

Amy Yarleen Lien

Goddard Space Flight Center

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Research Interests and Relevant Skills

Research Interests Gamma-ray bursts and supernovae, particle astrophysics, transients in synoptic surveys, cosmology

Relevant Skills Programming and plotting experience in C, Python, IDL, Matlab, Mathematica, Fortran

Experience in Higher Education

Sept 2013 – Present Postdoctoral Research Associate, Center for Space Science and Technology, University of Maryland Baltimore County

Sept 2011 – Aug 2013 NASA Postdoctoral Fellow, NASA Goddard Space Flight Center

Education

Aug 2005 – Aug 2011 Graduate student (PhD), Department of Astronomy, University of Illinois at Urbana-Champaign

Sept 2001 – June 2005 B.S. Department of Physics, National Central University (Taiwan)

Research Experience

Sept 2011 – Present:

Advisor: Dr. Neil Gehrels, Goddard Space Flight Center

- Exploring the connection between gamma-ray bursts (GRBs) and supernovae via multi-messenger observations. In particular, we developed a code that is capable of creating mock GRB light curves and simulate the BAT trigger algorithm. We use the code to study

intrinsic GRB characteristics.

- Data analysis for the BAT-detected GRB.
- Tasks related to data analysis of the *Swift* Burst Alert Telescope (BAT).

Jan 2007 – Aug 2011

Advisor: Prof. Brian Fields, University of Illinois at Urbana-Champaign

- Code development for detailed forecasting of core-collapse supernova detections for major future surveys in both optical and radio wavelengths, and exploration of science potentials of the detections, such as precision measurement of the cosmic supernova rate and the diffuse supernova neutrino background, and probing failed supernovae via multi-messenger observations.

May 2006 – Dec 2006

Advisor: Prof. Joseph Mohr, University of Illinois at Urbana-Champaign

- Code development for mock observations for the galaxy cluster search of the Dark Energy Survey, and seeking the optimal filter for galaxy cluster detections via SZ Effect.

Jun 2004 – Dec 2004

Advisor: Prof. S. K. Lai, National Central University (Taiwan)

- Adaptation of molecular structure code to find minimum potentials for iron molecules.

Publications

Major publications:

1. *Probing the Cosmic Gamma-ray Bursts Rate with Trigger Simulations for the Swift Burst Alert Telescope*
Amy Lien, Takanori Sakamoto, Neil Gehrels, David M. Palmer, Scott D. Barthelmy, Carlo Graziani, and John K. Cannizzo
The Astrophysical Journal, vol. 783, Issue 1, article id. 24, 22 pp. (2014)
2. *The Diffuse Gamma-ray Background from Type Ia Supernovae*
Amy Lien, Brian D. Fields
The Astrophysical Journal, vol. 747, Issue 2, article id. 120, 12 pp. (2012)
arXiv:1201.3447
3. *Radio Supernovae in the Great Survey Era*
Amy Lien, Nachiketa Chakraborty, Brian D. Fields, and Athol Kemball
Astrophysical Journal, vol. 740, Issue 1, id. 23 (2011)
arXiv:1107.0775
4. *Synoptic Sky Surveys and the Diffuse Supernova Neutrino Background: Removing Astrophysical Uncertainties and Revealing Invisible Supernovae*

Amy Lien, Brian D. Fields, and John F. Beacom
Physical Review D, vol. 81, Issue 8, id. 083001 (2010)
arXiv:1001.3678

5. *Cosmic Core-Collapse Supernovae from Upcoming Sky Surveys*
Amy Lien and Brian D. Fields
Journal of Cosmology and Astroparticle Physics, Issue 01, pp. 047 (2009)
arXiv:0902.0979

Other selected publications:

1. *The Third Swift Burst Alert Telescope Gamma-Ray Burst Catalog*
Lien, A., Sakamoto, T., et al. Conference Proceeding, Swift:10 Years of Discovery (2015)
2. *iPTF14yb: The First Discovery of a Gamma-Ray Burst Afterglow Independent of a High-energy Trigger*
Cenko, B. S. et al., ApJ Letters, Vol 803, Issue 2, L24, 6 (2015)
3. *GRB 130925A: an ultralong gamma ray burst with a dust-echo afterglow, and implications for the origin of the ultralong GRBs*
Evans, P. A. et al., MNRAS, Volume 444, Issue 1, p.250-267 (2014)
4. *The Swift/BAT Hard X-Ray Transient Monitor*
Krimm et al., ApJS, Volum 209, Issue 1, article id. 14, 33 pp. (2013)
5. *Trigger Simulations for GRB Detection with the Swift Burst Alert Telescope*
Amy Lien, Takanori Sakamoto, Neil Gehrels, David Palmer, Carlo Graziani
Death of Massive Stars: Supernovae and Gamma-Ray Bursts, Proceedings of the International Astronomical Union, IAU Symposium, Volume 279, p. 347-348 (2012)
6. *Core-Collapse Supernovae*
Amy Lien and Brian Fields
LSST Science Book contribution, pp. 401-403 (2009)
arXiv:0912.0201
Online version: <http://www.lsst.org/lsst/scibook>
7. *Cosmic Core-Collapse Explosions in Upcoming Sky Surveys*
Amy Lien and Brian D. Fields
The Nuclei in the Cosmos (NIC-X) refereed conference proceedings (2008)

Principal Investigator Research Grants

Chasing Short Gamma-Ray Bursts with Swift and Fermi	2014-2015
Swift Guest Investigator Program (Cycle 10): \$39K	
High Redshift Gamma-Ray Bursts from Swift	2013-2014
Swift Guest Investigator Program (Cycle 9): \$33.5K	

Invited Talks

- Apr 2015 Astronomical Sciences Seminars, Virginia Tech, Virginia
Title: Probing the Star-Formation History with Core-Collapse Supernovae,
Gamma-Ray Bursts, and Neutrinos in the Great Survey Era
- Apr 2015 ITC Seminar, CfA, Harvard University, Boston
Title: Gamma-ray Bursts from the Swift Burst Alert Telescope: Probing
Intrinsic Distributions with Trigger Simulations
- Jan 2015 Seminar, Academia Sinica, Taiwan
Title: Ten Years of Swift: The Third Swift Burst Alert Telescope Gamma-Ray
Burst Catalog
- July 2013 Seminar, Academia Sinica, Taiwan
Title: Connecting Core-Collapse Supernovae and Gamma-Ray Bursts in the
Great Survey Era
- July 2013 Seminar, National Central University, Taiwan
Title: Connecting Core-Collapse Supernovae and Gamma-Ray Bursts in the
Great Survey Era
- Feb 2012 Seminar, Naval Research Laboratory
Title: Core-Collapse Supernovae in the Great Survey Era
- Aug 2011 Seminar, National Tsing-Hua University, Taiwan
Title: Core-Collapse Supernovae in the Great Survey Era
- July 2011 Seminar, Goddard Space Flight Center
Title: Revealing Optically Invisible Core-Collapse Supernovae in the Great
Survey Era
- Apr 2011 The Second Annual CCAPP Symposium, Ohio State University
Title: Core-Collapse Supernovae in the Great Survey Era:
Impact on Particle Astrophysics and Cosmology
- Feb 2011 Triangle Nuclear Theory Colloquium, North Carolina State University
Title: Core-Collapse Supernovae in the Great Survey Era:
Impact on Particle Astrophysics and Cosmology

Other Presentations

June 2015 Summer Intern Brown Bag Lunch Talk, Goddard, DC
Title: Right off the BAT: Trigger Simulations of Swift Gamma-ray Bursts

Dec 2014 Swift: 10 Years of Discovery, Rome, Italy
Title: The Third Swift Burst Alert Telescope Gamma-Ray Burst Catalog

July 2014 Summer Intern Brown Bag Lunch Talk, Goddard, DC
Title: Right off the BAT: Trigger Simulations of Swift Gamma-ray Bursts

Jan 2014 The 223rd American Astronomical Society meeting (poster), DC
Title: Probing the Gamma-Ray Burst Rate with Trigger Simulations of the
Swift Burst Alert Telescope

Oct 2013 Swift Planning Meeting, State College, PA
Title: Probing the Gamma-Ray Burst Rate with Trigger Simulations of the
Swift Burst Alert Telescope

July 2013 Seminar, Aoyama Gakuin University, Japan
Title: Connecting Core-Collapse Supernovae and Gamma-Ray Bursts in the
Great Survey Era

April 2013 Huntsville Gamma-ray Burst Symposium, Nashville, TN
Title: Probing the Cosmic Gamma-Ray Burst Rate
with Trigger Simulations of the Swift Burst Alert Telescope

May 2012 Fermi/Swift GRB conference (poster), Munich, Germany
Title: Probing the Cosmic Gamma-Ray Burst Rate in the *Swift* Era

March 2012 The IAU Symposium (poster), Nikko, Japan
Title: Connecting Gamma-Ray Bursts and Supernovae in the *Swift* Era

Jan 2011 American Astronomical Society meeting (poster), Seattle, Washington
Title: Core-Collapse Supernovae in the LSST Era

Oct 2010 CTA Seminar on Theoretical Astrophysics & General Relativity (talk),
University of Illinois at Urbana-Champaign
Title: A Summary of the Astro2010 Decadal Survey

June 2010 The 10th Great Lakes Cosmology Workshop, University of Chicago (talk)
Title: The Cosmic Supernova Inventory from Future Sky Surveys:
Revealing Invisible Collapse with Neutrinos

April 2010 Student Seminar (talk), University of Illinois at Urbana-Champaign
Title: Cosmic Supernovae from the Square Kilometer Array

April 2010 CTA Seminar on Theoretical Astrophysics & General Relativity (talk),
University of Illinois at Urbana-Champaign
Title: The Cosmic Supernova Inventory from Future Sky Surveys:
Cosmic Star Formation, Neutrinos, and Invisible Collapse

<u>Jan 2010</u>	American Astronomical Society meeting (poster), Washington D.C. Title: Synoptic Sky Surveys and Particle Cosmology: Impact on Neutrino and Gamma-ray Backgrounds
<u>Sept 2009</u>	Student Seminar (talk), University of Illinois at Urbana-Champaign Title: Synoptic Sky Surveys and Cosmic Supernova Neutrinos
<u>Oct 2008</u>	Kavli Institute for Cosmological Physics (talk), University of Chicago Title: Cosmic Core-Collapse Supernovae and Neutrino Background in Upcoming Sky Surveys
<u>July 2008</u>	The Nuclei in the Cosmos X (poster), Mackinac Island, Michigan Title: Supernova Tsunami: Cosmic Core-Collapse Explosions in Upcoming Sky Surveys
<u>April 2008</u>	Student Seminar (talk), University of Illinois at Urbana-Champaign Title: Cosmic Core-Collapse Supernovae from Upcoming Sky Surveys
<u>April 2007</u>	Student Seminar (talk), University of Illinois at Urbana-Champaign Title: Mock Observation for the South Pole Telescope

Teaching Experience

<u>Fall 2010</u>	TA for Phys 598 (Topics in Computational Physics and Astrophysics) Instructor: Prof. Stuart Shapiro
<u>Summer 2009</u>	TA for Astro100 (Perspectives to Astronomy) Instructor: Dr. Ashley Ross
<u>Spring 2009</u>	TA for Astro330 (Extraterrestrial Life) with discussion sections Instructor: Prof. Leslie Looney
<u>Fall 2008</u>	TA for Astro121* (The Solar System) with discussion sections Instructor: Prof. Edmund Sutton
<u>Summer 2008</u>	TA for Astro100 (Perspectives in Astronomy) Instructor: Dr. Ashley Ross
<u>Spring 2008</u>	TA for Astro596 (Physical Cosmology) Instructor: Prof. Brian Fields
<u>Fall 2007</u>	TA for Astro502 (Theory Diffuse Matter Dynamics) Instructor: Prof. Charles Gammie TA for Astro330 (Extraterrestrial Life) Instructor: Prof. Leslie Looney
<u>Spring 2007</u>	TA for Astro405 (Solar System and Interstellar Medium) Instructor: Prof. Ronald Webbink

Spring 2006 TA for Astro100* (Perspectives to Astronomy)
 Instructor: Prof. Thomasanna Hail

Fall 2005 TA for Astro100* (Perspectives in Astronomy)
 Instructor: Prof. Laird Thompson

* Classes including night observing sections and solar observing sections.

References

Dr. Takanori Sakamoto Department of Physics and Mathematics,
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 Ohio State University
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I certify that the contents of this curriculum vitae are a complete and accurate record of my accomplishments.


Date: July 7, 2015