



FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Presented at the FIG Working Week 2024,
19-24 May 2024 in Accra, Ghana

Hackathon as a Format for Teaching Modern Geodesy

Ilya Oshchepkov and Gennady Melnik (Russia)



Roskadastr



MIIGAiK

MOSCOW STATE UNIVERSITY
OF GEODESY AND CARTOGRAPHY

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Hacking the Classroom: A Modern Approach to Teaching Geodesy

- Course: **Higher Geodesy II** (12 weeks)
(geodetic reference frames)
- Students (3rd year) with almost **no programming experience**
- Final project is a **hackathon**
- Topic: **GNSS time-series analysis with Python**



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Challenges in Traditional Methods

- Passive learning can lead to **disengagement & distraction**
- Large class sizes **hinder interaction**
- **Difficulty integrating modern skills** (coding, data analysis, problem solving)
- **Learning** the software (often commercial), **not the algorithms**



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What is a Hackathon?

- Collaborative event focused on **problem-solving**
- Teams work on a **specific challenge within a time limit** (i.e. very intensive)
- Encourages **creativity, innovation, and teamwork**
- Hands-on experience with **software development and data analysis**



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Designing a Hackathon for Geodesy: Recommendations for a Success Story

- Define clear **learning objectives, challenges and real-world problems**
- Provide access to relevant **datasets and software**
- **Prepare students** during the semester
- Create a **supportive and collaborative environment**

STUDENTS
CLASSROOM



THIRD PLACE



SERVER

Yandex Cloud



DATA

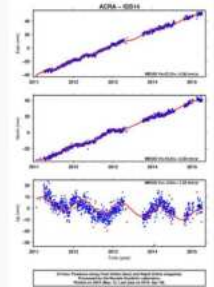




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Hackathons in Action: GNSS Time-Series Analysis with Python

- 65 students / 8 teams
- Create the **best possible model**
- 140 GNSS stations for **model learning**
- **Grading** depends on:
 - quality rating of the model (RMS)
 - quality of the defense

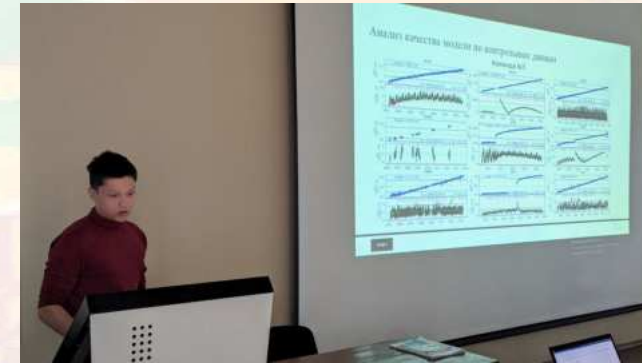




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Conclusions Based on Experience and Feedback

- Hackatons: increase student **engagement**, develop **modern skills**, promote **problem-solving** and **creativity**, build **collaboration** skills
- Students are **interested to continue working further** after the hackathon is over
- **Unusually intensive** for both students and teachers (hardest time of the semester)
- Critical dependence on **not-so-reliable cloud solutions and technology stack**

Consider implementing hackathons in your own geodesy & surveying courses!

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Commission 2

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