

Tansu Daylan

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POSITION

- Since June 2018, postdoctoral Kavli research fellow, MIT, Cambridge, MA, US

EDUCATION

- 2018, Ph.D in Physics, Harvard University, Cambridge, MA
- 2015, M.A. in Physics, Harvard University, Cambridge, MA
- 2013, B.S. in Physics, Middle East Technical University (METU), Ankara, Turkey
- 2012, B.S. in Electrical and Electronics Engineering, METU, Ankara, Turkey
- 2008, High school, Robert College, Istanbul, Turkey

RESEARCH

PhD advisor: Douglas P. Finkbeiner

Fields: astrophysics and statistics

Google Scholar link: <https://scholar.google.com/citations?user=1iduKLwAAAAJ&hl=en>

h-index: 8

Research interests:

- Bayesian inference, machine learning, modeling and analysis of large data sets
- cosmic-rays, dark matter, exoplanets, gravitational lensing

PUBLICATIONS

PAPERS

1. Rebekah I. Dawson, ..., **Tansu Daylan** et al., TOI-216b and TOI-216c: Two warm, large exoplanets in or slightly wide of the 2:1 orbital resonance. arXiv e-prints, page arXiv:1904.11852, Apr 2019. arXiv:1904.11852.
2. Liang Yu, ..., **Tansu Daylan** et al., Identifying Exoplanets with Deep Learning III: Automated Triage and Vetting of TESS Candidates. arXiv e-prints, page arXiv:1904.02726, Apr 2019. arXiv:1904.02726.
3. M. M. Fausnaugh, ..., **Tansu Daylan** et al., Early Time Light Curves of 18 Bright Type Ia Supernovae Observed with TESS. arXiv e-prints, page arXiv:1904.02171, Apr 2019. arXiv:1904.02171.
4. Nestor Espinoza, ..., **Tansu Daylan** et al., HD 213885b: A transiting 1-day-period super-Earth with an Earth-like composition around a bright ($V = 7.9$) star unveiled by TESS. arXiv e-prints, page arXiv:1903.07694, Mar 2019. arXiv:1903.07694.

5. Maximilian N. Guenther, ..., **Tansu Daylan** et al., A Super-Earth and two sub-Neptunes transiting the bright, nearby, and quiet M-dwarf TOI-270. arXiv e-prints, page arXiv:1903.06107, Mar 2019. arXiv:1903.06107.
6. L. G. Bouma, ..., **Tansu Daylan** et al., WASP-4b Arrived Early for the TESS Mission. , 157(6):217, Jun 2019. arXiv:1903.02573, doi:10.3847/1538-3881/ab189f.
7. Joseph E. Rodriguez, ..., **Tansu Daylan** et al., An Eccentric Massive Jupiter Orbiting a Subgiant on a 9.5-day Period Discovered in the Transiting Exoplanet Survey Satellite Full Frame Images. , 157(5):191, May 2019. arXiv:1901.09950, doi:10.3847/1538-3881/ab11d9.
8. Samuel N. Quinn, ..., **Tansu Daylan** et al., Near-resonance in a system of sub-Neptunes from TESS. arXiv e-prints, page arXiv:1901.09092, Jan 2019. arXiv:1901.09092.
9. Maximilian N. Guenther, ..., **Tansu Daylan** et al., Stellar Flares from the First Tess Data Release: Exploring a New Sample of M-dwarfs. arXiv e-prints, page arXiv:1901.00443, Jan 2019. arXiv:1901.00443.
10. Avi Shporer, ..., **Tansu Daylan** et al., TESS Full Orbital Phase Curve of the WASP-18b System. , 157(5):178, May 2019. arXiv:1811.06020, doi:10.3847/1538-3881/ab0f96.
11. E. F. Schlafly, ..., **Tansu Daylan** et al., The DECam Plane Survey: Optical Photometry of Two Billion Objects in the Southern Galactic Plane. , 234(2):39, Feb 2018. arXiv:1710.01309, doi:10.3847/1538-4365/aaa3e2.
12. **Tansu Daylan** et al., Probing the Small-scale Structure in Strongly Lensed Systems via Transdimensional Inference. , 854(2):141, Feb 2018. arXiv:1706.06111, doi:10.3847/1538-4357/aaa1e.
13. Stephen K. N. Portillo, Benjamin C. G. Lee, **Tansu Daylan**, and Douglas P. Finkbeiner. Improved Point-source Detection in Crowded Fields Using Probabilistic Cataloging. , 154(4):132, Oct 2017. arXiv:1703.01303, doi:10.3847/1538-3881/aa8565.
14. **Tansu Daylan**, Stephen K. N. Portillo, and Douglas P. Finkbeiner. Inference of Unresolved Point Sources at High Galactic Latitudes Using Probabilistic Catalogs. , 839(1):4, Apr 2017. arXiv:1607.04637, doi:10.3847/1538-4357/aa679e.
15. **Tansu Daylan**, Douglas P. Finkbeiner, Dan Hooper, Tim Linden, Stephen K. N. Portillo, Nicholas L. Rodd, and Tracy R. Slatyer. The characterization of the gamma-ray signal from the central Milky Way: A case for annihilating dark matter. Physics of the Dark Universe, 12:123, Jun 2016. arXiv:1402.6703, doi:10.1016/j.dark.2015.12.005.

PROCEEDINGS

16. S. Schael and the AMS Collaboration, Precision measurements of the electron spectrum and the positron spectrum with AMS, 33rd International Cosmic Ray Conference, Rio De Janeiro, 2013
17. J. Casaus and the AMS Collaboration, Determination of the positron anisotropy with AMS, 33rd International Cosmic Ray Conference, Rio De Janeiro, 2013
18. V. Choutko and the AMS Collaboration, Precision Measurement of the Cosmic Ray Helium Flux with AMS Experiment, 33rd International Cosmic Ray Conference, Rio De Janeiro, 2013
19. S. Haino and the AMS Collaboration, Precision measurement of the proton flux with AMS, 33rd International Cosmic Ray Conference, Rio De Janeiro, 2013

20. A. Oliva and the AMS Collaboration, Precision Measurement of the Cosmic Ray Boron-to-Carbon Ratio with AMS, 33rd International Cosmic Ray Conference, Rio De Janeiro, 2013
21. B. Bertucci and the AMS Collaboration, Precision measurement of the $e^+ + e^-$ spectrum with AMS, 33rd International Cosmic Ray Conference, Rio De Janeiro, 2013

SOFTWARE

- Probabilistic Cataloger (PCAT), a transdimensional, hierarchical, and Bayesian framework to sample from the posterior probability distribution of a metamodel, i.e., union of models with different dimensionality, given some data.
<https://github.com/tdaylan/pcat>
<http://pcat.readthedocs.io>

PROPOSALS

- Andrew Vanderburg
- Tom Evans

SERVICE

- Reviewer for NASA FDL2018
- Local Organizing Committee (LOC) member for the TESS Science Conference I
- Organizer of the MIT Exoplanet Journal Club
- Member of the organizer committee for the TUBITAK TBAE research schools Quantum: Applications and GW
- NOAO Telescope Allocation Committee member,
- Reviewer for the Hubble Space Telescope (HST) proposals,
- Reviewer for ApJ
- Member of the science council for the East Anatolian Observatory (DAG)

CODING SKILLS

- Unix-like operating systems, Python, IDL, C++
- TensorFlow, Numpy, Numba, PyCUDA
- Relational databases, SQL
- MATLAB, Mathematica
- Jekyll, HTML5, JavaScript, CSS

EXPERIENCE

- Autonomous robot design, real-time image processing for self-localization,
- Extensive modeling and analysis experience with astrophysical datasets such as Fermi-LAT, Chandra, HST, SDSS, DECam and AMS-02,
- Observing with the DECam on the 4m Blanco Telescope as part of DECam Plane Survey (DECaPS), 2016B-0279, CTIO, Cerro Tololo, Chile.

AWARDS AND ACHIEVEMENTS

- Translational Fellow MIT
- AAS Chambliss Honorable Mention (2015)
- WorldQuant Fellowship (2014-2015)
- Purcell Fellowship (2013-2014)
- First rank in the Senior Year Project Contest at the Bilkent University Physics Department (2013)
- Honorable Mention Award, Graduation project from the METU EEE Department (2012)
- Prof. Bülent Kerim Altay Award for the highest GPA in the class (twice, 2008 and 2009)
- Turkish Republic Prime Ministry Great Achievement Scholarship (2008-2012)
- Turkish Education Foundation Superior Success Scholarship (2008-2012)
- Fen Bilimleri (Technical Sciences) Scholarship (2008)
- Ranked 10th in the National University Entrance Examination among 1.5 million participants (2008)

TEACHING

- Spring 2019, , Guest Lecturer, MIT, Cambridge, MA
- Spring 2019, Doug's Astro, Guest Lecturer, Harvard, Cambridge, MA
- Fall 2016, Graduate Cosmology, Teaching Fellow, Harvard University, Cambridge, MA
- Spring 2015, The Energetic Universe, Teaching Fellow, Harvard University, Cambridge, MA
- Spring 2013, Fall 2012, Spring 2012, Modern Physics, Teaching Assistant, METU, Ankara, Turkey

MENTORING

- UROP MIT
- MIT MAP

SCIENCE OUTREACH

- Lecturer, The Project Science Voyagers, Turkish Ministry of Education, (2016-2019)
- Cambridge Explores the Universe, CfA, Cambridge, April 2016
- Ask a Scientist, Cambridge Science Festival, Cambridge, April 2016
- Sky & Space Day, Cambridge Science Festival, Cambridge, April 2015
- Lecturer, Beacon Hill Seminars, Cambridge, MA, (2014-2016)
- Lecturer, Science In The News Public Science Lecture Series, Cambridge, MA, (2014-2016)
- Guest Author, Science In The News Blog, Cambridge, MA, 2014
- Lecturer, "There is a Scientist In My Classroom" Project, Cambridge, MA, 2013
- Museum guide, Mobile CERN exhibition, METU, Ankara, Turkey, 2012
- First Lego League mentor
- Science and Utopia, Tree of Evolution,

AFFILIATIONS

- American Astronomical Society, 2014 -
- American Physical Society, 2014 -
- Sigma XI Society, 2014 - 2015
- Associate member, CERN, Geneva, Switzerland, 2011 - 2013
- AMS-02 Collaboration, Geneva, Switzerland, 2011 - 2013

NONACADEMIC INTERESTS

- Lifelong aviator, holding a Private Pilot License
- Amateur radio operator, holding a ham radio license
- Partner dances: Tango and Bachata

TALKS

- *Hunting for exoplanets with TESS*, Sabancı University, İstanbul, Turkey, 17 April 2019
- *A transdimensional perspective on dark matter*, METU, Ankara, Turkey, 16 April 2019
- *TESS ile Ötegezegen Avı (Hunting for exoplanets with TESS)*, Ankara University, Ankara, Turkey, 15 April 2019
- *Hunting for exoplanets with TESS*, Robert College, İstanbul, Turkey, 12 April 2019
- *TESS ile Ötegezegen Avı (Hunting for exoplanets with TESS)*, Marmara University, İstanbul, Turkey, 11 April 2019

- *A transdimensional perspective on dark matter*, İstanbul University, İstanbul, Turkey, 10 April 2019
- *A transdimensional perspective on dark matter*, Boğaziçi University, İstanbul, Turkey, 10 April 2019
- *TESS phase curve of WASP-121b*, BAESM, Cambridge, MA, 5 April 2019
- *Probing the small-scale structure in strongly lensed systems via transdimensional inference*, JPL, Pasadena, CA, 4 March 2019
- *Recharacterization of previously known exoplanets in multi-sector TESS data*, AAS233, Seattle, WA, 6-10 January 2019
- *Highlights of Early Results - HATS13*, TESS Science Meeting 16, Cambridge, MA, 29 October 2019
- *PSF fitting with the TESS data*, TESS Science Meeting 15, Cambridge, MA, 6 August 2018
- *Probing the small-scale structure in strongly lensed systems via transdimensional inference*, TPS33, Bodrum, Turkey, 09 September 2017
- *Probing faint gamma-ray point sources in the inner Milky Way using PCAT*, TeVPA2017, Columbus, OH, 09 August 2017
- *Probing the GeV Excess using PCAT*, IDM2016, Sheffield, UK, 18 July 2016
- *Inference of Dim Gamma-Ray Point Sources Using Probabilistic Catalogues*, Dark Matter and Gamma Rays 2015, Obergurgl, Austria, 09 December 2015
- *Contribution of Dark Matter annihilations to the low-redshift metagalactic ionization rate*, DPF2015, Ann Arbor, MI, 06 August 2015
- *Can MSPs account for the gamma-ray excess in the inner Milky Way?*, EWASS2015, Tenerife, Spain, 25 June 2015
- *The Characterization of the Gamma-Ray Signal from the Central Milky Way*, Turkish Physical Society 31st International Physics Conference, Bodrum, Turkey, 23 July 2014
- *Scrutinizing the Diffuse Gamma-Ray Emission in the Inner Galaxy*, Astroparticle Physics 2014, Astroparticle Physics (TeVPA/IDM) 2014, Amsterdam, Netherlands, 26 June 2014
- *The Characterization of the Gamma-Ray Signal from the Central Milky Way*, Fermi Summer School, University of Delaware, Lewes, DE, 31 May 2014
- *Anomalous Gamma-Ray Emission from the Inner Galaxy*, Particle Seminar, Harvard University, Boston, MA, 07 May 2014
- *Photon Reconstruction In Calorimetric Mode*, AMS Collaboration Meeting, CERN, Geneva, Switzerland, 14 February 2013
- *Spacetime Around a Rotating Massive Object: Kerr Solution*, 27th International Physics Conference of Turkish Physical Society, Istanbul, Turkey, 15 September 2010
- *Hellenic Era Ancient Greek Thoughts and Ideas*, Lions Club Meeting, Istanbul, Turkey, 12 March 2007

POSTER PRESENTATIONS

- *Recharacterization of previously known exoplanets in multi-sector TESS data*, Kepler Science Conference V, Glendale, CA, 4-8 March 2019
- *Scrutinizing the unresolved x-ray background in the CDFS field via transdimensional sampling*, the 16th AAS HEAD Meeting, Sun Valley, ID, 20-24 August 2017
- *Inference of Dim Gamma-Ray Point Sources Using Probabilistic Catalogues*, the 227th AAS Meeting, Kissimmee, FL, 07 January 2016
- *Inference of Dim Gamma-Ray Point Sources Using Probabilistic Catalogues*, 6th Fermi Symposium, Arlington, VA, 08 November 2015
- *Contribution of GeV Scale Dark Matter Annihilations to the Cosmic Ultraviolet Background*, the 225th AAS Meeting, Seattle, WA, 06 January 2015
- *GeV excess electrons upscattering the CMB: a possible resolution to the "Photon Underproduction Crisis"*, 5th Fermi Symposium, Nagoya, Japan, 20 October 2014
- *The Characterization of the Gamma-Ray Signal from the Central Milky Way*, Sackler Conference, Cambridge, MA, 19 May 2014

SUMMER SCHOOLS AND OTHER CONFERENCES

- 27 May - 06 June 2014, Fermi Summer School 2014, Lewes, DE
- 28 May - 01 June 2013, Recent Developments in High Energy Physics and LHC, METU NCC, Cyprus
- 01 - 06 July 2012, Lindau Nobel Laureates Meeting, Lindau, Germany
- June - August 2011, Summer school on particle physics, CERN, Geneva, Switzerland
- June 2010, Summer school on nonrelativistic quantum mechanics, Bilkent University, Ankara, Turkey
- June - July 2007, Summer Research Program, Koç University, Istanbul, Turkey