APARNA BHATTACHARYA

(অপর্ণা ভট্টাচার্য্য)

NASA Goddard Space Flight Center
Exoplanets & Stellar Astrophysics Lab.
Code 667
Greenbelt, MD 20771
https://science.gsfc.nasa.gov/sed/bio/aparna.bhattacharya

Phone: (301) 6145760
Fax:
aparna.bhattacharya@nasa.gov

RESEARCH INTERESTS

Adaptive Optics, Crowded field photometry and astrometry, Difference Imaging, Exoplanet demographics, Gravitational microlensing, Light curve modeling, Machine learning, PSF fitting, Planet formation, Simulations, Statistical studies on stellar evolution, Under-sampled images.

EDUCATION

University of Notre Dame, Notre Dame, IN, USA
Ph.D. Physics — May, 2017
Thesis Title: Developing Space Based Microlensing Exoplanet Mass Measurement Method
M.S. Physics — May, 2015

Calcutta University, St. Xaviers College, Kolkata, WB, India
B.Sc. Physics Honors — 2008- 2011

PROFESSIONAL APPOINTMENTS

Postdoctoral Research Associate — May, 2017 – present
NASA Goddard Space Flight Center, Exoplanets & Stellar Astrophysics Lab
University of Maryland, College Park

Faculty Research Assistant — July, 2016 – April, 2017
NASA Goddard Space Flight Center, Exoplanets & Stellar Astrophysics Lab
University of Maryland, Baltimore County

Graduate Research Assistant — Aug, 2011 -June, 2016
University of Notre Dame, Dept of Physics

Summer Research Intern Fellow — June, 2009
IISER (Indian Institute of Science Education and Research), Kolkata, India

HONORS & AWARDS

Graduate Student Conference Grant Award, University of Notre Dame — 2016
Zahm Travel Grant Award, University of Notre Dame — 2016
Computation Research Center Award, University of Notre Dame — 2015
(1 person awarded from all science departments each year)
Graduate Student Conference Grant Award, University of Notre Dame — 2014
Asian Science Camp participant — 2010
Selected and participated in *TIFR Mumbai Winter Astronomy School* — 2009
KVPY – IISc (Indian Institute of Science) National fellowship finalist — 2009
INSPIRE National (India) Scholarship, DST (Department of Science and Technology) — 2008

(Awarded to top 1% Science Student in India)

West Bengal(State) Merit Scholarship 2008

(Awarded to top 1% Science Student in West Bengal state)

INVITED TALKS

14. North East Astronomy Forum, PRO/AM session, NY, USA Apr, 2018
13. University of Delaware, Astronomy Colloquium, DE, USA Apr, 2018
12. Penn State University Center for Exoplanet and Habitable Worlds Colloquium, PA, USA Mar, 2018
11. Harvard CFA Star and Planet Seminar, Cambridge, USA Feb, 2018
10. MIT Exoplanet Tea Talk, Cambridge, USA Feb, 2018
9. Princeton University Exoplanet Seminar, NJ, USA Feb, 2018
8. American Astronomical Society 231st Meeting, WFIRST Splinter Session, USA Jan, 2018
7. Carnegie DTM, Astronomy Seminar, Washington DC, USA Dec, 2017
6. International High Energy Physics Conference, Rome, Italy Dec, 2017
5. NASA Goddard Space Flight Center Exoplanet Club Talk, USA Nov, 2017
4. University of Maryland College Park PALS Planetary Talk, USA Nov, 2017
3. NASA Goddard Space Flight Centre, Exoplanet club seminar, USA Dec, 2015
2. Notre Dame Astrophysics Seminar, USA Mar, 2015
1. California Institute of Technology IPAC Exoplanet Seminar, USA Feb, 2015

CONTRIBUTED TALKS

12. Keck Science Meeting, California Institute of Technology, Pasadena, USA Sep, 2018
11. Chesaspeake Bay Area Exoplanet Conference, Space Telescope Science Institute, USA Sep, 2018
10. Science with Precision Astrometry Workshop, Space Telescope Science Institute, USA Mar, 2018
9. 22nd International Microlensing Conference, Auckland, NZ Jan, 2018
8. Know thy star, know thy planet, Pasadena, USA Oct, 2017
7. Exoclipse 2017 Conference, Boise State University, USA Aug, 2017
6. ASTROCON DC, GWU, Washington DC, USA Jul, 2017
5. WFIRST 2020 Synergies Conference, Space Telescope Science Institute, Baltimore, USA May, 2017
4. 21st International Microlensing Conference, Caltech, USA Jan, 2017
3. 20th International Microlensing Conference, IAP, France Jan, 2016
2. 19th International Microlensing Conference, Annapolis, USA Jan, 2015
1. Wide Field Infra Red Conference, Pasadena, USA Nov, 2014

PROFESSIONAL SERVICE

Reviewer, NASA Exoplanet Research Funding Program Jul, 2018
Session Chair, 22nd International Microlensing Conference, University of Auckland, NZ Jan, 2018
Session Chair, Exoclipse 2017, Boise State University, USA Aug, 2017
Session Chair, WFIRST 2020 Synergies, Space Telescope Science Institute, Baltimore, USA May, 2017
Session Chair, 21st International Microlensing Conference, Caltech, USA Jan, 2017
Referee, Astronomical Journal 2018 – present
Referee, Astrophysical Journal 2016 – present
Referee, Notre Dame Graduate Student Union Travel Award 2015-2016

PROFESSIONAL MEMBERSHIP

Member, American Astronomical Society 2017 – present
Member, WFIRST Microlensing Science Investigation Team 2017 – present

OBSERVING EXPERIENCE

Keck II 10m USA

High Resolution Infrared observation of microlensing events with NIRC2: 5 nights Aug 2018

Keck II 10m USA
High Resolution Infrared observation of microlensing events with NIRC2: 5 nights May 2018

MOA II 1.8m New Zealand (MOA Collaboration)
Optical photometry of microlensing events: 20 nights April –May 2014

SAAO 1.0m South Africa (PLANET Collaboration)
Optical photometry of microlensing events: 14 nights June, 2012

TEACHING EXPERIENCE

Laboratory Assistant, Physics graduate*,* Graduate	Spring, 2013
Graduate Teaching Assistant, Classical Mechanics, Graduate	Fall, 2012
Graduate Tutor, Electricity and Magnetism part 2, Undergraduate	Spring, 2013
Graduate Tutor, Electricity and Magnetism part 2, Undergraduate	Spring, 2012
Laboratory Assistant, Electricity and Magnetism part 2, Undergraduate	Spring, 2012
Observatory Assistant, Undergraduate	Spring, 2012
Graduate Tutor, Electricity and Magnetism part 1, Undergraduate	Fall, 2011
Exam Grader, Electricity and Magnetism part 1, Undergraduate	Fall, 2011
Laboratory Assistant, Electricity and Magnetism part 1, Undergraduate	Fall, 2011

ACCEPTED PROPOSALS

6. Hubble Space Telescope Cycle 25 Grant # 15455 "Mass Measurements of Exoplanet Microlens Host Stars with Near Simultaneous Hubble and Keck AO Observations, Co-Investigator, (PI: D. Bennett)
October 01, 2018 - September 30, 2021, $ 66,148

5. NASA Keck Key Strategic Mission Support PI Data Award "Development of the WFIRST Exoplanet Mass Measurement Method", Co-Investigator, (PI: D. Bennett)
April 16, 2018 - April 15, 2020, $ 100,000

4. LCO NOAO Telescope observation time, "The Galactic Bulge Exoplanet Mass Function from High Magnification Microlensing Events", Co-Investigator, (PI: D. Bennett)
Jan, 2018 – May, 2018, Awarded: 12 nights

3. LCO NOAO Telescope observation time, "The Galactic Bulge Exoplanet Mass Function from High Magnification Microlensing Events", Co-Investigator, (PI: D. Bennett)
May, 2018 – Sep, 2018, Awarded: 90 hours

2. NASA Keck Data Award "Exoplanet Masses with the WFIRST Method", Co-Investigator, (PI: D. Bennett)
July 1, 2016 - June 30, 2018, $16,000

1. NASA Keck PI Data Award "Identification and Mass Measurements for Microlens Exoplanet Host Stars", Co-Investigator, (PI: D. Bennett)
July 1, 2015 - September 30, 2017, $16,000

SKILLS

Language:
Bengali (native), English (fluent), Hindi (advanced), Spanish (novice)

Programming:
C++, FORTRAN, Python, Parallel Computing (MPI), Shell scripting, UNIX

REFEREED PUBLICATIONS

Citations:: Total: 797 h-index: 17 i-10 index: 22 (according to google scholar as of Dec 03, 2018)
Citations by year:
2018: 384
2017: 228

2016: 152
2015: 25
2014: 6

Publications with Major Significant Contribution

47. "MOA-2008-BLG-379- Confirmation of a massive Microlensing Planet around a very late M-dwarf host", **Bhattacharya et al**., to be submitted soon, 2019.

46. "WFIRST Exoplanet Mass Measurement Method Finds a Planetary Mass of $39 \pm 8M_{\oplus}$ for OGLE-2012-BLG-0950Lb", **Bhattacharya et al**., 2018, AJ, 156, 6

45. "The star blended with MOA-2008-BLG-310 source is not the exoplanet host star" – **Bhattacharya et al**, 2017, AJ, 154, 2

44. "Developing Space Based Microlensing Mass Measurement Method", **Bhattacharya A**, 2017, *PhD thesis*

43. "Discovery of a gas giant planet in microlensing event OGLE-2014-BLG-1760" – **Bhattacharya et al,** 2016, ApJ, 152(5), 140

42. "Confirmation of the Planetary Microlensing Signal and Star and Planet Mass Determinations for Event OGLE-2005-BLG-169" – Bennett, **Bhattacharya**, Anderson et al, 2015, ApJ, 808(2), 169

Other Publications

41. "OGLE-2015-BLG-1459L: The Challenges of Exo-moon Microlensing", Hwang et al, *including A. Bhattacharya*, 2018, AJ, 155 (6), 259

40. "OGLE-2017-BLG-0482Lb: A Microlensing Super-Earth Orbiting a Low-mass Host Star", Han et al, *including A. Bhattacharya*, 2018, AJ, 155 (5), 211

39. "The first Planetary Microlensing Event with Two Microlensed Source Stars", Bennett et al, *including A. Bhattacharya*, 2018, AJ, 155 (3), 141

38. "OGLE-2014-BLG-0289: Precise Characterization of a Quintuple-peak Gravitational Microlensing Event", Udalski et al, *including A. Bhattacharya,* 2018, AJ, 853 (1), 70

37. "OGLE-2016-BLG-1190Lb: The First Spitzer Bulge Planet Lies Near the Planet/Brown-dwarf Boundary", Ryu et al, *including A. Bhattacharya*, 2017, AJ, 155 (1), 40

36. "An Isolated Microlens Observed from K2, Spitzer, and Earth", Zhu et al, *including A. Bhattacharya,* 2017, ApJL, 849 (2), L31

35. "OGLE-2013-BLG-0132Lb and OGLE-2013-BLG-1721Lb: Two Saturn-mass Planets Discovered around M-dwarfs", Mroz et al, *including A. Bhattacharya*, 2017, AJ, 154, 5

34. "MOA Data Reveal a New Mass, Distance, and Relative Proper Motion for Planetary System OGLE-2015-BLG-0954L", Bennett et al., *including A. Bhattacharya*, 2017, AJ, 154(2), 68

33. "OGLE-2016-BLG-0263Lb: Microlensing Detection of a Very Low –mass Binary Companion through a Repeating Event Channel", Han et al., *including A. Bhattacharya*, 2017, AJ, 154(133), 9pp

32. “The First Eclipsing Binary Catalogue from the MOA-II database”, Li et al., *including A. Bhattacharya*, 2017, MNRAS, 470, 539

31. “Binary Source Microlensing Event OGLE-2016-BLG-0733: Interpretation of a Long-term Asymmetric Perturbation”, Jung et al., *including A. Bhattacharya*, 2017, AJ, 153(3), 129

30. “Ground-based Parallax Confirmed by Spitzer Binary Microlensing Event MOA-2015-BLG-020”, Wang et al., *including A. Bhattacharya*, 2017, ApJ, 845, 2

29. “A companion on the planet/brown dwarf mass boundary on a wide orbit discovered by gravitational microlensing”, Poleski et al., *including A. Bhattacharya*, 2017, A&A, 604, A103

28. “The lowest mass ratio planetary microlens: OGLE-2016-BLG-1195Lb”, Bond et al., *including Bhattacharya et al.*, 2017, MNRAS, 469, 2, 2434

27. “MOA-2016-BLG-227Lb: A Massive Planet characterized by combining Light-curve Analysis and Keck AO Imaging”, Koshimoto et al., *including A. Bhattacharya*, 2017, 154, 3

26. “OGLE-2013-BLG-1761Lb: A Massive Planet around an M/K Dwarf” – Hirao et al, *including A. Bhattacharya*, 2017, AJ, 154, 1

25. “MOA-2012-BLG-505Lb: A super-Earth orbiting a very low mass M-dwarf”, Nagakane et al., *including A. Bhattacharya*, 2017, AJ, 154, 1

24. “Chemical evolution of the Galactic bulge as traced by microlensed dwarf and subgiant stars. VI. Age and abundance structure of the stellar populations in the central sub-kpc of the Milky Way” – Bensby et al., *including A. Bhattacharya*, 2017, A&A, 605, A89

23. “OGLE-2012-BLG-0950Lb: The First Planet Mass Measurement from Only Microlens Parallax and Lens Flux” – Koshimoto et al., *including A. Bhattacharya*, 2016, AJ, 153(1), 1

22. “The Exoplanet Mass-Ratio Function from the MOA-II Survey: Discovery of a Break and Likely Peak at a Neptune Mass”- Suzuki et al, *including A. Bhattacharya*, 2016, ApJ 833(2),145

21. “Faint source star planetary microlensing: the discovery of the cold gas giant planet OGLE-2014-BLG-0676Lb”- Rattenbury et al*, including A. Bhattacharya*, 2016, MNRAS, stw3185

20. “The First Simultaneous Microlensing Observations by Two Space Telescopes: Spitzer and Swift Reveal a Brown Dwarf in Event OGLE-2015-BLG-1319” – Shvartzvald et al., *including A. Bhattacharya*, 2016, ApJ, 831(2),183

19. “Campaign 9 of the K2 Mission: Observational Parameters, Scientific Drivers, and Community Involvement for a Simultaneous Space-and Ground-based Microlensing Survey” – Henderson et al, *including A. Bhattacharya*, 2016, ASP, 128 (970), 124401

18. “The First Circumbinary Planet Found by Microlensing: OGLE-2007-BLG-349L (AB) c” – Bennett et al., *including A. Bhattacharya*, 2016, ApJ 825(2), 125

17. “The first Neptune analog or super-earth with a Neptune-like orbit: MOA-2013-BLG-605LB” Sumi et al., *including A. Bhattacharya*, 2016, ApJ, 825(2), 112

16. “OGLE-2012-BLG-0724LB: A SATURN-MASS PLANET AROUND AN M DWARF”
- Hirao et al. , *including A. Bhattacharya*, 2016, ApJ, 824(2), 139

15. “Revisiting the Microlensing Event OGLE 2012-BLG-0026: A Solar Mass Star with Two Cold Giant Planets”- Beaulieu et al., *including A. Bhattacharya*, 2016, ApJ, 824(2), 83

14. “The frequency of snowline-region planets from four years of OGLE–MOA–Wise second-generation microlensing”- Shvartzvald et al, *including A. Bhattacharya*, 2016, MNRAS, 457(4), 4089

13. “Spitzer Observations of OGLE-2015-BLG-1212 Reveal a New Path toward Breaking Strong Microlens Degeneracies” – Bozza et al., *including A. Bhattacharya*, 2016, ApJ, 820(1), 79

12. “MOA-2011-BLG-028Lb: A NEPTUNE-MASS MICROLENSING PLANET IN THE GALACTIC BULGE” – Skowron et al., *including A. Bhattacharya*, 2016, ApJ, 820(1), 4

11. “Spitzer parallax of OGLE-2015-BLG-0966: a cold Neptune in the Galactic disk”
- Street et al., *including A. Bhattacharya*, 2016, ApJ, 819(2), 93

10. “Planet Sensitivity from Combined Ground-and Space-based Microlensing Observations” – Zhu et al., *including A. Bhattacharya*, 2015, ApJ, 814(2), 129

9. “MOA-2010-BLG-353Lb: a possible Saturn revealed” – Rattenbury et al., *including A. Bhattacharya*, 2015, MNRAS, 454(1), 946

8. “Red noise versus planetary interpretations in the microlensing event OGLE-2013-BLG-446” – Bachelet et al. *including A. Bhattacharya*, 2015, ApJ, 812 (2), 136

7. “A new multi-scale structure finding algorithm to identify cosmological structure” – Snedden et al, *including A. Bhattacharya*, 2015, JCP, 299, 92

6. “OGLE-2012-BLG-0563Lb: a Saturn-mass planet around an M dwarf with the mass constrained by Subaru AO imaging” – Fukui et al., *including A. Bhattacharya*, 2015, ApJ, 809(1), 74

5. “Confirmation of the OGLE-2005-BLG-169 Planet Signature and Its Characteristics with Lens–Source Proper Motion Detection” – Batista et al., *including A. Bhattacharya*, 2015, ApJ, 808(2), 170

4. “Ogle-2011-BLG-0265LB: a jovian microlensing planet orbiting an M dwarf” – Skowron et al., 2015, ApJ, 804(1), 33

3. “Pathway to the galactic distribution of planets: combined Spitzer and ground-based microlens parallax measurements of 21 single-lens events” – Novati et al., *including A. Bhattacharya*, 2015, ApJ 804(1), 20

2. “Origin and evolution of structure and nucleosynthesis for galaxies in the local group”- Mathews et al., *including A. Bhattacharya*, Modern Physics Leters A 29(14).

1. “A super-Jupiter orbiting a late-type star: a refined analysis of microlensing event OGLE-2012-BLG-0406” – Tsapras et al*., including A. Bhattacharya*, ApJ 782(1), 48