Mehdi Rezaie

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■ Research Interests

Large-Scale Structure • 21 cm Cosmology • Neutrino Cosmology • Supernova Cosmology •
Deep Learning • High-Performance Computing

■ Academic Employment and Titles

Ohio University Graduate Research Assistant	2016-present
Ohio University Graduate Teaching Assistant	2015-2016
Sharif University of Technology Graduate Assistant	2012-2015
Asia Pacific Center for Theoretical Physics Research Assistant	2014-2015
Institute for Research in Fundamental Sciences Graduate Research Assistant	2013-2015

■ Education

Ph.D. candidate in Physics, Ohio University (OU), Athens, Ohio, USA   Sep 2015 - present
Current GPA: **3.8/4**, *Supervisor:* Prof. Hee-Jong Seo

M.Sc. in Physics, Sharif University of Technology (SUT), Tehran, Iran   Sep 2012 - Jun 2015
GPA: **18.46/20**, *Supervisors:* Prof. Mehdi Golshani (SUT), Prof. Yasaman Farzan (IPM[1])

Visiting Student, POSTECH[2], Pohang, South Korea   Sep 2014 - Mar 2015
Supervisor: Prof. Arman Shafieloo (KASI)

B.Sc. in Physics, Shahid Chamran University (SCU), Ahvaz, Iran   Sep 2008 - Jun 2012
GPA: **18.51/20**, Magna cum laude, *Supervisor:* Dr. Mohammad Sabaian (SCU)

■ Skills

- *Operating System*: Mac OS X, Linux, MS Windows
- *Software*: LaTeX, Gnuplot, MS Office, Tableau
- *Programming*: Python, Jupyter Notebook, Git, BASH, Julia, FORTRAN, C

■ Collaboration Membership

• SDSS-IV Extended Baryon Oscillation Spectroscopic Survey (eBOSS)
Galaxy Quasar Clustering working group (2017-present): I have worked on the identification
and mitigation of imaging systematics; helped with the quality assurance and tests of the sys-
tematics of the clustering catalogs of emission line galaxies (ELG) and quasars. I have also
provided a survey selection function to simulate imaging systematics in the mock ELG cata-
logs. Recently, my primary contribution concentrates on the mitigation of systematic error for
the DR16 quasar sample and the primordial non-Gaussianity measurement.

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[1]Institute for Research in Fundamental Sciences, `http://ipm.ac.ir/`

[2]Pohang University of Science and Technology, `http://postech.ac.kr/eng/`

• Dark Energy Spectroscopic Instrument (DESI)

Galaxy Quasar Clustering and Imaging Validation working groups (2016-present): I have contributed to the analysis centering around the characterization and mitigation of foreground contaminations in the photometric catalogs of emission line galaxies and luminous red galaxies from the DESI Legacy Surveys data. I have helped with observing for a total of 17 nights at the Kitt Peak National Observatory, Arizona. I have also been involved in the analysis of mock data (e.g., *quicksurvey* in 2017). My recent contribution focuses on the impact of imaging systematics on the measurements of baryon acoustic oscillations (BAO) and redshift-space distortions (RSD) with mock data.

▬▬▬▬ Honors and awards

Travel scholarship from the Rocky Mountain Advanced Computing Consortium, Boulder, CO	2019
Graduate Student of the Week, Ohio University Graduate Student Senate, Ohio University	2018
Travel grant from Ohio University Graduate Student Senate for the DESI meeting at LBNL, CA	2017
Travel-support award for the Blind Data Analysis Workshop, Stanford, CA	2017
Ranked among top 5% in my masters class, Sharif University of Technology	2015
Six-month Research Fellowship at the Asia Pacific Center for Theoretical Physics, Korea	2014
Scored full-mark in *GRE Physics* (990/990), 94 (% below)	2014
Ranked third among +8000 test-takers in the nationwide qualifying exam for M.Sc. in Physics	2012
Selected as distinguished undergraduate physics student for three consecutive years, SCU	2009-2012
Dean's list as top physics student, SCU	2009-2012
Ranked 1st in my undergraduate class (year), SCU	2012

▬▬▬▬ Talks

"*Application of Deep Learning in Cosmology*", Department of Physics, Sharif University of Technology, Tehran, Iran, June 16, 2019

"*Emission Line Galaxies photometric weights with neural networks*", eBOSS collaboration meeting, Paris France, Dec 10-14, 2018

"*Deep learning systematics mitigation method*", DESI spring collaboration meeting, Tucson AZ, May 22-25, 2018

"*Mitigation of photometric systematics in galaxy clustering*", DECam community science workshop, Tucson AZ, May 21-22, 2018

"*Mitigating systematic errors in galaxy surveys with artificial intelligence*", the Center of Cosmology and Astro Particle Physics, Ohio State University, Columbus OH, Mar 12-16, 2018

"*Identification and Mitigation of the systematics effects on galaxy clustering using Neural Networks*", DESI science workshop, SLAC Stanford CA, Dec 4-7, 2017

"*DECaLS systematics tests and data challenge mock test*", DESI collaboration meeting LBNL Berkeley, CA, Jun 19-23, 2017

"*Clustering results from quicksurvey2017*", DESI collaboration meeting, LBNL Berkeley, CA, Jun 19-23, 2017

"*DECaLS systematics on target densities*", DESI collaboration workshop, Ohio State University, Columbus OH, Dec 7-9 2016

Poster Presentations

"*Probing Dark Energy with Galaxy Clustering and Deep Learning*", Poster presentation at Rocky Mountain Advanced Computing Consortium, Boulder, Colorado, May 21-23, 2019

"*Probing Dark Energy with Galaxy Clustering and Deep Learning*", Poster presentation at Inspiring Curiosity — Student Expo, Ohio University, OH April 11, 2019

Teaching Experience

Science & Math tutor for Upward Bound program, Ohio Univ.   2015-2017
Helped high school students from Athens county with preparation for the SAT, Geometry, Math, Statistics exams.

TA for Physics 2001, Undergraduate course, Ohio Univ.   2015-2017
Taught Physics 2001 lab and helped with the recitation class for Physics 2001

TA for General Physics, Undergraduate course, Sharif Univ.   2013-2014
Organized and planned weekly homework assignments and midterm exams.

Teacher of High School Physics, *Soroush* High School, Tehran, Iran   2013-2014
Taught high school students problem-solving strategies on topics ranging from kinematics to thermodynamics.

TA for Classical Electrodynamics, Graduate course, Sharif Univ.   2013-2014
Organized and planned the weekly homework assignments and recitation class.

TA for General Physics Lab, Undergraduate course, Sharif Univ.   2012-2013
Taught the general physics lab for science & engineering major undergraduate students.

Community Involvement / Volunteer Work

- *Physics Open House*: demo of telescopes, Ohio University, OH   Nov 9, 2019
- *Math and Science Family Night*: demo of IR cameras, Coolville, OH   Oct 3, 2019
- *Family Science Saturday*: demo of electric currents, Ohio University, OH   Apr 7, 2018
- *Math and Science Family Night*: demo of electric charges, Coolville, OH   Mar 8, 2018
- *Science Night*: demo of angular momentum, Nelsonville, OH   Mar 1, 2018
- *Physics Open House*: demo of hovercraft, Ohio University, OH   Nov 4, 2017
- *State Science Day*: judging, Columbus, OH   May 14, 2016
- *District Science Day*: demo of conductivity, Ohio University, OH   Mar 12, 2016
- *Kids On Campus*: demo of conductivity, Trimble Middle School, OH   Jan 13, 2016

Publication list

First author papers:

- Rezaie, Mehdi et al., "*Improving Galaxy Clustering Measurements with Deep Learning: analysis of the DECaLS DR7 data*", arXiv:1907.11355, submitted to MNRAS

Collaboration papers:

- Dey, Arjun, et al. "*Overview of the DESI Legacy Imaging Surveys*" The Astronomical Journal 157.5 (2019): 168
- Khaledi-Nasab, Ali, et al. "*Linear and nonlinear tunable optical properties of intersubband transitions in GaN/AlN quantum dots in presence and absence of wetting layer*" Journal of the European Optical Society-Rapid publications 9 (2014)

Collaboration White papers:

- Aghamousa, Amir, et al. "*The DESI Experiment Part I: Science, Targeting, and Survey Design*" arXiv:1611.00036 (2016)
- Aghamousa, Amir, et al. "*The DESI Experiment Part II: Instrument Design*" arXiv:1611.00037 (2016)