Amy Yarleen Lien

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Research Interests and Relevant Skills

Research Interests	Gamma-ray bursts and supernovae, time-domain astrophysics, multi-messenger studies, high-energy astrophysics, stellar evolution, early universe, cosmology
Relevant Skills	Fluent in C, Python, Shell Script. IDL, AWK, Xspec, FTOOLS. Experienced in Matlab, Mathematica, Fortran

Positions

Sept 2017 – Present	Assistant Research Scientist[1,2,*],
Sept 2013 – Sept 2017	Postdoctoral Research Associate[1,2,*], [1]NASA Goddard Space Flight Center and Center for Space Science and Technology (CRESST), [2]University of Maryland Baltimore County *80% time for supportive work of the *Swift* Burst Alert Telescope 20% time for personal research
Sept 2011 – Aug 2013	NASA Postdoctoral Fellow, NASA Goddard Space Flight Center

Education

Aug 2005 – Aug 2011	Ph.D., Department of Astronomy, University of Illinois at Urbana-Champaign
Sept 2001 – June 2005	B.S. Department of Physics, National Central University (Taiwan)

Professional Experience

Sept 2011 – Present:

- Research:
  1. 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 simulating the BAT trigger algorithm. We use the code to study intrinsic GRB characteristics.
  2. Making forecasts for future GRB/transient telescopes and exploring optimal survey strategies to maximize detections of high-redshift GRBs and nearby short GRBs, which are potential counterparts of gravitational wave events. These future missions includes the Transient Astrophysics Observatories (TAO), the Transient Astrophysics Probe (TAP), the All-sky Medium Energy Gamma-ray Observatory (AMEGO).
- Supporting tasks for *Swift*/BAT:
  1. GRB-related tasks: Data analysis for the BAT-detected GRB, maintaining and updating the GRB catalog website (http://swift.gsfc.nasa.gov/results/batgrbcat/).
  2. Maintaining the BAT hard X-ray transient monitor scripts and webpages (http://swift.gsfc.nasa.gov/results/transients/), and providing data to HEASARC for public use.
  3. Providing BAT data analysis when required, and offering help for users who have questions regarding the BAT analysis.
  4. Maintaining the BAT-team machines, arranging shifts for the BAT burst scientists and the Goddard burst advocates.
  5. Writing new automatic scripts for new requests for the BAT operation, including prompt data search following gravitational wave triggers.

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.

Selected Publications

*** See full publication list on the ADS search engine (http://adsabs.harvard.edu):**
29 refereed and 800+ non-refereed (e.g., GCN circulars or ATELs) articles.

Major publications:

1. *The Third Swift Burst Alert Telescope Gamma-Ray Burst Catalog*
   Amy Lien, Takanori Sakamoto, Scott D. Barthelmy et al.,
   The Astrophysical Journal, Vol. 829, Issue 1, article id 7, 47 pp. (2016)
   arXiv:1606.01956
2. *Modeling the Swift BAT Trigger Algorithm with Machine Learning*
   Philip B. Graff, **Amy Lien**, John G. Baker et al.,
   The Astrophysical Journal, Vol. 818, Issue 1, article id. 55, 10 pp. (2016)
   arXiv:1509.01228
3. *Swift Observations of Gamma-Ray Burst Pulse Shapes: GRB Pulse Spectral Evolution Clarified*
   Jon Hakkila, **Amy Lien**, Takanori Sakamoto et al.,
   The Astrophysical Journal, Vol. 815, Issue 2, article id. 134, 16 pp. (2015)
4. *Probing the Cosmic Gamma-ray Bursts Rate*
   with Trigger Simulations for the Swift Burst Alert Telescope
   Amy Lien, Takanori Sakamoto, Neil Gehrels, et al.
   The Astrophysical Journal, vol. 783, Issue 1, article id. 24, 22 pp. (2014)
   arXiv:1311.4567
5. *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
6. *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
7. *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
8. *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:

9. *Swift spectra of AT2018cow: A White Dwarf Tidal Disruption Event?*
   Kuin et al. arXiv:1808.08492, Submitted to MNRAS (2018)
10. *The 105-Month Swift-BAT All-sky Hard X-Ray Survey*
    Oh et al. The ApJ Supplement, Volume 235, Issue 1, article id. 4, 14 (2018)
11. *Swift and NuSTAR Observations of GW170817: Detection of a Blue Kilonova*
    Evans et al. Science, Volume 358, Issue 6370, pp. 1565-1570 (2017)
12. *The X-ray Counterpart to the Gravitational-wave Event GW170817*
    Troja et al. Nature, Volume 551, Issue 7678, pp. 71-74 (2017)
13. *The Environment of the Binary Neutron Star Merger GW170817*
    Leven et al. ApJ Letters Vol 848, Issue 2, L28, 9 (2017)
14. *Multi-messenger Observations of a Binary Neutron Star Merger*
    Abbott et al. The ApJ Letters, Volume 848, Issue 2, article id. L12, 59 (2017)
15. *Swift Follow-up of Gravitational Wave Triggers: Results from the First aLIGO run and Optimization for the Future*
    Evans et al., MNRAS, Vol. 462, Issue 2, p.1591-1602 (2016)
16. *An Achromatic Break in the Afterglow of the Short GRB 140903A: Evidence for a Narrow Jet*
    Troja et al., ApJ. Vol. 827, Issue 2, article id. 102, 12 (2016)
17. *Do the Fermi Gamma-Ray Burst Monitor and Swift Burst Alert Telescope see the Same Short Gamma-Ray Bursts?*
    Burns et al. ApJ. Vol. 818, Issue 2, article id. 110, 10 (2016)
18. *The Central Engine of GRB 130831A and the Energy Breakdown of a Relativistic Explosion*
    De Pasquale et al., MNRAS, Vol. 455, Issue 1, p. 1027-1042 (2016)
19. *Happy Birthday Swift: Ultra-long GRB 141121A and Its Broadband Afterglow*
    Cucchiara et al. ApJ, Vol. 812, Issue 2, article id. 122, 13 (2015)
20. *iPTF14yb: The First Discovery of a Gamma-Ray Burst Afterglow Independent of a High-energy Trigger*
    Cenko et al., ApJ Letters, Vol 803, Issue 2, L24, 6 (2015)
21. *GRB 130925A: an ultralong gamma ray burst with a dust-echo afterglow, and implications for the origin of the ultralong GRBs*
    Evans et al., MNRAS, Vol. 444, Issue 1, p.250-267 (2014)
22. *The Swift/BAT Hard X-Ray Transient Monitor*
    Krimm et al., ApJS, Volum 209, Issue 1, article id. 14, 33 pp. (2013)

Principal Investigator Research Grants

- Quantifying the Instrumental Effects and Systematic Uncertainties in the Durations of *Swift*/BAT Gamma-ray Bursts — 2017-2018
  - Swift Guest Investigator Program (Cycle 13): $40K
- Chasing Short Gamma-Ray Bursts with Swift and Fermi — 2014-2016
  - Swift Guest Investigator Program (Cycle 10): $39K
- High Redshift Gamma-Ray Bursts from Swift — 2013-2014
  - Swift Guest Investigator Program (Cycle 9): $33.5K

Selected/Recent Co-Investigator Research Projects

- Gamma-ray Bursts Similar to GRB 170817A: Comprehensive Search in the BATSE and Swift Data — 2019-2022
  PI: Peter Veres (University of Alabama, Huntsville, U.S.A.)
  Program: Astrophysics Data Analysis Program (ADAP)
- A missing population of short duration gamma-ray bursts — 2018-2021
  PI: Eleonora Troja (University of Maryland, College Park, U.S.A.)
  Program: Astrophysics Data Analysis Program (ADAP)
- Deeper, Wider, Faster: High Energy Counterparts to the Fastest Bursts in the Sky — 2017-2018
  PI: Tyler Pritchard (Swinburne University of Technology, Australia)
  Program: Swift Guest Investigator Program (Cycle 13)

Invited Talks

Oct. 2018 Student Colloquium at Tamkang University, Tamsui, Taiwan
Title: Gamma-ray bursts from the *Swift* Burst Alert Telescope
伽瑪射線爆和 Swift 太空望遠鏡 (Chinese version)

Oct. 2018 Taipei Gravitational Wave Group Conference, Tamkang University, Tamsui, Taiwan
Title: Gamma-ray Bursts in the Era of Multi-Messenger Astronomy (talk #1)
Catching Electromagnetic Counterparts for Gravitational Waves Events (talk #2)

Oct 2017 CTC seminar, University of Maryland, College Park
Title: Gamma-ray Bursts from the Swift Burst Alert Telescope

Dec 2016 Astroparticle Physic Workshop at Yachay Tech, Quito, Ecuador
Title: Gamma-ray Bursts from the Swift Burst Alert Telescope

Oct 2016 The Eighth Huntsville Gamma-Ray Burst Symposium, Huntsville, Alabama
Title: The Third Swift Burst Alert Telescope Gamma-Ray Burst Catalog:
Instrumental Sensitivity and Implication on the High-Redshift GRBs

Dec 2015 The Fourth AMON workshop, Penn State University, Pennsylvania
Title: Swift-BAT as a Triggering Facility

Sept 2015 Special Seminars, CEA Saclay, France
Title: Gamma-ray Bursts from the Swift Burst Alert Telescope: Probing Intrinsic Distributions with Trigger Simulations

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, NASA 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

Mentoring Experience

Summer 2018	Quantifying uncertainties in the durations of *Swift*/BAT Gamma-ray Bursts
	Student: Mike Moss, George Washington University
Summer 2018	Study of GRB pulses and X-ray flares (co-mentor)
	Student: Fatima Hussein, University of the Virgin Islands
Summer 2017	GRB pulse-shape study
	Student: Juan-Carlos Martinez, University of the Virgin Islands
Fall 2016	Spectral joint-fit analysis for GRBs from *Swift*/BAT and *Suzaku*/WAM
	Student: Austin Kim, University of Maryland at College Park
Fall 2016	Probing star-formation rate with Baysian analysis of Swift GRBs (co-mentor)
	Student: Anjali Mittu, University of Maryland at College Park
Summer 2016	GRB pulse-shape study
	Student: Jared Hanley, University of the Virgin Islands
Summer 2015	Chasing short GRBs with *Swift* and *Fermi*
	Student: Charles Law, Harvard University
Summer 2015	Study of GRB pulses and X-ray flares (co-mentor)
	Student: Jason Baron, University of the Virgin Islands
Summer 2014	High redshift GRBs from *Swift*
	Student: Kevin Chen, University of California, Berkeley
Summer 2014	Chasing short GRBs with *Swift* and *Fermi* (co-mentor)
	Student: John Kerin, Georgetown University

Teaching Experience: instructor

Fall 2018	Special Projects in Astronomy: Astronomy Research Techniques (ASTR288C), University of Maryland, College Park Team-teaching with Sean Griffin (University of Maryland, College Park) https://swift.gsfc.nasa.gov/results/BATbursts/ASTR_288C/Index.html
Fall 2017	Special Projects in Astronomy: Astronomy Research Techniques (ASTR288C), University of Maryland, College Park https://userpages.umbc.edu/~alien/ASTR_288C_2017/Index.html

Teaching Experience: teaching assistant

Fall 2010	TA for Phys 598 (Topics in Computational Physics and Astrophysics) Instructor: Prof. Stuart Shapiro
Summer 2009	TA for Astro100 (Perspectives to Astronomy) Instructor: Dr. Ashley Ross

Spring 2009	TA for Astro330 (Extraterrestrial Life) with discussion sections
	Instructor: Prof. Leslie Looney
Fall 2008	TA for Astro121* (The Solar System) with discussion sections
	Instructor: Prof. Edmund Sutton
Summer 2008	TA for Astro100 (Perspectives in Astronomy)
	Instructor: Dr. Ashley Ross
Spring 2008	TA for Astro596 (Physical Cosmology)
	Instructor: Prof. Brian Fields
Fall 2007	TA for Astro502 (Theory Diffuse Matter Dynamics)
	Instructor: Prof. Charles Gammie
	TA for Astro330 (Extraterrestrial Life)
	Instructor: Prof. Leslie Looney
Spring 2007	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.

Community Service and Outreach

- Representing the *Swift* telescope at the NASA Science Jamborees, the American Astronomical Society (AAS) meetings, and the NASA Goddard Open House
- Serving as a referee for academic journals (ApJ, MNRAS)
- Serving as a reviewer for grant proposals (*Swift*, *Fermi*, *Hubble*, NASA Earth and Space Science Fellowship)
- Participating in the volunteer mentor program for Generation Hope (http://supportgenerationhope.org/home/)
- Participating in AAAS STEM volunteer program to support high school science classes/activities (https://www.aaas.org/programs/STEM-volunteers)

References

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