

# VEDANT CHANDRA

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## Professional Appointments

Graduate Student, Center for Astrophysics   Harvard & Smithsonian	2021–Present
Visiting Researcher, Max Planck Institute for Astronomy	2022–Present
Research Intern, Space Telescope Science Institute	2020–2021
Research Assistant, Johns Hopkins University	2018–2021

## Education

Harvard University	2021–Present
• A.M., Ph.D. Astronomy & Astrophysics (intended)	
Johns Hopkins University	2017–2021
• B.S. Physics & Applied Mathematics, minor in Space Sciences	

## Awards & Honors

James Mills Peirce Fellowship, Harvard University	2021
Chambliss Medal, American Astronomical Society	2021
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Summer Student Fellowship, JHU IDIES	2020
Provost's Undergraduate Research Award, JHU	2019
Dean's Undergraduate Research Award, JHU	2019
Dean's List 7/7 Semesters, JHU	2017-2021

## Grant Allocations

STScI JWST Discretionary Fund (\$42,740)	2020
• “The Initial Mass Function of Resolved Stellar Populations in the Local Group”	
• PI: Mario Gennaro, Co-I: Vedant Chandra	
Various Undergraduate Research Grants (\$13,500)	2019-2020
• PI: Vedant Chandra, Co-Is: Nadia Zakamska, Hsiang-Chih Hwang, Kevin C. Schlaufman	

## Talks and Presentations

Gaia XPloration Workshop, University of Cambridge	May, 2023
• “Mapping the Outer Halo of the Milky Way with XP”.	
Wide Field Spectroscopy vs Galaxy Formation Theory	March, 2023
• “The Three-Phase Birth of the Milky Way”.	
Disk Formation Workshop, UC Irvine	September, 2022
• “The Poor Old Heart of the Milky Way”.	
ITC Luncheon, Harvard-Smithsonian CfA	September, 2022
• “A Ghost in Boötes: The Least Luminous Disrupted Dwarf Galaxy”, <a href="#">video</a> .	

<b>Milky Way Meeting, MPA Heidelberg</b>	April, 2022
• “To 100 kpc and Beyond: The Outer Halo with RGB Stars”.	
<b>Online Meetings on Evolved Stars and Systems</b>	December, 2021
• “Detection of Circumstellar Material and Rotation in a Runaway SNIa Donor”, <a href="#">video</a> .	
<b>Institute for Advanced Study, Astrophysics Coffee</b>	October, 2021
• “Circumstellar Material and Surface Rotation in a Runaway SNIa Donor”	
<b>Space Telescope Science Institute, Summer Symposium</b>	July, 2020
• “Fitting the Stellar Birth Function of Resolved Stellar Populations with Approximate Bayesian Computation”, <a href="#">19:30 onwards</a> .	
<b>Space Telescope Science Institute, Summer Symposium</b>	August, 2019
• “White Dwarf Spectroscopy with Machine Learning”, <a href="#">21:00 onwards</a> .	
<b>Maryland Space Grant Consortium, Annual Symposium</b>	July, 2019
• “White Dwarf Astronomy with Machine Learning”.	
<b>Poster Presentations</b>	
<b>237th Meeting of the American Astronomical Society</b>	January, 2021
• “Resolved Stellar Populations in the Era of JWST and Roman”, <a href="#">iPoster</a>	
<b>IDIES and MINDS Annual Symposium</b>	October, 2020
• “Hunting for Metal-Poor Main-Sequence Stars in SDSS”, awarded Best Poster.	
<b>NASA HRP Investigators Workshop</b>	January, 2020
• “Multivariate Analysis of Human Health and Performance in Spaceflight Simulation”	
<b>IDIES Annual Symposium</b>	October, 2019
• “Characterizing White Dwarf Spectra with Neural Networks”	
<b>JHU DREAMS Conference</b>	April, 2019
• “Hunting for Binary White Dwarf Stars with Spectroscopic Analysis”	
<b>Selected Public Coverage</b>	
<b><a href="#">Quanta Magazine</a></b>	March, 2023
• “Astronomers Dig Up the Stars That Birthed the Milky Way”	
<b><a href="#">MPIA Press Release</a></b>	December, 2022
• “Astronomers identify the ancient heart of the Milky Way galaxy”	
<b><a href="#">ScienceNews Magazine</a></b>	November, 2022
• “A protogalaxy in the Milky Way may be our galaxy’s original nucleus”	
<b><a href="#">Anton Petrov (YouTube)</a></b>	October, 2022
• “Original Core of the Milky Way Galaxy Found Using Gaia Telescope”	
<b><a href="#">astrobites</a></b>	August, 2022
• “The Haunting of Boötes’ Backyard”	
<b><a href="#">ScienceNews Magazine</a></b>	August, 2020
• “Paradoxically, white dwarf stars shrink as they gain mass”	
<b><a href="#">JHU Press Release</a></b>	July, 2020
• “Johns Hopkins astrophysicists observe long-theorized quantum phenomena”	

## Observatory Allocations

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### Principal Investigator (15):

**MPG/ESO 2.2m, FEROS, 110 hours** 2023

- “The Enrichment History of the Ancient Milky Way”, co-PI with Hans-Walter Rix.

**Very Large Telescope, FLAMES/GIRAFFE, 75 hours** 2023

- “A Chemical Survey of the Milky Way’s Ancient Heart”.

**Magellan Observatory, MagE, 14 nights** 2022-2023

- “Surveying the Uncharted Outer Halo with MagE”.

**MMT Observatory, Hectochelle, 4 nights** 2022-2023

- “Stealth Galaxies in the Outskirts of the Milky Way”.

**Anglo-Australian Telescope, 2dF+AAOmega, 3 nights** 2022

- “New Structures in the Outskirts of the Milky Way”, co-PI with Yuan-Sen Ting.

**Gemini Observatory, GMOS, 30 hours** 2021-2022

- “A Long-period Cataclysmic Variable in NGC 2234”
- “A New Double-lined White Dwarf Binary from SDSS-V”
- “A Long-Period AM CVn Binary with an Unusual Composition”
- “Monitoring a Dynamic Gaseous Debris Disk around a White Dwarf”
- “A Short-period Double White Dwarf Binary from SDSS-V”
- “Double White Dwarf Binaries from SDSS-V”

**Apache Point Observatory, DIS & ARCTIC, 6 nights)** 2020-2021

- “Monitoring Circumstellar Debris around a Runaway SN Ia Donor”
- “Peculiar Hypervelocity Stars from Gaia EDR3”
- “Time-resolved RVs of Massive WDs in Close Binary Systems”

**Neils Gehrels Swift Observatory, UVOT, 1 hour** 2021

- “ToO: A 99-minute WD+WD Binary”, Co-PI with Gagik Tovmassian.

### Co-Investigator (9): (advisees are indicated with an asterisk)

**James Webb Space Telescope, NIRCAM, 48 hours** 2023

- “A Pristine IMF Probe of the Star-Forming Conditions in the Early Universe”, PI: Mario Gennaro
- “Does the Stellar Initial Mass Function Depend on Metallicity?”, PI: Roger Cohen

**Gemini Observatory, GMOS, 7 hours** 2023

- “The Fastest Stars in the Galaxy”, PI: Kareem El-Badry
- “Discovery of a rare massive double-lined WD binary”, PI: Gautham Pallathadka\*
- “Probing the Mass-Radius Relation of White Dwarfs With Wide Binaries”, PI: Stefan Arseneau\*

**Magellan Observatory, MagE, 7 nights** 2022

- “Bringing the Gaia Revolution to the Brink of our Galaxy”, PI: Rohan Naidu
- “The progenitors of extremely low-mass white dwarfs”, PI: Kareem El-Badry

**Apache Point Observatory, DIS, 3 nights** 2022

- “Astrophysics of Stellar Binaries”, PI: Nadia Zakamska
- “Following up Double White Dwarf Binaries found in SDSS-V”, PI: Nadia Zakamska

## Research Mentorship

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Nicole Crumpler (JHU PhD, WD EoS with SDSS-V)	2022-Present
Gautham Pallathadka (JHU PhD, WD binaries in SDSS-V)	2022-Present
Stefan Arseneau (JHU UG, gravitational redshift of binary WDs)	2022-Present

## Teaching

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Teaching Fellow, ASTRON 120: Stellar Physics, Harvard	Spring, 2023
Teaching Assistant, 360.133: Great Books at Hopkins, JHU	Fall, 2018
Teaching Assistant, 171.101: General Physics I, JHU	Summer, 2018

## Professional Service

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Referee, Monthly Notices of the Royal Astronomical Society	2022-Present
Representative, Harvard Astronomy Student-Faculty Council	2021-Present
Member, Sloan Digital Sky Survey V	2020-Present

## Outreach

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Executive Committee, CfA Social & Recreational Club	2021-Present
Head of Logistics, JHU MedHacks Hackathon	2018-2019
Volunteer, JHU Physics Spring Fair	2018-2019
Contributing Writer, <a href="https://space.stackexchange.com">space.stackexchange.com</a>	2014-2018

## References

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Charlie Conroy, Professor, Harvard University	PhD Advisor, <a href="mailto:cconroy@cfa.harvard.edu">cconroy@cfa.harvard.edu</a>
Hans-Walter Rix, Director, Max Planck Institute for Astronomy	Advisor, <a href="mailto:rix@mpia.de">rix@mpia.de</a>
Nadia L. Zakamska, Professor, Johns Hopkins University	Advisor, <a href="mailto:zakamska@jhu.edu">zakamska@jhu.edu</a>
Daniel J. Eisenstein, Professor, Harvard University	TAC Chair, <a href="mailto:deisenstein@cfa.harvard.edu">deisenstein@cfa.harvard.edu</a>
Charles R. Alcock, Professor, Harvard University	Teaching Reference, <a href="mailto:calcock@cfa.harvard.edu">calcock@cfa.harvard.edu</a>

23 refereed publications, 8 as lead-author. [h-index: 10](#).

### Lead-Author Publications

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8. **Vedant Chandra**, Rohan P. Naidu, Charlie Conroy, Ana Bonaca, Dennis Zaritsky, Phillip A. Cargile, Nelson Caldwell, Benjamin D. Johnson, Jiwon Jesse Han, and Yuan-Sen Ting (2023)  
“Discovery of the Magellanic Stellar Stream Out to 100 Kiloparsecs”  
*The Astrophysical Journal*, *submitted*
7. **Vedant Chandra**, Rohan Naidu, Charlie Conroy, Alexander P. Ji, Hans-Walter Rix, Ana Bonaca, Phillip A. Cargile, Jiwon Jesse Han, Benjamin D. Johnson, Yuan-Sen Ting, Turner Woody, Dennis Zaritsky (2023)  
“Distant Echoes of the Milky Way’s Last Major Merger”  
*The Astrophysical Journal*, *951*, 26
6. **Vedant Chandra**, Charlie Conroy, Nelson Caldwell, Ana Bonaca, Rohan P. Naidu, Dennis Zaritsky, Phillip A. Cargile, Jiwon Jesse Han, Benjamin D. Johnson, Joshua S. Speagle, Yuan-Sen Ting & Turner Woody (2022)  
“A Ghost in Boötes: The Least Luminous Disrupted Dwarf Galaxy”  
*The Astrophysical Journal*, *940*, 127
5. **Vedant Chandra**, Hsiang-Chih Hwang, Nadia L. Zakamska, Simon Blouin, Andrew Swan, Thomas R. Marsh, Ken J. Shen, Boris T. Gänsicke, J.J. Hermes, Odelia Putterman, Evan B. Bauer, Evan Petrosky, Vikram S. Dhillon, Stuart P. Littlefair & Richard P. Ashley (2022)  
“The SN Ia Runaway LP 398-9: Detection of Circumstellar Material and Surface Rotation”  
*Monthly Notices of the Royal Astronomical Society*, *512*, 6122
4. **Vedant Chandra**, Hsiang-Chih Hwang, Nadia L. Zakamska, Boris T. Gänsicke, J.J. Hermes, Axel Schwöpe, Carles Badenes, Gagik Tovmassian, Evan B. Bauer, Dan Maoz, Matthias R. Schreiber, Odette F. Toloza, Keith P. Knight, Hans-Walter Rix & Warren R. Brown (2021)  
“A 99-minute Double-lined White Dwarf Binary from SDSS-V”  
*The Astrophysical Journal*, *921*, 160
3. **Vedant Chandra** & Kevin C. Schlaufman (2021)  
“Searching for Low-mass Population III Stars Disguised as White Dwarfs”  
*The Astronomical Journal*, *161*, 197
2. **Vedant Chandra**, Hsiang-Chih Hwang, Nadia L. Zakamska & Sihao Cheng (2020)  
“A Gravitational Redshift Measurement of the White Dwarf Mass–Radius Relation”  
*The Astrophysical Journal*, *899*, 146
1. **Vedant Chandra**, Hsiang-Chih Hwang, Nadia L. Zakamska & Tamás Budavári (2020)  
“Computational Tools for the Spectroscopic Analysis of White Dwarfs”  
*Monthly Notices of the Royal Astronomical Society*, *497*, 2688

### Publications with Major Contributions

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5. Vadim A. Semenov, Charlie Conroy, **Vedant Chandra**, Lars Hernquist, and Dylan Nelson (2023)  
“Formation of Galactic Disks I: Why did the Milky Way’s Disk Form Unusually Early?”  
*The Astrophysical Journal*, *submitted*
4. Kareem El-Badry, Ken J. Shen, **Vedant Chandra**, Evan Bauer, Jim Fuller, Jay Strader, Laura Chomiuk, Rohan Naidu, Ilaria Caiazzo, Antonio C. Rodriguez, Pranav Nagarajan, Natsuko Yamaguchi, Zachary P. Vanderbosch, Benjamin R. Roulston, Jan van Roestel, Boris Gänsicke, Jiwon Jesse Han, Kevin B. Burdge, Alexei V. Filippenko, Thomas G. Brink, and WeiKang Zheng (2023)  
“The fastest stars in the Galaxy”  
*The Open Journal of Astrophysics*, *submitted*
3. René Andrae, Hans-Walter Rix, **Vedant Chandra** (2023)  
“Robust Data-driven Metallicities for 175 Million Stars from Gaia XP Spectra”  
*The Astrophysical Journal Supplement*, *in press*

2. Hans-Walter Rix, **Vedant Chandra**, René Andrae, Adrian M. Price-Whelan, David H. Weinberg, Charlie Conroy, Morgan Fouesneau, David W Hogg, Francesca De Angeli, Rohan P. Naidu, Maosheng Xiang & Daniela Ruz-Mieres (2022)  
“The Poor Old Heart of the Milky Way”  
*The Astrophysical Journal*, 941, 45
1. Evan B. Bauer, **Vedant Chandra**, Ken J. Shen & J.J. Hermes (2022)  
“Masses of White Dwarf Binary Companions to Type Ia Supernovae Measured from Runaway Velocities”  
*The Astrophysical Journal Letters*, 923, L24

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## Co-Authored Publications

10. Vadim A. Semenov, Charlie Conroy, **Vedant Chandra**, et al (2023)  
“Formation of Galactic Disks II: the Physical Drivers of Disk Spin-up”  
*The Astrophysical Journal*, *submitted*
9. Keith Inight, Boris T. Gänsicke, Axel Schwöpe, et al (2023)  
“Cataclysmic Variables from Sloan Digital Sky Survey V – the search for period bouncers continues”  
*Monthly Notices of the Royal Astronomical Society*, *submitted*
8. The SDSS-V Collaboration (2023)  
“The Eighteenth Data Release of the Sloan Digital Sky Surveys: Targeting and First Spectra from SDSS-V”  
*The Astronomical Journal*, *in press*
7. Jiwon Jesse Han, Charlie Conroy, Benjamin D. Johnson, et al (2022)  
“The Stellar Halo of the Galaxy is Tilted & Doubly Broken”  
*The Astronomical Journal*, 164, 249
6. Rohan P. Naidu, Charlie Conroy, Ana Bonaca, et al (2022)  
“Live Fast, Die  $\alpha$ -Enhanced: The Mass-Metallicity- $\alpha$  Relation of the Milky Way’s Disrupted Dwarf Galaxies”  
*The Astrophysical Journal*, *submitted*
5. Charlie Conroy, David H. Weinberg, Rohan P. Naidu, et al (2022)  
“Birth of the Galactic Disk Revealed by the H3 Survey”  
*The Astrophysical Journal*, *submitted*
4. Rohan P. Naidu, Alexander P. Ji, Charlie Conroy, et al (2022)  
“Evidence from Disrupted Halo Dwarfs that r-process Enrichment via Neutron Star Mergers is Delayed by  $\gtrsim 500$  Myrs”  
*The Astrophysical Journal Letters*, 926, L36
3. Jiwon Jesse Han, Rohan P. Naidu, Charlie Conroy, et al (2022)  
“A Tilt in the Dark Matter Halo of the Galaxy”  
*The Astrophysical Journal*, 934, 14
2. Hsiang-Chih Hwang, Yuan-Sen Ting, Charlie Conroy, et al (2022)  
“Wide binaries from the H3 survey: the thick disk and halo have similar wide binary fractions”  
*Monthly Notices of the Royal Astronomical Society*, 513, 754
1. Evan Petrosky, Hsiang-Chih Hwang, Nadia L. Zakamska, et al (2021)  
“Variability, periodicity and contact binaries in WISE”  
*Monthly Notices of the Royal Astronomical Society*, 503, 3975

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## Other Writing

4. Arjun Dey, Joan Najita, Carrie Fillion, et al (2023)  
“RomAndromeda: The Roman Survey of the Andromeda Halo”  
*NASA Roman Core Community Survey White Paper*

3. Jiwon Jesse Han, Arjun Dey, Adrian M. Price-Whelan, et al (2022)  
“NANCY: Next-generation All-sky Near-infrared Community surveyY”  
*NASA Roman Core Community Survey White Paper*
2. Charlie Conroy, Dan Fabricant, Nelson Caldwell, **Vedant Chandra**, et al (2022)  
“A Fast All-Sky Spectroscopic Survey to Discover the Nature of Dark Matter, Find the Edge of Galaxy Formation, and Map the Cold Gas Feeding the Milky Way”  
*CfA Science & Technology White Paper*
1. **Vedant Chandra** (2020)  
“Measuring the White Dwarf Mass-Radius Relation using Thousands of Stars”  
[astrobites](#)