

School of Meteor Astronomy

@Petnica Science Center

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**What is
Petnica Science
Center?**



What is Petnica Science Center?

Petnica Science Center (PSC) is the biggest and, probably, the oldest independent nonprofit organization for extracurricular, informal science education in South Eastern Europe. Since 1982.

Majority of programs are designed for secondary-school students...

... although there are a lot of programs for primary-school pupils, university students and science teachers.

... from all over the former Yugoslavia.



Basic educational principles

The approach to the science education is unique, and can be generally described in three main “philosophies”:

LEARNING THROUGH RESEARCH

**IMPLICIT AND TACIT
KNOWLEDGE**

PEER EDUCATION



Learning through research

Problem-solving

Learning methods and question-asking, not (just) the facts!

Data management

Inter/multi/anti-disciplinarity

The correctness of the research process (from the idea to scientific paper)

IMPLICIT KNOWLEDGE: critical thinking, scientific and philosophical literacy, intuition and insight, explanatory skills, academic responsibility and honesty, team work, networking, patience, tolerance, failure management, ...

**Apply this to
meteor science
and you will get...**

**School of
Meteor
Astronomy**

SCHOOL OF METEOR ASTRONOMY

it exists in various forms from 1973, but as a distinctive program from 2009.

participants are mostly high school (but from time to time we have few and bachelor students among them)

“teachers” are researchers from university and institutes, almost all of them are (or were) members of Petnica Meteor Group

LECTURES + WORKSHOPS + PROJECTS

Topics of the lectures and workshops

METEOR SCIENCE AND SMALL BODIES' PLANETARY SCIENCES

“What are meteors and why and how do we study them?”

METEOR SCIENCE HISTORY

VISUAL OBSERVATIONS

ZHR AND SHOWER ANALYSIS

VIDEO, RADIO, and everything else...

METEOR SPECTROSCOPY

METEORITICS

METEOR PHYSICS

ENERGIES AND VELOCITIES
IN THE SOLAR SYSTEM

SOLAR SYSTEM DYNAMICS

SMALL BODIES OF THE SOLAR SYSTEM

EVOLUTION OF METEOR SHOWERS

STATISTICS

... and so on, and so on...

Projects

INDIVIDUAL OR GROUP WORK

Hot and actual problems with the goals **achivable** to students... **around 30 topics!**

goal: ONE special case, one particular variable, experimental setup, ...

Some of the projects were presented on last IMCs!

MENTOR WORK + PEER EDUCATION

JUNE - 10 days

NOVEMBER - 4 days

DECEMBER - CONFERENCE!

Projects outcome

“You MUST have a **definite result**, at least for some **simple, special case**. That is the minimum requirement. The more situations you explore the better - though remember that we aim for quality, not only quantity. Some problems are inherently more complicated than others, and the amounts of data you produce/study are not directly comparable for different projects. Nevertheless, it is important that you make progress. Don't get stuck in modeling the most general situation without any results. Solving the general situation is the final objective, but you must reach many benchmarks along the way. All those projects can be turned into summer projects (and beyond) if you are interested in doing that.”

Three body problems:
Binary stars, Sun-Jupiter,
Saturn-Janus-Epimetheus

Asteroid impacts in the Earth-Moon system

Orbital maneuvering around
non-spherical bodies

**Meteor trajectory reconstruction
from multi-station photos**

Collisional disruption of the
rubble pile asteroid

Impact size distribution on saturated surface

Satellite formation toy
model

Aggregations of particles using the 'sticky
spheres' (Smoluchowski) model

Radio Meteor Observing Bulleting Data Analysis

Lunar crater detection
and statistics

**Geometry of meteor
imaging**

Light curves of complex asteroids

Meteor entry simulation

Tunguska-type explosion and pattern of
the fallen trees

Chondrules and CAI inclusions
in chondrites

Perturbation of the toy-Oort cloud

Video Observation Data Analysis

Why do we do this?

Why should you do this?

**Thanks for your
attention!**