

Katherine A. Rosenfeld

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Education

Harvard University
Ph.D. in Astronomy & Astrophysics
Harvard Merit Fellowship

Cambridge, MA
Fall 2015

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

New Haven, CT
2010

Work Experience

Institute for Disease Modeling (Bill & Melinda Gates Foundation | Intellectual Ventures)
Senior Research Scientist (2023-Present) | Research Scientist (2019-2023)

2019-Present

- Lead detailed modeling of disease transmission and analyses of public health data for strategic decisions
- Informed key stakeholders for COVID-19, measles, and other vaccine preventable diseases
- Collaborated to build software and tools, including AI, 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 a certificate of distinction for high performance ratings from students.

Skills and Interests

Research: 25 h-index

Computing: Python, Matlab, C/C++, CUDA, git

Recent Software Projects

1. Laser-measles (<https://github.com/InstituteforDiseaseModeling/laser-measles>)
Agent based simulation of measles transmission written in python
2. mcp-pack (<https://github.com/krosenfeld-IDM/mcp-pack>)
MCP for creating and managing documentation databases from GitHub repositories
3. AIMigrate (<https://github.com/starsimhub/aimigrate>)
Help migrate code to maintain compatibility when one of your dependency packages changes

Publications

1. Seelinger, L.; Reinarz, A.; Lykkegaard, M. B.; Akers, R.; Alghamdi, A. M.; Aristoff, D.; Bangerth, W.; Bénézech, J.; Diez, M.; Frey, K.; others. Democratizing Uncertainty Quantification. *Journal of Computational Physics* **2025**, 521, 113542.
2. Rosenfeld, K. A.; Kerr, C. C.; Lundin, J. What a Diff Makes: Automating Code Migration with Large Language Models. arXiv October 31, 2025. <https://doi.org/10.48550/arXiv.2511.00160>.
3. Thakkar, N.; Jindal, S.; Rosenfeld, K. Seasonality and Susceptibility from Measles Time Series. *arXiv preprint arXiv:2405.09664* **2024**.
4. Rosenfeld, K. A.; Sonnewald, M.; Jindal, S. J.; McCarthy, K. A.; Proctor, J. L. Building Understandable Messaging for Policy and Evidence Review (BUMPER) with AI. *arXiv preprint arXiv:2407.12812* **2024**.
5. Rosenfeld, K. A.; Frey, K.; McCarthy, K. A. Optimal Timing Regularly Outperforms Higher Coverage in Preventative Measles Supplementary Immunization Campaigns. *Vaccines* **2024**, 12 (7), 820.
6. Shea, K.; Borchering, R. K.; Probert, W. J.; Howerton, E.; Bogich, T. L.; Li, S.-L.; van Panhuis, W. G.; Viboud, C.; Aguás, R.; Belov, A. A.; others. Multiple Models for Outbreak Decision Support in the Face of Uncertainty. *Proceedings of the National Academy of Sciences* **2023**, 120 (18), e2207537120.
7. Panovska-Griffiths, J.; Swallow, B.; Hinch, R.; Cohen, J.; Rosenfeld, K.; Stuart, R. M.; Ferretti, L.; Di Lauro, F.; Wymant, C.; Izzo, A.; others. Statistical and Agent-Based Modelling of the Transmissibility of Different SARS-CoV-2 Variants in England and Impact of Different Interventions. *Philosophical Transactions of the Royal Society A* **2022**, 380 (2233), 20210315.
8. Panovska-Griffiths, J.; Stuart, R.; Kerr, C.; Rosenfeld, K.; Mistry, D.; Waites, W.; Klein, D.; Bonell, C.; Viner, R. 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**.
9. Kerr, C. C.; Stuart, R. M.; Mistry, D.; Abey Suriya, R. G.; Rosenfeld, K.; Hart, G. R.; Núñez, R. C.; Cohen, J. A.; Selvaraj, P.; Hagedorn, B.; others. Covasim: An Agent-Based Model of COVID-19 Dynamics and Interventions. *PLOS Computational Biology* **2021**, 17 (7), e1009149.
10. Kerr, C. C.; Mistry, D.; Stuart, R. M.; Rosenfeld, K.; Hart, G. R.; Núñez, R. C.; Cohen, J. A.; Selvaraj, P.; Abey Suriya, R. G.; Jastrzębski, M.; others. Controlling COVID-19 via Test-Trace-Quarantine. *Nature communications* **2021**, 12 (1), 2993.
11. Cohen, J. A.; Stuart, R. M.; Rosenfeld, K.; Lyons, H.; White, M.; Kerr, C. C.; Klein, D. J.; Famulare, M. Quantifying the Role of Naturally-and Vaccine-Derived Neutralizing Antibodies as a Correlate of Protection against COVID-19 Variants. **2021**.

12. Stuart, R.; Kerr, C.; Rosenfeld, K.; Mistry, D.; Waites, W.; Klein, D.; Bonell, C.; Viner, R. 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**.
13. Shea, K.; Borchering, R. K.; Probert, W. J.; Howerton, E.; Bogich, T. L.; Li, S.; van Panhuis, W. G.; Viboud, C.; Aguás, R.; Belov, A.; others. COVID-19 Reopening Strategies at the County Level in the Face of Uncertainty: Multiple Models for Outbreak Decision Support. *Medrxiv* **2020**.
14. Kerr, C.; Rosenfeld, K.; Hagedorn, B.; Mistry, D.; Klein, D. COVID-19 Trends in Oregon: Preparing for Opening Up. *Institute for Disease Modeling* **2020**.
15. Benrimoh, D.; Tanguay-Sela, M.; Perlman, K.; Israel, S.; Mehlretter, J.; Armstrong, C.; Fratila, R.; Parikh, S. V.; Karp, J. F.; Heller, K.; others. Using a Simulation Centre to Evaluate the Effect of an Artificial Intelligence-Powered Clinical Decision Support System for Depression Treatment on the Physician-Patient Interaction. *Medrxiv* **2020**, 2020–03.
16. Loomis, R. A.; Oberg, K. I.; Andrews, S. M.; Walsh, C.; Czekala, I.; Huang, J.; Rosenfeld, K. A. VISIBLE: VISibility Based Line Extraction. *Astrophysics Source Code Library* **2018**, ascl-1802.
17. Loomis, R. A.; Öberg, K. I.; Andrews, S. M.; Walsh, C.; Czekala, I.; Huang, J.; Rosenfeld, K. A. Detecting Weak Spectral Lines in Interferometric Data through Matched Filtering. *The Astronomical Journal* **2018**, 155 (4), 182.
18. Rosenfeld, K. Applications of High-Resolution Observations at Millimeter Wavelengths. *Ph. D. Thesis* **2016**.
19. Ortiz-León, G. N.; Johnson, M. D.; Doeleman, S. S.; Blackburn, L.; Fish, V. L.; Loinard, L.; Reid, M. J.; Castillo, E.; Chael, A. A.; Hernández-Gómez, A.; others. The Intrinsic Shape of Sagittarius A* at 3.5 Mm Wavelength. *The Astrophysical Journal* **2016**, 824 (1), 40.
20. Fish, V.; Johnson, M.; Doeleman, S.; Broderick, A.; Psaltis, D.; Lu, R.-S.; Akiyama, K.; Alef, W.; Algaba, J.; Asada, K.; others. VizieR Online Data Catalog: 4yr 1.3 Mm VLBI Observations of SgrA* with EHT (Fish+, 2016). *VizieR Online Data Catalog* **2016**, 182, J-ApJ.
21. Fish, V.; Johnson, M.; Doeleman, S.; Broderick, A.; Psaltis, D.; Lu, R.-S.; Akiyama, K.; Alef, W.; Algaba, J.; Asada, K.; others. 4yr 1.3 Mm VLBI Observations of SgrA* with EHT. *(No Title)* **2016**.
22. Fish, V. L.; Johnson, M. D.; Doeleman, S. S.; Broderick, A. E.; Psaltis, D.; Lu, R.-S.; Akiyama, K.; Alef, W.; Algaba, J. C.; Asada, K.; others. Persistent Asymmetric Structure of Sagittarius A* on Event Horizon Scales. *The Astrophysical Journal* **2016**, 820 (2), 90.
23. Broderick, A. E.; Fish, V. L.; Johnson, M. D.; Rosenfeld, K.; Wang, C.; Doeleman, S. S.; Akiyama, K.; Johannsen, T.; Roy, A. L. Modeling Seven Years of Event Horizon Telescope Observations with Radiatively Inefficient Accretion Flow Models. *The Astrophysical Journal* **2016**, 820 (2), 137.
24. Rapson, V. A.; Sargent, B.; Sacco, G. G.; Kastner, J. H.; Wilner, D.; Rosenfeld, K.; Andrews, S.; Herczeg, G.; Van Der Marel, N. 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.

25. Johnson, M. D.; Fish, V. L.; Doeleman, S. S.; Marrone, D. P.; Plambeck, R. L.; Wardle, J. F.; Akiyama, K.; Asada, K.; Beaudoin, C.; Blackburn, L.; others. Resolved Magnetic-Field Structure and Variability near the Event Horizon of Sagittarius A. *Science* **2015**, 350 (6265), 1242–1245.
26. Flaherty, K. M.; Hughes, A. M.; Rosenfeld, K. A.; Andrews, S. M.; Chiang, E.; Simon, J. B.; Kerzner, S.; Wilner, D. J. Weak Turbulence in the HD 163296 Protoplanetary Disk Revealed by ALMA CO Observations. *The astrophysical journal* **2015**, 813 (2), 99.
27. Rosenfeld, K. A.; Chiang, E.; Andrews, S. M. Fast Radial Flows in Transition Disk Holes. *The Astrophysical Journal* **2014**, 782 (2), 62.
28. Andrews, S. M.; Chandler, C. J.; Isella, A.; Birnstiel, T.; Rosenfeld, K. A.; Wilner, D. J.; Perez, L. M.; Ricci, L.; Carpenter, J. M.; Calvet, N.; others. Resolved Multifrequency Radio Observations of GG Tau. *The Astrophysical Journal* **2014**, 787 (2), 148.
29. Rosenfeld, K. A.; Andrews, S. M.; Wilner, D. J.; Kastner, J.; McClure, M. The Structure of the Evolved Circumbinary Disk around V4046 Sgr. *The Astrophysical Journal* **2013**, 775 (2), 136.
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31. Qi, C.; Öberg, K. I.; Wilner, D. J.; Rosenfeld, K. A. First Detection of C-C₃H₂ in a Circumstellar Disk. *The Astrophysical Journal Letters* **2013**, 765 (1), L14.
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33. Isella, A.; Andrews, S.; Carpenter, J.; Perez, L.; Rosenfeld, K.; Ricci, L. The Signature of Young Planetary Systems in Circumstellar Disks. In *American Astronomical Society Meeting Abstracts# 221*; 2013; Vol. 221, pp 144–17.
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35. Andrews, S. M.; Rosenfeld, K. A.; Kraus, A. L.; Wilner, D. J. The Mass Dependence between Protoplanetary Disks and Their Stellar Hosts. *The Astrophysical Journal* **2013**, 771 (2), 129.
36. Rosenfeld, K. A.; Qi, C.; Andrews, S. M.; Wilner, D. J.; Corder, S. A.; Dullemond, C.; Lin, S.-Y.; Hughes, A.; D'Alessio, P.; Ho, P. Kinematics of the CO Gas in the Inner Regions of the TW Hya Disk. *The Astrophysical Journal* **2012**, 757 (2), 129.
37. Rosenfeld, K. A.; Andrews, S. M.; Wilner, D. J.; Stempels, H. A Disk-Based Dynamical Mass Estimate for the Young Binary V4046 Sgr. *The Astrophysical Journal* **2012**, 759 (2), 119.
38. MacGregor, M. A.; Wilner, D. J.; Rosenfeld, K. A.; Andrews, S. M.; Matthews, B.; Hughes, A. M.; Booth, M.; Chiang, E.; Graham, J. R.; Kalas, P.; others. Millimeter Emission Structure in the First ALMA Image of the AU Mic Debris Disk. *The Astrophysical Journal Letters* **2012**, 762 (2), L21.
39. Brown, J. M.; Rosenfeld, K. A.; Andrews, S. M.; Wilner, D. J.; van Dishoeck, E. F. Matryoshka Holes: Nested Emission Rings in the Transitional Disk Oph IRS 48. *The Astrophysical Journal Letters* **2012**, 758 (2), L30.

40. Brown, J.; Herczeg, G.; Andrews, S.; van Dishoeck, E.; Wilner, D.; Rosenfeld, K.; Pontoppidan, K. Dust and Gas Depletion in the Disk around Herbig Ae Star Oph IRS 48. In *American Astronomical Society Meeting Abstracts# 220*; 2012; Vol. 220, pp 506–01.
41. Sanders, N.; Newton, E.; Czekala, I.; Rosenfeld, K.; Dressing, C.; Gifford, D.; Suresh, J.; Schneider, E.; Morley, C.; Kohler, S. Astrobites: The Astro-Ph Reader's Digest For Undergraduates. In *American Astronomical Society Meeting Abstracts# 218*; 2011; Vol. 218, pp 333–11.
42. Bouland, A.; Easter, R.; Rosenfeld, K. InterPMC: Caching and Interpolated Likelihoods-Accelerating Cosmological Monte Carlo Markov Chains. *Astrophysics Source Code Library* **2011**, ascl-1101.
43. Bouland, A.; Easter, R.; Rosenfeld, K. Caching and Interpolated Likelihoods: Accelerating Cosmological Monte Carlo Markov Chains. *Journal of Cosmology and Astroparticle Physics* **2011**, 2011 (05), 016.
44. Andrews, S. M.; Wilner, D. J.; Hughes, A.; Qi, C.; Rosenfeld, K. A.; Öberg, K. I.; Birnstiel, T.; Espaillat, C.; Cieza, L. A.; Williams, J. P.; others. The TW Hya Disk at 870 Mm: Comparison of CO and Dust Radial Structures. *The Astrophysical Journal* **2011**, 744 (2), 162.
45. Andrews, S. M.; Rosenfeld, K. A.; Wilner, D. J.; Bremer, M. A Closer Look at the Lkca 15 Protoplanetary Disk. *The Astrophysical Journal Letters* **2011**, 742 (1), L5.
46. Kerr, C.; Stuart, R.; Mistry, D.; Abeysuriya, R.; Hart, G.; Rosenfeld, K.; Selvaraj, P.; Nunez, R.; Hagedorn, B.; George, L.; others. Covasim: An Agent-Based Model of COVID-19 Dynamics and Interventions, 2020. *DOI 10* (2020.05), 10–20097469.