

Vedant Chandra

Curriculum Vitae

+1 443 842 1362
vchandra@jhu.edu
vedantchandra.com
vedant-chandra
vedantchandra
vedantchandra

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Employment

- June, 2020 - **Research Intern**, Space Telescope Science Institute (STScI).
Present *Understanding star formation with the Hubble Space Telescope*
- November, 2018 - **Research Assistant**, Department of Physics & Astronomy, Johns Hopkins University.
Present *Characterizing white dwarf stars with atmospheric models and spectroscopic data.*
- June, 2020 - **Summer Fellow**, Institute for Data Intensive Engineering and Science (IDIES).
August, 2020 *Searching for the oldest and most metal-poor stars in the Universe.*
- January, 2019 - **Research Assistant**, Department of Biomedical Engineering, Johns Hopkins School of Medicine.
May, 2020 *Analyzing astronaut stress and performance during simulated spaceflight.*

Education

- 2017-Present **B.S. in Physics and Applied Mathematics**, Johns Hopkins University, Baltimore, MD, USA, (Minor in Space Sciences).
Advised by Professors Tobias Marriage, Beryl Castello, and Charles L. Bennett.

Awards and Honors

- 2020 **Sigma Pi Sigma**, JHU Department of Physics.
Elected to the national Physics honors society for strong academic achievement.
- 2020 **Summer Student Fellowship**, Institute for Data Intensive Engineering & Science.
Awarded a \$6000 grant for ongoing data-intensive research into metal-poor stars.
- 2019 **Provost's Undergraduate Research Award (PURA)**, JHU HOUR.
Awarded a \$3000 grant for ongoing research into white dwarf atmospheres.
- 2019 **Dean's Undergraduate Research Award (DURA)**, JHU URSCA.
Awarded a \$4500 grant for ongoing research into white dwarf binaries.
- 2017-2020 **Dean's List**, JHU Krieger School of Arts and Sciences.
GPA above 3.5/4.0 for 6/6 semesters.

Peer-Reviewed Publications

- [2] **Chandra, V.**, Hwang, H.C., Zakamska, N.L. & Cheng, S. 2020, "A Gravitational Redshift Measurement of the White Dwarf Mass-Radius Relation", *The Astrophysical Journal*, 899, 146
- [1] **Chandra, V.**, Hwang, H.C., Zakamska, N.L. & Budavari, T. 2020, "Computational Tools for the Spectroscopic Analysis of White Dwarfs", *Monthly Notices of the Royal Astronomical Society*, 497, 2688

Press

- August 29, 2020 **ScienceNews Magazine**, "Paradoxically, white dwarf stars shrink as they gain mass".

July 30, 2020 **JHU HUB**, "Johns Hopkins astrophysicists observe long-theorized quantum phenomena".

Software Development

wdtools, Computational tools to infer the atmospheric parameters of white dwarf stars from spectroscopic observations.

starwave, Fitting the stellar birth function of resolved stellar populations with approximate Bayesian computation (WIP).

Grant Allocations

April, 2020 **Space Telescope Science Institute**, *JWST Discretionary Fund (\$42,740)*.
"The Initial Mass Function of Resolved Stellar Populations in the Local Group"
PI: Mario Gennaro, Co-I: Vedant Chandra

Talks and Presentations

Invited Talks

July, 2020 **Space Telescope Science Institute**, *Summer Symposium*.

"Fitting the Stellar Birth Function of Resolved Stellar Populations with Approximate Bayesian Computation", 19:30 onwards.

August, 2019 **Space Telescope Science Institute**, *Summer Symposium*.

"White Dwarf Spectroscopy with Machine Learning", 21:00 onwards.

July, 2019 **Maryland Space Grant Consortium**, *Annual Symposium*.

"White Dwarf Astronomy with Machine Learning". (PDF)

Poster Presentations

January, 2020 **NASA**, *Human Research Program Investigators Workshop*.

"Multivariate Analysis of Human Health and Performance in Spaceflight Simulation"

October, 2019 **Institute for Data Intensive Engineering & Science**, *Annual Symposium*.

"Characterizing White Dwarf Spectra with Neural Networks"

April, 2019 **Johns Hopkins University**, *DREAMS Conference*.

"Hunting for Binary White Dwarf Stars with Spectroscopic Analysis"

Observatory Allocations

Principal Investigator

2020 **Apache Point Observatory**, *DIS Spectrograph*.

"Time-resolved Radial Velocities of Massive White Dwarfs in Close Binary Systems"
APO 4Q2020JH04

Co-Investigator

2020 **Gemini Observatory**, *GMOS Spectrograph*.

"Discovery of mass-dependent gravitational redshifts in white dwarfs"
PI: Hsiang-Chih Hwang; GN-2020A-FT-103, GS-2020A-FT-101

2020 **Apache Point Observatory**, *DIS Spectrograph*.

"Gravitational redshifts of white dwarfs"
PI: Hsiang-Chih Hwang; APO 1Q2020JH01

Undergraduate Research Mentorship

- Summer, 2020 **John Magardino**, "*Magnetic white dwarfs*", co-advisor with Professor Nadia Zakamska.
- Summer, 2020 **Felix Yu**, "*ML classification of WD spectra*", co-advisor with Professor Nadia Zakamska.
- 2019-2020 **Rebecca Mosier**, "*Feature extraction from physiological signals*", JHU Human Spaceflight Lab, co-advisor with Professor Mark Shelhamer.
- 2019-2020 **Jessica Nguyen**, "*Heartrate variability from wearable sensors*", JHU Human Spaceflight Lab, co-advisor with Professor Michael Rosen.

Teaching Experience

- Fall, 2018 **TA**, *Great Books at Hopkins*, JHU Literature & Philosophy.
- Summer, 2018 **TA**, *General Physics I*, JHU Physics & Astronomy.

Outreach

- 2018-2019 **Head of Logistics**, *JHU MedHacks Hackathon*.
- 2018-2019 **Volunteer**, *JHU Physics Department Spring Fair*.
- 2014-2018 **Contributing Writer**, space.stackexchange.com.

Skills

- **Programming Environments:** Python, UNIX, MATLAB, R, Julia, IRAF/PyRAF, cluster computing.
- **Research Experience:** White dwarfs, stellar binaries, resolved stellar populations, spaceflight physiology.
- **Techniques:** Stellar spectroscopy, signal processing, non-linear dynamics, (un)supervised machine learning, artificial neural networks, Bayesian simulations and inference.
- **Supercomputer Experience:** Blue Crab cluster at the Maryland Advanced Research Computing Center.

References

- Professor Nadia L. Zakamska, Johns Hopkins University (zakamska@jhu.edu)
- Dr Mario Gennaro, Space Telescope Science Institute (gennaro@stsci.edu)
- Professor Kevin C. Schlaufman, Johns Hopkins University (kschlaufman@jhu.edu)
- Professor Mark J. Shelhamer, Johns Hopkins University (mshelhamer@jhu.edu)