Dr. Catherine Elena Fielder

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EDUCATION

2014 – 2022 **Doctor of Philosophy in Physics**
Department of Physics and Astronomy
University of Pittsburgh

2014 – 2016 **Master of Science in Physics**
Department of Physics and Astronomy
University of Pittsburgh

2010 – 2014 **Bachelor of Science in Physics**
MAGNA CUM LAUDE, PHI BETA KAPPA, SIGMA PI SIGMA, DEANS LIST
Department of Physics
Texas Tech University

RESEARCH EXPERIENCE

2022 – PRESENT
TUCSON, AZ
Postdoctoral Research Associate; Supervisor: Dr. Dave Sand
Steward Observatory, *The University of Arizona*
Prepared observations for and collected/analysed data on dwarf galaxies from a number of telescopes and instruments.
Conducted multi-wavelength analysis of and searches for globular cluster populations in tidally influenced ultra-diffuse galaxies, using both ground-based and space-based data.
Collaborated on a CNN-driven search and led follow-up of semi-resolved dwarf galaxies.
Performed a variety of photometric analyses focused on stellar populations within dwarf galaxies/dwarf stellar halos.

2015 – 2022
PITTSBURGH, PA
Graduate Research Assistant; Adviser: Dr. Jeff Newman, Co-Adviser: Dr. Andrew Zentner
Dept. of Physics and Astronomy, *The University of Pittsburgh*
Constructed a Gaussian Process Regression model to predict Milky Way photometric properties via measured physical parameters, trained on a large sample of local galaxies in order to obtain the first long baseline SED of the Milky Way.
Built an empirically driven linear fitting technique in order to obtain IR K-corrections for low-redshift galaxies.
Manipulated numerous sets of simulation data on determining dark matter halo property correlations with rank correlation measures and built a Poisson maximum likelihood model with robust regression techniques.
Worked with large scale data analysis on clustered hardware to construct halo mass distributions from particles, performed least squares fitting to numerous analytic prescriptions, and assessed fit quality with statistical measures.

SUMMER 2014
LOS ALAMON, NM
Post Baccalaureate Researcher; Adviser: Dr. Wesley Even
Los Alamos National Laboratory
Core developer for a Python software package on analyzing opacities in modeled supernova ejecta.
Used data analysis techniques and tools to study and visualize low-luminosity simulated supernovae with various Nickel enhancement, and constructed templates to be included in the supernova database.

2012 – 2014
LUBBOCK, TX
Undergraduate Researcher; Adviser: Dr. Tom Maccarone
Department of Physics and Astronomy, *Texas Tech*
Utilized data mining techniques and data frame analysis in order to search for unique binary systems in the Milky Way.

TEACHING AND MENTORING EXPERIENCE

PROJECT MENTOR, PHD STUDENT — Lorena Mezini, Exploring subhalo effects on host halo properties, fall 2021 to present

TEACHING ASSISTANT
Astro 087: Basics of Space Flight (University of Pittsburgh, fall 2014, spring 2015)
Astro 088: Stonehenge to Hubble (University of Pittsburgh, spring 2018)
Phys 0111: Introduction to Physics 2 (University of Pittsburgh, spring 2015)

TEACHING FELLOW — Astro 087 and Astro 088 (University of Pittsburgh, fall 2018)

GUEST LECTURE — AstroPGH Research Seminar "A Beginner's Guide to LaTeX" (University of Pittsburgh, July 1, 2020)

SKILLS

CODING LANGUAGES	Python, IDL, Bash, SQL, C
MARKUP & TYPESETTING	LaTeX, HTML/CSS, Markdown
ASTRONOMICAL TOOLS	AstroPy, DOLPHOT, Gemini DRAGONS, PhotUtils, SourceExtractor, DS9
DATA SCIENCE & ANALYSIS	NumPy, pandas, matplotlib, seaborn, Jupyter, SciPy
MACHINE LEARNING PACKAGES	scikit-learn, GPyTorch, PyTorch, GPflow, TensorFlow
SOFTWARE & DEVELOPMENT TOOLS	Unix/Linux command line, Git, GitHub, Make
STATISTICAL & MODELING SKILLS	Bayesian inference, MCMC, maximum likelihood estimation, error propagation, model fitting, hypothesis testing, dimensionality reduction
SPOKEN LANGUAGES	English, Japanese (competent)
OBSERVING	Keck DEIMOS, Keck Observatory Magellan Baade IMACS, Las Campanas Observatory Magellan Clay MegaCam, Las Campanas Observatory Magellan Clay IFUM, Las Campanas Observatory Kuiper 61", Steward Observatory Green Bank Telescope Observer Training Workshop, Fall 2017 WIYN 3.5m telescope, Kitt Peak National Observatory Observational Techniques course at TTU with 12" and 20" telescopes at the Preston Gott Observatory

AWARDED TELESCOPE TIME

NASA Keck/DEIMOS - 25A
Magellan IMACS - 24A, 24B, 25A
Magellan Megacam - 23A, 23B
Magellan IFUM - 23A, 23B, 24A
MMT Binospec IFU - 24A
LBT LBC - 25A
VLA Directors Discretionary Time - 9hrs. 23A

OUTREACH

Speaker for Astronomy on Tap (Fall 2018)
High School Visit Lecture (Oct. 2019)
Guest lecture on astrophysics research for the Avonworth High School visit to the Pitt Physics and Astronomy department.
High School Class Lecture (March 2020, March 2023)
Guest lecture on dark matter at Shadyside Academy.
Society of Physics Students Research Lecture (Sept. 2020)
Guest lecture on astrophysics research for the Pitt Society of Physics students.
Society of Physics Students Student Mentor (Fall 2020)
Through the Women and Minorities in Physics group I mentored undergraduate students with a research interest in astronomy.
ACCelerate Festival (April 8-10 2022)
At this outreach festival at the Smithsonian we presented a booth on making the largest map of the Universe with DESI.
Steward Observatory Public Lecture Series (Jan. 30 2023)
Dissertation Workshop Panelist (March 21, 2024)
Senior Citizen Public Lecture at St. Luke's Home (April 21 2023, June 2024)
Senior Citizen Public Lecture at Hacienda at the River (Twice Jan. 2025)
Conference for Undergraduate Women in Physics (Jan. 21 2024)
Panelist and talk judge.

SERVICE

AAS Chambliss Poster Judge (AAS 243 Jan. 2024; AAS 245 Jan. 2025)
HST Cycle 32 External Panelist (2024)
HST Cycle 32 External Panelist (2025)
JWST Cycle 4 External Panelist (2024)

PRESENTATIONS

INVITED TALKS

DESC Dark Matter Telecon – January 22, 2025
AAS Winter 2025 Press Release – January 16, 2025
Astronomy Lunch Seminar, The University of Pittsburgh – October 25, 2024
CCAPP/OSU Seminar Series – January 30, 2024
Lunch Seminar, University of St Andrews – July 25, 2023
Survey Group Meeting, Fermilab – July 12, 2023
STScI/JHU Galaxies & AGN Seminar – April 11, 2023
Astronomy Seminar, The University of Surrey – Oct. 27, 2022
Hot Topics Seminar, The University of Toledo – Feb. 11, 2022
Physics and Astronomy Colloquium, The University of Utah – Jan. 20, 2022
Galaxies/ISM Group Talk, The Ohio State University – Oct. 6, 2020

CONTRIBUTED TALKS

FLASH Talk Series, NOIRLab – January 31, 2025
AAS Winter 2025 – January 16, 2025
Small Galaxies Cosmic Questions II, Durham, United Kingdom – July 2024
Rubin Community Workshop – July 2024
AAS Winter 2024 – January 10, 2024
MWAG X MaNGA SciCon 1 – November 29, 2021
SDSS-IV Collaboration Meeting – August 2021
Linking the Galactic and Extragalactic, University of Sydney – Dec. 2020
Lunch Talk Series, National Radio Astronomy Observatory/University of Virginia – Oct. 27, 2020
Morning Astro Tea, Sydney Institute for Astronomy/The University of Sydney – Oct. 26, 2020
Talk Series, International Centre for Radio Astronomy Research, Australia – Oct. 22, 2020
Galaxy Lunch, Yale University – Oct. 21, 2020
Astronomy Seminar, Vanderbilt University – Oct. 16, 2020
Astronomy Seminar, New Mexico State University – Oct. 5, 2020
SDSS-IV Collaboration Meeting – June 2020
Great Lakes Cosmology Workshop 12, Rochester Institute of Technology, Rochester USA – Aug. 2019
Great Lakes Cosmology Workshop 11, Mc Master University, Hamilton, Ontario Canada – 2016

POSTER PRESENTATIONS

KICP Workshop – Dwarf Galaxies, Star Clusters, and Streams in the LSST Era, Chicago, Illinois – July 2024
Small Galaxies Cosmic Questions, Durham, United Kingdom – July 2019
Dark Matter 2018, Kingston, Ontario Canada – 2018

DEPARTMENTAL TALKS

Steward Research Seminar – April 2024
Steward Journal Club – Sept. 2022
Steward Internal Symposium – Oct. 2022, April 2024
Pitt Astro Student Seminar – March 2021, Sept. 2020, Dec. 2019, May 2019, Dec. 2018, Dec. 2017

PUBLICATIONS (7 FIRST AUTHOR, 10+ CONTRIBUTING AUTHOR)

LEAD AUTHOR

Fielder, C. E.; Sand, D; Jones, M. G; et al. 2025. Accepted by *The Astronomical Journal*
Streams, Shells, and Substructures in the Accretion-Built Stellar Halo of NGC 300.

Fielder, C. E.; Jones, M. G.; Sand, D; et al., 2024. *The Astronomical Journal*, 168(5), 212
All Puffed Up: Exploring Ultra-diffuse Galaxy Origins through Galaxy Interactions.

Fielder, C. E.; Jones, M. G.; Sand, D; et al., 2023. *The Astrophysical Journal Letters*, 954(2), L39
The Disturbed and Globular-cluster-rich Ultradiffuse Galaxy UGC 9050-Dw1.

Fielder, C. E.; Andrews, B. H.; Newman, J. A.; et al., 2023. *Monthly Notices of the Royal Astronomical Society,* 525(1), 1023-1038
Empirically-driven multiwavelength K-corrections at low redshift.

Fielder, C. E.; Newman, J. A.; Andrews, B. H.; et al., 2021. *Monthly Notices of the Royal Astronomical Society* 508(3), 4459-4483.
Constraining the Milky Way's ultraviolet to infrared SED with Gaussian process regression.

Fielder, C. E.; Mao, Y.; Zentner, A. R.; Newman, J. A.; et al., 2020. *Monthly Notices of the Royal Astronomical Society*, 499(2), 2426–2444.

Illuminating dark matter halo density profiles without subhaloes.

Fielder, C. E.; Mao, Y.; Newman, J. A.; Zentner, A. R.; et al., 2019. *Monthly Notices of the Royal Astronomical Society*, 486(4), 4545-4568.
Predictably missing satellites: subhalo abundances in Milky Way-like haloes.

COLLABORATIONS

DELVE-Deep
MADCASH
SEAMLESS
SDSS-IV Milky Way as a Galaxy and Milky Way Analogs Working Groups: Group Co-chair
SDSS-IV MaNGA H1 Follow-up Team
DESI - Outreach Committee

REFERENCES

Dr. David Sand
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EMPLOYER Department of Astronomy & Steward Observatory
University of Arizona
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POSITION Assistant Professor
EMPLOYER Department of Astronomy and Astrophysics
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EMPLOYER Department of Physics and Astronomy
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Dr. Jeffrey Newman
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