithaca (1989)  
 Cornell University, Ithaca (1988)

### TEACHING & MENTORING

PhD Dissertations:

*Youngmin JeongAhn* - Planetary Sciences, PhD 2015

(currently Postdoctoral Associate, IANCU, Taiwan)

*Kathryn Volk* - Planetary Sciences, PhD 2013

(currently Staff Scientist, U. Arizona)

*David A. Minton* - Planetary Sciences, PhD 2009

(currently Assistant Professor, Purdue University)

*Amaya Moro-Martin* - Astronomy, PhD 2004

(currently tenure-track Assistant Astronomer, Space Telescope Science Institute)

*Matthew Tiscareno* - Planetary Sciences, PhD 2004

(currently Senior Research Scientist, SETI Institute)

Post-docs

*Kathryn Volk*, 2015–2017

*Stephen Kortenkamp*, 2002-2004

*Joseph Hahn*, 1997-2000

Other

*Lei Lan* (visiting graduate student, from Tsinghua University, Beijing, China), 2017–2018

*Nathan Hendler* (Planetary Sciences, graduate student), 2017-2018

*Saverio Cambioni* (Planetary Sciences, graduate student), 2017-2018  
*Xianyu Wang* (visiting graduate student, from Tsinghua University, Beijing, China), 2015–2016  
*Sonia Cornejo* (Latin America Summer Program, undergraduate), 2016  
*Timothy Rodigas* (Astronomy, graduate student), 2012-2013  
*Sarah Morrison* (Planetary Sciences, graduate student), 2011-2014  
*Brenae Bailey* (Applied Mathematics, graduate student), 2007-2009  
*Takashi Ito*, 2004-2005  
*Tatiana Michtchenko*, 2002-2003

Graduate courses:

*Asteroids, Comets, Kuiper Belt Objects*: graduate elective in planetary science, 3 credit units, Fall 2011, Fall 2013, Fall 2014, Fall 2016, Fall 2018  
*Solar System Dynamics*: graduate elective in astronomy and planetary science, 3 credit units, Fall 2003, Fall 2005, Fall 2009, Spring 2014, Spring 2016, Spring 2018

Undergraduate courses:

*The Universe and Humanity*: general education–tier 1; 3 credit units, enrollment ~40; Spring 2017  
*Asteroids, Comets, Kuiper Belt Objects*: upper level undergraduate elective in planetary science, 3 credit units, enrollment ~5–10/semester; Fall 2011, Fall 2013, Fall 2014, Fall 2016  
*Our Golden Age of Planetary Exploration*: general education–tier II; 3 credit units, enrollment ~150/semester; Spring 2010  
*Planet Earth: Evolution of a Habitable World*: general education–tier I; 3 credit units, enrollment ~150/semester; Fall 2001, Spring 2002, Fall 2002, Spring 2004, Fall 2004, Spring 2006, Spring 2007, Spring 2008  
*New Views of the Solar System*: first year colloquium, 1 credit unit, enrollment ~15–20/semester; Spring 2005

NATIONAL/INTERNATIONAL SERVICE

Universities Space Research Association, Council of Institutions, Vice Chair (2018–)  
National Academy of Sciences – Stanley Miller Medal Selection Committee (2018)  
American Astronomical Society-Division for Dynamical Astronomy, Vera Rubin Prize Selection Committee, Chair (2018)  
American Astronomical Society-Division for Planetary Sciences, Prize Sub-Committee (2017)  
American Astronomical Society-Division for Dynamical Astronomy, Vera Rubin Prize Selection Committee (2017)  
American Astronomical Society-Division for Dynamical Astronomy, Awards Review Committee (2016)  
Morrison Planetarium of the California Academy of Sciences, Science Advisor (2015–2016)  
Celestial Mechanics Institute member (elected, 2014–)  
LSST–Science Advisory Committee (2014–)  
Harvard University – Ad Hoc Tenure Review Committee (2013)

Aspen Center for Physics, Winter Conference on Exoplanets in Multi-body Systems in the Kepler Era, Scientific Organizing Committee (2012-2013)  
 American Astronomical Society-Division for Planetary Sciences 2011 Scientific Organizing Committee (chair)  
 Kavli Prize nomination, 2009  
 International Astronomical Union – Commission 7 (elected member), 2006  
 NOAO Solar System Time Allocation Committee, 2006–2008  
 NASA Outer Planets Research Program Review Panel, 2006  
 IAU Symposium on Extrasolar Planets–2007, Suzhou, China: Scientific Organizing Committee, 2005–2007  
 Protostars & Planets V (International Conference in Hawaii in 2005, book 2006): Scientific Advisory Committee, 2002–2006  
 Interstellar Probe Science and Technology Definition Team, 1999–2004  
 LPSC Program Committee 1997–2000  
 NASA Origins of Solar Systems Research Program: Management Operations Working Group, 1998–2000  
 NASA Planetary Geophysics Research Program Review panel 1998–1999  
 Kuiper Belt Workshop, Toronto, 1996: co-organiser  
 Icy Galilean Satellites Conference, San Juan Capistrano, California: Scientific Organising Committee, 1994  
 LPSC Program Committee 1993–1994  
 Referee for 5–10 professional journal papers per year  
 Reviewer for 5–10 research grant proposals per year

#### UNIVERSITY/DEPARTMENT SERVICE

LPL Awards Committee, Chair, 2018-2019  
 Steward Observatory Faculty Status (Promotion & Tenure Review) Committee, 2018-2019  
 LPL Computer Committee, 2018-2019  
 LPL Red Team reviewer, 2018  
 UA–Reviewer for Packard Fellowship Proposals, 2018-2019  
 LPL Faculty Status (Promotion & Tenure Review) Committee, Chair, 2016–2018  
 UA–Henry Koffler Prize Selection Committee, Chair, 2017  
 LPL Professor of Practice – Promotion & Tenure ad hoc Review Committee, 2016–2017  
 LPL Awards Committee, 2016–2018  
 University Representative to USRA, 2011–present  
 Theoretical Astrophysics Program, Chair, 2011–2016  
 LPL Journal Club co-organizer, 2014-2015  
 College of Science Galileo Circle Fellows Selection Committee, 2014–2016  
 LPL Faculty Status (Promotion & Tenure Review) Committee, 2013–2015  
 Standing member of LPL Graduate Student Candidacy Examination Committees, 2012–2013  
 College of Science Honors Convocation, Keynote speaker, Fall 2012  
 Lunar and Planetary Laboratory–Strategic Planning Committee, 2012

Lunar and Planetary Laboratory–Director Search Committee, 2011  
 Lunar and Planetary Laboratory–Strategic Planning Committee, 2011  
 Lunar and Planetary Laboratory–Strategic Planning Committee, Chair, 2009  
 Academic Program Review of UA Astronomy Department, 2009  
 Lunar and Planetary Laboratory–Faculty Peer Review Committee, 2009  
 Lunar and Planetary Laboratory–Faculty Peer Review Committee, Chair, 2008  
 Lunar and Planetary Laboratory–Computer Committee, 2008, 2009  
 Lunar and Planetary Laboratory–Library Committee, Chair, 2008  
 Blitzler Award Committee, UA, 2006–2008  
 Theoretical Astrophysics Program Steering Committee, UA, 2005–present  
 UA–Templeton Steering Committee, UA, 2005–2008  
 Lunar and Planetary Laboratory–Promotion and Tenure Committee, 2005, 2006, 2007  
 Academic Program Review of UA Planetary Sciences Department, 2006  
 Review Committee for LPL–Director, UA, 2005  
 Astrobiology Faculty Search Committee, UA, 2005  
 Astrobiology Graduate Student Bessey Award Committee, UA, 2004–2007  
 Pre-tenure Advising & Review planning committee, LPL, 2003  
 Centennial Awards Committee, UA, 2002–2004  
 Representative to Oral Comprehensive Examinations for Doctoral Candidacy, 2002–2005  
 Graduate Admissions & Advising Committee, LPL 2001–2002  
 Lunar and Planetary Laboratory Action Plan Committee, 2000  
 Computer Resources Committee, LPL 2000  
 Theoretical Astrophysics Colloquium Organizer, 2000-2001

## PUBLIC OUTREACH

### *Workshops/Presentations:*

Radio interview with Michael S. Robinson on MicRobin Radio (AM970 in New York, New York), December 9, 2017  
 Prospects for Unseen Planets in the Distant Solar System, Huachuca Astronomy Club, August 11, 2017  
 The Search for Planet Nine, TEDx, Portland, OR, April 2017  
 The Structure and Evolution of the Solar System, Saddlebrooke SkyGazers Club, February 12, 2017  
 The Structure and Evolution of the Solar System, Sun City-Oro Valley, October 20 2016  
 Pluto Matters, Benjamin Dean lecture, Morrison Planetarium, May 9, 2016  
 Planet Migration, Other Earths dinner presentation, April 20, 2016  
 The Structure and Evolution of the Solar System, UA Osher Lifelong Learning Institute, March 18, 2016  
 Science Advisor for CalAcademy–Morrison Planetarium show, 2015-2016  
 Pluto and the Kuiper Belt, UA-Summer Science Saturday Lecture Series, July 18 2015.  
 The Structure and Evolution of the Solar System, UA Lifelong Learning Institute, Oct 01, 2014  
 Jury panel for “The Art of Planetary Science”, UA, Oct 2014

Tracking the Planets: Ours and Theirs, Girls Need Their Space, UA, March 29, 2014  
 Fractions for Planets, art exhibit for “The Art of Planetary Science”, UA, Oct 2013  
 The Early History of the Solar System, Biosphere 2, AZ, Oct 22, 2011  
 Migrating planets, East Valley Astronomy Club, Mesa, AZ, Nov 5, 2009  
 Migrating Planets, Arizona Senior Academy Village, October 01, 2009  
 Migrating planets, LPL Public Evening Lecture, Tucson, AZ, Sep 15, 2009  
 Panelist for “Expanding Your Horizons Youth Conference”, UA-WISE, Tucson, AZ, March 28, 2009  
 Balancing work and family, Girl Scout Troop 794, Tucson, AZ, Feb 22, 2009  
 Lessons from Pluto, Basis High School, Tucson, AZ, Oct 24, 2008  
 Optical Illusions, Science Night at Catalina Foothills School District, Tucson, AZ, Dec 1, 2007  
 Video program on the Late Heavy Bombardment, National Geographic, Nov 27, 2006  
 Workshop on Space Science for K-12 teachers in the Catalina Foothills School District, Tucson, AZ, July 25–28, 2005  
 Video program on the Solar System, Coast Learning Systems Astronomy Telecourse, September 21, 2004  
 Presentation and discussion on new discoveries in the Solar System, Science Teachers Workshop, Catalina Foothills School District, Tucson, AZ, June 2004

*Popular writing/press:*

“The Galaxy may be teeming with small planets”, Arizona Daily Star–Science Supplement, January 2016  
 “Exploring our solar system’s past through Pluto”, Arizona Science podcast, AZPM.org, December 2015  
 “Our wild wild solar system”, cover story in National Geographic magazine, July 2013  
 NASA Solar System Exploration portal profile, <http://solarsystem.nasa.gov/people>, July 2013  
 “What Would Happen If Earth and Mars Switched Places?”, Scientific American, blog by George Musser, June 2011  
*AstroConfidential* column, Astronomy magazine, June 2011  
 “Will Pluto ever collide with Neptune?”, Astronomy magazine, October 2007  
 “Planets and planetary systems”, *Scholastic Encyclopedia* (2005)  
 “Migrating Planets”, *Scientific American*, 281(3):56-63 (1999)  
 “Chaotic planet formation”, *Nature*, 402:599-600 (1999)  
 “Galileo reveals Ganymede’s secrets”, *Physics World*, March 1997  
 “Bringing Order to Chaos”, *Mercury*, 26(4):33-34 (1997)  
 “The Kuiper Belt: a review of the present status”, *Highlights of Astronomy*, 11A:223-228 (1998)  
 “The origin of the Solar system”, *Encyclopedia of Earth Sciences*, McMillan Publishing, New York(1995)  
 “Pluto and Charon: Planets on the edge”, *Lun. and Plan. Infm. Bull.*, August (1993)  
 & Numerous interviews with science journalists, on radio and in print and electronic media.