Michael Scott Talbot

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Education

PhD in Physics, University of Utah **August 2021**

Milestone Masters in Physics, University of Utah **2019**

BS in Physics and Astronomy with Minor in Math, Northern Arizona University (Chairman Award) **2012**

AS, Dixie State University (Summa cum laude) **2009**

Research Experience

Postdoc, Dr. Leonidas Moustakas, 2016-2021
Origin Of The Universe, Astrophysics and Space Sciences, NASA Jet Propulsion Laboratory, Pasadena, California

- Following up on previously found lens samples to:
  - Improve lens and dynamic modeling.
  - Statistically map galaxy mass evolution to understand how galaxies form and evolve.

Graduate Research Assistant, Dr. Joel Brownstein, 2016-2021
Physics and Astronomy Department, University of Utah, Salt Lake City, Utah

- Created Spectroscopic Identification of Lensing Objects (SILO; Talbot et al. 2018, 2021, MNRAS submitted) software to find strong galaxy-galaxy gravitational lens candidates.
  - Adapted and improved upon a BELLS (Brownstein et al. 2012) single-fiber spectroscopic detection methodology to also scan integral field systems (IFS) for spatially dependent detections, including:
    - Inspection of narrowband and low-resolution images to identify lensed features.
    - Inspection of many new quality assurance observables of the signal to better identify real signals.
    - Determine if spatially dependent detections are near the projected strong lensing regime computed both from dynamical mass modeling of IFS kinematics and stellar*NFW dark matter fraction.
  - Created a strong lensing probability simulator for MaNGA and eBOSS targets within SDSS-IV (Talbot, et al, MNRAS submitted).
    - Includes ray-tracing sources from lens mass models and convolving flux to determine fiber magnification
- Found 1,551 strong lens candidates within ~2 million BOSS+eBOSS galaxies of SDSS-IV.
  - ~1/3 of candidates demonstrate indications of lensing.
- Found ~100 strong lens candidates within ~10,000 MaNGA galaxies of SDSS-IV.
- Helped classify hundreds of stellar spectra (Yan et al. 2019).

- Produced several SDSS value-added-catalogues (VAC data; https://dr16.sdss.org/sas/dr16/manga/spectro/specz/v2_4_3/1.0.1, https://dr16.sdss.org/sas/dr16/eboss/spectro/lensing/silo/v5_13_0/v5_13_0/1.0.1/).
- Contributed enough data management and research to be a co-author on four SDSS-IV data releases (Abolfathi et al. 2018, Aguado et al. 2019, Ahumada et al. 2020, Accetta, et al. in prep).
- Presented results at five SDSS conferences.

Undergraduate Research Assistant, Dr. Nadine Barlow, 2011-2012
Physics and Astronomy Department, Northern Arizona University, Flagstaff, Arizona

- Catalogued erosion morphology and features of ~10,000 craters on Mars via JMARS, MRO, and Odyssey THEMSIS satellite data.
- Projected ancient Mars environments from erosion morphology.
- Presented research at 2012 Undergraduate Research Conference (Southern Utah University) and at Northern Arizona University.

Undergraduate Research Assistant, Andrew B. Christensen, 2007-1010
Science Department, Dixie State University

- Sub-lead a research team to study the Earth's ionosphere.
    - Created many MATLAB programs to study temperature, Earth's magnetic field, OII, NII, density, and other trends in the Ionosphere via the Global Ultraviolet Imager data from the TIMED spacecraft.
    - Presented ionosphere periodic variation correlations to solar coronal hole mass ejections at two Small Satellite Conferences (Utah State University) and one Undergraduate Research Conference (Southern Utah University).

Additional Computer Experience

Data Management for SDSS-IV, Dr. Joel Brownstein, Dr. Michael R. Blanton, 2016-2020

- Created and operated monitoring software (~40 python files) to plot ~1,000,000,000 Nginx and Rsync hits, data activity, and other users statistics across the Science Archive Server (SAS) for SDSS-IV and Marvin.
- Wrote and test code for many SDSS related tasks.
- Archived properties and locations of files on the SAS into PSQL database.
- Updated hundreds and populated several web pages.
- Communicated with the data management team on maintenance tasks.

Updated Lens Candidate/Confirmed Database for JPL/NASA and public, Dr. Leonidas Moustakas, 2021

- Created a journal parser to update the Master Lens Database (MLD) with ~11,000 galaxy/cluster scale lenses/candidates.
- Altered and updated a second version of the MLD to expand its usability to the public.

Skills

- Experienced/educated in galaxy/stellar spectra and strong gravitational lensing.
- Nine years in:
    - Research
    - Software development
    - Testing software
    - Mining/managing large datasets
- Coding experience in:
    - Python (5 years)

    - PSQL (5 years)
    - Bash (5 sparse years)
    - IDL (sparse 5 years)
    - MATLAB (3 years 7 years ago)
    - MySQL (A sparse year)
    - C++ (Educated)
    - IRAF (Educated)
    - Web documentation updates and migration (5 sparse years)
    - Batch cluster utilization (5 sparse years)
- Worked within several teams across ~10 research/work positions.
- Sub-lead several work and research teams.
- Gave ~10 talks and poster presentations.

Publications

- "SDSS-IV MaNGA: A Catalogue of Spectroscopically Detected Strong Galaxy-Galaxy Lens Candidates", **Michael S. Talbot**, Joel R. Brownstein, Justus Neumann, Daniel Thomas, Claudia Maraston, Niv Drory, MNRAS submitted (2021)
- "The Sixteenth Data Release of the Sloan Digital Sky Surveys: First Release from the APOGEE-2 Southern Survey and Full Release of eBOSS Spectra", Romina Ahumada, et al., ApJS 249, 3 (2020)
- "The Completed SDSS-IV extended Baryon Oscillation Spectroscopic Survey: A Catalogue of Strong Galaxy-Galaxy Lens Candidates", **Michael S. Talbot**, Joel R. Brownstein, Kyle S. Dawson, Jean-Paul Kneib, Julian Bautista, MNRAS 502, 4617T (2021)
- "SDSS-IV MaStar -- A Large and Comprehensive Empirical Stellar Spectral Library: First Release", Yan Renbin, et al., ApJ 883, 175Y (2019)
- "The Fifteenth Data Release of the Sloan Digital Sky Surveys: First Release of MaNGA Derived Quantities, Data Visualization Tools and Stellar Library", David S. Aguado, et al., ApJS, 240, 23 (2019)
- "SDSS-IV MaNGA: the spectroscopic discovery of strongly lensed galaxies", **Michael S. Talbot**, Joel R. Brownstein, Adam S. Bolton, Kevin Bundy, Brett H. Andrews, Brian Cherinka, Thomas E. Collet, Anupreeta More, Surhud More, Alessandro Sonnenfeld, Simona Vegetti, David A. Wake, Anne-Marie Weijmans, Kyle B. Westfall, MNRAS 477, 195T (2018)
- "The Fourteenth Data Release of the Sloan Digital Sky Survey: First Spectroscopic Data from the extended Baryon Oscillation Spectroscopic Survey and from the second phase of the Apache Point Observatory Galactic Evolution Experiment", Bela Abolfathi, et al., ApJS, 235, 42 (2018)

Talks

- U HEAP seminar, Salt Lake City, Utah — Sep 2020
- SDSS-IV/V Collaboration Meeting in Gotham, New York (online) — June 2020
- U HEAP seminar, Salt Lake City, Utah — Sep 2019
- SDSS-IV/V Collaboration Meeting in Ensenada, Mexico — June 2019
- ISU Physics Department in Pocatello, Idaho — April 2019

- SDSS-IV/MaNGA Collaboration Meeting in Campeche, Mexico Dec 2017

References

- Joel Brownstein (joelbrownstein@astro.utah.edu, Data Scientist for SDSS-IV, creator of BELLS survey, and research advisor at University of Utah)
- Leonidas Moustakas (leonidas@jpl.nasa.gov, Section Manager at Jet Propulsion Laboratory at NASA, California Institute of Technology)
- Adam Bolton (adam.bolton@noirlab.edu, Associate Director for the Community Science and Data Center at NSF's NOIRLab, NOAO)
- Michael Blanton (michael.blanton@gmail.com, Director of SDSS-IV, New York University)
- Anne-Marie Weijmans (amw23@st-andrews.ac.uk, Reader, University of St Andrews)