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Tarraneh Eftekhari

Center for Interdisciplinary Exploration and Research in Astrophysics (CIERA)
Northwestern University ⋄ 1800 Sherman Ave, 8th Floor ⋄ Evanston, IL 60201

EDUCATION

Harvard University 2021
Ph.D, Astronomy and Astrophysics
- Thesis: Unveiling the Transient Radio and Millimeter Sky
- Advisor: Edo Berger, Ph.D.

Harvard University 2017
M.A., Astronomy and Astrophysics

University of New Mexico 2015
B.S., Astrophysics, Minor in Mathematics, *Magna Cum Laude*

RELATED EMPLOYMENT

NASA Hubble Einstein Fellow (Northwestern University) 2022–

CIERA Postdoctoral Fellow (Northwestern University) 2021–2022

Content Developer (HarvardX) 2017–2020
- University Chemistry: Molecular Foundations and Global Frontiers
- Reclaiming Argument: An Introduction to Logical Reasoning
- The FDA and Prescription Drugs: Current Controversies in Context
- Science of the Physical Universe 30: Super-Earths and Life
- Fundamentals of Neuroscience Part 3: The Brain

Laboratory Assistant (Harvard University) 2015–2016
- Development of a Low-Noise Amplifier for the Large Aperture Experiment to Detect the Dark Ages
- Supervisor: Lincoln Greenhill, Ph.D.

Telescope Operator (Long Wavelength Array, University of New Mexico) 2013–2015

Summer Research Assistant (ASTRON) 2014
- Heliospheric Faraday Rotation from the Crab Pulsar
- Supervisor: Richard Fallows, Ph.D.

TEACHING & MENTORING

Research Advisor (Northwestern University) 2021 -
Yuxin Dong, Graduate Student
Potential Analogs of the First Repeating Fast Radio Burst

Head Teaching Fellow (Harvard University) Spring 2017, 2018, 2019
Science of the Physical Universe 22: From the Big Bang to the Brontosaurus and Beyond
Prof: Irwin Shapiro, Ph.D.

AWARDS

- NASA Hubble Fellowship Program Einstein Fellow 2022
- ALMA Ambassador 2021
  Organized and led a day long workshop on proposal preparation with ALMA, including lectures on mm interferometry
- CIERA Postdoctoral Fellowship 2021
- ALMA Cycle 7 Student Observing Support 2019
- ALMA Cycle 6 Student Observing Support 2018
- National Science Foundation Graduate Research Fellowship Honorable Mention 2017
- Harvard University Bok Center Certificate of Distinction in Teaching 2017
- La Serena School for Data Science Full Scholarship 2017
- New Mexico Space Grant Consortium Scholarship 2014
- University of New Mexico Undergraduate Research Award 2013

TELESCOPE TIME ALLOCATIONS (AS PI)

Very Large Array (VLA)	141.6 hr
Atacama Large Millimeter/submillimeter Array (ALMA)	39 hr
Very Long Baseline Array (VLBA)	3 hr
Arecibo	15 hr
Chandra *(Total Support Funding: $130,686 USD)*	190 ks
Submillimeter Array	7 tracks
Australia Telescope Compact Array	36 hours

OUTREACH AND SERVICE

- Seminar Coordinator, Astronomy Seminar, *CIERA, Northwestern University* 2022–
- Coordinator, Journal Club, *CIERA, Northwestern University* 2022–
- Co-chair for Academic Support Committee at Stateville Correctional Center, *Northwestern Prison Education Program* 2021–
- Member, *Fast and Fortunate for FRB Follow-up Collaboration* 2021–
  International collaboration for follow-up of fast radio bursts and their host galaxies
- Referee for *ApJ, ApJL, & MNRAS* 2019–
- Seminar Coordinator, *Beacon Hill Seminars* 2018–2020
- Speaker Chair and Blog Writer, *Harvard Science in the News* 2016–2019
- Mentor to first-year graduate students, *Harvard Astronomy* 2019
- Graduate student panelist, *Smithsonian Astrophysical Observatory Solar Physics REU* 2019
- Local Organizing Committee, *ComSciCon* 2018
- Poster Judge, *National Collegiate Research Conference* 2018
- Volunteer, *Cambridge Explores the Universe* 2018
- Peer Review Facilitator, *Chandra Cycle 19 Peer Review* 2017
- Graduate student panelist, *Wellesley College* 2017
- Mentor, *Science Club for Girls* 2016–2017
- Digital Mentor, *YouthAstroNet* 2016–2017
- Mentor, *Harvard University Women in Stem* 2016
- Telescope Operator, *University of New Mexico* 2013–2015

PROFESSIONAL DEVELOPMENT

ALMA Ambassador Training	2022
GROWTH Astronomy School: Follow up of transients in the era of multi-messenger astronomy	2019
ICRAR/CASS Radio School	2019
Jerusalem Winter School in Theoretical Physics, The Physics of Astronomical Transients	2018
La Serena School of Data Science: Applied Tools for Data Driven Sciences	2017

NRAO Synthesis Imaging Workshop 2014, 2016, 2022

INVITED TALKS

1. The Host Galaxies and Environments of Fast Radio Bursts 2022
   IAU Symposium 369: The Dawn Of Cosmology & Multi-Messenger Studies With Fast Radio Bursts
2. Extragalactic Transient Detection Rates with CMB-S4 2022
   Astrophysics with the CMB-S4 Survey – Part II: Source and Transient Science
3. Millimeter Transients in the Era of Next Generation CMB Surveys 2022
   Caltech Tea Talk
4. Late-time Radio and Millimeter Observations of Superluminous Supernovae 2021
   Pennsylvania State University Transients Group
5. Millimeter Transients in the Era of CMB-S4 2021
   CMB-S4 Spring 2021 Collaboration Meeting
6. An Overview of FRB Environments 2020
   The Astrophysics of Fast Radio Bursts, Flatiron Institute
7. Localizing Fast Radio Bursts and Their Host Galaxies 2019
   Toronto FRB Day, CITA/Dunlap Institute
8. Identifying the Host Galaxies of Fast Radio Bursts 2019
   FRBs and their Possible Neutron Star Origins, Amsterdam
9. A Radio Source Coincident with the Superluminous Supernova PTF10hgi 2019
   Columbia University, Department of Astronomy Pizza Lunch
10. A Radio Source Coincident with a Superluminous Supernovae 2019
    Institute for Theory and Computation Luncheon, Harvard University

PUBLIC TALKS

1. Uncovering the Mystery of Fast Radio Bursts 2022
   Amateur Astronomers, Inc
2. Uncovering the Mystery of Fast Radio Bursts 2022
   Astronomical Society of the Palm Beaches
3. Uncovering the Mystery of Fast Radio Bursts 2021
   Gloucester Area Astronomy Club
4. Uncovering the Mystery of Fast Radio Bursts 2018
   New Hampshire Astronomical Society

CONFERENCE CONTRIBUTIONS

1. Elucidating the Origin of Fast Radio Bursts with Radio and X-ray Observations *(Talk)* 2022
   NHFP Fellows Symposium
2. Extragalactic Millimeter Transients in the Era of Next-Generation CMB Surveys *(Talk)* 2022
   3rd URSI Atlantic Radio Science Meeting
3. Millimeter Transients in the Era of CMB Surveys *(Talk)* 2021
   Spoken-WERRD Symposium

4. Unveiling the Progenitors of Superluminous Supernovae with Radio and Millimeter Observations *(Talk)* 2020
Narayan Group Meeting, Center for Astrophysics | Harvard and Smithsonian

5. Unveiling the Progenitors of Superluminous Supernovae with Radio and Millimeter Observations *(Talk)* 2020
TUNA Talk, National Radio Astronomy Observatory

6. Late-time Radio Observations of Superluminous Supernovae: Implications for Central Engines and Fast Radio Bursts *(Talk)* 2020
Compact Objects Group Meeting, Flatiron Center for Computational Astrophysics

7. Late-time Radio and Millimeter Observations of Superluminous Supernovae and Long Gamma-ray Bursts *(Poster)* 2020
Royal Astronomical Society Early Career Poster Exhibition

8. Millimeter Transients with CMB-S4 *(Talk)* 2020
CMB-S4 Spring 2020 Collaboration Meeting, Lawrence Berkeley National Laboratory

9. Millimeter Transients in the Era of CMB Surveys *(Talk)* 2019
Astrophysics with the CMB-S4 Survey, University of Chicago

10. Tidal Disruption Events and Fast Radio Burst *(Talk)* 2018
Transients Group Meeting, CIERA Northwestern University

11. Radio Monitoring of the Tidal Disruption Event Swift J1644+57 *(Poster)* 2018
Jerusalem Winter School in Theoretical Physics, The Physics of Astronomical Transients

12. On the Association of Fast Radio Bursts and Their Hosts *(Talk)* 2017
Workshop on Fast Radio Bursts, McGill University

13. Multi-wavelength Monitoring of the Relativistic TDE Swift J1644+57 *(Poster)* 2017
American Astronomical Society 229th Meeting

14. Tidal Disruption Events: A Multi-Wavelength Approach *(Talk)* 2016
Time-Domain Astrophysics in the American Northeast

15. A Low Frequency Survey of Giant Pulses from the Crab Pulsar *(Poster)* 2015
American Astronomical Society 225th Meeting 2015

PUBLICATIONS

I have been an author on 42 publications (refereed/under review), including **8 first-author publications [172 total citations]**, and 1 second-author publication. A full listing of my publications can be found on the ADS.

FIRST AUTHOR PUBLICATIONS

1. *Extragalactic Millimeter Transients in the Era of Next Generation CMB Surveys*
T. Eftekhari, E. Berger, B. D. Metzger, et al.
2021, Submitted to ApJ, pp. 23 (arXiv: 2110.05494)

2. *Late-time Radio and Millimeter Observations of Superluminous Supernovae and Long Gamma-Ray Bursts: Implications for Obscured Star Formation, Central Engines, and Fast Radio Bursts*
T. Eftekhari, B. Margalit, C. M. B. Omand, et al.
2021, ApJ, 912, 21, pp. 23 (arXiv:2010.06612)

3. *Wandering Massive Black Holes or Analogs of the First Repeating Fast Radio Burst?*
T. Eftekhari, E. Berger, B. Margalit, B. D. Metzger, P. K. G. Williams
2020, Astrophysical Journal, 895, 98, pp. 10 (arXiv:2001.02688)

4. *A Radio Source Coincident with the Superluminous Supernova PTF10hgi: Evidence for a Central Engine and an Analogue of the Repeating FRB121102?*
T. Eftekhari, E. Berger, B. Margalit, et al.
2019, Astrophysical Journal Letters, 876, L10, pp. 10 (arXiv:1901.10479)

5. *Associating Fast Radio Bursts with Extragalactic Radio Sources: General Methodology and a Search for a Counterpart to FRB 170107*
T. Eftekhari, E. Berger, P. K. G. Williams, P. K. Blanchard
2018, Astrophysical Journal, 860, 73, pp. 9 (arXiv:1802.09525)

6. *Radio Monitoring of the Tidal Disruption Event Swift J164449.3+573451. III. Late-time Jet Energetics and a Deviation from Equipartition*
T. Eftekhari, E. Berger, B. A. Zauderer, et al.
2018, Astrophysical Journal, 854, 86, pp. 12 (arXiv:1710.07289)

7. *Associating Fast Radio Bursts with Their Host Galaxies*
T. Eftekhari & E. Berger
2017, Astrophysical Journal, 849, 162, pp. 7 (arxiv:1705.02998)

8. *A Low Frequency Survey of Giant Pulses from the Crab Pulsar*
T. Eftekhari, K. Stovall, J. Dowell, F. K. Schinzel, G. B. Taylor
2016, Astrophysical Journal, 829, 62, pp. 8 (arxiv:1607.08612)

SECOND AUTHOR PUBLICATIONS

1. *Radio Monitoring of the Tidal Disruption Event Swift J164449.3+573451. IV. The Slow Fade*
Y. Cendes, **T. Eftekhari**, E. Berger, E. Polisensky et al., 2021, ApJ, 908, 125

PUBLICATIONS AS NTH AUTHOR

1. *Chronicling the Host Galaxy Properties of the Remarkable Repeating FRB 20201124A*
W. Fong et al., 2021, arXiv:2106.11993

2. *The emergence of a new source of X-rays from the binary neutron star merger GW170817*
A. Hajela, et al., 2021, arXiv:2104.02070

3. *Probabilistic Association of Transients to their Hosts (PATH)*
K. Aggarwal, et al., 2021, ApJ, 911, 95

4. *A Late-Time Galaxy-Targeted Search for the Radio Counterpart of GW190814*
K. D. Alexander, et al., 2021, Accepted to ApJ

5. *Radio Observations of an Ordinary Outflow from the Tidal Disruption Event AT2019dsg*
Y. Cendes, et al., 2021, Accepted to ApJ

6. *The Broad-band Counterpart of the Short GRB 200522A at z=0.5536 : A Luminous Kilonova or a Collimated Outflow with a Reverse Shock?*
W. Fong et al., 2020, *Accepted to ApJ*

7. *The Tidal Disruption Event AT 2018hyz II: Light-curve modelling of a partially disrupted star*
S. Gomez, M. Nicholl, P. Short, R. Margutti, K. D. Alexander, P. K. Blanchard, E. Berger, **T. Eftekhari**, et al., 2020, MNRAS, 497, 1952

8. *AT 2018cow VLBI: No Long-Lived Relativistic Outflow*
M. F. Bietenholz, R. Margutti, D. Coppejans, K. D. Alexander, M. Argo, N. Bartel, **T. Eftekhari**, D. Milisavljevic, G. Terreran, E. Berger, 2020, MNRAS, 491, 4735

9. *Two years of non-thermal emission from the binary neutron star merger GW170817: rapid fading of the jet afterglow and first constraints on the kilonova fastest ejecta*
A. Hajela et al., 2019, ApJ, 886, L17

10. *A Galaxy-Targeted Search for the Optical Counterpart of the Candidate NS-BH Merger S190814bv with Magellan*
S. Gomez, G. Hosseinzadeh, P. S. Cowperthwaite, V. A. Villar, E. Berger, T. Gardner, K. D. Alexander, P. K. Blanchard, R. Chornock, M. R. Drout, **T. Eftekhari**, et al. 2019, ApJ, 884, L55

11. *The Optical Afterglow of GW170817: An Off-axis Structured Jet and Deep Constraints on a Globular Cluster Origin*
W. Fong, P. K. Blanchard, K. D. Alexander, J. Strader, R. Margutti, A. Hajela, V. A. Villar, Y. Wu, C. S. Ye, E. Berger, R. Chornock, D. Coppejans, P. S. Cowperthwaite, **T. Eftekhari**, et al. 2019, ApJL, 883, L1

12. *Follow-up of the Neutron Star Bearing Gravitational Wave Candidate Events S190425z and S190426c with MMT and SOAR*
G. Hosseinzadeh et al., 2019, ApJL, 880, L4

13. *An embedded X-ray source shines through the aspherical AT2018cow: revealing the inner workings of the most luminous fast-evolving optical transients*
R. Margutti et al., 2019, ApJ, 872, 18

14. *Unveiling the Engines of Fast Radio Bursts, Super-Luminous Supernovae, and Gamma-Ray Bursts*
B. Margalit et al., 2018, MNRAS, 481, 2407

15. *Spitzer Space Telescope Infrared Observations of the Binary Neutron Star Merger GW170817*
V. A. Villar, P. S. Cowperthwaite, E. Berger, P. K. Blanchard, S. Gomez, K. D. Alexander, R. Margutti, R. Chornock, **T. Eftekhari** G. G. Fazio, J. Guillochon, J. L. Hora, M. Nicholl, P. K. G. Williams, 2018, ApJL, 862, L11

16. *A Decline in the X-ray through Radio Emission from GW170817 Continues to Support an Off-Axis Structured Jet*
K. D. Alexander, R. Margutti, P. K. Blanchard, W. Fong, E. Berger, A. Hajela, **T. Eftekhari**, et al., 2018, ApJL, 863, 18L

17. *A Precise Distance to the Host Galaxy of the Binary Neutron Star Merger GW170817 Using Surface Brightness Fluctuations*
M. Cantiello et al., 2018, ApJ, 854, 31L

18. *The Binary Neutron Star event LIGO/VIRGO GW170817 a hundred and sixty days after merger: synchrotron emission across the electromagnetic spectrum*
R. Margutti et al., 2018, ApJ, 856, 18L

19. *Design and characterization of the Large-Aperture Experiment to Detect the Dark Age (LEDA) radiometer systems* D. Price et al., 2018, MNRAS, 478, 4193

20. *Improved Constraints on H0 from a combined analysis of gravitational-wave and electromagnetic emission from GW170817*
C. Guidorzi et al., 2017, ApJ, 851, 36L

21. *A gravitational-wave standard siren measurement of the Hubble constant*
B. P. Abbott et al., 2017, Nature, 551, 85

22. *The Electromagnetic Counterpart of the Binary Neutron Star Merger LIGO/VIRGO GW170817. II. UV, Optical, and Near-IR Light Curves and Comparison to Kilonova Models*
P. S. Cowperthwaite et al., 2017, ApJ, 848, 17L

23. *The Electromagnetic Counterpart of the Binary Neutron Star Merger LIGO/VIRGO GW170817. III. Optical and UV Spectra of a Blue Kilonova From Fast Polar Ejecta*
M. Nicholl et al., 2017, ApJ, 848, L18

24. *The Electromagnetic Counterpart of the Binary Neutron Star Merger LIGO/VIRGO GW170817. IV. Detection of Near-infrared Signatures of r-process Nucleosynthesis with Gemini-South*
R. Chornock et al., 2017, ApJ, 848, L19

25. *The Electromagnetic Counterpart of the Binary Neutron Star Merger LIGO/VIRGO GW170817. V. Rising X-ray Emission from an Off-Axis Jet*
R. Margutti et al., 2017, ApJ, 848, L20

26. *The Electromagnetic Counterpart of the Binary Neutron Star Merger LIGO/VIRGO GW170817. VI. Radio Constraints on a Relativistic Jet and Predictions for Late-Time Emission from the Kilonova Ejecta*
K. D. Alexander et al., 2017, ApJ, 848, L21

27. *The Electromagnetic Counterpart of the Binary Neutron Star Merger LIGO/VIRGO GW170817. VII. Properties of the Host Galaxy and Constraints on the Merger Timescale*
P. K. Blanchard et al., 2017, ApJ, 848, L22

28. *The Electromagnetic Counterpart of the Binary Neutron Star Merger LIGO/VIRGO GW170817. VIII. A Comparison to Cosmological Short-duration Gamma-ray Bursts*
W. Fong et al., 2017, ApJ, 848, L23

29. *Bifrost: a Python/C++ Framework for High-Throughput Stream Processing in Astronomy*
M. D. Cranmer, B. R. Barsdell, D. C. Price, J. Dowell, H. Garsden, V. Dike, **T. Eftekhari**, et al., 2017, JAI, 6, 1750007

30. *Empirical constraints on the origin of fast radio bursts: volumetric rates and host galaxy demographics as a test of millisecond magnetar connection*
M. Nicholl, P. K. G. Williams, E. Berger, V. A. Villar, K. D. Alexander, **T. Eftekhari**, B. D. Metzger, 2017, ApJ, 843, 84

31. *Bayesian Constraints on the Global 21-cm Signal from the Cosmic Dawn*
G. Bernardi, J. T. L. Zwart, D. Price, L. J. Greenhill, A. Mesinger, J. Dowell, **T. Eftekhari**, S. W. Ellingson, J. Kocz, F. Schinzel, 2016, MNRAS, 461, 3

32. *Digital Signal Processing using Stream High Performance Computing: A 512-input Broadband Correlator for Radio Astronomy*
J. Kocz, L. J. Greenhill, B. R. Barsdell, D. Price, G. Bernardi, S. Bourke, M. A. Clark, J. Craig, M. Dexter, J. Dowell, **T. Eftekhari**, et al., JAI, 2015, 4 50003

33. *Pulsar Observations Using the First Station of the Long Wavelength Array and the LWA Pulsar Data Archive*
K. Stovall, P. S. Ray, J. Blythe, J. Dowell, **T. Eftekhari**, A. Garcia, A.; T. J. W. Lazio, M. McCrackan, F. K. Schinzel, G. B. Taylor, ApJ, 2015, 808, 156