Olga Borodina

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Education

2020 – Present **Moscow Institute of Physics and Technology, Russia (MIPT)**, M.S. in Applied Mathematics and Physics
- General Astrophysics, Waves in Space Plasma, Exoplanets
- Thesis: "On the density distribution of bound clusters after residual star-forming gas expulsion", Advisor: Dr. Evgeny Polyachenko

2019 – 2020 **Moscow Institute of Physics and Technology, Russia (MIPT)**, B.S. in Applied Mathematics and Physics **GPA 4.98/5.0**
- Machine Learning, Data Analysis in Space Experiments, Plasma Physics
- Thesis: "Unresolved Binaries in Open Clusters", Advisor: Dr. Dana Kovaleva

2015 – 2019 (transferred to MIPT) **Ural Federal University, Russia (UrFU)**, Astronomy, GPA 5.0/5.0
- General Math (Calculus, Linear Algebra etc.) and Physics (General and Theoretical)
- Astrophysics, Galactic Astronomy, Observational Astronomy, Celestial Mechanics etc.
- Pedagogy & Psychology

Research Experience

July 2019 – Present **Research Assistant**, Institute of Astronomy, Russian Academy of Sciences (INASAN)
- Developed 2 methods to measure binary stars fraction in open star clusters (using GAIA DR2)
- Researching clusters' stability and evolution by running N-body simulations on GPUs

June 2021 – Sep 2021 **Internship**, Max Planck Institute for Astronomy (MPIA)
- Tested Tremaine-Weinberg method applying to simulated galaxies, *PHANGS group*

Feb 2016 – May 2019 **Research Assistant**, Ural Federal University (UrFU)
- Estimated open clusters' hidden mass caused by unresolved binaries

July 2018 **Internship**, Kourovka Astronomical Observatory
- Conducted spectroscopic observations using solar telescope and calculated gas velocity in prominence
- Observed variable stars on the MASTER-II-Ural telescope and processed images

Publications (1st author)

2021 **Borodina et al.**, Unresolved Multiples and Galactic Clusters' Mass Estimates, **ApJ**, 908, 60

2020 **Borodina O.I.**, Kovaleva D.A., Unresolved Binaries in Open Clusters, INASAN SR, 5, 351

2019 **Borodina et al.**, Unresolved Binaries and Galactic Clusters' Mass Estimates, **ApJ**, 874, 127

Publications (co-author)

2021 Shukirgaliyev, B.;[and 14 others, including **Borodina O.**], The bound mass of Dehnen models with centrally peaked star formation efficiency, **A&A**, 654, A53

2021 Polyachenko, E. V.; Shukhman, I. G.; **Borodina, O. I.**, Damped perturbations in stellar systems: Genuine modes and Landau-damped waves, **MNRAS**, 503, 660

Conferences, Seminars & Extra Courses

Dec 2021 **Astrophysical Seminar INASAN**, INASAN
"The bound mass of Dehnen models with centrally peaked star formation efficiency" (talk)

Sep 2021 **Volkswagen Trilateral Project Workshop**, ARI/ZAH, INASAN, MAO, NAOC
"On the density distribution of bound clusters after residual star-forming gas expulsion: Zhao profiles" (talk)

Nov 2020 **63th All-Russian Scientific Conference**, MIPT
"Unresolved Binaries in Open Clusters" (talk)
- the Best Presentation Award

May 2020 **Course "Data-driven astronomy"**, Coursera
- Applied SQL, Astropy, ML tools to SDSS and NASA Exoplanet Archive data

2019 – 2020 **Annual conference for young scientists**, INASAN
"Unresolved Binaries and Galactic Clusters' Mass Estimates", "Unresolved Binary Stars in Open Clusters" (talks)

2016 – 2019 **Annual conference "Physics of the Space"**, Kourovka Astronomical Observatory
- Presented projects on open clusters & binary stars based on 2MASS and GAIA DR1 (talks)

Nov 2018 **Conference of the Natural Science Department**, UrFU
"Open Clusters Research Group" (poster)

Social Activity

2021 **MPIA Student retreats**, MPIA
- Organized hiking and biking tours from Heidelberg for other intern and Ph.D. students

2016 – 2019 **Annual conference "Physics of the Space"**, Kourovka Astronomical Observatory
- Organized and coordinated entertainment activities (contests, intellectual games, excursions for >100 attendees)

Feb 2017 – May 2019 **Astronomy Tutor**, KantrSkrip school
- Developed Astronomy & Astrophysics courses for high school students
- Trained all-Russia Astronomy Olympiad winner (2019)

Scholarships & Awards

2021 **The Andrei Sakharov Scholarship**, for scientific achievements

2019 – 2021 **Scholarship** for excellent academic achievements, MIPT

2019 **1st place in Astronomy Contest**, Kourovka Astronomical Observatory
Astronomy Contest among all students at conference "Physics of the Space"

2018 **Scholarship** of President of the Russian Federation

2018 **Scholarship** of Parliament of the Russian Federation

2018 **Bronze Medal in Mathematics Olympiad**, Ariel University, Israel
International Mathematics Contest among European, Western Asian, and post-Soviet countries

2018 **3rd place in Astronomy Contest**, Kourovka Astronomical Observatory
Astronomy Contest among all students at conference "Physics of the Space"

2015 – 2019 **Scholarship** for excellent academic achievement, UrFU

2017 **1st place in Astronomy Contest**, Kourovka Astronomical Observatory
Astronomy Contest among all students at conference "Physics of the Space"

2017 **1st place in Physics Contest**, UrFU
Physics Contest among undergraduate students

Skills

Computer Science
Python (NumPy, SciPy, Pandas, Matplotlib, Scikit-learn), AstroPy, SQL, C++, TopCAT, Git, LaTeX

Languages
Russian(native), English (fluent), Spanish (fluent), German (beginner), Chinese (beginner)