

# VEDANT CHANDRA

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## Professional Appointments

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

## Education

Harvard University	2021–2026 (intended)
• A.M., Ph.D. Astronomy & Astrophysics	
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

Galaxy Coffee, MPA Heidelberg	June, 2024
• “The Milky Way’s Global Kinematic Response to the LMC”.	
The Milky Way Assembly Tale, INAF Bologna	May, 2024
• “The Uncharted Horizons of the Milky Way: From the Heart to the Halo”.	
Milky Clouds Above Manhattan, Flatiron Institute	February, 2024
• “Shakes, Wakes, and Streams: The XMC Influence to 100 kpc and Beyond”, <a href="#">video</a> .	
ITC Luncheon, CfA   Harvard & Smithsonian	February, 2024
• “The Three-Phase Evolution of the Milky Way” , <a href="#">video</a> .	

<b>Supernova Explosions (SNE<sub>x</sub>) Meeting</b> • “Hypervelocity Runaways from Type Ia Supernovae”.	November, 2023
<b>Central Halo Workshop, University of Cambridge</b> • “Chemodynamically Surveying the Ancient Heart of the Milky Way”.	September, 2023
<b>ITC Luncheon, CfA   Harvard &amp; Smithsonian</b> • “Discovery of the Magellanic Stellar Stream Out to 100 kpc”, <a href="#">video</a> .	September, 2023
<b>SDSS-V Collaboration Meeting</b> • “Mapping the Milky Way’s Outer Halo with SDSS-V”.	August, 2023
<b>Galaxy Coffee, MPIA</b> • “Discovery of the Magellanic Stellar Stream Out to 100 kpc”.	July, 2023
<b>Gaia XPloration Workshop, University of Cambridge</b> • “Mapping the Outer Halo of the Milky Way with XP”.	May, 2023
<b>Wide Field Spectroscopy vs Galaxy Formation Theory</b> • “The Three-Phase Birth of the Milky Way”.	March, 2023
<b>Disk Formation Workshop, UC Irvine</b> • “The Poor Old Heart of the Milky Way”.	September, 2022
<b>ITC Luncheon, CfA   Harvard &amp; Smithsonian</b> • “A Ghost in Boötes: The Least Luminous Disrupted Dwarf Galaxy”, <a href="#">video</a> .	September, 2022
<b>Milky Way Meeting, MPIA</b> • “To 100 kpc and Beyond: The Outer Halo with RGB Stars”.	April, 2022
<b>Online Meetings on Evolved Stars and Systems</b> • “Detection of Circumstellar Material and Rotation in a Runaway SNIa Donor”, <a href="#">video</a> .	December, 2021
<b>Institute for Advanced Study, Astrophysics Coffee</b> • “Circumstellar Material and Surface Rotation in a Runaway SNIa Donor”	October, 2021
<b>Space Telescope Science Institute, Summer Symposium</b> • “Fitting the Stellar Birth Function of Resolved Stellar Populations with Approximate Bayesian Computation”, <a href="#">19:30 onwards</a> .	July, 2020
<b>Space Telescope Science Institute, Summer Symposium</b> • “White Dwarf Spectroscopy with Machine Learning”, <a href="#">21:00 onwards</a> .	August, 2019
<b>Maryland Space Grant Consortium, Annual Symposium</b> • “White Dwarf Astronomy with Machine Learning”.	July, 2019
<b>Poster Presentations</b>	
<b>Milky Way Surveys Conference, Caltech</b> • “The Three-Phase Evolution of the Milky Way”	October, 2023
<b>237th Meeting of the American Astronomical Society</b> • “Resolved Stellar Populations in the Era of JWST and Roman”, <a href="#">iPoster</a>	January, 2021
<b>IDIES and MINDS Annual Symposium</b> • “Hunting for Metal-Poor Main-Sequence Stars in SDSS”, awarded Best Poster.	October, 2020
<b>NASA HRP Investigators Workshop</b> • “Multivariate Analysis of Human Health and Performance in Spaceflight Simulation”	January, 2020

## IDIES Annual Symposium

October, 2019

- “Characterizing White Dwarf Spectra with Neural Networks”

## JHU DREAMS Conference

April, 2019

- “Hunting for Binary White Dwarf Stars with Spectroscopic Analysis”

## Selected Press Coverage

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### Discovery of the Magellanic Stellar Stream ([Chandra et al 2023](#))

- [CfA Press Release](#), “Distant Stars Spotted for the First Time in the Vast Magellanic Stream”
- [Sky & Telescope Magazine](#), “Astronomers find stars cast away from Galactic neighbors”
- [New Scientist](#), “Stars found hidden in huge cloud wrapped around the Milky Way”
- [Anton Petrov](#), “Updates About Strange Structure Known as Magellanic Stream”

### Discovery of the ‘Poor Old Heart’ of the Milky Way ([Rix, Chandra et al 2022](#))

- [MPIA Press Release](#), “Astronomers identify the ancient heart of the Milky Way galaxy”
- [Quanta Magazine](#), “Astronomers Dig Up the Stars That Birthed the Milky Way”
- [ScienceNews Magazine](#), “A protogalaxy in the Milky Way may be our galaxy’s original nucleus”
- [Anton Petrov](#), “Original Core of Milky Way Galaxy Found Using Gaia Telescope”

### Discovery of ‘Specter’, the faintest known disrupted dwarf galaxy ([Chandra et al 2022](#))

- [astrobites](#), “The Haunting of Boötes’ Backyard”

### Novel measurements of the white dwarf mass-radius relation ([Chandra et al 2021](#))

- [JHU Press Release](#), “Johns Hopkins astrophysicists observe long-theorized quantum phenomena”
- [ScienceNews Magazine](#), “Paradoxically, white dwarf stars shrink as they gain mass”

## Observatory Allocations

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### Principal Investigator (16):

MPG/ESO 2.2m, FEROS, 250 hours

2023-2024

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

ESO Very Large Telescope, FLAMES/GIRAFFE, 75 hours

2023

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

Magellan Observatory, MagE, 19 nights

2022-2023

- “Surveying the Uncharted Outer Halo with MagE”
- “Stealth Galaxies in the Southern Outskirts of the Milky Way”

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”

<ul style="list-style-type: none"> <li>• “Double White Dwarf Binaries from SDSS-V”</li> </ul>	
<b>Apache Point Observatory, DIS &amp; ARCTIC, 6 nights)</b>	2020-2021
<ul style="list-style-type: none"> <li>• “Monitoring Circumstellar Debris around a Runaway SN Ia Donor”</li> <li>• “Peculiar Hypervelocity Stars from Gaia EDR3”</li> <li>• “Time-resolved RVs of Massive WDs in Close Binary Systems”</li> </ul>	
<b>Neils Gehrels Swift Observatory, UVOT, 1 hour</b>	2021
<ul style="list-style-type: none"> <li>• “ToO: A 99-minute WD+WD Binary”, Co-PI with Gagik Tovmassian.</li> </ul>	
<u>Co-Investigator (11): (advisees are indicated with an asterisk)</u>	
<b>ESO Very Large Telescope, X-Shooter, 8 hours</b>	2023
<ul style="list-style-type: none"> <li>• “The Fastest Stars in the Galaxy”, PI: Kareem El-Badry.</li> </ul>	
<b>CTIO Blanco, DECam, 54 nights</b>	2023
<ul style="list-style-type: none"> <li>• “The DECam MAGIC Survey: Mapping the Ancient Galaxy in CaHK”, PI: Anirudh Chiti.</li> </ul>	
<b>James Webb Space Telescope, NIRCAM, 48 hours</b>	2023
<ul style="list-style-type: none"> <li>• “A Pristine IMF Probe of the Star-Forming Conditions in the Early Universe”, PI: Mario Gennaro</li> <li>• “Does the Stellar Initial Mass Function Depend on Metallicity?”, PI: Roger Cohen</li> </ul>	
<b>Gemini Observatory, GMOS, 7 hours</b>	2023
<ul style="list-style-type: none"> <li>• “The Fastest Stars in the Galaxy”, PI: Kareem El-Badry</li> <li>• “Discovery of a rare massive double-lined WD binary”, PI: Gautham Pallathadka*</li> <li>• “Probing the Mass-Radius Relation of White Dwarfs With Wide Binaries”, PI: Stefan Arseneau*</li> </ul>	
<b>Magellan Observatory, MagE, 7 nights</b>	2022-2023
<ul style="list-style-type: none"> <li>• “Bringing the Gaia Revolution to the Brink of our Galaxy”, PI: Rohan Naidu</li> <li>• “The progenitors of extremely low-mass white dwarfs”, PI: Kareem El-Badry</li> </ul>	
<b>Apache Point Observatory, DIS, 3 nights</b>	2022
<ul style="list-style-type: none"> <li>• “Astrophysics of Stellar Binaries”, PI: Nadia Zakamska</li> <li>• “Following up Double White Dwarf Binaries found in SDSS-V”, PI: Nadia Zakamska</li> </ul>	
<b>Research Mentorship</b>	
<b>Riley Thai</b> (Monash UG, EMP stars from <i>Gaia</i> XP)	2024-Present
<b>Nicole Crumpler</b> (JHU PhD, WD EoS with SDSS-V)	2022-Present
<b>Gautham A. Pallathadka</b> (JHU PhD, WD binaries in SDSS-V, 1 paper)	2022-Present
<b>Stefan Arseneau</b> (JHU UG → BU PhD, gravitational redshift of binary WDs, 1 paper)	2022-Present
<b>Teaching</b>	
<b>Teaching Fellow, ASTRON 202a: Galaxies and Cosmology, Harvard</b>	Spring, 2024
<b>Teaching Fellow, ASTRON 120: Stellar Physics, Harvard</b>	Spring, 2023
<b>Teaching Assistant, 360.133: Great Books at Hopkins, JHU</b>	Fall, 2018
<b>Teaching Assistant, 171.101: General Physics I, JHU</b>	Summer, 2018

## Professional Service

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Deputy Project Scientist, <a href="#">Via Project</a>	2022-Present
Journal Referee (MNRAS, ApJS, A&A)	2022-Present
Faculty Search Committee, Harvard Astronomy	2023-2024
Lead Organizer, Harvard Astronomy Student-Faculty Forum	2023-2024
Representative, Harvard Astronomy Student-Faculty Council	2021-2023

## Outreach

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Representative, Astronomy Graduate Student Congress	2023-Present
Guest Speaker	2023-Present
<ul style="list-style-type: none"><li>• Gloucester Area Astronomy Club, 50 attendees (<a href="#">video</a>)</li><li>• The Shri Ram School, 200 high-school students</li></ul>	
Executive Committee, CfA Social & Recreational Club	2021-2023
Head of Logistics, JHU MedHacks Hackathon	2018-2019
Volunteer, JHU Physics Spring Fair	2018-2019
Contributing Writer, <a href="#">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>
Lars Hernquist, Professor, Harvard University	Teaching Reference, <a href="mailto:lhernquist@cfa.harvard.edu">lhernquist@cfa.harvard.edu</a>

35 refereed publications, 10 as lead-author, 2 as supervising author  
[h-index: 16](#), advisees are highlighted with an asterisk.

### Lead-Author Publications

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10. **Vedant Chandra**, Rohan P. Naidu, Charlie Conroy, et al (2024)  
“All-Sky Kinematics of the Distant Halo: The Reflex Response to the LMC”  
[The Astrophysical Journal, submitted](#)
9. **Vedant Chandra**, Vadim A. Semenov, Hans-Walter Rix, et al (2024)  
“The Three-Phase Evolution of the Milky Way”  
[The Astrophysical Journal, 972, 112](#)
8. **Vedant Chandra**, Rohan P. Naidu, Charlie Conroy, et al (2023)  
“Discovery of the Magellanic Stellar Stream Out to 100 Kiloparsecs”  
[The Astrophysical Journal, 956, 110](#)
7. **Vedant Chandra**, Rohan Naidu, Charlie Conroy, et al (2023)  
“Distant Echoes of the Milky Way’s Last Major Merger”  
[The Astrophysical Journal, 951, 26](#)
6. **Vedant Chandra**, Charlie Conroy, Nelson Caldwell, et al (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, et al (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, et al (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 as Co-Lead or Supervising Author

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5. Hans-Walter Rix, **Vedant Chandra**, Gail Zasowski, et al (2024)  
“The Extremely Metal Rich Knot of Stars at the Heart of the Galaxy”  
[The Astrophysical Journal, in press](#)
4. Stefan Arseneau\*, **Vedant Chandra**, Hsiang-Chih Hwang, et al (2024)  
“Measuring The Mass-Radius Relation of White Dwarfs Using Wide Binaries”  
[The Astrophysical Journal, submitted](#)
3. Gautham A. Pallathadka\*, **Vedant Chandra**, Nadia L. Zakamska, et al (2024)  
“Discovery of a proto-white dwarf with a massive unseen companion”  
[The Astrophysical Journal, submitted](#)
2. Hans-Walter Rix, **Vedant Chandra**, René Andrae, et al (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

## Co-Authored Publications

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20. Gagik Tovmassian, Keith Inight, Anna Francesca Pala et al (2024)  
“V498 Hya, a new candidate for a period bouncer Cataclysmic Variable”  
*Monthly Notices of the Royal Astronomical Society*, submitted
19. Jiwon Jesse Han, Charlie Conroy, Dennis Zaritsky et al (2024)  
“Our Halo of Ice and Fire: Strong Kinematic Asymmetries in the Galactic Halo”  
*The Astrophysical Journal*, submitted
18. Neige Frankel, Rene Andrae, Hans-Walter Rix, et al (2024)  
“What Does the Large Magellanic Cloud Look Like? It Depends on [M/H] and Age”  
*The Astrophysical Journal*, submitted
17. Logan Sizemore, Diego Llanes, Marina Kounkel, et al (2023)  
“A self-consistent data-driven model for determining stellar parameters from optical and near-IR spectra”  
*The Astrophysical Journal*, submitted
16. 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
15. Vadim A. Semenov, Charlie Conroy, **Vedant Chandra**, et al (2023)  
“Formation of Galactic Disks I: Why did the Milky Way’s Disk Form Unusually Early?”  
*The Astrophysical Journal*, 962, 18
14. Alexander P. Ji, Sanjana Curtis, Nicholas Storm, et al (2023)  
“Spectacular nucleosynthesis from early massive stars”  
*The Astrophysical Journal Letters*, 961, 25
13. Jiadong Li, Kaze W.K. Wong, David W. Hogg, et al (2023)  
“AspGap: Augmented Stellar Parameters and Abundances for 23 million RGB stars from Gaia XP low-resolution spectra”  
*The Astrophysical Journal Supplement*, submitted
12. Kareem El-Badry, Ken J. Shen, **Vedant Chandra**, et al (2023)  
“The fastest stars in the Galaxy”  
*The Open Journal of Astrophysics*, 6 (July)
11. Guilherme Limberg, Alexander P. Ji, Rohan P. Naidu, et al (2023)  
“Extending the Chemical Reach of the H3 Survey: Detailed Abundances of the Dwarf-galaxy Stellar Stream Wukong/LMS-1”  
*Monthly Notices of the Royal Astronomical Society*, submitted
10. René Andrae, Hans-Walter Rix and **Vedant Chandra** (2023)  
“Robust Data-driven Metallicities for 175 Million Stars from Gaia XP Spectra”  
*The Astrophysical Journal Supplement*, 267, 8
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*, 525, 3597
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*, 267, 44



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](#)

## Other Writing

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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\*](#)