Katherine A. Rosenfeld

https://www.linkedin.com/in/krosenf/ | **katherine.rosenfeld@gatesfoundation.org**

Education

Harvard University — Cambridge, MA
Ph.D. in Astronomy & Astrophysics — Fall 2015
Harvard Merit Fellowship

Yale University — New Haven, CT
B.S. in Astronomy & Physics — 2010
Summa Cum Laude, Phi Beta Kappa, Robert C. Byrd Scholarship

Work Experience

Institute for Disease Modeling (Bill & Melinda Gates Foundation | Intellectual Ventures)
Research Scientist — 2019-Present

- Lead detailed modeling of disease transmission and analyses of public health data
- Informed key stakeholders for COVID-19, measles, and other vaccine preventable diseases
- Collaborated to build powerful software and tools to enable other researchers and decision makers
- Contributed to variety of teams across the organization from key strategy groups to fundamental research

MIT Lincoln Laboratory
Technical Staff in ISR Systems and Architectures Group — 2016-2019

- Built physics-based models of technologies for intelligence, surveillance, and reconnaissance
- Analyzed systems and solutions relevant for national defense
- Mentored college students on technical summer projects

Harvard-Smithsonian Center for Astrophysics
PhD Researcher for Multinational Event Horizon Telescope — 2014-2015

- Pioneered realistic simulations of interstellar scattering for images of black holes.
- Implemented multirate resampling algorithm for processing 200 TB of data using GPUs.

PhD Researcher in Interferometric Observations of Planet-Forming Disks — 2011-2014

- Published 5 first author and 8 co-author articles in peer-reviewed scientific journals
- Led one of first studies using data from multi-billion dollar ALMA observatory
- Leveraged Bayesian statistics to study structure of planet forming disks and evolution of stars
- Developed software using stochastic processes for optimization and radiative transfer

Teaching Experience

Harvard University
Teaching Fellow, General Astronomy and Stellar & Planetary Astronomy — 2011, 2013

- Conducted lab sessions with 5 students along with problem-solving sections for 10-30 students.
- Recognized with certificate of distinction for high performance ratings from students.

Skills and Interests

Computing: Python, Matlab, C/C++, CUDA, git, Mathematica*, Fortran 90*, MPI*, ParaView*, SolidWorks*

Publications

1. Kerr CC, Stuart RM, Mistry D, Abeysuriya RG, Hart G, Rosenfeld K. Covasim: an agent-based model of COVID-19 dynamics and interventions, 2020. DOI. 10(2020.05):10.20097469.
2. Panovska-Griffiths J, Swallow B, Hinch R, Cohen JA, Rosenfeld K, Stuart RM, et al. Statistical and agent-based modelling of the transmissibility of different SARS-CoV-2 variants in England and impact of different interventions. medRxiv. 2022;2021.12. 30.21267090.
3. Panovska-Griffiths J, Stuart R, Kerr C, Rosenfeld K, Mistry D, Waites W, et al. Modelling the impact of reopening schools in early 2021 in the presence of the new SARS-CoV-2 variant and with roll-out of vaccination against COVID-19. 2021;
4. Kerr CC, Stuart RM, Mistry D, Abeysuriya RG, Rosenfeld K, Hart GR, et al. Covasim: an agent-based model of COVID-19 dynamics and interventions. PLOS Computational Biology. 2021;17(7):e1009149.
5. Kerr CC, Mistry D, Stuart RM, Rosenfeld K, Hart GR, Núñez RC, et al. Controlling COVID-19 via test-trace-quarantine. Nature communications. 2021;12(1):1–12.
6. Cohen JA, Stuart RM, Rosenfeld K, Lyons H, White M, Kerr C, et al. Mechanistic modeling of SARS-CoV-2 immune memory, variants, and vaccines. 2021;
7. Cohen JA, Stuart RM, Rosenfeld K, Lyons H, White M, Kerr CC, et al. Quantifying the role of naturally-and vaccine-derived neutralizing antibodies as a correlate of protection against COVID-19 variants. medRxiv. 2021;
8. Stuart R, Kerr C, Rosenfeld K, Mistry D, Waites W, Klein D, et al. Modelling the impact of reopening schools in early 2021 in the presence of the new SARS-CoV-2 variant and with roll-out of vaccination against COVID-19. 2020;
9. Shea K, Borchering RK, Probert WJ, Howerton E, Bogich TL, Li S, et al. COVID-19 reopening strategies at the county level in the face of uncertainty: Multiple Models for Outbreak Decision Support. MedRxiv. 2020;
10. Kerr C, Rosenfeld K, Hagedorn B, Mistry D, Klein D. COVID-19 trends in Oregon: Preparing for opening up. Institute for Disease Modeling. 2020;
11. Benrimoh D, Tanguay-Sela M, Perlman K, Israel S, Mehltretter J, Armstrong C, et al. Using a Simulation Centre to Evaluate the Effect of anArtificial Intelligence-Powered Clinical Decision Support System for Depression Treatment on the Physician-Patient Interaction. Medrxiv. 2020;
12. Loomis RA, Oberg KI, Andrews SM, Walsh C, Czekala I, Huang J, et al. VISIBLE: VISIbility Based Line Extraction. Astrophysics Source Code Library. 2018;ascl: 1802.006.
13. Loomis RA, Öberg KI, Andrews SM, Walsh C, Czekala I, Huang J, et al. Detecting weak spectral lines in interferometric data through matched filtering. The Astronomical Journal. 2018;155(4):182.
14. Ortiz-León GN, Johnson MD, Doeleman SS, Blackburn L, Fish VL, Loinard L, et al. The intrinsic shape of Sagittarius A* at 3.5 mm wavelength. The Astrophysical Journal. 2016;824(1):40.
15. Fish VL, Johnson MD, Doeleman SS, Broderick AE, Psaltis D, Lu RS, et al. Persistent asymmetric structure of Sagittarius A* on event horizon scales. The Astrophysical Journal. 2016;820(2):90.

16. Fish VL, Johnson MD, Doeleman SS, Broderick AE, Psaltis D, Lu RS, et al. VizieR Online Data Catalog: 4yr 1.3 mm VLBI observations of SgrA* with EHT (Fish+, 2016). VizieR Online Data Catalog. 2016;J/ApJ/820/90.
17. Broderick AE, Fish VL, Johnson MD, Rosenfeld K, Wang C, Doeleman SS, et al. Modeling seven years of Event Horizon Telescope observations with radiatively inefficient accretion flow models. The Astrophysical Journal. 2016;820(2):137.
18. Rapson VA, Sargent B, Sacco GG, Kastner JH, Wilner D, Rosenfeld K, et al. A combined Spitzer and Herschel infrared study of gas and dust in the circumbinary disk orbiting V4046 Sgr. The Astrophysical Journal. 2015;810(1):62.
19. Johnson MD, Fish VL, Doeleman SS, Marrone DP, Plambeck RL, Wardle JF, et al. Resolved magnetic-field structure and variability near the event horizon of Sagittarius A. Science. 2015;350(6265):1242–5.
20. Flaherty KM, Hughes AM, Rosenfeld KA, Andrews SM, Chiang E, Simon JB, et al. Weak turbulence in the HD 163296 protoplanetary disk revealed by ALMA CO observations. The Astrophysical Journal. 2015;813(2):99.
21. Rosenfeld KA, Chiang E, Andrews SM. Fast radial flows in transition disk holes. The Astrophysical Journal. 2014;782(2):62.
22. Andrews SM, Chandler CJ, Isella A, Birnstiel T, Rosenfeld KA, Wilner DJ, et al. Resolved multifrequency radio observations of GG Tau. The Astrophysical Journal. 2014;787(2):148.
23. Rosenfeld KA, Andrews SM, Wilner DJ, Kastner JH, McClure MK. The structure of the evolved circumbinary disk around V4046 Sgr. The Astrophysical Journal. 2013;775(2):136.
24. Rosenfeld KA, Andrews SM, Hughes AM, Wilner DJ, Qi C. A spatially resolved vertical temperature gradient in the HD 163296 disk. The Astrophysical Journal. 2013;774(1):16.
25. Qi C, Öberg KI, Wilner DJ, Rosenfeld KA. First detection of c-C3H2 in a circumstellar disk. The Astrophysical Journal Letters. 2013;765(1):L14.
26. Isella A, Pérez LM, Carpenter JM, Ricci L, Andrews S, Rosenfeld K. An azimuthal asymmetry in the LkHα 330 disk. The Astrophysical Journal. 2013;775(1):30.
27. Isella A, Andrews SM, Carpenter JM, Perez LM, Rosenfeld K, Ricci L. The Signature of Young Planetary Systems in Circumstellar Disks. In: American Astronomical Society Meeting Abstracts# 221. 2013. p. 144.17.
28. Chunhua Q, Wilner DJ, Rosenfeld KA, Oeberg KI. FIRST DETECTION OF cC {sub 3} H {sub 2} IN A CIRCUMSTELLAR DISK. Astrophysical Journal Letters. 2013;765(1).
29. Andrews SM, Rosenfeld KA, Kraus AL, Wilner DJ. The mass dependence between protoplanetary disks and their stellar hosts. The Astrophysical Journal. 2013;771(2):129.
30. Rosenfeld KA, Qi C, Andrews SM, Wilner DJ, Corder SA, Dullemond CP, et al. Kinematics of the CO Gas in the Inner Regions of the TW Hya Disk. The Astrophysical Journal. 2012;757(2):129.
31. Rosenfeld KA, Andrews SM, Wilner DJ, Stempels HC. A disk-based dynamical mass estimate for the young binary V4046 Sgr. The Astrophysical Journal. 2012;759(2):119.
32. MacGregor MA, Wilner DJ, Rosenfeld KA, Andrews SM, Matthews B, Hughes AM, et al. Millimeter emission structure in the first ALMA image of the AU Mic debris disk. The Astrophysical Journal Letters. 2012;762(2):L21.

33. Brown JM, Rosenfeld KA, Andrews SM, Wilner DJ, van Dishoeck EF. Matryoshka holes: Nested emission rings in the transitional disk Oph IRS 48. The Astrophysical Journal Letters. 2012;758(2):L30.
34. Brown J, Herczeg G, Andrews S, van Dishoeck E, Wilner D, Rosenfeld K, et al. Dust and Gas Depletion in the Disk around Herbig Ae Star Oph IRS 48. In: American Astronomical Society Meeting Abstracts# 220. 2012. p. 506.01.
35. Sanders N, Newton ER, Czekala I, Rosenfeld K, Dressing CD, Gifford D, et al. Astrobites: The Astro-ph Reader's Digest For Undergraduates. In: American Astronomical Society Meeting Abstracts# 218. 2011. p. 333.11.
36. Bouland A, Easther R, Rosenfeld K. InterpMC: Caching and Interpolated Likelihoods-Accelerating Cosmological Monte Carlo Markov Chains. Astrophysics Source Code Library. 2011;ascl: 1101.004.
37. Bouland A, Easther R, Rosenfeld K. Caching and interpolated likelihoods: accelerating cosmological Monte Carlo Markov chains. Journal of Cosmology and Astroparticle Physics. 2011;2011(05):016.
38. Andrews SM, Wilner DJ, Hughes AM, Qi C, Rosenfeld KA, Öberg KI, et al. The TW Hya disk at 870 μm: comparison of CO and dust radial structures. The Astrophysical Journal. 2011;744(2):162.
39. Andrews SM, Wilner DJ, Hughes AM, Qi C, Rosenfeld KA, Oberg KI, et al. The TW Hya Disk at 870 microns: Comparison of CO and Dust Radial Structures. arXiv preprint arXiv:11115037. 2011;
40. Andrews SM, Rosenfeld KA, Wilner DJ, Bremer M. A Closer Look at the LkCa 15 Protoplanetary Disk. The Astrophysical Journal Letters. 2011;742(1):L5.