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Scientific Olympiads & Competitions

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- [International Zhautykov Olympiad](#), Almaty, Kazakhstan
- [International Olympiad of Metropolices](#), Moscow, Russia

Presentation outline

- What are Scientific Olympiads?
- What is a teaching excellence?
- Who are the best students we would like to see and work with?
- How personal achievements in Olympiads correlates among different competitions and with research impact?

What are Scientific Olympiads

- (narrow view) Educational events for secondary school students

Good for students?

Demonstrates a Country level in education?

Jury members have a time to prepare problem sets instead of working on their research

- (Wide view) A science itself

Scientific competitions are origin of modern Science ?

- http://www.storyofmathematics.com/16th_tartaglia.html

In the Renaissance Italy of the early 16th Century, Bologna University in particular was famed for its intense public mathematics competitions.

It was in just such a competition, in 1535, that the unlikely figure of the young Venetian Tartaglia first revealed a mathematical finding hitherto considered impossible, and which had stumped the best mathematicians of China, India and the Islamic world.

- Scientific research is a Competition?

Expectations & Benefits

- (Secondary school students) **Enter University**

Does it work for US Universities?

University of Waterloo, Canada:

Michael & Ophelia Lazaridis Olympiad Scholarship

- (University students) **Get <Google> job offer**

Actually works with Google and others

- (Professors) **Homeworks/Exams preparation**

There are a lot of automated online judge systems to study programming

Negative feedback

- Olympiads produce narrow minded / ... students
- Wish to be first – it's a sin?
Ready to cheat to get gold medal
Do not enter contest having low chance to win
- Students are preparing for Google interview instead of study
- We have to teach not only best/self-motivated students
- What is a fun solving a task which is known to be solvable?

Objective reasoning

- V.I. Arnold: «Как вам удалось при столь низком школьном образовании достичь столь высокого уровня в науке?»
- Olympiads produce excellent tasks/problems – like Arnold’s Mathematical trivium
- Known things should be done in reasonable time – otherwise a lifetime is not enough to solve a complex problem
- The only way to learn programming is to write programs with (online) judge
- The best ways to learn the art of fast and correct programming are various programming contests

Olympiads & Competitions

Secondary schools International Olympiads, UNESCO	High schools / Universities
IMO, Mathematics (since 1959) https://www.imo-official.org	International Mathematics Competition for University Students http://www.imc-math.org.uk (Bulgaria)
IPhO, Physics (since 1967) http://ipho.org/	
IChO, Chemistry (since 1968)	
IOI, Informatics (since 1989) http://ioinformatics.org	ACM International Collegiate Programming Contest https://icpc.baylor.edu/
IBO, Biology (since 1990) www.ibo-info.org/	iGEM Competition http://igem.org

[Kaggle](#) is a platform for predictive modelling and analytics competitions in which companies and researchers post data and statisticians and data miners compete to produce the best models for predicting and describing the data. (crowdsourcing approach)

What is a teaching excellence?

- Inspire students to learn - do not kill student's dream
- Student needs challenge - the challenge comes from modern science and industry
- Your students are ready to work in top level high-tech companies
- Achievements of your student are higher than yours. Isaac Newton: "If I have seen further it is by standing on the shoulders of giants."

What is a teaching excellence?

- Triple R: Read → Remember → Repeat
- Triple L: Listen → Learn → Lead
- The Arabic word QURAN means Read, Remember & Repeat ?

Who are the best students we would like to see and work with?

- School/University level competition winners are not always best students / researchers
- It is hard to teach and work with students who knows subject “better” than teacher
- It is hard to give to winners challenging tasks

How personal achievements in Olympiads correlates among different competitions and with research impact?

- IOI vs. ACM ICPC

Good correlation – good problem for detailed analysis

Winners of IOI (secondary school) not always are winners of ACM ICPC – the level of tasks and contest are different

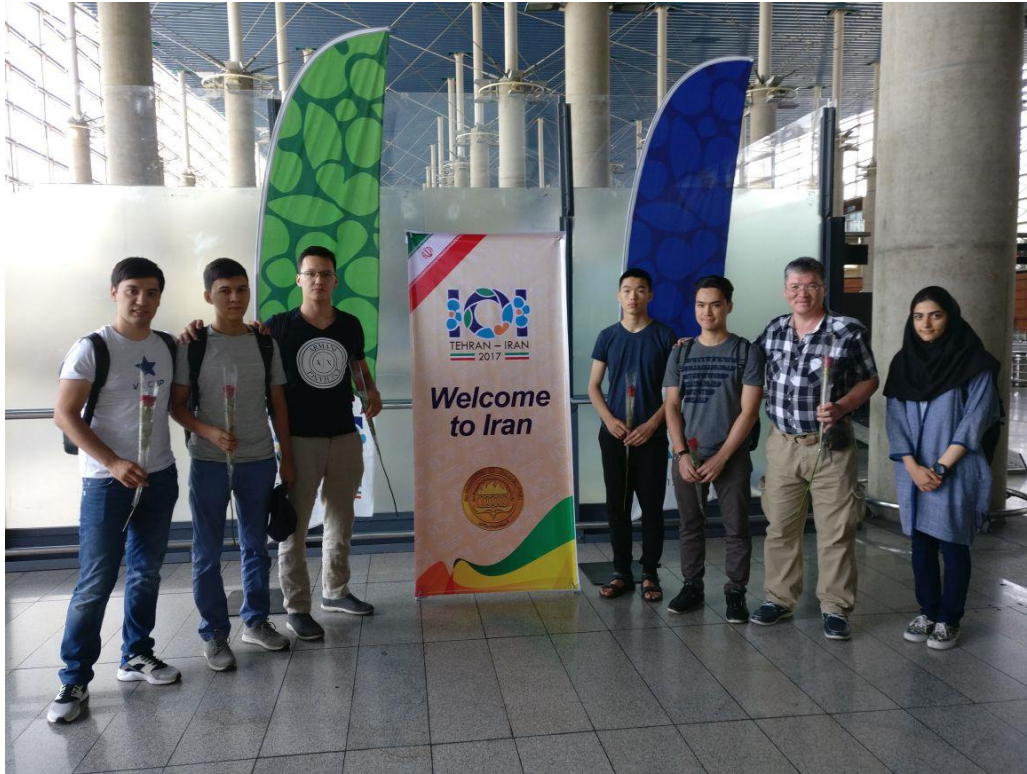
- Grisha Perelman

IMO'82 Absolute winner

Poincaré conjecture



29th
International Olympiad in Informatics
July 28 – August 4, 2017
Tehran, Iran



This is first IOI in my memory when we get presents at arrival day – roses in our hands are valuable demonstration of hospitality and heart of Persia!

Yuta Takaya, Japan – absolute winner of both IMO'17 and IOI'17



2017 ACM-ICPC World Finals, sponsored by IBM

Place	Name	Solved	Time	Last solved
1	St. Petersburg ITMO University	10	1093	248
2	University of Warsaw	10	1240	287
3	Seoul National University	10	1320	246
4	St. Petersburg State University	10	1377	299
5	Moscow Institute of Physics & Technology	10	1460	287
6	Tsinghua University	9	964	233
7	Peking University	9	1245	274
8	Fudan University	8	1103	275
9	KAIST	8	1119	272
10	Ural Federal University	8	1264	291
11	KTH - Royal Institute of Technology	8	1357	290
12	The University of Tokyo	8	1490	283