# John Kehayias

PHYSICIST · WRITER · PROGRAMMER
LECTURER IN CRITICAL WRITING · UNIVERSITY OF PENNSYLVANIA

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## Education

### University of California, Santa Cruz

PHD, MS IN PHYSICS                                                                                          *2006 — 2011*

- **Advisers**: Michael Dine and Stefano Profumo
- **Dissertation topic**: Discrete $R$-symmetries in supersymmetric theories
- **Research areas**: theoretical particle physics including phenomenology (BSM) and supersymmetric theories, astrophysics, cosmology, and gravity
- Taught introductory lab sections and upper division discussion sections, graded, gave written evaluations, and held office hours. Assisted with the particle physics lab section of COSMOS at UCSC for high school students.

### Columbia University

BA                                                                                                          *2003 — 2006*

**Majors**: Physics and Mathematics

## Experience

### Lecturer in Critical Writing                                                        *University of Pennsylvania*

CRITICAL WRITING PROGRAM                                                                         *August 2017 — Present*

- Teach undergraduate critical writing seminars (maximum 16 students) focusing on academic, professional, and public writing, often based in the sciences.
- Meet with students individually, hold office hours, provide extensive oral and written feedback to develop reading, writing, and research skills.
- Courses include "Science & Politics," "Physics of Everyday Life," "Policing Social Media and Its Impacts," "Everyday Quantum Physics," and a Penn Global Seminar, "Scientific Nationalism in Japan" (Spring 2020, 2022, 2024), with travel to Japan (travel canceled due to COVID-19 pandemic in 2020; travel to New York and Hawaii in 2022).
- The Critical Writing Program was awarded a Writing Program Certificate of Excellence by the Conference on College Composition & Communication in 2018.

### Freelance Data Scientist/Programmer                                          *Remote, approx. 5-10 hrs/week*

TENOR, MOSEY                                                                                                *2017, 2022*

- Researched and developed search and categorization algorithms for Tenor using Machine Learning techniques, `node2vec`, `word2vec`, and hierarchical representations.
- Implemented state business requirements and backend workflow automation for Mosey with Python and Playwright.

### Postdoctoral Scholar                                                                  *Vanderbilt University*

DEPARTMENT OF PHYSICS & ASTRONOMY                                                               *Oct. 2014 — Oct. 2016*

Research in theoretical particle physics (BSM), phenomenology, cosmology, and astrophysics. Published papers in leading high impact factor physics journals and presented at conferences. Served as a referee for papers on related topics.

### Postdoctoral Research Fellow                                                      *The University of Tokyo*

KAVLI INSTITUTE FOR THE PHYSICS AND MATHEMATICS OF THE UNIVERSE                                 *Sept. 2011 — Sept. 2014*

Research in high-energy/particle physics (BSM), phenomenology, gravity, and astrophysics. Published papers in leading high impact factor physics journals and presented at international and domestic conferences. Served as a referee for papers on related topics.

## Technical Skills

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|---|---|
| **Programming** | Python, C/C++, Common Lisp, Guile Scheme, Git, shell scripting (Bash), LaTeX |
| **Open Source Contributions** | GNU Guix (operating system/distribution of Linux and package manager): contributor with commit access since December 2022; developer/maintainer for Nonguix (non-free Guix channel); various bug reports, fixes, and testing for free software projects |
| **Physics/Math Software** | Wolfram Mathematica, ROOT, gnuplot |
| **Other Applications** | Linux and web server administration; common word processing, spreadsheet, and presentation software; photo editing and post processing with Adobe Lightroom and Photoshop, Darktable |

## Writing

**Freelance Writing** <span style="float:right">*Various Venues*</span>

<div align="right">*2017 - Present*</div>

Pitch, research, and write pieces for *Wired*, *Vice*, *The Chronicle of Higher Education*, and other venues. See Publications section for individual pieces.

**Boiling Steam**

Writer and Editor <span style="float:right">*2020–Present*</span>

Write and edit articles about Linux gaming, all articles available at boilingsteam.com.

## Publications

### Public Writing

**The Filesystem Hierarchy Standard Comes to Guix Containers**

J. Kehayias

*GNU Guix Blog*, url: `https://guix.gnu.org/en/blog/2023/the-filesystem-hierarchy-standard-comes-to-guix-containers/`, 2023

**Meet the Self-Hosters, Taking Back the Internet One Server at a Time**

J. Kehayias

*Vice Motherboard*, url: `https://www.vice.com/en/article/pkb4ng/meet-the-self-hosters-taking-back-the-internet-one-server-at-a-time`, 2021

**Games Don't Just Let You Escape. They Also Help You Remember**

J. Kehayias

*Wired*, url: `https://www.wired.com/story/games-dont-just-let-you-escape-they-also-help-you-remember/`, 2021

**Death by 1,000 Tabs: Confessions of a Tab Hoarder**

J. Kehayias

*Vice Motherboard*, url: `https://www.vice.com/en/article/88adya/death-by-1000-tabs-confessions-of-a-tab-hoarder`, 2021

**The Worst F-Word**

J. Kehayias

*The Chronicle of Higher Education*, url: `https://www.chronicle.com/article/the-worst-f-word/`, 2017

### Journal Articles

**Neighborhood Writing: Developing Drop-In Writing Consultations in Philadelphia Public Libraries**

D. M. Walker, P. Manning, J. Kehayias

*Community Literacy Journal* 15 (2021) Iss. 1, Article 12. 2021

**New generic evolution for $k$-essence dark energy with $w \approx -1$**

J. Kehayias, R. J. Scherrer

*Phys. Rev.* D100.2 (2019) p. 023525. 2019. arXiv: `1905.05628` (gr-qc)

**Oscillating and Static Universes from a Single Barotropic Fluid**

J. Kehayias, R. J. Scherrer

*JCAP* 1512.12 (2015) p. 015. 2015. arXiv: `1509.08915` (hep-th)

**The Excess Radio Background and Fast Radio Transients**

J. Kehayias, T. W. Kephart, T. J. Weiler

*JCAP* 2015.10 (2015) p. 053. 2015. arXiv: `1509.00011` (astro-ph.CO)

**Chaotic Inflation from Nonlinear Sigma Models in Supergravity**

S. Hellerman, J. Kehayias, T. T. Yanagida

*Phys.Lett.* B742 (2015) pp. 390–393. 2015. arXiv: `1411.3720` (hep-ph)

**A keV String Axion from High Scale Supersymmetry**

B. Henning, J. Kehayias, H. Murayama, D. Pinner, T. T. Yanagida

*Phys.Rev.* D91.4 (2015) p. 045036. 2015. arXiv: `1408.0286` (hep-ph)

**Emergent Lorentz Signature, Fermions, and the Standard Model**

J. Kehayias, S. Mukohyama, J.-P. Uzan

*Phys.Rev.* D89 (2014) p. 105017. 2014. arXiv: `1403.0580` (hep-th)

**Charge Quantization and the Standard Model from the $\mathbb{CP}^2$ and $\mathbb{CP}^3$ Nonlinear $\sigma$-Models**

S. Hellerman, J. Kehayias, T. T. Yanagida

*Physics Letters B* 731 (2014) pp. 148–153. 2014. arXiv: `1312.6889` (hep-th)

**Charge Quantization in the $\mathbb{CP}(1)$ Nonlinear Sigma-Model**

S. Hellerman, J. Kehayias, T. T. Yanagida

*Physics Letters B* 728 (2014) pp. 358–362. 2014. arXiv: `1309.0692` (hep-th)

**Quantum Instability of the Emergent Universe**

A. Aguirre, J. Kehayias

*Phys.Rev.* D88 (2013) p. 103504. 2013. arXiv: `1306.3232` (hep-th)

**Non-Anomalous Discrete R-symmetry Decrees Three Generations**

J. L. Evans, M. Ibe, J. Kehayias, T. T. Yanagida

*Phys.Rev.Lett.* 109 (2012) p. 181801. 2012. arXiv: `1111.2481` (hep-ph)

**Fuzzy Geometry via the Spinor Bundle, with Applications to Holographic Space-time and Matrix Theory**

T. Banks, J. Kehayias

*Phys. Rev.* D84 (2011) p. 086008. 2011. arXiv: `1106.1179` (hep-th)

**Axions in the Landscape and String Theory**

M. Dine, G. Festuccia, J. Kehayias, W. Wu

*JHEP* 01 (2011) p. 012. 2011. arXiv: `1010.4803` (hep-th)

**Generalized Gaugino Condensation in Super Yang-Mills Theories: Discrete R-Symmetries and Vacua**

J. Kehayias

*Phys. Rev.* D82 (2010) p. 125041. 2010. arXiv: `1005.4686` (hep-th)

**Semi-Analytic Calculation of the Gravitational Wave Signal From the Electroweak Phase Transition for General Quartic Scalar Effective Potentials**

J. Kehayias, S. Profumo

*JCAP* 1003 (2010) p. 003. 2010. arXiv: `0911.0687` (hep-ph)

**Discrete R Symmetries and Low Energy Supersymmetry**

M. Dine, J. Kehayias

*Phys. Rev.* D82 (2010) p. 055014. 2010. arXiv: `0909.1615` (hep-ph)

**Gamma Rays from Clusters and Groups of Galaxies: Cosmic Rays versus Dark Matter**

T. E. Jeltema, J. Kehayias, S. Profumo

*Phys. Rev.* D80 (2009) p. 023005. 2009. arXiv: `0812.0597` (astro-ph)

## Conference Proceedings

**Recent work on gravitational waves from a generic standard model-like effective Higgs potential**

J. Kehayias

*Nucl. Phys. Proc. Suppl.* 192-193 (2009) pp. 152–153. 2009. arXiv: `0912.0007` (hep-ph)

# Talks

## Invited Talks

**Brown Bag Seminar**

*Michigan Center for Theoretical Physics (MCTP), University of Michigan*

"Theory and Applications of Nonlinear Sigma Models"     *October 28, 2015*

**Theory Symposium, Santa Cruz Institute for Particle Physics (SCIPP) Reunion and 35th Anniversary Celebration**

*University of California, Santa Cruz*

"Nonlinear Sigma Models for Fun and Profit"     *April 24, 2015*

**High Energy Theory Seminar**

*William I. Fine Theoretical Physics Institute (FTPI), University of Minnesota*

"Charge Quantization and the Standard Model from Nonlinear Sigma Models"     *March 27, 2014*

**Theory Group Seminars**     *United States, Japan, Canada*

"No GUTs, All Glory: Charge Quantization from Nonlinear Sigma Models"     *September–December 2013*

UC Berkeley/LBL, Columbia University, YITP/Stony Brook University, NYU, UC Irvine, UC Santa Cruz, University of Tokyo (Komaba), Perimeter Institute

**Research Center for the Early Universe (RESCEU Group) Seminar**     *The University of Tokyo, Sendai*

"Quantum Instability of the Emergent Universe"     *December 3, 2012*

**Particle and Cosmology Group Seminar**     *Tohoku University, Sendai, Japan*

"Discrete R-symmetries, Generalized Gaugino Condensation, and Three Generations"     *December 1, 2011*

**ACP Seminar**     *Kavli IPMU, University of Tokyo (WPI)*

"Discrete R-Symmetries and Generalized Gaugino Condensation (and Three Generations)"     *November 24, 2011*

## Conferences

**FOSDEM '23**     *Brussels, Belgium*

"Using GNU Guix Containers with FHS (Filesystem Hierarchy Standard) Support"     *February 4–5, 2023*

Remote talk on FHS-support for Guix containers which I added to the Guix operating system in 2022. This allows easily emulating other Linux environments for development and testing. Available online at https://fosdem.org/2023/schedule/event/guixfhs/

**Guix Days Conference**     *Online*

"My experiences as a newcomer to Guix"     *February 19–20, 2022*

A presentation on my experiences from learning about GNU Guix to contributing and becoming part of this free software community. Available online .

**Conference on Community Writing**     *Philadelphia, PA*

"Now You've Built It, But Will They Come?: Developing a New Community Writing Program in and around Philadelphia" (Roundtable Discussion)     *October 17–19, 2019*

Presentation and discussion on a community writing program with the Free Library of Philadelphia, presented with colleagues from the Critical Writing Program and Free Library.

**Rencontres de Moriond: Cosmology 2016**     *La Thuile, Aosta Valley, Italy*

"Static and Oscillating Universes" (Poster)     *August 19–26, 2016*

**Miami 2015 Conference, a topical conference on elementary particles, astrophysics, and cosmology** *Fort Lauderdale, Florida, United States*

"FAST RADIO TRANSIENTS" *December 16–22, 2015*

**SUSY 2015, 23ʳᵈ International Conference on Supersymmetry and Unification of Fundamental Interactions** *Lake Tahoe, California, United States*

"LIGHT FIELDS AND FLAT DIRECTIONS FROM NONLINEAR SIGMA MODELS IN SUPERGRAVITY" *August 23–29, 2015*

**Miami 2014 Conference, a topical conference on elementary particles, astrophysics, and cosmology** *Fort Lauderdale, Florida, United States*

"CHAOTIC INFLATION FROM NONLINEAR SIGMA MODELS IN SUPERGRAVITY" *December 17–23, 2014*

**SI 2014, 20ᵗʰ International Summer Institute on Phenomenology of Elementary Particles and Cosmology** *Fuji-Yoshida, Japan*

"CHAOTIC INFLATION AND A LIGHT HIGGS IN SUPERGRAVITY" *August 21–28, 2014*

**SUSY 2013, 21ˢᵗ International Conference on Supersymmetry and Unification of Fundamental Interactions** *ICTP, Trieste, Italy*

"NO GUTS, ALL GLORY: CHARGE QUANTIZATION FROM NONLINEAR SIGMA MODELS" *August 26–31, 2013*

**MCCQG, 2ⁿᵈ Mediterranean Conference on Classical and Quantum Gravity** *Veli Lošinj, Croatia*

"QUANTUM INSTABILITY OF THE EMERGENT UNIVERSE" *June 9–15, 2013*

**SUSY 2012, 20ᵗʰ International Conference on Supersymmetry and Unification of Fundamental Interactions** *Peking University, Beijing, China*

"THREE GENERATIONS FROM A NON-ANOMALOUS DISCRETE R-SYMMETRY" *August 13–18, 2012*

**SUSY 2010, 18ᵗʰ International Conference on Supersymmetry and Unification of Fundamental Interactions** *Physikalisches Institut, Bonn, Germany*

"GENERALIZED GAUGINO CONDENSATION AND DISCRETE R-SYMMETRIES" *August 23–28, 2010*

# University Service

**The Marks Family Center for Excellence in Writing** *University of Pennsylvania*

DEPARTMENT SERVICE *2017–Present*

Research Writing & Information Literacy Advisory Committee 2021: researched and advised on Critical Writing Program's ongoing relationship with Penn Libraries; Recruiting and Hiring Committee 2019-20: attended interviews, candidate talks, visits and lunches, provided recommendations on candidates; recommended students for tutor positions, Phi Beta Kappa; wrote recommendation letters for current and former students; cover classes for colleagues

**SUNFEST (The Summer Undergraduate Fellowship in Sensor Technologies)** *University of Pennsylvania*

SCIENCE WRITING WORKSHOP *Summer 2019, 2021, 2022, 2023*

Led a workshop on scientific writing for visiting undergraduate students.

**Community Writing Assistance at the Free Library of Philadelphia** *Charles Santore Branch*

FACULTY STAFF AND ORGANIZER *2018–2021*

Organize a community writing assistance program with colleagues in the Critical Writing Program with the Free Library of Philadelphia. Volunteer at a local branch (or online virtual sessions) to help members with resumes, cover letters, and other pieces of writing.

**Penn HOSA (Future Health Professionals) Club** *University of Pennsylvania*

FACULTY CO-ADVISOR *2017–2018*

Assisted student leaders to establish and run a Penn chapter of the international HOSA organization.