

# DEOVRAT PRASAD

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Physics and Astronomy  
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## RESEARCH INTERESTS

Feedback Processes in Galaxies, Groups and Clusters  
Galaxy Formation and Evolution  
Accretion onto Super Massive Black Holes  
Numerical Methods

## EMPLOYMENT

Postdoctoral Research Associate, November 2022 - June 2025, Cardiff University, Cardiff, UK

Postdoctoral Fellow, July 2018 - June 2022, Michigan State University, East Lansing, US

Research Associate, August 2017 - June 2018, Indian Institute of Science, Bangalore, India

## EDUCATION

**PhD, Astronomy and Astrophysics, CSIR Junior/Senior Research Fellow**

June 2018, Indian Institute of Science, Bangalore, India

Thesis:- AGN Feedback In Galaxy Clusters - Controlling cooling flows in galaxy clusters  
by momentum-driven AGN jets

Advisor :- Prateek Sharma, IISc Bangalore

**Integrated M.Sc. (5 year degree program), Physics, INSPIRE Fellow** CGPA - 7.9/10

2012, UM-DAE Center for Excellence in Basic Sciences, University of Mumbai, Mumbai, India

M.Sc. Thesis :- Study of Resonance Particles in Quantum Mechanics by Numerical Method

## AWARDS & FELLOWSHIPS

**INSPIRE fellowship**, 2007-12, Dept. Of Science and Technology, Govt. Of India.

**Certificate of merit**, National top 1%, National Graduate Physics Exam 2010

**CSIR NET fellowship**, 2012-2017, **24th All India Rank** in National Eligibility Test (June-2012)

**India Top Cited Author Award**, 2018 (for period 2015-2017), IOP Publishing | American Astronomical Society

## COMPUTING GRANTS

SCW (Hawk & Sunbird) :Studying the evolution of massive galaxies with cold-mode AGN feedback at low redshift, (**Co-PI, 1.0 million CPU hours**) Nov 2022 - Dec 2025

INCITE (Frontier - Oak Ridge Leadership Computing Facility) : Feedback and Energetics from Magnetized AGN Jets in Galaxy Groups and Clusters (**Co-PI, 630 K + 600 K GPU node hours**) Jan 2023 - Dec 2024

NSF XSEDE (Stampede & Expanse) : Probing Galaxy Formation at Low and High Redshifts  
( **Co-PI, 1.6 million CPU hours** ) Jan 2022 - Dec 2022

NSF XSEDE (Comet & Expanse) : Precipitation-Regulated AGN Feedback in Halos From  $10^{12} - 10^{15} M_{\odot}$  ( **PI, 2.05 million CPU hours** ) Jan 2021 - June 2022.

NSF XSEDE (Comet) : Precipitation-Regulated AGN Feedback in Halos From  $10^{12} - 10^{15} M_{\odot}$  ( **PI, 1.23 million CPU hours** ) July 2019 - June 2020.

### **REVIEW EXPERIENCE**

2025, subject matter expert reviewer for a publication in *Science*.

2025, subject matter expert reviewer for a publication in *The Astrophysical Journal*.

2024, subject matter expert reviewer for UKRI funded computing resources proposal.

2022, subject matter expert reviewer in a NASA peer review.

2018, subject matter expert reviewer for a publication in *MNRAS* journal.

### **TEACHING EXPERIENCE**

Guest Lecturer, Energy and Gas in Interstellar Space, Graduate Course, Cardiff University, Instructor Dr. Tim Davis (Spring semester 2024, 2025)

Co-Instructor, Introduction to Astrophysics, Undergraduate course, Cardiff University, Co-teaching with Dr. Mathew Smith ( Spring semester 2023, 2024)

Teaching Assistant, Electricity, Magnetism and Optics, Undergraduate course, IISc, taught by Dr. Tarun Deep Saini. (January - April, 2015)

Teaching Assistant, Fluids and Plasma, Graduate course, IISc, taught by Prof. Prateek Sharma. (August - November, 2014)

### **MENTORING EXPERIENCE**

Kobe Richards (Cardiff University), co-Mentoring, annual project, School of Physics and Astronomy, Cardiff University (September 2024 - May2025)

Sebastian Lacayo (Florida International University), co-mentoring, ACRES 2019 summer program, CMSE Department, Michigan State University (May-July 2019)

### **MAJOR COLLABORATIONS**

Feedback and Energetics from Magnetized AGN Jets collaboration at Michigan State University, US (2023 - ongoing).

Figuring Out Gas & Galaxies in Enzo (FOGGIE) collaborations at Space Telescope Science Institute, US (2019-2022)

### **PROGRAMMING EXPERIENCE**

Fortran77/95, C, C++, Python, Matlab, MPI

Research experience with Zeus-MP, Pluto, Enzo, AthenaPK and Arepo HD/MHD codes.

Experience of working on XSEDE, NASA, MSU, IISc and SCW high performance computing facilities.

Co-developer of Enzo code - mainly with implementing AGN feedback using “Active Particle” formulation.

Co-developer of PLUTO code - mainly with developing AGN feedback and Runge-Kutta-Legendre super-time-stepping method for implementing anisotropic thermal conduction.

## PRESENTATIONS

### Important conference presentations

Environmental effects on Black Hole Feedback Valve in Massive Galaxies, Resolving Galaxy Ecosystems Across All Scales, The Chinese University of Hong Kong, Hong Kong, December 2023. (**TALK**)

Environmental effects on Black Hole Feedback Valve in Massive Galaxies, 6th ICM Theory and Computation Workshop, Neils Bohr Institute, Copenhagen, Denmark, August 2022. (**TALK**)

AGN and Stellar Feedback in Galaxy Clusters, ASTRONUM-2019, Paris, France, July 2019 (**TALK**)

Role of BCG and AGN-driven Turbulence in Galaxy Cluster Evolution, SnowCluster - The Physics of Galaxy Clusters, Snowbird, Utah, US, March 2018 (**TALK**)

AGN Feedback in Galaxy Groups, The Physics of Groups and Galaxy Properties therein meeting, Institut d'Astrophysique de Paris (IAP) Paris, France, December 2016 (**TALK**)

### Other important presentations

Cool-Core Cycles : From Massive Galaxies to Galaxy Clusters, Raman Research Institute, Bangalore, January 2026 (**COLLOQUIUM**)

Environmental effects on Black Hole Feedback Valve in Massive Galaxies, Department of Physics, Indian Institute of Science, Bangalore, October 2022 (**COLLOQUIUM**)

Cool Core Cycles - AGN Feedback in Galaxy Groups and Clusters, Inter-University Centre for Astronomy and Astrophysics, Pune, September 2022 (**COLLOQUIUM**)

Cool Core Cycles - AGN Feedback in Galaxy Groups and Clusters, Department of Astronomy and Astrophysics, Tata Institute of Fundamental Research, Mumbai, September 2022 (**COLLOQUIUM**)

Environmental dependence of self-regulating black hole feedback in massive galaxies, HALO 2021, KITP, US, January-March 2021 (**SHORT VIDEO**)

Environmental effects on Black Hole Feedback Valve in Massive Galaxies, Astro Group Meeting, Centre for Computational Astrophysics, Faltiron Institute, October 2020 (**TALK**)

The Feedback Loop : Controlling cooling flows in galaxy clusters, Physics and Astronomy, Astronomy Colloquium, University of Notre-Dame, US, December 2018 (**COLLOQUIUM**)

## PUBLICATIONS

### Refereed Publications : Lead Author

XMAGNET : Kinetic, Thermal and Magnetic AGN Feedback in Massive Galaxies at Halo Masses  $\sim 10^{13.5} M_{\odot}$

**Deovrat Prasad**, Philipp Grete, Brian O'Shea, Forrest Glines, Mark Voit, Freeke van de Voort, Martin Fournier, and Ben Wibking, 2026, MNRAS, 545, 1-18

The Case for Hot-Mode Accretion in Abell 2029

**Deovrat Prasad**, Mark Voit and Brian O'Shea, 2024, MNRAS, 531, 259

Atmospheric Circulation in Simulations of the AGN-CGM Connection at Halo Masses  $\sim 10^{13.5} M_{\odot}$

**Deovrat Prasad**, Mark Voit and Brian O’Shea, 2022, ApJ, 932, 18

*Environmental Dependence of Self-Regulating Black-hole Feedback in Massive Galaxies*

**Deovrat Prasad**, Mark Voit, Brian O’Shea, and Forrest Glines, 2020, ApJ, 905, 50

*Cool-Core Cycles and Phoenix*

**Deovrat Prasad**, Prateek Sharma, Arif Babul, Mark Voit and Brian O’Shea, 2020, MNRAS, 495, 594

*Cool-Core Clusters : Role of BCG, Star Formation & AGN-Driven Turbulence*

**Deovrat Prasad**, Prateek Sharma, and Arif Babul 2018, ApJ, 863, 62

*AGN jets driven stochastic cold accretion in cluster cores*

**Deovrat Prasad**, Prateek Sharma, and Arif Babul, 2017, MNRAS, 471, 1531

*Cool core cycles: Cold gas and AGN jet feedback in cluster cores*

**Deovrat Prasad**, Prateek Sharma, and Arif Babul, 2015, ApJ, 811, 108

#### **Refereed Publications : Non-lead Author**

*XMAGNET: Velocity structure functions of AGN-driven turbulence in the multiphase intracluster medium*

Martin Fournier, Philipp Grete, Marcus Brüggen, Brian W. O’Shea, **Deovrat Prasad**, Benjamin D. Wibking, Forrest W. Glines, and Rajshekhar Mohapatra, 2025, A&A, 698, A121

*The XMAGNET Exascale MHD simulations of SMBH feedback in galaxy groups and clusters:*

*Overview and preliminary cluster results*

Philipp Grete, Brian W. O’Shea, Forrest W. Glines, **Deovrat Prasad**, Benjamin D. Wibking, Martin Fournier, Marcus Brüggen, and G. Mark Voit, 2025, ApJ, 988, 155

*A Black-Hole Feedback Valve in Massive Galaxies*

G. Mark Voit, Greg L. Bryan, **Deovrat Prasad**, Rachel Frisbie, Yuan Li, Megan Donahue, Brian W. O’Shea, Ming Sun, and Norbert Werner, 2020, ApJ, 899, 70

*Figuring Out Gas & Galaxies In Enzo (FOGGIE). IV. The Stochasticity of Ram Pressure Stripping in Galactic Halos*

Raymond C. Simons, Molly S. Peebles, Jason Tumlinson, Brian W. O’Shea, Britton D. Smith, Lauren Corlies, Cassandra Lochhaas, Yong Zheng, Ramona Augustin, **Deovrat Prasad**, Gregory F. Snyder, and Erik Tollerud, 2020, ApJ, 905, 167

*Scalable explicit implementation of anisotropic diffusion with Runge-Kutta-Legendre super-time-stepping*

Bhargava Vaidya, **Deovrat Prasad** Andrea Mignone , Prateek Sharma , Luca Rickler, 2017, MNRAS , 472, 3147

#### **Non-Refereed Publications : Astro2020 Science White Paper**

Circumgalactic Gas and the Precipitation Limit

G. M. Voit, A. Babul, Iu. Babyk, G. L. Bryan, H.-W. Chen, M. Donahue, D. Fielding, M. Gaspari, Y. Li, M. McDonald, B. W. O’Shea, **D. Prasad**, P. Sharma, M. Sun, G. Tremblay, J. Werk, N. Werner, and F. Zahedy, 2019, arXiv:1903.11212

**Complete list of papers can be accessed on :**

<https://ui.adsabs.harvard.edu/public-libraries/oczDkRSgS4uJgMWUz63qyg>

## **REFERENCES**

### **Mark Voit**

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### **Arif Babul**

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### **Freek van de Voort**

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