

# 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-PI: Vedant Chandra	
Various Undergraduate Research Grants (\$13,500)	2019–2020
• PI: Vedant Chandra, Co-Is: Nadia Zakamska, Hsiang-Chih Hwang, Kevin C. Schlaufman	

## Invited Talks and Seminars

Wine & Cheese Seminar, Johns Hopkins University	September, 2024
Astrophysics Coffee, Johns Hopkins University	September, 2024
Astrophysics Coffee, The Institute for Advanced Study	September, 2024
Galaxy Coffee, Max Planck Institute for Astronomy	June, 2024
ITC Luncheon, CfA   Harvard & Smithsonian ( <a href="#">video</a> )	February, 2024
Supernova Explosions (SNE <sub>x</sub> ) Meeting	November, 2023
ITC Luncheon, CfA   Harvard & Smithsonian ( <a href="#">video</a> )	September, 2023
Galaxy Coffee, Max Planck Institute for Astronomy	July, 2023
ITC Luncheon, CfA   Harvard & Smithsonian ( <a href="#">video</a> )	September, 2022

Milky Way Meeting, Max Planck Institute for Astronomy	April, 2022
Online Meetings on Evolved Stars and Systems ( <a href="#">video</a> )	December, 2021
Astrophysics Coffee, Institute for Advanced Study	October, 2021
Contributed Conference Talks	

The Milky Way Assembly Tale, INAF Bologna	May, 2024
Milky Clouds Above Manhattan, Flatiron Institute ( <a href="#">video</a> )	February, 2024
Central Halo Workshop, University of Cambridge	September, 2023
SDSS-V Collaboration Meeting	August, 2023
Gaia XPloration Workshop, University of Cambridge	May, 2023
Wide Field Spectroscopy vs Galaxy Formation Theory	March, 2023
Disk Formation Workshop, UC Irvine	September, 2022
Space Telescope Science Institute, Summer Symposium ( <a href="#">19:30 onwards</a> )	July, 2020
Space Telescope Science Institute, Summer Symposium ( <a href="#">21:00 onwards</a> )	August, 2019
Maryland Space Grant Consortium, Annual Symposium	July, 2019

#### Poster Presentations

Milky Way Surveys Conference, Caltech	October, 2023
237th Meeting of the American Astronomical Society ( <a href="#">iPoster</a> )	January, 2021
IDIES and MINDS Annual Symposium	October, 2020
NASA HRP Investigators Workshop	January, 2020
IDIES Annual Symposium	October, 2019
JHU DREAMS Conference	April, 2019

#### Selected Press Coverage

##### 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”
- “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 (11): (advisees are indicated with an asterisk)

**ESO Very Large Telescope, X-Shooter, 8 hours** 2023

- “The Fastest Stars in the Galaxy”, PI: Kareem El-Badry.

**CTIO Blanco, DECam, 54 nights** 2023

- “The DECam MAGIC Survey: Mapping the Ancient Galaxy in CaHK”, PI: Anirudh Chiti.

**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** 2022-2023

- “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

<a href="#">Riley Thai</a> (Monash UG, EMP stars from <i>Gaia</i> XP)	2024-Present
Nicole Crumpler (JHU PhD, WD EoS with SDSS-V)	2022-Present
Gautham A. Pallathadka (JHU PhD, WD binaries in SDSS-V, 1 paper)	2022-Present
<a href="#">Stefan Arseneau</a> (JHU UG → BU PhD, gravitational redshift of binary WDs, 1 paper)	2022-Present

## Teaching

Teaching Fellow, ASTRON 202a: Galaxies and Cosmology, Harvard	Spring, 2024
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

Deputy Project Scientist, <a href="#">Via Project</a>	2022-Present
Journal Referee (1× MNRAS, 1× ApJS, 2× 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

Representative, Astronomy Graduate Student Congress	2023-Present
Guest Speaker	2023-Present
• Gloucester Area Astronomy Club, 50 attendees ( <a href="#">video</a> )	
• The Shri Ram School, 200 high-school students	
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

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>

37 refereed publications, 10 as lead-author, 6 as co-lead/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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6. Nicole Crumpler\*, **Vedant Chandra**, Nadia Zakamska, et al (2024)  
“Detection of the Temperature-dependence of the White Dwarf Mass-Radius Relation with Gravitational Redshifts”  
*The Astrophysical Journal*, *submitted*
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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21. Turner Woody, Charlie Conroy, Phillip Cargile et al (2024)  
“The Rapid Formation of the Metal Poor Milky Way”  
*The Astrophysical Journal*, *submitted*
20. Gagik Tovmassian, Keith Knight, 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 Schwobe, 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*