

# IRA WOLFSON

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Braude Academic College of Engineering  
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## EDUCATION

### Ph.D. in Physics (Cosmology)

Ben-Gurion University of the Negev, Israel, 2015-2019  
Advisor: Prof. Ram Brustein  
*Dissertation: Numerical Analysis of the Primordial Power Spectrum for Inflationary Potentials*

## CURRENT POSITION

### Senior Lecturer

Department of Electrical Engineering  
Braude Academic College of Engineering, Karmiel, Israel  
Teaching: Electromagnetic Fields, Transmission Lines, MATLAB Programming

## PREVIOUS POSITIONS

### Postdoctoral Research Associate

International School for Advanced Studies (SISSA), Trieste, Italy  
2020-2022 | Supervisor: Prof. Roberto Trotta  
*Focus: Data Science, Machine Learning applications in Cosmology*

### Postdoctoral Research Fellow

Max Planck Institute for Astrophysics, Garching, Germany  
*Collaborations with Prof. Eiichiro Komatsu on axion-SU(2) inflation models*

## RESEARCH INTERESTS

- Theoretical Physics: Thermodynamics, Statistical Mechanics, Foundations of Physics
- Cosmology: Inflationary models, CMB observables, gravitational waves
- Philosophy of Science: Bayesian epistemology, demarcation criteria, AI ethics
- Computational Methods: High-dimensional Bayesian evidence calculation, GPU-accelerated algorithms
- Interdisciplinary Research: Neuroscience, Physics Education

## PUBLICATIONS

### Peer-Reviewed Journal Articles

1. Wolfson, I. (2026). *Informed consent for AI consciousness research: a Talmudic framework for graduated protections*. *AI and Ethics*, 6(1), 20.

- 2. Ben Abu, Y., & Wolfson, I.** (2024). *Short-term plasticity as 'energetic memory' of ion channel components of action potential*. Royal Society Open Science, 11(6), 231420.
- 3. Wolfson, I.** (2022). *Analytic correlation of inflationary potential to power spectrum shape: limits of validity, and 'no-go' for small field model analytics*. Journal of Cosmology and Astroparticle Physics, 2022(01), 036.
- 4. Wolfson, I., Maleknejad, A., Murata, T., Komatsu, E., & Kobayashi, T.** (2021). *The isotropic attractor solution of axion-SU(2) inflation: universal isotropization in Bianchi type-I geometry*. Journal of Cosmology and Astroparticle Physics, 2021(09), 031.
- 5. Wolfson, I., Maleknejad, A., & Komatsu, E.** (2020). *How attractive is the isotropic attractor solution of axion-SU(2) inflation?* Journal of Cosmology and Astroparticle Physics, 2020(09), 047.
- 6. Wolfson, I., & Brustein, R.** (2019). *Small field models of inflation that predict a tensor-to-scalar ratio r=0.03*. Physical Review D, 100(4), 043522.
- 7. Wolfson, I., & Brustein, R.** (2019). *Likelihood analysis of small field polynomial models of inflation yielding a high Tensor-to-Scalar ratio*. PLoS One, 14(4), e0215287.
- 8. Ben-Dayan, I., Keating, B., Leon, D., & Wolfson, I.** (2019). *Constraints on scalar and tensor spectra from N\_eff*. Journal of Cosmology and Astroparticle Physics, 2019(06), 007.
- 9. Ben-Abu, Y., Yizhaq, H., Eshach, H., & Wolfson, I.** (2019). *Interweaving the numerical kinematic symmetry principles in school and introductory university physics courses*. Symmetry, 11(2), 148.
- 10. Wolfson, I., Schramm, N.R., Biton, Y.Y., & Ben-Abu, Y.** (2019). *The rain stick, a simple model for the dynamics of particles passing obstacles in a gravitational field*. Physica A: Statistical Mechanics and its Applications, 528, 121473.
- 11. Wolfson, I., & Brustein, R.** (2018). *Small field models with gravitational wave signature supported by CMB data*. PLoS One, 13(5), e0197735.
- 12. Ben-Abu, Y., Wolfson, I., Eshach, H., & Yizhaq, H.** (2018). *Energy, Christiaan Huygens, and the wonderful cycloid—theory versus experiment*. Symmetry, 10(4), 111.
- 13. Ben-Abu, Y., Wolfson, I., & Yizhaq, H.** (2018). *Finding the speed of a bicycle in circular motion by measuring the lean angle of the bicycle*. Physics Education, 53(3), 035004.
- 14. Abu, Y.B., Wolfson, I., Bran, G., & Yizhaq, H.** (2017). *Downhill cycling symmetry breaking: how the rider foils experiment*. Physics Education, 52(6), 065005.

## Preprints & Working Papers

- 15. Wolfson, I.** (2026). *SunBURST: Deterministic GPU-Accelerated Bayesian Evidence via Mode-Centric Laplace Integration*. arXiv:2601.19957.
- 16. Wolfson, I.** (2025). *The Geometric Origin of Time's Arrow: Loschmidt Resolved*. arXiv:2511.03843.
- 17. Wolfson, I.** (2023). *Suffering Toasters—A New Self-Awareness Test for AI*. arXiv:2306.17258.

**18.** **Wolfson, I., Kumar, U., Ben-Dayan, I., & Brustein, R.** (2022). *Small Field models with ACTPol and BICEP3 data—Likelihood analysis*. arXiv:2207.03150.

**19.** **Wolfson, I.** (2021). *Numerical analysis of the Primordial Power Spectrum for inflationary potentials*. arXiv:2103.16594.

## Software & Code

**20.** **Wolfson, I.** (2026). *SunBURST: GPU-accelerated Bayesian evidence calculation framework*. Available at [irawolfson.com/sunburst](http://irawolfson.com/sunburst)

**21.** **Wolfson, I.** (2022). *INSANE: INflationary potential Simulator and ANalysis Engine*. Astrophysics Source Code Library, ascl:2202.

## Manuscripts Under Review

**22.** **Wolfson, I.** Knowledge and Morality Without Certainty: A Bayesian Framework. *Under review at Episteme*.

**23.** **Wolfson, I.** Abortion Ethics: A Bayesian Framework for Graduated Moral Status. *Under review at Journal of Bioethical Inquiry*.

**24.** **Wolfson, I.** The Geometric Origin of Time's Arrow: Loschmidt Resolved. *Under review at Physical Review E*.

**25.** **Wolfson, I.** Relativistic Thermodynamics and Black Hole Entropy. *Under review at Physical Review D*.

**26.** **Wolfson, I.** Rational Polarization in the Age of Information Overload. *Under review at Social Epistemology*.

**27.** **Wolfson, I.** SunBURST: Deterministic GPU-Accelerated Bayesian Evidence via Mode-Centric Laplace Integration. *Under review at Monthly Notices of the Royal Astronomical Society*.

## TEACHING EXPERIENCE

### Braude Academic College of Engineering (Current)

- Electromagnetic Fields and Waves
  - Transmission Lines Theory
  - MATLAB Programming for Engineers
- Teaching Load: 12 hours per week

## TECHNICAL SKILLS

- Programming Languages: Python, MATLAB, C++, JavaScript, Fortran
- Computational Tools: GPU computing (CUDA), NumPy, SciPy, TensorFlow
- Numerical Methods: Bayesian inference, Monte Carlo simulations, optimization algorithms
- Data Analysis: Machine learning, statistical analysis, high-dimensional data processing

## **PROFESSIONAL SERVICE**

- Peer Review: Multiple journals including JCAP, Physical Review, AI & Ethics
- Conference Participation: Regular presenter at physics and cosmology conferences

## **LANGUAGES**

- Hebrew (Native)
- English (Native)

## **REFERENCES**

Available upon request

*Last Updated: February 2026*