

# Mami Deka

PHD STUDENT · ASTRONOMY & ASTROPHYSICS

Cotton University, Guwahati-781001, India

☎ (+91) 9707348948 | ✉ mamideka8@gmail.com | 🏠 mami-deka.github.io/

“Be the change that you want to see in the world.”

## Education

### Cotton University

PHD CANDIDATE IN ASTROPHYSICS

- Advisor: Dr. Sukanta Deb

Guwahati, India

01/02/2020 - present

### Gauhati University

MSC IN PHYSICS

- Advisor: Prof. Madhurjya P Bora
- Specialization- Astrophysics, General theory of relativity and Cosmology

Guwahati, India

August, 2016 - June, 2018

### Nalbari College, Gauhati University

BSC IN PHYSICS

- Minors in Mathematics and Chemistry

Nalbari, Assam, India

August, 2012 - June, 2015

## Research Experience

### Cotton University - Dept of Physics

PHD CANDIDATE IN ASTROPHYSICS

- Advisor: Dr. Sukanta Deb
- Thesis: “[Variable Stars as Astrophysical Laboratories](#)”

Guwahati, India

February, 2020 - Present

### Inter-University Centre for Astronomy and Astrophysics (IUCAA)

VISITING RESEARCH STUDENT

Pune, India

Jan, 2024 - March, 2024

### Max Planck Institute for Astrophysics

MPA-KAVLI SUMMER FELLOW

- Advisor: Dr. Felix Ahlborn, Heidelberg Institute for Theoretical Studies, Germany and Prof. Achim Weiss, MPA - Garching
- Project Title: “[Core helium burning using turbulent convection models in intermediate and massive stars: Implications for Cepheid models](#)”

Garching, Germany

June, 2023 - August, 2023

### Konkoly Observatory

IAU INTERNATIONAL SPRING SCHOOL

- Modern methods of cosmic distance determination

Budapest, Hungary

April, 2023

### Lyon (LIO, CRAL CNRS UMR5574, UCBL1) and IUCAA

7<sup>RD</sup> INDO-FRENCH ASTRONOMY SCHOOL ” ON ”SPECTROSCOPY, TREASURES IN THE VOXELS

- Advisor: Jens-Kristian Krogager (CRAL, Lyon, France)
- Project Title: “[Chemical composition of neutral gas in a distant galaxy](#)”

IUCAA, Pune, India.

November, 2022

### Gauhati University - Dept of Physics

MSC THESIS RESEARCH PROJECT

- Advisor: Prof. Madhurjya P Bora,
- Thesis: “[Magnetorotational Instability in Accretion Disks](#)”

Guwahati, India

August, 2017 - June, 2018

### Birla Institute of Technology and Science, Pilani

PULSAR ASTRONOMY WITH UGMRT BOOT-CAMP & MULTI-WAVELENGTH NEUTRON STAR WORKSHOP

Hyderabad, India

January, 2018

## Awards, Fellowships, & Grants

2023

**Kavli Summer Fellowship**, Kavli Foundation & Max Planck Institute for Astrophysics

2023	<b>International Travel Grant</b> , Science and Engineering Research Board (SERB), Government of India
2021	<b>State Level Eligibility Test (SLET) in Physics</b> , SLET Commission, Assam
2021	<b>Graduate Aptitude Test in Engineering (GATE) in Physics</b> , Indian Institute of Technology (IIT)
2020	<b>National Eligibility Test-Lectureship (NET-LS) in Physical Science</b> , Council of Scientific and Industrial Research (CSIR), India
2019-2022	<b>CSIR research fellowship</b> , Council of Scientific and Industrial Research (CSIR), India
2019	<b>National Eligibility Test-Lectureship (NET-LS) in Physical Science</b> , Council of Scientific and Industrial Research (CSIR), India
2016-2018	<b>NEC Merit Scholarship</b> , North Eastern Council (NEC), India

## Publications

The full list can also be found in [ADS](#) || [Google Scholar](#).

### PUBLISHED

- Mami Deka**, Earl P. Bellinger, Shashi Kanbur, Sukanta Deb, Anupam Bhardwaj, Hugh Riley Randall, Selim Kalici, Susmita Das.  
[“Bridging theory and observation in stellar pulsation models: The impact of convection and metallicity on instability strip boundaries for Classical and Type-II Cepheids”](#), Monthly Notices of the Royal Astronomical Society, Volume 530, Issue 4, June 2024, Pages 5099–5119
- Gautam Bhuyan, Sukanta Deb, Shashi Kanbur, Earl P. Bellinger, **Mami Deka**, Anupam Bhardwaj.  
[“Geometry of the LMC based on multi-phase analysis of multi-wavelength Cepheid light curves using OGLE-IV and Gaia DR3 data”](#), Monthly Notices of the Royal Astronomical Society, Volume 527, Issue 3, January 2024, Pages 8671–8686
- Kerdaris Kurbah, Sukanta Deb, Shashi M Kanbur, Susmita Das, **Mami Deka**, Anupam Bhardwaj, Hugh Riley Randall, Selim Kalici.  
[“A multiphase study of theoretical and observed light curves of classical Cepheids in the Magellanic Clouds”](#), Monthly Notices of the Royal Astronomical Society, Volume 521, Issue 4, June 2023, Pages 6034–6052
- Mami Deka**, Shashi M Kanbur, Sukanta Deb, Susmita Das, Kerdaris Kurbah, Earl P Bellinger, Anupam Bhardwaj. [“Period-Colour and Amplitude-Colour relations for OGLE- \$\delta\$  Scuti stars in the Galactic Bulge and LMC”](#), Monthly Notices of the Royal Astronomical Society, Volume 517, Issue 2, December 2022, Pages 2251–2263
- Mami Deka**, Sukanta Deb, Kerdaris Kurbah.  
[“An MCMC approach to the three-dimensional structure of the Milky Way bulge using OGLE-IV  \$\delta\$  Scuti stars”](#), Monthly Notices of the Royal Astronomical Society, Volume 514, Issue 3, August 2022, Pages 3984–3992

### IN PREP

- Mami Deka**, Felix Ahlborn, Teresa Braun, Achim Weiss.  
[“Core helium burning using turbulent convection models in intermediate and massive stars: Implications for Cepheid models”](#)
- Mami Deka**, Sukanta Deb.  
[“Precise Stellar Parameters for Five Kepler Binary Systems: KIC 3327980, KIC 5738698, KIC 4848423, KIC 10686876 and KIC 10191056”](#)

### CONFERENCE PROCEEDINGS

- Mami Deka**, Shashi M. Kanbur, Sukanta Deb, Susmita Das.  
[“A Study of Stellar Photosphere – Hydrogen Ionization Front Interaction in  \$\delta\$  Scuti Stars”](#)
- Kerdaris Kurbah, Sukanta Deb, Shashi M Kanbur, Susmita Das, **Mami Deka**, Anupam Bhardwaj, Hugh Riley Randall, Selim Kalici.  
[“A multiphase study of classical Cepheids in the Magellanic Clouds-Models and Observations”](#)

## Talks & presentations

May, 2024

**IUCAA Refresher Course & Summer School 2024 (Invited)**, [Getting started with MESA \(Hands-on tutorials\)](#)

*Inter-University Centre for  
Astronomy and Astrophysics, Pune ,  
India*

January, 2024	<b>42nd meeting of the Astronomical Society of India</b> , The impact of convection and metallicity on instability strip boundaries of Classical Cepheids (Oral)	Indian Institute of Science (IISc), Indian Space Research Organisation (ISRO) and Jawaharlal Nehru Planetarium (JNP), Bengaluru
November, 2023	<b>North East Meet of Astronomers (NEMA – IX)</b> , The impact of convection and metallicity on instability strip boundaries of Classical Cepheids (Oral)	Mizoram University, Mizoram
August, 2023	<b>MPA-Kavli Summer Programme in Astrophysics</b> , A new model* for turbulent convection: Implications for Cepheid models (Oral)	Max Planck Institute for Astrophysics, Garching, Germany
April, 2023	<b>International Astronomical Union (IAU) Symposium 376</b> , "At the cross-roads of astrophysics and cosmology: Period–luminosity relations in the 2020s", A Study of Stellar Photosphere – Hydrogen Ionization Front Interaction in $\delta$ Scuti Stars (oral)	Konkoly Observatory, Budapest, Hungary
March, 2023	<b>41st meeting of The Astronomical Society of India</b> , The HIF-stellar photosphere interaction theory: $\delta$ Scuti Stars. (Poster)	Indian Institute of Technology, Indore
November, 2022	<b>7RD INDO-FRENCH ASTRONOMY SCHOOL "ON "SPECTROSCOPY, TREASURES IN THE VOXELS</b> , Chemical composition of neutral gas in a distant galaxy (Oral)	IUCAA, Pune, India
April, 2022	<b>National Conference on Physical Science (NCPS)</b> , Galecto-Centric Distance using Galactic bulge RR-Lyrae Stars. (Oral)	Dibrugarh University, Assam

## Skills

<b>Programming</b>	Python (SciPy, NumPy, AstroPy, Matplotlib, Pandas), IDL, Bash, R, FORTRAN
<b>Other tools</b>	MESA, Phoebe, IRAF, VOSA (SED fitting), DS9, HPC cluster, Machine learning, LATEX, MS-Office.
<b>Data handling</b>	OGLE, Gaia, TESS, Kepler Data etc.
<b>Statistical techniques</b>	MCMC, Bayesian analysis, F-test, Principal Component Analysis
<b>Languages</b>	Assamese (Native), English, Hindi

## Students supervised

\* Co-supervised with Dr. Sukanta Deb; † Co-supervised with Prof. Shashi M. Kanbur

2022	<b>Liza Devi*</b> , MSc project (Current position: PhD student, Tezpur University)	Cotton University, India
2022	<b>Snigdha Sarmah*</b> , MSc project (Current position: PhD student, Tezpur University)	Cotton University, India
2023	<b>Anurag Baruah*</b> , MSc project	Cotton University, India
2022	<b>Hugh Riley Randall, †</b> , Undergraduate student	State University of New York, USA
2023	<b>Krishna Soni †</b> , High School student	The Bronx High School of Science, USA
2023	<b>Lucas Mac †</b> , High School student	The Bronx High School of Science, USA

## Teaching Experience

2024	<b>Tutorial (Introduction + Hands-on session) on MESA</b> , Pedagogic workshop on Astronomy, Astrophysics and Cosmology: A Faculty Enrichment Programme (January 04-10)	Gauhati University, India
2023	<b>Higher Secondary: Physics practicals</b> , Teaching Assistant	Cotton University, India
2022	<b>Tutorial (Introduction + Hands-on session) on MESA-RSP</b> , With Prof. Shashi Kanbur	Indian Institute of Astrophysics, India
2022	<b>Postgraduate: Astrophysics</b> , Tutorial on MESA-RSP	Cotton University, India
2019	<b>Undergraduate: Physics (Classical mechanics, Thermodynamics, Mathematical Physics, Practicals); Higher Secondary: Physics (Optics, Magnetism, Mathematical Physics, Practicals)</b> , Teaching Assistant	Nalbari College, India

## Outreach and Volunteering

2022	<b>Volunteered to organize the DAE Symposium on Nuclear Physics,</b>	<i>Cotton University, India</i>
2018	<b>Volunteered to organize a public event during lunar eclipse at Gauhati University Observatory,</b>	<i>Gauhati University, India</i>

References

<b>Dr. Sukanta Deb</b> <b>Connection:</b> PhD advisor Department of Physics Cotton University Guwahati-781001, India ✉ <a href="mailto:sukanta.deb@cottonuniversity.ac.in">sukanta.deb@cottonuniversity.ac.in</a>	<b>Prof. Shashi M. Kanbur</b> <b>Connection:</b> External Collaborator Department of Physics SUNY Oswego Oswego, NY 13126, USA ✉ <a href="mailto:shashi.kanbur@oswego.edu">shashi.kanbur@oswego.edu</a>
<b>Dr. Earl P Bellinger</b> <b>Connection:</b> External Collaborator Department of Astronomy, Yale University New Haven, CT 06520, USA ✉ <a href="mailto:earl.bellinger@yale.edu">earl.bellinger@yale.edu</a>	<b>Prof. Selma E. de Mink</b> <b>Connection:</b> MPA-Kavli Summer program Max Planck Institute for Astrophysics Garching, Germany ✉ <a href="mailto:deMink_office@MPA-Garching.mpg.de">deMink_office@MPA-Garching.mpg.de</a>
<b>Anupam Bhardwaj</b> <b>Connection:</b> External Collaborator Inter-University Centre for Astronomy and Astrophysics (IUCAA) Pune, India ✉ <a href="mailto:anupam.bhardwaj@iucaa.in">anupam.bhardwaj@iucaa.in</a>	<b>Jens-Kristian Krogager</b> <b>Connection:</b> Indo-French Astronomy School on Spectroscopy Centre de Recherche Astrophysique de Lyon France ✉ <a href="mailto:jens-kristian.krogager@univ-lyon1.fr">jens-kristian.krogager@univ-lyon1.fr</a>