Natalia Guerrero

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Research Objective

To identify potential exoplanet candidates (TESS Objects of Interest) for follow-up towards the TESS level 1 science requirement (to measure masses for 50 planets with $R_p < 4R_\odot$)

Education

Royal Holloway University of London — Egham, Surrey, UK
Candidate for Master of Philosophy in Physics by Research — **Oct. 2014-Feb. 2016**

- Advisor: Prof. Jocelyn Monroe

Massachusetts Institute of Technology — Cambridge, MA
Bachelor of Science, Physics — **June 2014**

- Advisors: Dr. Peter Dourmashkin and Prof. Joseph Formaggio

Research Experience

MIT Kavli Institute for Astrophysics, Cambridge, MA
Research associate — **February 16, 2016 - present**

- TESS Objects of Interest Manager for the NASA TESS (Transiting Exoplanet Satellite Survey) mission, PI Dr. George Ricker
- Manages TESS Objects of Interest working group
- Designed workflow, software tools, and staffing plan to create TESS Objects of Interest list from TESS data
- Designed and operated extended camera testing for TESS flight spare camera.
- Measured focus shift and thermal and optical performance of four TESS flight cameras
- Coordinates press requests and acts as MIT-TESS communications point-of-contact between MIT, NASA and other stakeholders
- Curates @TESSatMIT Twitter account with over 19k followers

MIT Laboratory for Nuclear Science, Cambridge, MA
Graduate research assistant — **October 5, 2014 - February 15, 2016**

- Research student for Prof. Jocelyn Monroe on 1 m^3 prototype of DMTPC (Dark Matter Time Projection Chamber) experiment at MIT
- Designed and fabricated a 48" diameter triple-layer mesh charge amplification plane for installation in DMTPC vacuum vessel
- Operated 1 m^3 detector in R&D mode to acquire CF_4 gas gain data with Fe-55 and Am-241 sources and to measure voltage breakdown threshold in amplification region
- Integrated waveform digitizer output of charge amplification into existing data acquisition software for readout of CCD images of amplification plane

SNOLAB, Sudbury, Ontario, Canada
UROP student — **January 6, 2014 - January 31, 2014**

- Research student for Dr. Kim Palladino on MiniCLEAN experiment
- Organized all low-background radioisotope assay data for materials in MiniCLEAN inner vessel and prepared samples of remaining materials for future assays in SNOLAB Ge detector.
- Assisted with "first light" operation and data acquisition of MiniCLEAN detector, including installing Ar gas manifold and creating descriptive schematics,

debugging noise in DAQ electronics, and inspecting intital PMT events in event viewer
- Created safety and emergency shutdown documentation for MiniCLEAN inner vessel, Ar gas manifold system, and DAQ.

SNOLAB, Sudbury, Ontario, Canada
UROP student **June 10, 2013 - July 16, 2013**
- Research student for Dr. Kim Palladino on MiniCLEAN experiment
- Assisted with leak-checking and cleaning MiniCLEAN inner vessel for installation of light guides
- Inventoried light guide parts and cleaned photomultiplier tubes in preparation for light guide assembly and installation
- Assisted with installation of data acquisition hardware and controls

Lowell Observatory, Flagstaff, AZ
Student researcher **January 6 - 26, 2013**
- Student researcher for Dr. Amanda Bosh in MIT course 12.411 Astronomy Field Camp
- Reduced spectrogaph data of asteroid 24 Themis to extract variations in asteroid spectrum over rotational period
- Operated the 72" Perkins telescope to acquire CCD images of nebulae, galaxies, and star clusters

Massachusetts Institute of Technology, Cambridge, MA
UROP student **September 2012-May 2013**
- Research student for Prof. Joseph Formaggio and Dr. Kim Palladino in Neutrino and Dark Matter Group at MIT Laboratory for Nuclear Science
- Oversaw machinist fabrication of neutron source enclosure
- Assisted with testing of neutron calibration system with source installed in enclosure

Massachusetts Institute of Technology, Cambridge, MA
UROP student **June 2012 - August 2012**
- Summer research student for Prof. Joseph Formaggio and Dr. Kim Palladino in Neutrino and Dark Matter Group at MIT Laboratory for Nuclear Science
- Designed and drafted CAD drawings for an enclosure for a neutron calibration source to be used in the MiniCLEAN direct dark matter detector

Massachusetts Institute of Technology, Cambridge, MA
UROP student **October 2011-May 2012**
- Research student for Prof. Enectali Figueroa-Feliciano at MIT Kavli Institute
- Prepared dilution refrigerator and internal electronics for testing CDMS phonon detectors to be used in Ricochet, a neutrino detection experiment

Computer Skills
Languages: Python, bash, HTML, LaTeX
GitHub: github.com/namagu

Talks

Contributed Talks

- Guerrero, Natalia, et al. "TESS Objects of Interest Catalog" MAST TESS Data Workshop, Baltimore, MA, February 12, 2019
- Guerrero, Natalia, et al. "TESS Objects of Interest Catalog" 233rd American Astronomical Society Meeting, Seattle, WA, January 10, 2019
- Guerrero, Natalia, et al. "TOI Process Update" TESS Science Team Meeting 16, Cambridge, MA, October 29, 2018
- Guerrero, Natalia et al. "TOI Process" TESS Science Team Meeting 15, Cambridge, MA, August 6, 2018
- Guerrero, Natalia et al. "Finding Objects of Interest in the TESS Data" TESS Science Team Meeting 14, Cambridge, MA, February 1, 2018

Public/Outreach Talks

- Guerrero, Natalia "Searching for Exoplanets with TESS" Changwon Science High School visit, Cambridge, MA, October 23, 2018
- Guerrero, Natalia "Searching for Exoplanets with TESS" Explo at Yale (remote), New Haven, CT, July 27, 2018
- Guerrero, Natalia "Searching for Exoplanets with TESS" MIT Warrior Scholar Project, Cambridge, MA, July 20, 2018
- Guerrero, Natalia "Searching for Exoplanets with TESS" Applied Physics of Eindhoven University of Technology visit, Cambridge, MA, July 17, 2018
- Guerrero, Natalia "Searching for Exoplanets with TESS" Dexter Southfield GAINS program, Brookline, MA, April 24, 2018
- Guerrero, Natalia "Searching for Exoplanets with TESS" St. Andrew Catholic School, Orlando, FL, April 20, 2018

Posters

- Guerrero, Natalia, et al. "TESS Objects of Interest" Coolstars 20, Boston, MA, July 2018
- Guerrero, Natalia, et al. "TESS Objects of Interest" 231st American Astronomical Society Meeting, National Harbor, MD, January 2018

Outreach

SXSW 2019, Austin, TX
March 2019
- Successfully proposed, coordinated, and participated in panel "Hi, Neighbor! Exoplanet Discoveries by NASA's TESS" for Intelligent Futures track of SXSW 2019

Tech Boston Academy STEAM Career Symposium, Dorchester, MA
November 2018
- Shared the day-to-day experience of being an exoplanets astronomer with small groups of 9-12th grade students

Communicating Science at MIT, Cambridge, MA
August 2018
- Facebook Live interview with Gabi Serrato Marks on exoplanet science

TESS Launch, Cape Canaveral, FL
April 16-18 2018

- Provided live coverage post-launch on NASA TV
- Fielded questions as part of the Reddit AMA (Ask Me Anything) with the TESS team
- Appeared on NASA Edge TV show pre-launch for a 20-minute interview on the TESS spacecraft
- Briefed social media science communicators on the TESS spacecraft at the NASA Social event
- Appeared on Spanish-language media outlets (TV, radio) for live shots pre-launch
- Represented the TESS Science Office in interviews with journalists covering the TESS launch

Cambridge Science Festival, Cambridge, MA
April 2018
- Coordinated TESS outreach at MIT Kavli Institute booth for the Cambridge Science Festival Science Carnival

observe@MIT, Cambridge, MA
August 2017
- Astronomy ambassador as part of MIT observing event for the August 21 solar eclipse
- Demonstrated how to use eclipse glasses, camera obscura, and solar telescopes to observe the eclipse

Gique, Cambridge, MA
April 2016 - April 2018
- Engaged children and parents in STEAM (science, technology, engineering, art, math) through typography at several science community outreach events
- Danced STEM concepts as an assistant instructor for the Science Can Dance! program
- Mentored students learning HTML in a hands-on STEAM Workshop

MIT Undergraduate Women in Physics, Cambridge, MA

- Organized lab tours and guest speakers for PhysEx 2014, a day-long outreach event for high school girls interested in studying physics in university
- Participated as a panelist in an undergraduate experience Q&A session at PhysEx 2013

MIT Edgerton Outreach Center, Cambridge, MA

- Assistant Teacher, **September 2010-June 2014**
- Taught hands-on lessons in various STEM topics to students grades 4-8

Awards

American Physical Society Minority Scholarship Recipient, 2012-2013 and 2011-2012

Teaching Experience

Massachusetts Institute of Technology, Cambridge, MA
Teacher Assistant **February 2013-May 2013**
- **Hands-On Astronomy**
  An introduction to the background and techniques of contemporary observational astronomy taught by Dr. Amanda Bosh

Languages English, Spanish