

# Jennifer M. Gaskins

March 2015

## Contact and Personal Information

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Date of Birth: July 3, 1980  
Languages: English (native), Italian (proficient)

Citizenship: USA

## Research Interests

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Particle astrophysics, dark matter, high-energy astrophysics, cosmology

## Positions Held

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**Marie Curie Postdoctoral Fellow** October 2014 - present  
Gravitation AstroParticle Physics Amsterdam (GRAPPA)  
University of Amsterdam, Amsterdam, Netherlands

**Einstein Postdoctoral Fellow** October 2011 - September 2014  
California Institute of Technology, Pasadena, California, USA

**CCAPP Postdoctoral Fellow** September 2008 - September 2011  
Center for Cosmology and Astro-Particle Physics (CCAPP)  
The Ohio State University, Columbus, Ohio, USA

## Collaboration Memberships

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**Member**, Cherenkov Telescope Array (CTA) Consortium August 2013 - present  
**Co-chair** of Dark Matter and Fundamental Physics Working Group February 2015 - present

**Affiliated Scientist**, Fermi Gamma-ray Space Telescope March 2009 - present  
**Co-coordinator** of Dark Matter and New Physics Science Group September 2011 - March 2013

## Grants

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- Principal Investigator, "Revealing the nature of dark matter with multi-wavelength observations of the Galactic Center", Fermi Guest Investigator Cycle 6 Grant, 2013 - 2014, \$60k
- Co-Investigator, "Probing sterile neutrino dark matter with the GBM", Fermi Guest Investigator Cycle 4 Grant, 2011 - 2012, \$90k (PI: M. Smith)
- Co-Investigator, "Anisotropy and energy spectrum of the gamma-ray background as probes of dark matter and astrophysical sources", Fermi Guest Investigator Cycle 2 Grant, 2009 - 2010, \$80k (PI: V. Pavlidou)

## Education

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University of Chicago, Chicago, Illinois, USA  
Ph.D., Physics, August 2008, Advisor: Angela Olinto  
M.S., Physics, March 2004

Brown University, Providence, Rhode Island, USA  
Sc.B., Physics, May 2002, Honors Thesis Advisor: Ian dell'Antonio  
*Magna cum Laude*, with Honors in Physics  
A.B., Theatre Arts, May 2002

## Honors and Awards

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- Marie Skłodowska-Curie Fellowship  
European Commission, 2013
- Einstein Fellowship  
NASA, 2011
- Luise Meyer-Schutzmeister Memorial Award  
Association for Women in Science Educational Foundation, 2007
- Doolittle-Harrison Fellowship  
University of Chicago, 2007

## Publication Record

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25 papers published in international peer-reviewed journals; 2 journals paper submitted and under review; 7 conference proceedings; 1 white paper; 1 Astronomer's Telegram

## Preprints and Papers in Preparation

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1. "Improved limits on sterile neutrino dark matter from full-sky observations by Fermi-GBM"  
Kenny C. Y. Ng, Shunsaku Horiuchi, **Jennifer M. Gaskins**, Miles Smith, and Robert Preece  
*in final preparation*
2. "Search for Gamma-ray Emission from Dark Matter Annihilation in the Large Magellanic Cloud with the Fermi Large Area Telescope"  
Matthew R. Buckley, Eric Charles, **Jennifer M. Gaskins**, Alyson M. Brooks, Alex Drlica-Wagner, Pierrick Martin, and Geng Zhao  
*submitted to Phys. Rev. D.*, arXiv:1502.01020
3. "A review of indirect searches for particle dark matter"  
**Jennifer M. Gaskins**  
*submitted; invited review*

## Refereed Publications

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4. "Fermi-LAT gamma-ray anisotropy and intensity explained by unresolved radio-loud active galactic nuclei"  
Mattia Di Mauro, Alessandro Cuoco, Fiorenza Donato, **Jennifer M. Siegal-Gaskins**  
*JCAP* 1411, 021 (2014), arXiv:1407.3275
5. "Separating astrophysical sources from indirect dark matter signals"  
**Jennifer M. Siegal-Gaskins**  
*Proceedings of the National Academy of Sciences (invited contribution to proceedings of the NAS Sackler Symposium "Dark Matter Universe")*, 1315181111 (2014), arXiv:1308.2228
6. "Sensitivity of CTA to dark matter signals from the Galactic Center"  
Mathias Pierre, **Jennifer M. Siegal-Gaskins**, Pat Scott  
*JCAP*, 1406, 024 (2014), arXiv:1401.7330

7. "Search for gamma-ray spectral lines with the Fermi Large Area Telescope and dark matter implications"  
M. Ackermann et al. [**The Fermi LAT Collaboration\***]  
*Phys. Rev. D.*, 88, 082002 (2013), arXiv:1305.5597
8. "Millisecond pulsars cannot account for the Inner Galaxy's GeV excess"  
Dan Hooper, Ilias Cholis, Tim Linden, **Jennifer M. Siegal-Gaskins**, and Tracy Slatyer  
*Phys. Rev. D*, 88, 083009 (2013), arXiv:1305.0830
9. "Novel techniques for decomposing diffuse backgrounds"  
Brandon S. Hensley, Vasiliki Pavlidou, and **Jennifer M. Siegal-Gaskins**  
*MNRAS*, 433, 591 (2013), arXiv:1210.7239
10. "New sensitivity to solar WIMP annihilation using low-energy neutrinos"  
Carsten Rott, **Jennifer M. Siegal-Gaskins**, and John F. Beacom  
*Phys. Rev. D*, 88, 055005 (2013), arXiv:1208.0827
11. "Characterization of dark-matter-induced anisotropies in the diffuse gamma-ray background"  
Mattia Fornasa, Jesús Zavala, Miguel A. Sánchez-Conde, **Jennifer M. Siegal-Gaskins**, Timur Delahaye, Francisco Prada, Mark Vogelsberger, Fabio Zandanel, and Carlos S. Frenk  
*MNRAS*, 429, 1529 (2013), arXiv:1207.0502
12. "The Fermi Large Area Telescope On Orbit: Event Classification, Instrument Response Functions, and Calibration"  
M. Ackermann et al. [**The Fermi LAT Collaboration\***]  
*Astrophys.J.Suppl.*, 203:4 (2012), arXiv:1206.1896
13. "Joint anisotropy and source count constraints on the contribution of blazars to the diffuse gamma-ray background"  
Alessandro Cuoco, Eiichiro Komatsu, and **Jennifer M. Siegal-Gaskins**  
*Phys. Rev. D*, 86, 063004 (2012), arXiv:1202.5309
14. "Anisotropies in the diffuse gamma-ray background measured by the *Fermi* LAT"  
M. Ackermann et al. [**The Fermi LAT Collaboration\* (CONTACT AUTHOR)**] and Eiichiro Komatsu  
*Phys. Rev. D*, 85, 083007 (2012), arXiv:1202.2856
15. "Constraints on dark matter models from a *Fermi* LAT search for high-energy cosmic-ray electrons from the Sun"  
M. Ajello et al. [**The Fermi LAT Collaboration\* (CONTACT AUTHOR)**]  
*Phys. Rev. D*, 84, 032007 (2011), arXiv:1107.4272
16. "Anisotropies in the gamma-ray sky from millisecond pulsars"  
**Jennifer M. Siegal-Gaskins**, Rebecca Reesman, Vasiliki Pavlidou, Stefano Profumo, and Terry P. Walker  
*MNRAS*, 415, 1074 (2011), arXiv:1011.5501
17. "Searches for cosmic-ray electron anisotropies with the *Fermi* Large Area Telescope"  
M. Ackermann et al. [**The Fermi LAT Collaboration\***]  
*Phys. Rev. D*, 82, 092003 (2010), arXiv:1008.5119
18. "Annihilation vs. Decay: Constraining dark matter properties from a gamma-ray detection"  
Sergio Palomares-Ruiz and **Jennifer M. Siegal-Gaskins**  
*JCAP*, 07, 023 (2010), arXiv:1003.1142

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\*As an Affiliated Scientist in the Fermi LAT Collaboration, I am only included in the author list of papers to which I have made a significant direct contribution. Authors taking a leading role in a study are designated as contact authors.

19. "The detectability of dark matter annihilation with *Fermi* using the anisotropy energy spectrum of the gamma-ray background"  
Brandon S. Hensley, **Jennifer M. Siegal-Gaskins**, and Vasiliki Pavlidou  
*ApJ*, 723, 277 (2010), arXiv:0912.1854
20. "Gamma-ray signatures of annihilation to charged leptons in dark matter substructure"  
Matthew D. Kistler and **Jennifer M. Siegal-Gaskins**  
*Phys. Rev. D*, 81, 103521 (2010), arXiv:0909.0519
21. "Robust identification of isotropic diffuse gamma rays from Galactic dark matter"  
**Jennifer M. Siegal-Gaskins** and Vasiliki Pavlidou  
*Phys. Rev. Lett.*, 102, 241301 (2009), arXiv:0901.3776
22. "A luminosity constraint on the origin of unidentified high energy sources"  
**Jennifer M. Siegal-Gaskins**, Vasiliki Pavlidou, Angela V. Olinto, Carolyn Brown, and Brian D. Fields  
*J. Phys. G*, 36, 055201 (2009), arXiv:0710.0874
23. "Revealing dark matter substructure with anisotropies in the diffuse gamma-ray background"  
**Jennifer M. Siegal-Gaskins**  
*JCAP*, 10, 040 (2008), arXiv:0807.1328
24. "Signatures of  $\Lambda$ CDM substructure in tidal debris"  
**Jennifer M. Siegal-Gaskins** and Monica Valluri  
*ApJ*, 681, 40 (2008), arXiv:0710.0385
25. "Unresolved unidentified source contribution to the gamma-ray background"  
Vasiliki Pavlidou, **Jennifer M. Siegal-Gaskins**, Brian D. Fields, Angela V. Olinto, and Carolyn Brown  
*ApJ*, 677, 27 (2008), arXiv:0710.0619
26. "Population studies of the unidentified EGRET sources"  
**Jennifer M. Siegal-Gaskins**, Vasiliki Pavlidou, Angela V. Olinto, Carolyn Brown, and Brian D. Fields  
*Ap&SS* 309, 43 (2007), astro-ph/0611273
27. "Unidentified EGRET sources and the extragalactic gamma-ray background"  
Vasiliki Pavlidou, **Jennifer M. Siegal-Gaskins**, Carolyn Brown, Brian D. Fields, and Angela V. Olinto  
*Ap&SS* 309, 81 (2007), astro-ph/0611271
28. "Gamma-ray and synchrotron emission from neutralino annihilation in the Large Magellanic Cloud"  
Argyro Tasitsiomi, **Jennifer Gaskins**, and Angela V. Olinto  
*Astropart. Phys.*, 21, 637 (2004), astro-ph/0307375

## Other Publications

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29. "Cosmic Frontier Indirect Dark Matter Detection Working Group Summary"  
J. Buckley, D.F. Cowen, S. Profumo, A. Archer, M. Cahill-Rowley, R. Cotta, S. Digel, A. Drlica-Wagner, F. Ferrer, S. Funk, J. Hewett, J. Holder, B. Humensky, A. Ismail, M. Israel, T. Jeltema, A. Olinto, A. Peter, J. Pretz, T. Rizzo, **J. Siegal-Gaskins**, A. Smith, D. Staszak, J. Vandenbroucke, M. Wood  
arXiv:1310.7040 (2013)

30. "Search for gamma rays from VVV-WIT-01 or other possible Galactic Type Ia Supernovae using Fermi GBM"  
 Kenny Chun Yu Ng, Shunsaku Horiuchi, John F. Beacom, **Jennifer M. Siegal-Gaskins**, Rob Preece, Miles Smith, Jonathan Gelbord  
 Astronomer's Telegram, ATel #4473, October 10 (2012)

### Selected Invited Conference Presentations (2011 - present)

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Total of 20 invited conference presentations given since 2011. Selected presentations listed below.

- *Frontier Objects in Astrophysics and Particle Physics*, Vulcano, Italy, May 2014
- *Frontiers in Particle Physics: From Dark Matter to the LHC and Beyond*, Aspen, CO, January 2014
- *Particle Physics and Cosmology 2013*, Deadwood, SD, July 2013
- *Physics of the Universe Summit*, Los Angeles, CA, January 2013
- *National Academy of Sciences' Sackler Colloquium: Dark Matter Universe*, Irvine, CA, October 2012
- *Identification of Dark Matter 2012*, Chicago, IL, July 2012
- *Dark Matter Silver Jubilee*, Pacific Northwest National Laboratory, Richland, WA, June 2012
- *American Physical Society April Meeting 2012*, Atlanta, GA, April 2012
- *High Energy Astroparticle Physics (HEAP) 2011*, KEK, Tsukuba, Japan, November 2011
- *The Future of Astronomy*, Northwestern University, Chicago, IL, September 2011

### Seminars and Colloquia (2011 - present)

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Total of 34 seminars and colloquia given since 2011 in the US, the UK, and at several European institutes.

### Teaching and Advising Experience

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- **Lecturer**, *Indirect dark matter searches (2 lectures)*, SLAC Summer Institute August 2014
- **Guest Lecturer**, *Indirect dark matter searches*, Frontiers in Physics course, Caltech May 2014
- **Caltech Research Advisor** April 2014 - August 2014
  - Thibault Michel (visiting graduate student from ENS de Cachan): *Forecasted constraints on dark matter particle properties from a detection with CTA*
- **Advisor**, Summer Undergraduate Research Fellowship (SURF) program June 2014 - August 2014
  - Natalie Harrison (University of Chicago): *Dark matter vs. unresolved sources as the origin of the Galactic Center GeV excess*
- **Lecturer**, *Indirect dark matter searches*, TAUP School September 2013
- **Caltech Research Advisor** April 2013 - July 2013
  - Mathias Pierre (visiting graduate student from ENS de Cachan / Université Pierre et Marie Curie): *Sensitivity of CTA to indirect dark matter signals from the Galactic Center*

- **Advisor**, Summer Undergraduate Research Fellowship (SURF) program June 2012 - August 2012
  - Cassandra Lochhaas (Caltech): *Predicting the Blazar Anisotropy Energy Spectrum*
  - Rok Nežič (University of Cambridge): *Cross-correlation analysis of simulated Fermi LAT and Planck satellite data to determine detectability of star-forming galaxies*
- **Caltech Research Advisor** May 2012 - August 2012
  - Germán Gómez-Vargas (visiting Ph.D. student from Universidad Autónoma de Madrid): *Dark matter implications of the gamma-ray background anisotropy*
- **Co-Advisor** June 2009 - April 2011
  - Rebecca Reesman (Ph.D. student at The Ohio State University): *Anisotropies in the gamma-ray background from millisecond pulsars*
- **Teaching Assistant**, University of Chicago 2006 - 2007
  - Physical Sciences 119: Stellar Astronomy and Astrophysics
  - Physics 123: Waves, Optics, and Modern Physics

## Professional Activities

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- Creator and Organizer of Caltech Dark Matter Group, March 2012 - August 2014  
<https://sites.google.com/site/caltechdarkmatter/>
- Conference organization: 11 meetings organized since 2010. Selected meetings listed below.
  - Co-creator and co-organizer, *Dark Matter in Southern California (DaMaSC) Symposium III*, Caltech, April 2014
  - Co-creator and co-organizer, *Dark Matter in Southern California (DaMaSC) Symposium II*, Caltech, September 2013
  - Co-organizer, *Aspen Summer Program: Dark Matter in Galaxies, the LHC, and Direct and Indirect Searches: Are We Near the End of the Road?*, Aspen Center for Physics, August 2013
  - Co-organizer, *Aspen Winter Conference on Astrophysics: Closing in on Dark Matter*, Aspen Center for Physics, January 2013
  - Co-Creator and Co-organizer, *Dark Matter in Southern California (DaMaSC) Symposium*, Caltech, January 2013
  - Co-organizer, *Conference for Undergraduate Women in Physics*, Caltech, January 2013
  - Organizer, *Identifying the physics potential of multi-wavelength & multi-messenger anisotropy studies*, Ohio State University, June 2010
  - Co-organizer, *3rd Annual Midwest Conference for Undergraduate Women in Physics*, Ohio State University, January 2010
- Manuscript referee for *Astrophysical Journal*, *Astrophysical Journal Letters*, *Journal of Cosmology and Astroparticle Physics*, *Physical Review D*, *Physical Review Letters*

## Mentoring and Outreach Experience

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- **Featured Scientist** June 2014  
 Axion (an interactive, educational video game focused on current cosmology and particle physics research, in development)
- **Mentor**, Huffington Post Girls in STEM Mentorship Program May 2013 - July 2013

- **Mentor**, Women Mentoring Women program, Caltech October 2012 - August 2014
- **Guest Speaker** October 2012  
“Dark Matter” public lecture at Machine Project gallery and community space, Los Angeles, CA
- **Mentor**, Postdoc Mentors program, Caltech April 2012 - August 2014
- **Guest Speaker** October 2009 and November 2010  
“Gender and Science” course in Comparative Studies & Women’s Studies, Ohio State University
- **Instructor**, Science and Technology Outreach and Mentoring Program 2005 - 2008  
Organized and led a weekly after-school science club at a Chicago public elementary school. Engaged young students in science through hands-on activities and experiments, and provided support and mentoring.
- **Intern**, Museum Presentation in Science 2004 - 2005  
Designed and created new exhibits showcasing current research in cosmology for SciTech Hands-On Museum in Aurora, Illinois.

## References

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Spokesperson of GRAPPA Center for Excellence  
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4. **Angela V. Olinto**  
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7. **Steve Ritz**  
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