

# DEOVRAT PRASAD

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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 Fellow, November 2022 to present, Cardiff University, Cardiff, UK

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

## EDUCATION

**PhD, Astronomy and Astrophysics**, 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

**Integrated M.Sc. (5 year program)**, Physics, 2012, University of Mumbai, Mumbai, India

## FELLOWSHIPS

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

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

## COMPUTING GRANTS

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.

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 (Stampede & Expanse) : Probing Galaxy Formation at Low and High Redshifts

( **Co-PI, 1.6 million CPU hours** ) Jan 2022 - Dec 2022.

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

## **PROPOSAL REVIEW EXPERIENCE**

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

2019, subject matter expert reviewer for ACRES REU program by CMSE department at MSU.

## **TEACHING AND MENTORING EXPERIENCE**

Co-Instructor, **Introduction to Astrophysics**, Undergraduate course, Cardiff University, Co-teaching with Dr. Mathew Smith (January-May 2023)

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

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

Mentored one student through ‘ACRES 2019’ summer program, CMSE Dept., Michigan State University (May-July 2019)

## **MAJOR COLLABORATIONS**

Feedback and Energetics from Magnetized AGN Jets collaboration at Michigan State University, US.

Formerly part of Figuring Out Gas & Galaxies in Enzo (FOGGIE) collaborations at Space Telescope Science Institute, US.

## **PROGRAMMING EXPERIENCE**

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

Simulations experience 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**

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**

### **Lead Author Publications**

*The Case for Hot-Mode Accretion in Abell 2029*

Deovrat Prasad, Mark Voit and Brian O'Shea, 2023, <https://doi.org/10.48550/arXiv.2311.05704> (under review, submitted to MNRAS for publication)

*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

**Other Publications**

*A Black-Hole Feedback Valve in Massive Galaxies*

Voit, G. M. *et al.* (including **Prasad, D.** ) 2020, ApJ, 899, 70

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

Simons, R. C. *et al.* ( including **Prasad, D.** ) 2020, ApJ, 905, 167

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

Vaidya, B., **Prasad, D.** *et al.* 2017, MNRAS , 472, 3147

**REFERENCES**

**Mark Voit**

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