Miha Černetič

+49 551 384 979 405
cernetic@mps.mpg.de
Date of birth: 13.12.1994

Research interests

Cosmology: CMB, large scale structure formation

Radiative transfer: Opacity distribution functions, grids of atmospheres

HPC simulations: Optimizing code for large systems

Research experience

Oct 2017 - present **Max Planck Institute for Solar System Research**, *Göttingen, Germany*
Research assistant position with Dr. Alexander Shapiro.

Jun 2017 - Aug 2017 **Max Planck Institute for Astrophysics**, *Garching, Germany*
Invited research visit, working with Dr. Thorsten Naab.
- Working on zoomed-in GADGET simulations of galaxy formation in DM clusters:
  - Analyzing the behavior of gas in strong and weak feedback models.
  - Further development of visualization tools for these simulations.

Oct 2016 - May 2017 **Max Planck Institute for Solar System Research**, *Göttingen, Germany*
Invited research visit, working with Dr. Alexander Shapiro.
- Continuation of my previous work in August:
  - Parallelizing the existing code to run on HPC clusters.
  - Improving the existing radiative transfer code and developing of new procedures.

Aug 2016 **Max Planck Institute for Solar System Research**, *Göttingen, Germany*
Research internship mentored by Dr. Alexander Shapiro.
- Improving the existing radiative transfer code NESSY written in FORTRAN:
  - Developing and implementing opacity distribution functions in to significantly speed up radiative transfer calculations.
  - Evaluating the impact of different parameters of ODFs on accuracy of the method.

Oct 2015 - Jul 2016 **Jožef Stefan Institute**, *Ljubljana, Slovenia*
Student researcher mentored by Dr. Matej Lipoglavšek.
- Investigating theoretical models of nuclear reactions:
  - Data acquisition, reduction and analysis. Using a 2 MV Tandem Van de Graaf accelerator to determine the cross-section of hydrogen embedded in various metals.

Education

Oct 2017 - present **Masters of Science, Physics**, *Georg-August-Universität*, Göttingen, Germany

2013 - 2017 **Bachelor of Science, Physics**, *University of Ljubljana*, Ljubljana, Slovenia
Bachelor project: Anisotropies in the CMB and large structure formation
Supervisor: Prof. Dr. Andreja Gomboc

Awards and grants

2018 IAU2018 travel grant, 600€.

2013 Gold medal in the Slovenian national astronomy competition.

2013 Best project: "Automation of an astronomical observatory" awarded by the Slovenian Centre of Excellence for Space Sciences and Technologies Space-SI.

2013 Municipal award in Ajdovščina for extraordinary achievements of high school students.

Summer schools

Apr 2018 **Parallelization with MPI and OpenMP**, *by High Performance Computing Center Stuttgart*, in Mainz, Germany

Jul 2016 **Summer School on General Relativity**, *by ICTP and SISSA*, in Petnica, Serbia

Jul 2015 **Summer School on Astrophysics and Astroparticles**, *by ICTP, SISSA and University of Nova Gorica*, in Petnica, Serbia

Other projects and relevant experience

2012 - 2014 **Summer camp on astronomy and astrophysics**, Slovenia

- Observation, data reduction and parametrization of an eclipsing binary system (2014).
- Observation of globular clusters, creation of HR diagrams and their interpretation (2013).
- Astrometry of Pluto through a week long observation run (2012).
- Simulation of light refraction in the atmosphere for a given atmospheric model (2012).

2012 - present **Astronomical society Nanos**, Ajdovščina, Slovenia

High school researcher:

- Project lead for research and construction of an automated astronomical observatory.
- Secured 60.000 € in funding. Determined the combination of CCD camera, filters, focuser, mount and telescope. Selected the required software, helped scout the physical location, set-up the network, computer hardware and data server.

Teaching experience

Mar - Jun 2017 **Elementary school Šturje**, *Ajdovščina, Slovenia*

- An introductory course in astronomy and advanced physics for selected last year students.
- Imaging and data processing of Jupiter moons' movement

2015 **High school Veno Pilon Ajdovščina**, *Ajdovščina, Slovenia*

- Preparing and educating students in general astronomy and astrophysics for the national astronomy competition.

2012 - 2013 **Elementary school Danila Lokarja**, *Ajdovščina, Slovenia*

- Creating a 3 semesters long curriculum and preparing the practical experiments for a weekly astronomy class for children aged 10-12 years.

Public engagement

Sep 2016 **IAU Symposium 324: New Frontiers in Black Hole Astrophysics**, *Ljubljana, Slovenia*

- Giving tours of the public exhibition for high schools and the general public.

Nov 2014 - Nov 2015 **Student club Ajdovščina**, *Ajdovščina, Slovenia*

President

- Securing over 100.000€ in funding for more than 30 cultural, social, sport, educational events for students in the local region.
- Leading the team of 22 students and 1 employee

Nov 2013 - Nov 2014 **Student club Ajdovščina**, *Ajdovščina, Slovenia*

Secretary

- Organizing 2 projects and helping with organization of over 10 other, IT & technical support.

2013 - 2014 **TEDxAjdovscina**, *Organizer*, Ajdovščina, Slovenia

- Part of the team creating the TEDx event, selection of speakers, technical support.

Dec 2012 - Sep 2013 **Astronomical society Nanos**, *Ajdovščina, Slovenia*

Project leader in collaboration with Andrej Rutar

- Project lead for an international exchange on astronomy and light pollution "Youth under European sky" under the EU scheme "Youth in action". 9 days, 3 countries, 34 participants.

Programming skills

Advanced	PYTHON(numpy, scipy, matplotlib), gnuplot, LaTeX, bash, *nix
Intermediate	FORTRAN, C++, Mathematica, HPC batch systems (PBS, HTCondor), IRAF, LibreOffice, Microsoft Office
Basic	C, MATLAB

Languages

Slovenian	Mother tongue
English	Advanced IELTS 8.0/9.0
German	CEFR level: A2

Presentations

Oral presentations

Aug 2018 **XXXth General Assembly of the International Astronomical Union, Focus Meeting 9, Solar Irradiance: Physics-Based Advances**, *Vienna, Austria*, "Fast Spectral Synthesis for a New Generation of Solar and Stellar Brightness Variability Models".

Jun 2018 **15th HITRAN Conference**, *Boston, USA*, "Importance of Line Databases for Spectral Synthesis for a New Generation of Solar and Stellar Brightness Variability Models".

Mar 2018 **2018 Sun-Climate Symposium**, *Lake Arrowhead, USA*, "Fast Spectral Synthesis for a New Generation of Solar and Stellar Brightness Variability Models".

Posters

Nov 2017 **Fachbeirat/Scientific Advisory Board**, *Göttingen, Germany*, "Opacity distribution functions for stellar spectra synthesis".

Publications

2018 **M. Cernetic**, A.I. Shapiro, N.A. Krivova, S.K. Solanki, V. Witzke, R. V. Tagirov, *Opacity distribution functions for stellar spectra synthesis. Technical details*, In preparation

2018 Bernhard Röttgers, Thorsten Naab, **Miha Cernetic**, Romeel Davé, Shuiyao Huang, Guinevere Kauffmann, Sanchayeeta Borthakur, *Lyman-α absorption at the disk-halo interface of simulated spiral galaxies*, In preparation