Nicolaus Copernicus Astronomical Center PAS

- We exist since 1976
- We conduct research in astronomy and astrophysics
- We employ 63 researchers

phot.: Alosza Pamyatnykh

Warszawa, March 2024

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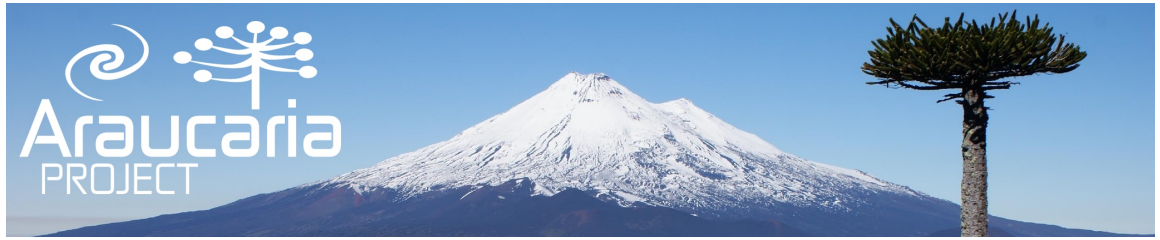


ATHENA

cta cherenkov telescope array

H.E.S.S.

GaiaESO

LSC LIGO Scientific Collaboration

VIRGO

S·A·L·T

BRITE PL

SOLARIS
Pushing the envelope.

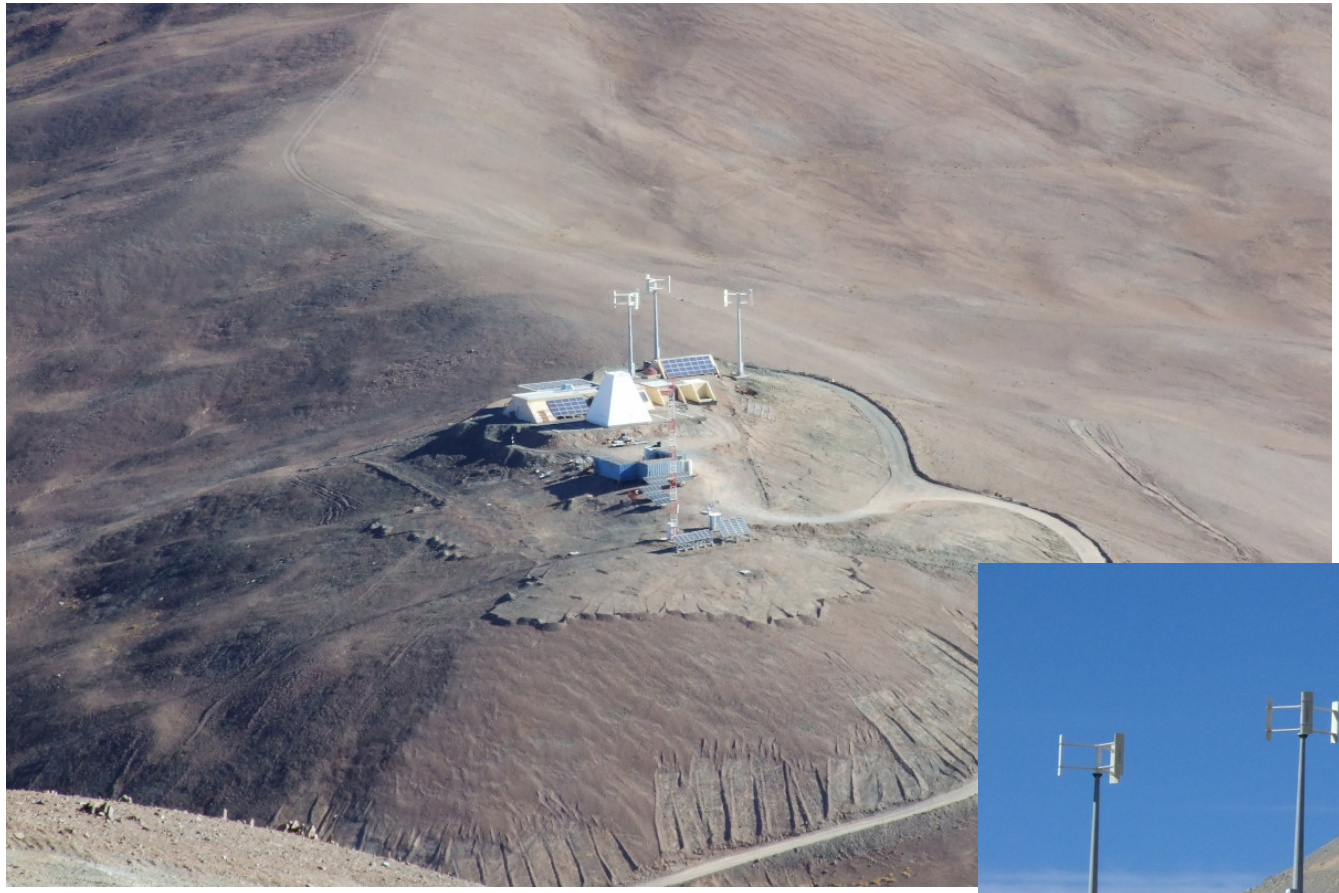
FNP Międzynarodowe Agendy Badawcze

European Union

AstroCeNT

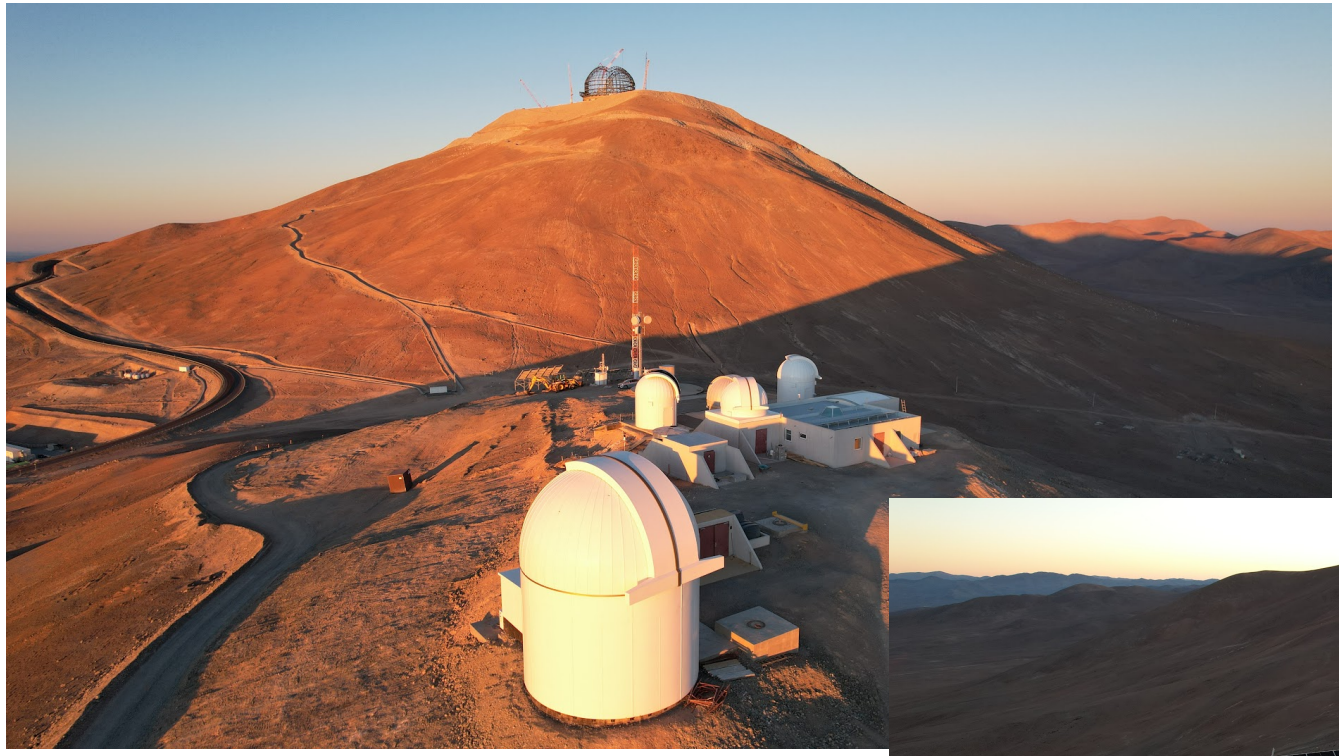
Nicolaus Copernicus Astronomical Center PAS

Cerro Murphy Observatory – before upgrade and renovation



Nicolaus Copernicus Astronomical Center PAS

Cerro Murphy Observatory – today

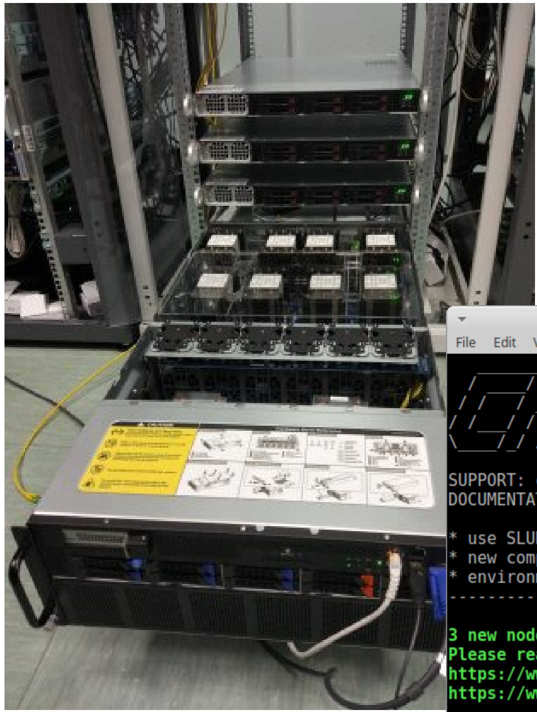


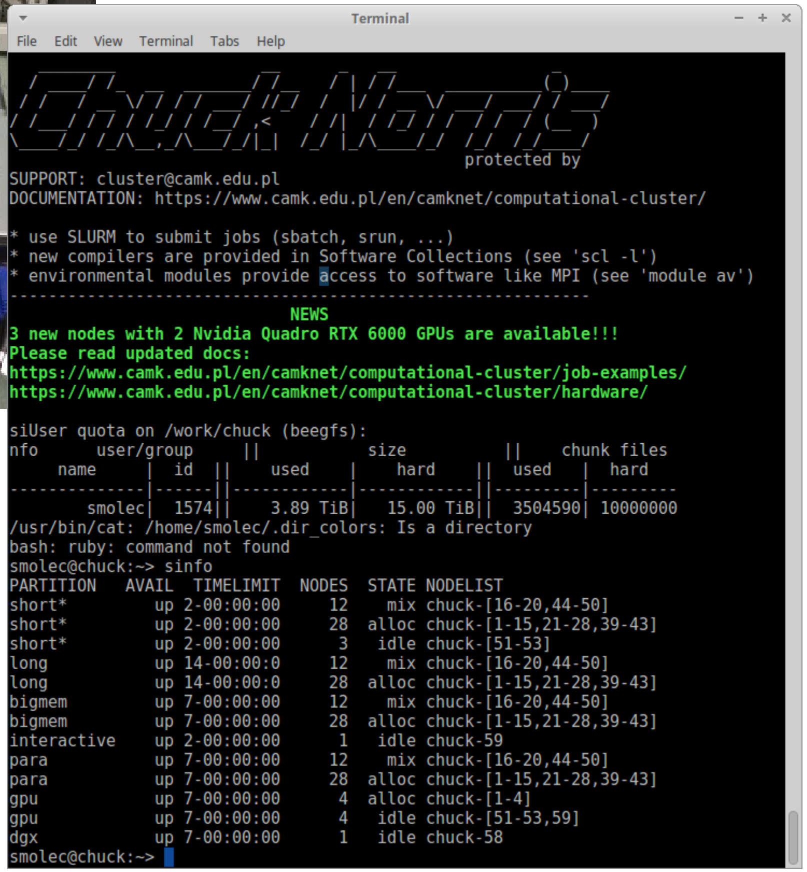
- 0.6-m, 0.8-m, 1.5-m optical telescopes
- 2.5-m optical (scheduled)
- 0.8-m infrared telescope

Nicolaus Copernicus Astronomical Center PAS

library

computer cluster





training observatory on the roof

Doctoral school

- A relatively new form of education introduced by the *Law on Higher Education and Science* (20th July 2018)
- From 2019/2020, the only way (apart from the extramural mode) to obtain a doctoral degree

⋆ The doctoral school must provide training in at least two scientific disciplines

GeoPlanet Doctoral School

⋆ Eight institutes: 7 institutes of the Polish Academy of Sciences and one National Research Institute

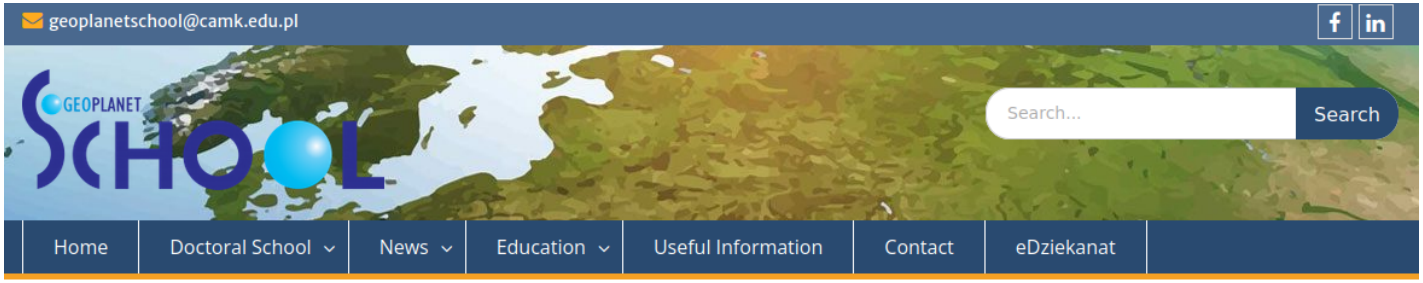
NCAC is the school's leader

⋆ 5 disciplines: **astronomy**; automation, electronic and electrical engineering and space technologies; Earth and environmental sciences; physical sciences; social and economic geography and spatial planning

GeoPlanet Doctoral School

- ⋆ 74 students (including 37 international; September 2023)
- ⋆ 27 students at NCAC (including 25 international; 5 in Toruń)
- ⋆ all lectures and activities in English
- ⋆ for students from outside of Warsaw there is a possibility of accommodation in NCAC hotel (there is no such possibility in Toruń)

GeoPlanet Doctoral School – www.geoplanetschool.pl



Polish Qualifications Framework Level 8

The **Integrated Qualifications System** implemented in Poland is intended to make it possible to compare qualifications awarded in Poland and in other European Union countries by relating them to the levels of the **Polish Qualifications Framework** (PQF) and through it to the levels of the **European Qualifications Framework**.

During education in doctoral school, students acquire learning outcomes corresponding to **level 8** of the Polish Qualifications Framework.

The learning outcomes are defined in terms of:

- **knowledge**
- **skills**
- **social competences**

PQF Level 8 Descriptors

– based on **The Polish Qualifications Framework — User's Guide (2017)**, published by the **Educational Research Institute** and **Order of the Minister of Science and Higher Education of 14th November 2018**.

Polish version of this page.

KNOWS AND UNDERSTANDS	IS ABLE TO	IS READY TO
First stage generic descriptors (universal)	First stage generic descriptors (universal)	First stage generic descriptors (universal)
W the world's achievements in science	U analyse and creatively synthesise scientific and creative achievements to identify and solve research problems as well as those related to innovative and creative activities;	K conduct independent research which contributes to existing scientific and creative achievements; assume professional and public

Recent Posts

- PhD opportunity at the Institute of Geophysics: Robust Optimization of Inverse Problems for Wave-based Seismic Imaging
- Unsupervised Machine Learning Helps to Decipher the Galactic Halo
- Vivat Academia, Vivant Professores! GeoPlanet Doctoral School Inauguration
- 2023/2024 Inaugural Lecture "Poles together – missing link between Arctic and Antarctic early Earth record" by Prof. Monika A. Kusiak
- PhD Opportunity at the Institute of Geophysics, Department of Atmospheric Physics

Categories

- events
- news
- recruitment
- research
- Uncategorized

GeoPlanet Doctoral School

Three documents you should read:

- ⋆ Regulations of the doctoral school
- ⋆ Recruitment rules
- ⋆ Program of the studies

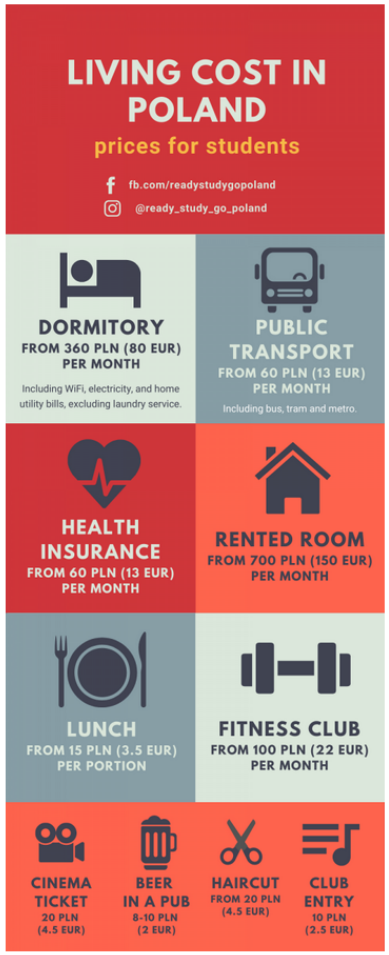
Doctoral school – scholarship

- **Each** doctoral student receives a scholarship, but **for no longer than 4 years**.
- Minimum amount of the scholarship is set in the law and currently is:

  ≈3077 PLN (net amount) before mid-term evaluation (years I-II),

  ≈4740 PLN (net amount) after mid-term evaluation (years III-IV).
- Some of the students receive higher scholarship paid from the supervisor's grant (typically 5000 PLN gross for the whole grant duration)
- Obligatory contribution to pension scheme
- 2024/2025 recruitment: all students are offered a minimum scholarship with a possibility to switch into grant funding later. One topic with grant funding for the full 4 years.
- Grant funding usually comes with more benefits (funds for equipment, conference, collaborations, observations)

Doctoral school – scholarship



https://study.gov.pl/cost-living-poland

add some 20-30%

accommodation in Warsaw may be expensive

MONTHLY EXPENSES (AVERAGE VALUE)

Expenses	Cost (PLN)	Cost (EUR)
Rent (student dormitory)	400 - 600	90 - 140
Public transportation	50 - 60	11 - 13
Health insurance	40 - 60	9 - 13
Phone, internet, and TV subscription bills	80 - 100	17 - 22
Groceries	700 - 900	150 - 200
Entertainment	150 - 200	35 - 45
Average total expenses	**1500 - 2000**	**330 - 430**

Doctoral school – scholarship

- Opportunities for **outstanding** doctoral students:
  - scholarship for outstanding young scientists from the Minister
  - START Fellowship (Foundation for Polish Science)
  - scholarship of the president of PAS
  - NCAC's young researcher award
  - additional scholarship from **own grant (like NCN's Preludium)**
- Public health insurance
  - Covered for EU citizens
  - non-EU students have to pay 60PLN/month
- All **NCAC** students are entitled for free of charge private health insurance

  (covers basic appointments; **but no emergency or hospital treatment**)

Doctoral school

- ⋆ Doctoral education lasts 8 semesters (possible extension by two years)
- ⋆ The supervisor shall be appointed within 3 months of commencing education
- ⋆ A doctoral student shall pursue:
  - ▸ Program of the studies in GeoPlanet doctoral school

    lectures, seminars, papers, conferences, popularization, etc.; **35 ECTS**
  - ▸ Individual Research Plan

    a *schedule* for PhD thesis; submitted within 12 months
- ⋆ Education ends with the submission of a doctoral dissertation

Doctoral school – education

⋆ **Interdisciplinary lectures**

▸ *Scientist's ABC, lecture: How to successfully apply for the financing of research projects as well as present and publish scientific research results*

▸ *Advanced statistical methods and bayesian inference in scientific research*

▸ *Philosophy of Science*

⋆ **GeoPlanet interdisciplinary lectures** – in principle, for students of other institutes, examples:

▸ *Space Robotics* (at CBK PAN)

▸ *Introduction to hydrogeology and sustainable groundwater management* (at PIG PIB)

▸ *All you want to know about climate change and its impact from the ocean perspective* (at IO PAN)

Doctoral school – education

- ⋆ **Monographic lectures at NCAC**, eg.,
  - ▸ *Introduction to Astrophysics*
  - ▸ *Star Cluster Dynamics and Evolution*
  - ▸ *Experimental search for dark matter*
- ⋆ **Seminars**
  - ▸ Wednesday seminar
  - ▸ Journal Club
  - ▸ PhD seminar
- ⋆ ECTS credits are also awarded for: papers, grants, conference presentations (talks, posters), attending summer schools, individual training, teaching, popularization

However, the most important thing is to work with supervisor → PhD thesis & doctoral degree

Individual Research Plan

YEAR OF EDUCATION (year of 20.../20..).			
Lp	Name of the research task (expected period of implementation in months)	Description of the implementation of the research task	Expected outcomes of the research task, in particular measurable effects[3]
I.1			
I.2			
I.3			
Planned activities aimed at increasing qualifications of the doctoral student and preparing for the research and/or didactic work[4]:			
Lp	Description of the activity:		
I.a			
I.b			
I.c			
Remarks, including possible risks for the implementation of the scientific tasks and means to minimize them (explicitly refer to task numbers)[5]:			

Individual Research Plan

- ⋆ Implementation of the Individual Research Plan is evaluated during the **mid-term evaluation** (after two years). Evaluation is done by a committee that includes external member. In case of **negative** evaluation, a student is removed from the student's list.
- ⋆ Poor implementation of the Individual Research Plan may be grounds for removal from the student list at any stage of study.

Integration, leisure activities, social life

Doctoral degree

- ⋆ Doctoral School does not conduct proceedings for granting the degree – it is done by the doctoral granting body, ie. the Scientific Council of NCAC
- ⋆ The procedure is initiated upon the application of the doctoral student, accompanied by the thesis and positive opinion of the supervisor
- ⋆ At least one scientific peer-reviewed paper authored by the student must be published to start the procedure
- ⋆ The details of the procedure are determined by the institute
  - ▸ **astrophysics exam**
  - ▸ **three** reviews, two must be positive
  - ▸ public defense

Doctoral degree

The **2024 MERAC Prizes** for the **Best Doctoral Thesis** are awarded in

Theoretical Astrophysics to

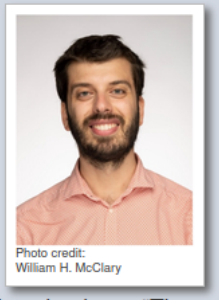


Photo credit:
William H. McClary

▾ Dr Lorenzo Gavassino (Vanderbilt University, United States of America)

for his thermodynamics-based formulation of relativistic viscous hydrodynamics for multi-messenger and gravitational astronomy.

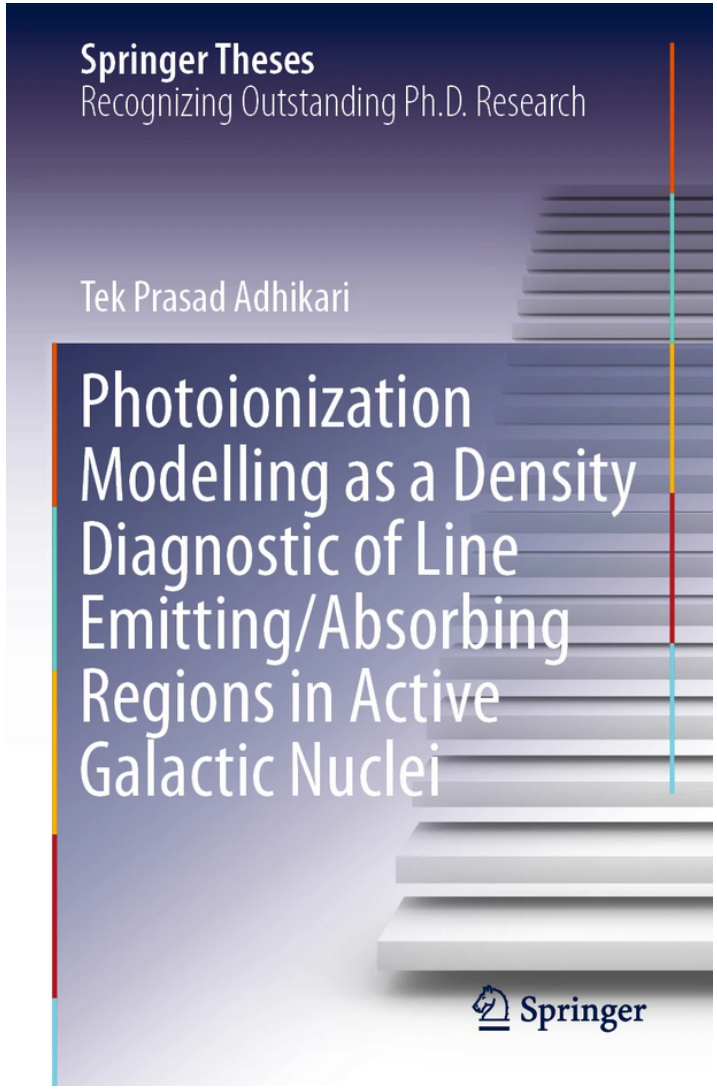
Dr Lorenzo Gavassino received his Master's degree (cum laude) in Physics from the University of Milano "La Statale" in Milan, Italy, and moved to the Nicolaus Copernicus Astronomical Center of the Polish Academy of Science in Warsaw, Poland, for his doctoral studies (initially with a Della Riccia scholarship). He graduated in June 2022 and obtained his PhD (with distinction) in astronomy and astrophysics with a thesis on "Thermodynamic methods for relativistic hydrodynamics". He is currently a postdoctoral scholar at the department of mathematics of Vanderbilt University, in Nashville, USA, and member of the Vanderbilt Initiative for Gravity, Waves, and Fluids (VandyGRAF).

Dr Gavassino's thesis focuses on how to develop a formulation of viscous hydrodynamics in general relativity. The topic has become of importance for multi-messenger astronomy, given the detection of gravitational waves created during the final stages of inspiral and coalescence of two neutron stars (GW170817A). Events like this are very energetic and require the use of relativistic, dissipative fluid dynamics for modeling and data extraction. However, the theoretical foundations of relativistic dissipative fluid dynamics are not completely settled, with troubling issues dealing with causality and stability still debated.

His work approaches these issues of causality and stability in a modern and original way, namely, to start the discussion of a many-particle system with well-established conservation laws, such as energy, baryon number, and momentum, to build a manifold of possible thermodynamic states. Dr Gavassino clarified several outstanding questions concerning the role played by the second law of thermodynamics in the determination of the stability properties of relativistic fluids. He explained why several fluid dynamic formulations are inconsistent with relativity, even though they formally satisfy the second law of thermodynamics. Furthermore, he created a quick systematic technique to construct a quadratic Lyapunov-like functional that can be used to investigate the stability properties of relativistic viscous fluid dynamic theories with an entropy current that exactly satisfies the second law of thermodynamics. His work provided for the first time both a systematic method for constructing such a functional and also the physics reasoning behind it. In a separate paper, he showed that relativistic fluids, which possess a well-defined entropy that is maximized in equilibrium according to the second law of thermodynamics, cannot possess superluminal perturbations that would violate relativistic causality.

The PhD thesis of Dr Lorenzo Gavassino was conducted at the Nicolaus Copernicus Astronomical Center of the Polish Academy of Sciences in Warsaw, Poland, under the supervision of Professor Brynmor Haskell.

Doctoral degree



Authors: Tek Prasad Adhikari

Nominated as an outstanding PhD thesis by the Nicolaus Copernicus Astronomical Center of the Polish Academy of Sciences, Warsaw, Poland

Provides a general overview of the latest research on Active Galactic Nuclei (AGN)

Includes a detailed description of photoionization simulations

Presents step-by-step demonstrations of using physical models to explain the observational results

Part of the book series: Springer Theses (Springer Theses)

Doctoral school – recruitment

⋆ Recruitment is open! **Application deadline: April 7th**

⋆ **6th Meeting of Young Astronomers**

- ▸ presentation of NCAC and the doctoral school
- ▸ presentation of possible research topics by potential supervisors and/or their team members
- ▸ presentation of cooperation opportunities: summer internships, scientific projects
- ▸ **Please follow our website!**

Doctoral school – recruitment

⋆ Application for a specific research topic to a specific supervisor

▸ **it is a good idea to make contact at this conference or during summer programme**

An information about the proposed research topics and their supervisors is attached to this announcement. Candidates can apply for up to two topics, but should indicate the preferred one. **Before applying, candidates should contact their potential supervisors to obtain more details on the proposals.**

Doctoral school – recruitment

⋆ funding (scholarship): either from research grant or from the institute:

Students in the doctoral school receive a scholarship for the period of 4 years. The amount of scholarship is set in the Law on higher education and science and is 3466,90 PLN/month, gross (ca. 3077 PLN/month net), before the mid-term evaluation (years 1–2) and 5340,90 PLN/month, gross (ca. 4740 PLN/month, net), after the positive mid-term evaluation (years 3–4).

Subject: Numerical simulations of relativistic jets from black holes

Supervisor: dr hab. Krzysztof Nalewajko (contact: **knalew@camk.edu.pl**)

Relativistic jets are powerful collimated outflows observed in certain active galaxies, stellar X-ray binaries, gamma-ray bursts, etc. They are thought to be driven by the magnetospheres of accreting rotating black holes. Global numerical simulations of relativistic jets can be performed by numerical simulations of magnetized plasma in the Kerr metric. The Ph.D. candidate will be introduced to general relativistic numerical codes, high-performance computing, theory of relativistic jets, etc. Knowledge of numerical methods, fluid dynamics, magnetohydrodynamics, plasma physics or general relativity will be preferred, but is not mandatory.

Location: Warsaw
Funding: by the institute, as set in the announcement. Possibility to switch into grant funding in later years.
Note: A single ranking list will be created for this and other topics, except the first.

Doctoral school – recruitment

⋆ Application documents: CV, motivation letter, BSc and MSc degree certificates, transcripts of grades, recommendation letter

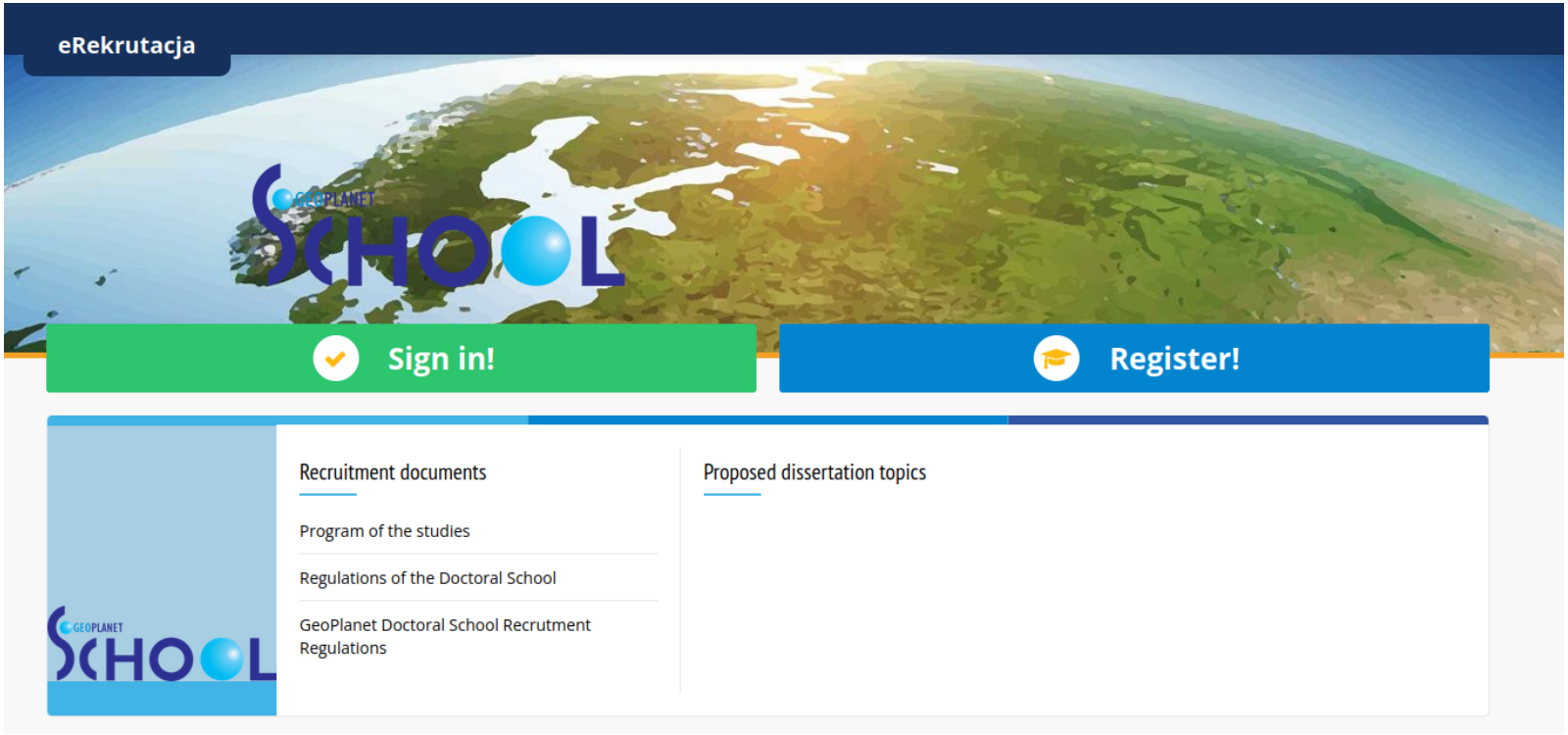
For the application, candidates should provide their complete application documents including:

1. The application for admission to the doctoral school together with GDPR statement (following the templates available for download in the online application form; address given below).
2. A copy of their master's/university and bachelor's degree diplomas. **In case master's degree diploma is not yet available, it must be provided before the candidate is admitted to the school.**
3. A transcript of grades (Bachelor and Master Courses).
4. A Curriculum Vitae including an education and employment records, list of publications, information on involvement in scientific activities – membership in scientific groups/societies, participation in scientific conferences, internships and training, awards and distinctions.
5. A letter of motivation containing a short description of the candidate's interests and scientific achievements, and justification of the intention to undertake education at the Doctoral School.
6. English language certificate(s), if available.

All documents should be in the PDF format, including scans, and should be submitted via an on-line application form **by by April 7th, 2024. The online system will be launched on March 17th, 2024, details will be updated in this announcement.**

In addition to application documents given above, at least one recommendation letter should be sent **directly by the referee to: phdstudies@camk.edu.pl, before the application deadline (April 7th).**

Doctoral school – recruitment



Doctoral school – recruitment

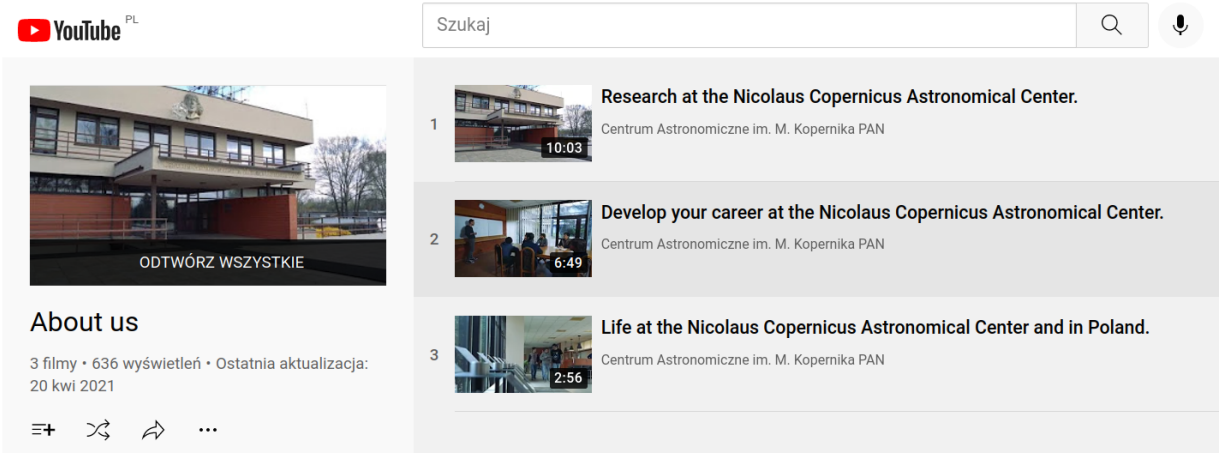
- Two-stage procedure: evaluation of documents and an interview
- Committee: doctoral school coordinator (head), deputy director, **prospective supervisor** (Director is usually present at interviews)
- Application documents
  - A strong application consists of: good grades, participation in additional projects (beyond the master's degree), publications (eg. conference proceedings), participation in conferences (eg. PTA congress)
  - The motivation letter should get the supervisor's attention.

  Write why you are interested in their topic.

Doctoral school – recruitment

- The best candidates are invited to an interview (Zoom)
- During the interview we ask questions:
  - related to previous research work (eg., MSc project, additional projects)
  - related to the research topic for which you are applying
  - astrophysics (very general; show your interest in astronomy!)

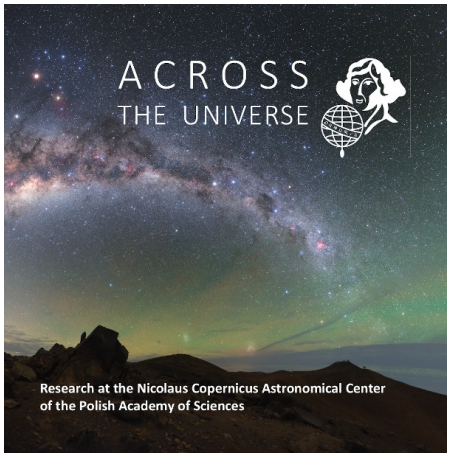
More information



Promotional movies

Album about research we are doing

Student's self-government



Social media

www.geoplanetschool.pl
www.camk.edu.pl/en/phd/