

**Gender gap**  
Only 25 of the  
400 students are girls.  
Page 3

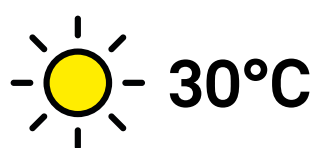
**Win a carafe**  
Take part in the big drinking  
water contest.  
Page 4

**Spotless country**  
The strange recycling habits  
of the Swiss.  
Page 7

# MOMENTUM

Issue 1 – Zurich, 10 July 2016

## Today's Weather



Wear a hat and  
put on sunscreen.

## Schedule

### Students

16:00 – 22:00  
Registration at Irchel Campus

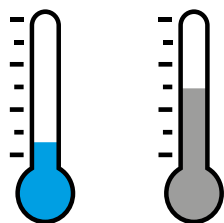
18:30 – 22:00  
Dinner at canteen Irchel  
Campus

### Leaders

16:00 – 23:00  
Registration at Technopark

18:30 – 20:00  
Dinner at Technopark

## Stress Level Barometer



Students

Organising  
Committee

# Super Guides

**Our guides will be your mother, father, emergency doctor, anti-cheating officer and best friend.**

IPhO would not be possible without our guides. During the period of our Olympiad, we have leader guides and student guides. They are the lifeline for our students and leaders. Very often, the leader guides are faced with questions that range from ‘Where can I get a pre-paid phone card’ to ‘where can I get a beer!’ and our omniscient leader guides always help them out. In the same way, our student guides are the go-to persons for all the participating students. They are all-rounders, as they welcome

their respective delegates and help them with everything, including waking them up in the morning, ensuring that the students have their breakfast and eat well, being the guide for the students by helping them with their everyday tasks and lastly, seeing them off when the IPhO is finally over. They work their own schedule according to the schedule of the students. Past student guides say, ‘Being an IPhO student guide was one of the best times of our lives. We not only became close to the delegated country’s students, but also made friends from many other countries. We learnt about their multifarious cultures through them.

And when they left there were lots of tears, but what remained with us were the sweet memories and the strong bonds of friendship!’ Being a student and leader guide is very hectic, but at the same time, very enjoyable. Many student and leader guides have been previous participants at various IPhOs. Here they have the opportunity to learn how important it is to work as a team. Tobias Wihler says, ‘The guides are the ambassadors for bringing this event to life’. Let us applaud all these superheroes who are ready to assist at all times!

*Asira Lele*



Our guides in Superman posture.

Image: *Roman Ernst*

# More than mass $\times$ velocity

EDITORIAL

A warm welcome to everybody from the editorial team of Momentum! What you are holding in your hands is your daily update on news concerning the IPhO 2016. We write for the students, the leaders, the markers, the Academic and Organising committee, but also for the parents at home wherever that may be. Thus, although we are short eight-page newspaper with a circulation of one thousand copies, we are read online around the world from Thailand to the United States and from the island of Borneo to the shores of Macao. One of our main missions is to get to know you. Please tell us your story. How do you feel facing the challenges ahead? What do you think about Switzerland and Liechtenstein? Why do you love physics? We hope that after reading the first issue, you will find that Momentum is much more than just mass multiplied by velocity.

Yours sincerely  
Atlant Bieri



Our blackboard with the first issue of Momentum.

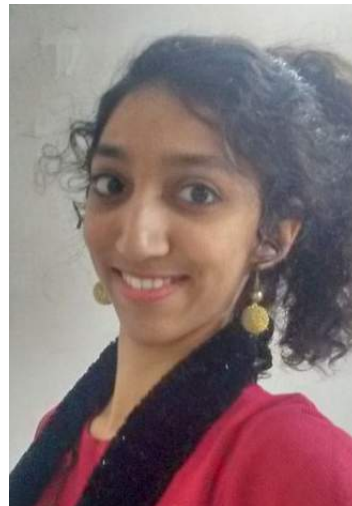
## Our editorial staff



**Kira Hussinger**, 29 years old, has a Masters degree in Economics Sociology and is working as a Campaign Manager for a campaign agency in Switzerland. She likes fashion & design, traveling and blogging for herself and others.



**Atlant Bieri**, 36 years old, is a science journalist. He loves chocolate, aphids and gravity.



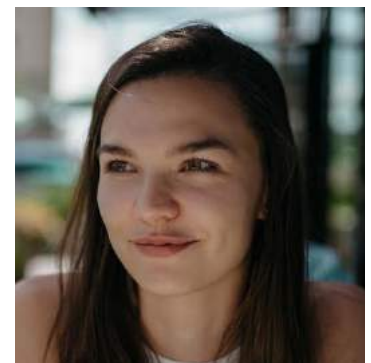
**Asira Lele**, 22 years old, was a student guide for IPhO 2015 in Mumbai. Back in India, she works in Barclays and she just finished her Masters in Computer Science. She loves dancing, painting, reading books and writing.



**Björn Bauhofer**, 20 years, studying Earth System Science at university of Zurich. His hobbies are videography and rowing.



**Roman Ernst**, 29 years old, is the photographer for the IPhO 2016. He is excited to finally get in touch with the IPhO 2016 community and he will work hard to catch as many memorable moments as possible with his camera.



**Céline Nauer**, 23 years old, doing her Bachelor's degree in physics. Her favourite physics experiments are the cloud chamber and the Ruben's tube. Apart from physics she likes dancing Boogie-Woogie and making concrete furniture.

## Girls outnumbered

**Physics is for boys. In this year's contest there are only two dozen girls competing.**

Only 25 of the 400 students are females. This comes down to only six percent. However, they come from 21 different countries. Most of them

contribute only one female contestant. Only Macedonia, Moldova, Mongolia and Sweden are competitive with two women. Among leaders and observers the female representation is a bit better with 35 of 264 persons or 13 percent.

*Björn Bauhofer*



Angela Merkel: a study in physics as career boost.

## Country report

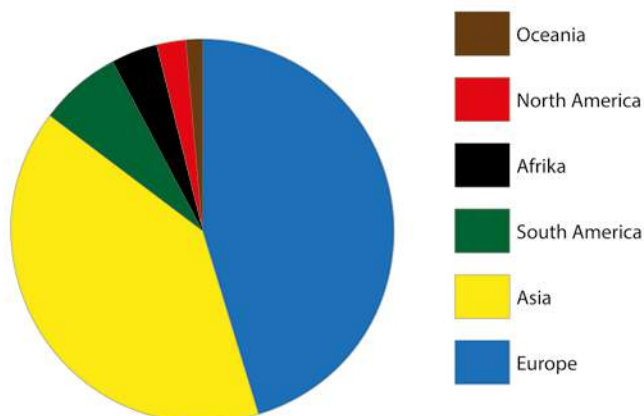
**At the country level Europe and Asia are ahead of everybody else. Africa and Oceania are gaining momentum.**

Europe has the highest number of participants for IPhO

2016. Participants from Asia are almost equal in number. South America has a fairly low participation, but Africa and North America are lower. Oceania has the lowest number of participants.

*Asira Lele*

### Participants by Continents



## Men at work

**There is a massive construction site at campus Irchel right behind the Department of Physics building. By 2019 this will be new chemistry buildings.**

With the extension the chemistry institute will profit from top modern offices and lab spaces. A key concept of the building is the multifunctionality of the ground plan. Whenever offices and laboratories need to be extended due to changes in research or staff the changes are inexpensive and easy to make. The chemistry professor Roland Sigel has

also expressed his excitement towards the new building. "Me and the entire institute are looking forward to the new building since it is tailored for us users and our experimental methods. In the mean time it is fully flexible and can be adjusted to new research areas in the future."

Other than that there will be numerous study areas and desks for the growing number of students at UZH. That being said, the new building will not only be an enrichment for the chemists but also for the entire university and it's student body.

*Céline Nauer*



Irchel Campus is building new laboratories.

## Bus ballet

**Since the IPhO participants arrive by bus at Irchel Campus the drivers had to examine the access route in advance where they faced some difficulties.**

Close to the Irchel Campus there is an underground roundabout being built. In order to stabilize the surroundings there is a scaffold around the street which is difficult

to pass by for the bus. Therefore the bus drivers tried to squeeze their vehicles through the roundabout in advance and it turned out that it is not possible for them to access the Irchel campus directly. Now they have to make a 180 degree turn 400 meters in advance in order to transport the IPhO participants to their destination.

*Céline Nauer*

# Water: Filtered and stirred

**In Zurich most drinking water comes from the lake. To improve its taste, it is flavoured with a dash of ground and spring water.**

The participants of IPHO 2016 got a brand name drinking bottle of Sigg. But what to do with it? The simple answer: fill it with tap water. Zurich's tap water is amongst the best quality tap water in the world. This is not a matter of chance but a matter of hard work and a lot of filtering.

Zurich Water Supply counts 280 employees who manage the collection, filtering and distribution the drinking water. It all starts with Lake Zurich. Two treatment plants collect water from 30 metres below surface. Through a pipe



**The cool Sigg bottle at your local refill station.**

it reaches the treatment plant. In the first step, the water is mixed with ozone. This kills

all the bacteria and other organisms. Then it goes through a sand filter. It looks like an Olympic pool and is just about as big. "The sand holds back any particles," says Riccarda Engi, spokes person of Zurich Water Supply.

Afterwards, the water goes through a filter of activated carbon. "It eliminates any flavours or discolouring of the water. Also chemicals from agriculture and pharmaceuticals are removed," Engi says. Now the water is technically ready for drinking. But because it is lake water, it doesn't taste much, as the mineral content is very low. Thus it is mixed with 30 percent groundwater and spring water. This gives it a nice fresh taste. Now go and enjoy!

*Atlant Bieri*

## Excursion note

On Tuesday students will get a guided tour through a water treatment plant.

## The big water contest

How long is the pipe network of the Zurich drinking water distribution?

**A: 900 kilometres**

**B: 1550 kilometres**

**C: 2550 kilometres**

Send the correct answer to [momentum@ipho2016.org](mailto:momentum@ipho2016.org) or see us at the editorial office. The first six correct answers will get a carafe offered by Zurich Water Supply.

## PEOPLE & COUNTRY

### Enno Van der Laan



I'm one of the two leaders of the Dutch IPHO team. It's my 6th IPHO as a leader. I'm one of the organizers of the Dutch National Physics Olympiad. I work at the University of Groningen as a lecturer. My hobby is geocaching. I hope to find some geocaches in Zurich!

### Elvinas Ribinskas



My name is Elvinas and I am from Lithuania. I am really happy to participate in the IPHO for the second time. I like learning about physics because it explains a lot of phenomena we encounter every day. I believe that International Olympiads have a huge influence on our lives. It is not only a competition, but also a chance to visit another country and meet new interesting people, who all share the same interest in physics. I hope that everyone will enjoy every minute of this fantastic event.

### George Tombras



George Tombras is a B.Sc., M.Sc, Ph.D., is Professor of Electronics, Director of the Laboratory of Electronic Physics, and Chairman of the Faculty of Physics at the National and Kapodistrian University of Athens, Greece. His research interests include Wireless and Mobile Communications, Free Space Optical Communications, Analogue and Digital Circuits and Systems among others.

# Love at first sight

**With a bag full of Indian sweets I landed in Zurich. What a gorgeous town! Everything is like in a fairy-tale book.**

Switzerland. What comes to your mind? Chocolates,



My plane over Lake Constance preparing for landing.

cheese, Heidi, the snow-capped Alps and all the natural beauty... God's own country – Sweetzerland! I must say, I was over-excited for this trip and packed all sorts of things. You hear so many wonderful things about Switzerland – you

just can't wait to check them all out! Being a Team Guide twice, I was additionally looking forward to meeting all the familiar faces and making new friends. So for them, I brought plenty of sweets and lip smacking Indian snacks! Being from a multi-cultural country like India, I am also eager to learn about the Swiss culture.

As the Swiss plane descended through the brown and grey clouds, I saw Zurich for the first time. Well, it was love at first sight! I really wondered if they had taken an aerial view of Zurich before constructing the city. It was a quaint picture – patches of green and brown criss-crossing next to the slant-roofed houses, neatly arranged in long rows



## Röschi & Curry

along the beautiful countryside. Cars, the shape of ants in my view zoomed along the long, winding roads. Driving through Zurich is a pure pleasure. Switzerland's natural beauty feels like it is straight out of a fairy-tale book. Zurich – if a first impression is a last impression, then I'm already blown over by your dainty and picturesque beauty!

*Asira Lele*

## Sandar Lim



Hi, everyone! I am a high school physics teacher from Singapore. I like hiking, scuba diving, and climbing. I am coming to the IPhO 2016 as an Observer.

## Ming Yi Lee



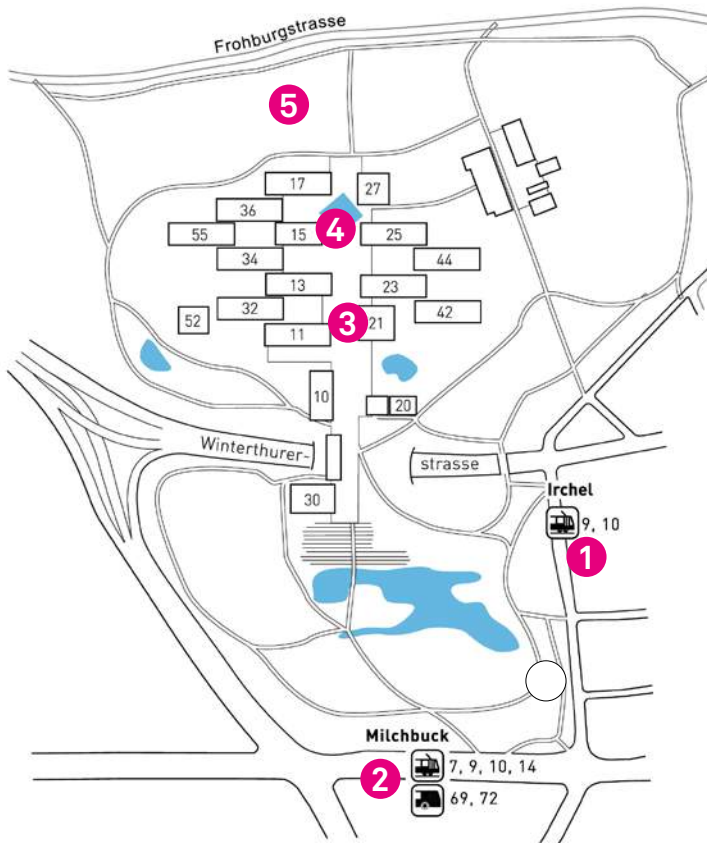
I'm Ming Yi from Malaysia! This is the second time I have been able to participate in IPhO and also to be able to meet with so many participants from other parts of Earth who also love Physics and think Physics! During free time, I play Tai Chi besides thinking about physics. Tai Chi is my hobby, not only because it can strengthen my physical health but also keeps my mind alert. Most importantly, it makes me think about the world. Just like what physics did!

## Andreas Sundstrom



This time I'm coming as an observer for the Swedish team, but I've participated as a student in IPhO before. That was in Estonia 2012 and Denmark 2013. Besides being an observer here, I'm currently studying Engineering Physics, but since it's summer I've just come home from a week's sailing along the Swedish West Coast (which has a really nice archipelago). If you ever visit Sweden, don't forget the West Coast!

# Getting around Irchel



- 1 Tram station
- 2 Tram and bus station
- 3 Canteen / Registration / Momentum office
- 4 Blue square
- 5 Construction site



## Party manager



**Tobias Wihler: Manages hotels, visas and the midterm party.**

Today, 800 people are arriving from all over the world in Zurich. Someone has to organize that all those volunteers, leaders and students have a bed, that they can stay with their delegation, that boys and the (few) girls are put in separate rooms and that the arrivals are scheduled. This is where Tobias Wihler comes

into play. He is responsible for administration and volunteer management. Besides that, he helps organizing visas and fixes last minute changes such as arrival and departure dates. He was also responsible for the planning of the opening event, the midterm party and the closing ceremony.

Asking him what the participants can look forward to the most, he answers that the midterm party will be an unforgettable Swiss adventure where everyone can participate actively. Tobias himself is excited to work with a motivated team of volunteers, UZH staff and also the delegations and he is looking forward to interesting encounters.

*Céline Nauer*

## In the press

***“The Einsteins of tomorrow are competing at the Physics Olympiad”***

*Aargauer Zeitung (Swiss regional newspaper)*

***“University of Zurich is host of the International Physics Olympiad 2016”***

*moneycab.com*

***Brilliant mind headed for Swiss Olympiad***

*theweeklyreview.com.au*

# Cleaner than clean

Besides chocolate and punctuality, Switzerland is also well known for its scrupulously clean cities. When it comes to garbage and recycling, the Swiss display some rather strange behaviour.

Growing up in Switzerland you probably know how to recycle before you even know how to walk. Whenever you get a bit of chocolate you were told that the aluminium foil around it doesn't go to the trash but to the aluminium collection, that glass bottles are to be separated by colour and that every two weeks there is a truck coming to collect your paper and your cardboard (separately of course!), that PET bottles and milk bottles are recycled in different places and that apple cores are to be thrown in the compost.

The rest of the trash which can't be recycled doesn't go to landfills but to an incineration and everything is burned (If you ever wander around central Zurich you might encounter a very tall chimney, which is in fact an incineration).

But contradicting all this education, on a Saturday night in a public place it becomes evident that the Swiss also tend to completely forget their habits concerning recycling and the streets do not look as picture perfect anymore.



But as soon as the sun rises the dozens of cleaners have done their magic and Switzerland is able to live up to its clichés again, it almost seems as if nothing ever happened. The city of Basel even hires people to judge the cleanliness of public places on a regular basis.

So all in all there is a lot of effort put into cleaning up and it is left to you to decide whether this is admirable and progressive or just pure obsession.

*Céline Nauer*

## Swiss Treat

### Rocket ice cream

Since the moon landing in 1969 this orange-white delight is a Swiss classic.

Flavoured with orange, pineapple and a cacao tip (the best part!) this treat is very popular amongst children and nostalgic adults. At only one Franc this is also the cheapest ice cream around. So if you have a sweet tooth, you need to try one!



Nobel laureates of the University of Zurich

# Turning light into electrons

Albert Einstein published no less than five groundbreaking papers. Among these was his **Light Quanta Hypothesis**, for which he was awarded the Nobel Prize 1921.

In 1905, 26-year-old Albert Einstein submitted to the University of Zurich his dissertation entitled «A New Determination of Molecular Dimensions». Within just a few months, he published another four papers.

His groundbreaking work included the Theory of Special Relativity and the Light Quanta Hypothesis; the latter being singled out for the Nobel Prize in Physics in 1921.

Einstein's revolutionary Light-Quantum Hypothesis states that light consists of tiny bundles of energy (quanta). If the energy of light shining on a metallic surface is sufficient, the surface will emit electrons.

The electrical charge released during this process can be measured. This phenomenon is called the photoelectric effect. Though this effect had long been known in physics, Einstein was the first to explain it correctly, by developing the Light-Quantum Hypothesis.

From 1909 to 1911 he was Professor of Theoretical Physics at the University of Zurich. This was Einstein's first academic position.

*Kira Hussinger*

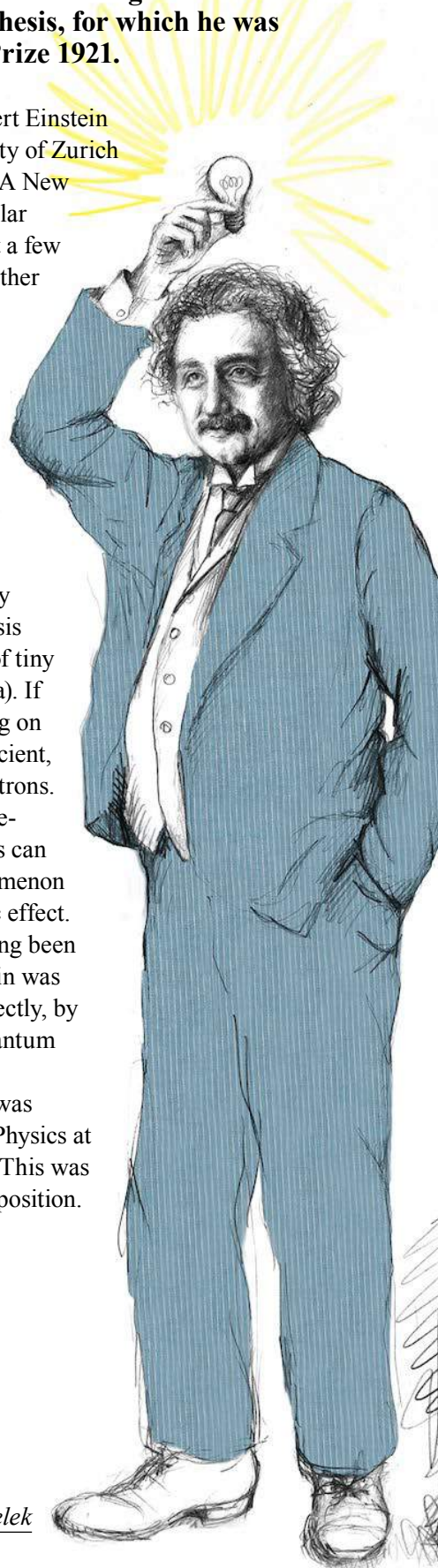


Illustration: *Aline Telek*

# Happy Birthday



Today is **Stephan Läubli's** birthday. Congratulations! For IPhO, he is working at the multimedia department and will be filming a lot of the events.

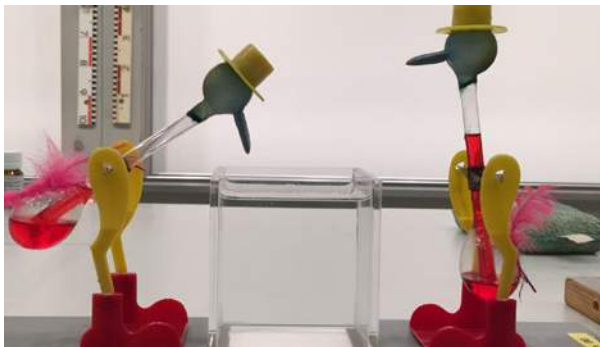


**Good news:** Every birthday child will get a big pack of Ragusa. This is a traditional kind of Swiss chocolate. Want to know more about it? Read this week's chocolate report in Momentum.

## Imprint

General Manager:  
**Andrea Schneider**  
Manager of the editorial office:  
**Kira Hussinger**  
Editor-in-chief:  
**Atlant Bieri**  
Journalist:  
**Asira Lele**  
Journalist:  
**Céline Nauer**  
Journalist:  
**Björn Bauhofer**  
Photography:  
**Roman Ernst**  
Photography:  
**Pascal Sommer**  
Proofreading:  
**Karen Abraham**

# In colour and sound



See the IPhO 2016 through our photographer's eye.

New pictures will be uploaded daily on [www.ipho2016.org](http://www.ipho2016.org), to [facebook.com/ipho2016](https://facebook.com/ipho2016) or [flickr.com/photos/ipho2016/](https://flickr.com/photos/ipho2016/)

You can also post your own pictures on Instagram, FB or Twitter: #ipho2016

## Write to us!

If you want to say something to the IPhO community, to Momentum or just tell everybody how you feel, write to us on [momentum@ipho2016.org](mailto:momentum@ipho2016.org) or drop us a note in your letter box at the editorial office.

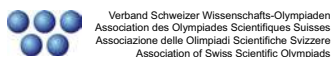
### Organizers



University of Zurich  
UZH



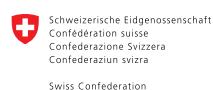
OFFICE OF EDUCATION  
PRINCIPALITY OF LIECHTENSTEIN



Verband Schweizer Wissenschafts-Olympiaden  
Association des Olympiades Scientifiques Suisses  
Associazione delle Olimpiadi Scientifiche Svizzere  
Association of Swiss Scientific Olympiads



### Main Partner



Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,  
Education and Research EAER  
State Secretariat for Education,  
Research and Innovation SERI

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### Partners



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**Landslide gets in the way**

The Swiss team is cut off from the rest of the world.

Page 3

**Breakfast review**

Everything on the delicious continental breakfast at Novotel.

Page 4

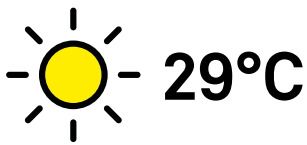
**Count your kisses**

Greeting habits of the Swiss.

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# MOMENTUM

Issue 2 – Zurich, July 11th 2016

**Today's Weather**

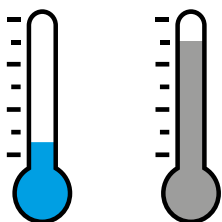
Wear a hat and put on sunscreen. Pack an umbrella for the evening.

**Schedule****Students**

10:00 – 11:30  
Opening Event, Irchel Campus  
Paul Scherer Institut PSI  
and Discover Irchel Campus  
Dinner at Mensa Irchel

**Leaders**

10:00 – 11:30  
Opening Event, Irchel Campus  
Lunch and Dinner at  
Technopark  
Discussion and Translation  
of Experimental Exams,  
Technopark

**Stress Level  
Barometer**

Students

Organising  
Committee

## Registration day



Image: Roman Ernst

# Gravity Garden

In physics, gravity is denoted by the letter  $g$ . Now, that's very handy, because if you reduce a force to a symbol, you can put it into formulas, solve physical problems, and use it to test the brain of students in an international physics contest. But in all this  $g$ -frenzy, we tend to forget that gravity is more than just a letter. It is real and you can feel it. How? Well, for example by building a cairn. For this, you will need to be very concentrated on the gravitational force each rock



exerts. The task is, to put one rock on top of the next while perfectly aligning the centres of gravity. This exercise can only be achieved if your hands and your mind are calm – an ability that may come in handy in tomorrow's practical exam. Watch out for the little rocks on the floor at Irchel Campus. They will guide you on the way to the gravity garden. Give it a try!

Atlant Bieri

My cairn  
at gravity  
garden.

## Yesterday in pictures

The leader guides were waiting for the delegations to arrive at Zurich Airport.



Delegation by delegation the IPhO 2016 community has arrived.



The students were eager to get more information.



«Momentum», the IPhO 2016 newsletter has been handed out to everybody.



Students came to the University of Zurich to register...



... and to hand in their mobile devices.

## The arrival of the fittest

**Zurich Airport got crammed as students and leaders started to arrive yesterday.**

Yesterday, most of the teams arrived at the airport in Zu-

rich, where their IPhO 2016 experience began with them meeting their team guides. One of the teams that is involved in the competition is Lithuania. They have had a four-hour journey from

Vilnius over Frankfurt, and passed 1 time zone. “We’re a small country (3 million citizens) but we’re proud to represent Lithuania”, says Umbrazunas Gilbertas.

Most teams arrived punctually in Zurich, and the transfer to the hotels has works without big issues. But some teams had problems: “The flight from Hong Kong arrived with a three-hour delay, because the had to take an other plane form Frankfurt. We think that they’ve had a problem from Hong Kong to Frankfurt,” says Dustin Hofstetter.

Also, there was a short time when contact to the Vietnamese team was lost.

Björn Bauhofer



Arrival of students at Zurich Airport.

## Missing in action

**The whereabouts of the team from Uzbekistan are unclear.**

Yesterday at Zurich Airport the team guide of Uzbekistan, Alicja Marszakek, lost track of her students. The whereabouts of the flight were unclear. “We’ve the information that they come with a flight from Istanbul, which has arrived punctually in Zurich,” Marszakek said. But non of the students actually turned up.

Björn Bauhofer

## Swiss team cut off by landslide

**The Swiss delegation of the IPhO took a trip to the alps where they were surprised by nature.**

The Swiss IPhO team did a high altitude training in order to study some last minute physics. They had the possibility to stay at one of the team member’s idyllic chalet in the canton of Wallis for the weekend of the 1st to the 4th of July. Far from civilisation and surrounded by the fresh mountain air they could optimally prepare for the approaching event. However, not everything was that idyllic. In the morning of the 3rd of July a hiker walked by and informed the group about a landslide 1.5

**The Swiss team staggering over the boulders.**



km away from the chalet. Unfortunately the rubble blocked the road which the IPhO team had to take in order to get back from the mountains. The

only possibility for the team to get back was to climb over the rocks. But as experienced Swiss hikers, they successfully overcame the landslide and

were picked up by a participant’s parents on the other side of the road block. Fortunately nobody was hurt.

Céline Nauer

# Breakfast with sparrows

**The continental Breakfast at the Novotel is rich and fresh. An extensive test eating report.**

Breakfast is the most important meal of the day. It actually means ‘breaking’ your ‘fast’ after a long night of sleep. It gives us the strength to carry on throughout the day so its very important to have a good, nutritious, heavy and healthy breakfast. At the Novotel, the breakfast is a tasty continental type of breakfast where they serve a delicious breakfast with various types of food.

They have scrambled eggs, rosti potatoes and baked beans which go well with bread and cheese or with jam, honey and nutella. Then there is bacon



Rich fruit buffet.



My first course.



Freshly pressed juices.

and boiled eggs, sausages and salmon as well. There is also plenty of nutritive cereals which you can have with milk, coupled with a variety of yoghurts. My own favourite was the strawberry yoghurt!

To provide some good roughage for your body, there is a mix of fruits: grapes, apples, pineapples, tangerines, berries and many more! Having them along with slices of tomatoes, cucumbers and some fruit mousse on the side is really great. It feels really nice when you sit outside on the lawn to have your breakfast, watching the sparrows. You can wash it all down with some fruit juice, tea or coffee later. Enjoy your breakfast!

*Asira Lele*

## PEOPLE & COUNTRY

### Juray Májek



Juray Májek, 18, has finished secondary school and will begin studying physics in Prag. He's intressed in physics and chemistry. He is organising math competitions for younger students, in which he also joined formerly. He likes playing frisbee, and reading fantasy books.

### Danito Kromosoeto



I consider myself a nice guy. I love to help out people who are struggling with their school work. I am a patient person. I love to laugh and of course, to make other people laugh.

### Iddo Friedman



Hi, I am Iddo Friedman. I am a student from Israel. Happy to meet you all!



# My past experience as a student guide

My day used to start by waking up the boys. They all were, still are and always will be very special to me. I used to make sure that they had breakfast on time and all five of them were punctual and very nice- a Swiss quality, I think! They used to love playing cards- even on the days of the exams! For me, being a student guide was

truly amazing. You learn how to manage time, how to take care of others, how to handle emergencies and how to literally do ten things at once! The priority and focus always becomes the students. After their exams, I was invited over to the Swiss Consulate for dinner where I met many interesting people. We also toured around Mumbai where I taught them

a lot about Hinduism and Indian culture and they loved it. I also made friends with many other teams- Suriname, Syria, Sweden, Cyprus and Greece. Some student guides taught a bit of Hindi to them and the ones who could speak it really became popular with the locals! Teams Cyprus and Greece especially became very close to us. So much that they actually tried to hide in the kitchens on the last day because they didn't want to leave! Golden bonds like these are so important. I have countless memories- a favourite was when one team put all their room's furniture outside in the corridor and played cards atop it. On the last day, everyone- students and guides were sobbing at the departure. As my team left too, I was left with



## Röshti & Curry

a sad smile on my face and a very heavy heart. Perhaps it is because of the Indian culture; we Indian guides became close to the students very quickly. Today, when I look back, IPhO 2015 is like opening a box of a variety of sweets- it was a mixture of laughter, playing games way into the night, behaving in the craziest of ways, deep affection and a feeling of certainty that you have, when you know that you've got friends in almost every part of the globe. And trust me, that feeling is the best.

*Asira Lele*



Back than: IPhO 2015 in Mumbai.



## Abijith Krishnan



Abijith Krishnan is a 12th grader from the US delegation attending Harvard University in the fall. He became interested in physics in 8th grade and has been studying it diligently since. He is also interested in physics research – this spring he theoretically modeled some of the surface properties of silicon dioxide.



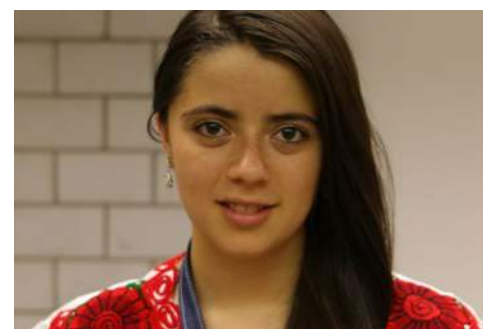
## Alicja Marszakek



Alicja is the team guide of Uzbekistan, she's studying economics at the University of Bern. Her motivation to be a team guide is that she wants to experience something new. She also wants to do networking and improve her English skills. Her expectation for this week is to have a good experiences and a cool week.



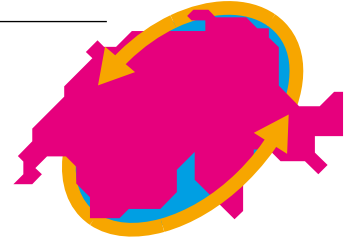
## Grecia Castelazo Martínez



Grecia Castelazi Martínez, 18, from Mexico is in the second last year of highschool. Afterwards she wants to study physics in the USA or in Mexico City. She is particularly interested in medicinal physics. She likes swimming, running, and boxing.



# Materials, environment and health



**IPhO Trotter**

## Research at Paul Scherrer Institute covers a wide range of activities from material science to cancer treatment.

The Paul Scherrer Institute PSI is the largest research institute for natural and engineering sciences in Switzerland, conducting cutting-edge research in three main fields: matter and materials, energy and environment and human health.

Researchers in the area of Matter and Materials study the internal structure of a wide range of different materials. Results contribute towards a better understanding of processes occurring in nature and provide starting points in the

development of new materials for technical applications.

The goal of activities in the Energy and Environment area is to develop new technologies to facilitate the creation of a sustainable and secure supply of energy, as well as an uncontaminated environment.



Areal view of the Paul Scherrer Institute.

In the Health area, researchers are searching for the causes of illnesses, and exploring potential treatment methods. Their basic research activities also include the clarification of generic processes in living organisms.

**Source:** [www.psi.ch](http://www.psi.ch)

## Shooting star



**Roman Ernst.**

One of the people who will most likely cross your way is Roman Ernst, the IPhO 2016 photographer. Besides taking your picture, he films the “small talk” videos together with his partner Pascal Sommer in order to document this event for

eternity. He sees his job as a possibility to change perspective between the different groups of involved people, documenting their tasks and making them understandable for everyone in order to create a feeling of unity. He is excited to spend an intense week with people from different cultures and to shoot them as professionals as well as humans.

He hopes to get as many impressions from the various events as possible. Besides working as a photographer, Roman works for an agency and supported Andrea Schneider in communications before IPhO. His task was to work on giving a positive image of physics to the public and to tie that to UZH.

*Céline Nauer*

## In the press

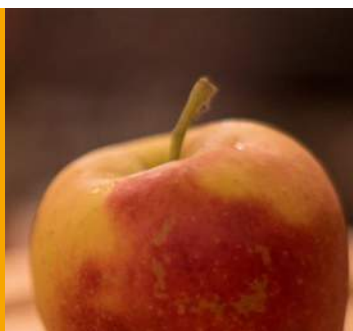
*“Con la participación de nuestro país, comienza la Olimpiada Internacional de Física en Suiza”*

*La Agencia Arabe Siria de Noticias*

## Swiss Treat

### Apple

An apple a day keeps the doctor away – this proverb is taken really seriously in Switzerland. Around here apples are very popular break snacks amongst people of all age categories. Although apple season is only in fall you'll find at least a dozen of apple cultivars year round.



The most typical one is the Gala apple despite that it's origin is actually New Zealand.

## Nobel laureates of the University of Zurich

# Matter's Secrets

**Peter Debye was often described as the “Leonardo da Vinci” of the 20th century. Many methods and laws in physics bear his name, for instance the “Debye temperature” for his theory on the specific heat of solid bodies, which he developed at the University of Zurich.**

Peter Debye was just 26 years old when, in 1911, he took on his first academic appointment as professor for theoretical physics. Wilhelm Conrad Röntgen, who was teaching in Munich, gave him an outstanding reference, saying Debye represented “an excellent acquisition” for the University of Zurich.

The young researcher's outstanding talent quickly became apparent in Zurich. On 10 December 1911, Debye wrote to his mentor Arnold Sommerfeld in Munich: “Dear Sommerfeld, in the last 48 hours I have discovered something really quite special.” This “something special” was to occupy Debye for 40 years and to become the basis for his Nobel Prize in 1936. It was the idea that there are molecules that are permanent electrical dipoles. The “dipole moment” of a substance can be measured, thus enabling conclusions as to its molecular structure. The brief period of Debye's activity at the University saw more fundamental work based on the hypothesis of permanent dipoles, for example, on the behavior of molecules when temperatures change.

Peter Debye left the University of Zurich and Switzerland in 1912, but returned to Zurich in 1920. Now famous, the physicist took on a professorship at ETH for some seven years.

*Kira Hussinger*

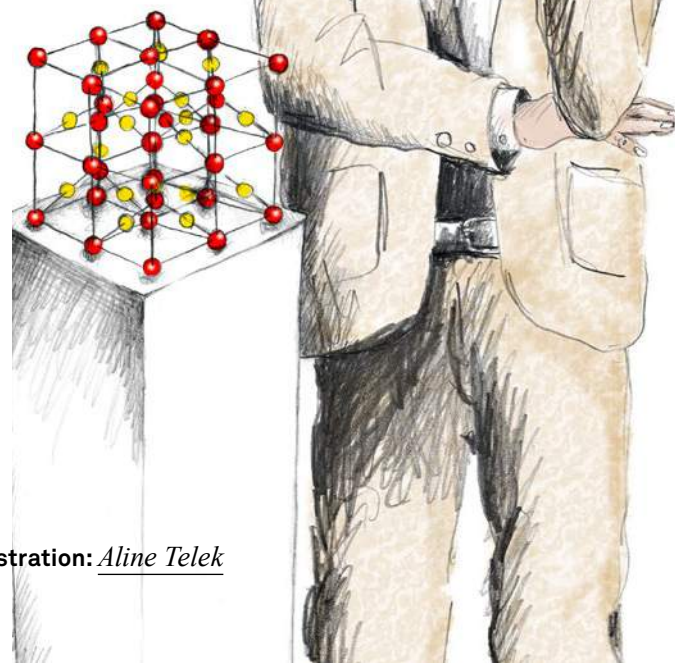


Illustration: *Aline Telek*

# How many times do you kiss?

Culture Shock

**Kissing on the cheek is a common Swiss greeting method. The number of kisses indicates your relationship to each other.**



You want to greet a person, but how? In Switzerland, this strongly depends on your relation with the other person. If you're greeting a stranger it is usual to shake hands, look each other in the eyes and always remember each others name in order to repeat it when saying goodbye. People feel taken seriously and honoured if you can recall how they are called. If you forgot the name nonetheless, either try to get around it by making awkward sentence structures or try one of the following frequent Swiss last names: Müller, Meier, Schneider, Keller, Weber, Frei or Huber. You are very likely to meet someone in Zurich with one of those surnames. Of course you could always just admit you forgot the name and hope that the other person did too. When meeting a bigger group of people, you introduce yourself the same way – greeting,

shaking hands, remembering all the names (the same goes for meeting children!).

If you are meeting with distant friends and sometimes colleagues it is common practice to kiss on the cheeks. But how many times? In the German speaking part of Switzerland it is usual to kiss three times while the Francophones kiss twice. Meeting closer friends you can also kiss just once or even hug. This is a lot to take in for a foreigner and of course all of these possibilities can result in an awkward situation where both parties kiss, hug and shake hands at the same time followed by embarrassed smiling. This sounds uncomfortable but it has probably happened to all the Swiss themselves too, if that's any consolation.

*Céline Nauer*

# Riddle

Imagine you sit at your dinner table and you're having a glass of red and a glass of white wine. Now you take a spoon of the red wine and pour it into the white wine. After that, you pour one spoon of the red-white wine assemblage back into the red wine. What are the mixing ratios of the two glasses now?

The near correct answer will be in tomorrow's issue.



# Yoga

## Garud-Asana

The Eagle Pose Exercise

Although this is a standing exercise, you can also do it while you're sitting in a chair. This Yoga exercise essentially helps to increase concentration, but during the opening ceremony it will help you stretch your muscles a little too.

- 1) Sit straight – Your spine has to be straight for this.
- 2) Cross one leg over the other and twine it around.
- 3) Similarly, twine your arms around each other in front of your chest. Your palms and fingers should be spread out.

*Asira Lele*



## Imprint

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**Pascal Sommer**  
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**Karen Abraham**

## Write to us!

If you want to say something to the IPHO community, to Momentum or just tell everybody how you feel, write to us on [momentum@ipho2016.org](mailto:momentum@ipho2016.org) or drop us a note in your letter box at the editorial office.

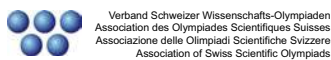
### Organizers



University of Zurich  
UZH



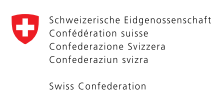
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**Table soccer XXL**

A game between new friends.

Page 3

**Carbon alpenhorn**

A traditional instrument becomes super cool.

Page 4

**Grey air**

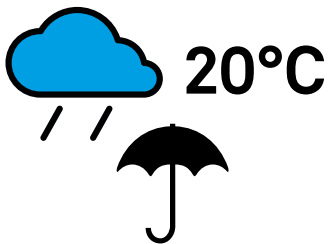
Swiss smoking habits shock our foreign guests.

Page 5



# MOMENTUM

Issue 3 – Zurich, July 12th 2016

**Today's Weather****Schedule****Students****Group 1**

7:30 – 12:30

Experimental Exams

14:20 – 19:30

Discover Zürich

**Group 2**

09:00 – 12:45

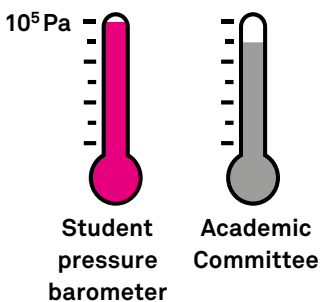
Discover Zürich

14:30 – 19:30

Experimental Exams

**Leaders**

Daytrip Mount Rigi, Lake Lucerne, City of Lucerne

**Stress Level Barometer**

Good luck for the exams!

## “Science and friendship know no borders”

**The first ever IPhO in Switzerland and Liechtenstein was formally opened yesterday.**

The teams of almost ninety different nations gathered in the extended auditorium maximum for the opening ceremony of IPhO 2016. Michael Hengartner, the President of the University of Zurich, welcomed all participants in his opening speech.

He pointed out that science is not something happening in secrecy in a university. “Science is part of society.

We want our students to become part of this society,” he said. Further, he underlined the importance of friendship during the IPhO 2016. “Science and friendship know no borders,” he said.

The event was accompanied with the sounds of the alpenhorn played by the musician Enrico Lenzin. For his performance he big round of applause. The audience loved it. “I really like the music. It was amazing”, Muhammad Gohar Javed, student from team Pakistan said.

Every country was introduced with a slide showing typical things to do with that country. Simultaneously, each team cheered and waved their flags. Notable was the team of the Netherlands. Together they did the so-called “Dab” move. Team member Sasha Ivlev explained its meaning. “It shows that you are awesome”, he said.

Overall the opening was a great success. “It was really outstanding”, Helvijs Sebris, student from the team Latvia said.

*Atlant Bieri*



The team of the Netherlands performing a “Dab” move.

Image: *Pascal Sommer*

# Errors are good

Errors don't have a good reputation. They are however important for physics. Errors will happen (Murphy's Law)!

You can't judge people on the basis of the errors they make but you can get an idea of the personality by looking at how they deal with errors. Many times in history a mistake has resulted in a new product. Two examples are the microwave oven or the Teflon coating of pans. Unfortunately, not every mistake leads to a great new product, but that's exactly where science begins. You have a new idea, a new hypothesis, and thus you will begin to do experiments. Maybe you'll fail. Then you make some changes, then you fail another time, change again, fail... And suddenly, you can prove your theory. With errors you can also get an impression of history. If you tell an atomic-physicist that your measurement has an error of a second, then he will get a fit of laughter. Some century's ago you would have been a genius if you were able to measure an event with a second of exactitude. Errors are the reason to force progress! Use your errors wisely and you will be able to progress. Anyway, for today's exam I wish you few errors.

Björn Bauhofer

## Yesterday in pictures

Images: *Pascal Sommer*



Reading the program before the opening.



The President of the University of Zurich, Michael Hengartner, is welcoming the participants.



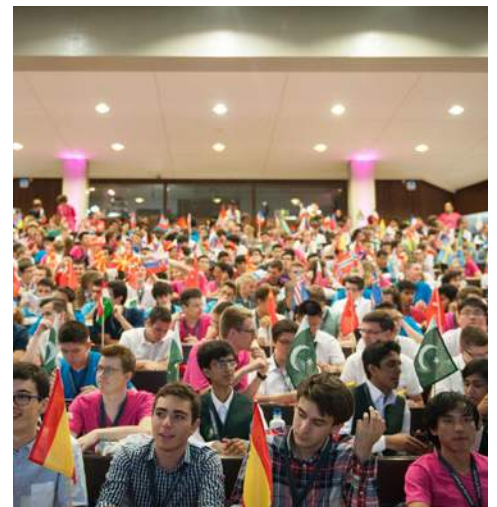
Waving flags.



Having fun while watching the presentation of the countries.



Taking the oath.



900 participants gathering in the big auditorium.

## Championship of fun

**Getting outside and having some fun is also part of the IPhO. Students got a first taste of that when playing table footy.**

The students re-enacted Sunday's European Championship final while playing a round of table soccer. The games took place at Irchel Campus. The soccer tables were unusually long. On each side at least a dozen players could stand and hit the ball.

"The idea is that the students can get outside and have some fun," Calista Fischer, Head of Communications of the Faculty of Science of UZH said. "The teams should not compete as nations, but as mixed groups. And it seems they do it quite well," she said.

*Atlant Bieri*



Students having fun while playing table soccer.

## Uzbekistan found

**The missing Uzbekistan team has reappeared. They were forced to change their travel route to Switzerland.**

The Uzbekistan's team was forced to fly via Moscow instead of Istanbul as originally planned. In Moscow they had to endure an eight hour transit. They arrived safe and sound in Zurich and are ready to join the IPhO.

*Björn Bauhofer*



Happy Birthday

Ísleifsson Hjalti Þór, Student Iceland  
Watanabe Akihiro, Student Japan

## Further Place to work?

Yesterday, the students had the opportunity to visit the Paul Scherrer Institute (PSI) and even got a chance to speak with scientists.

The afternoon began with a lecture of Prof. Dr. Kurt Clausen. He presented what the PSI is doing it and where the future research could be going. For the PSI, an event like the IPhO is a good platform to show possible workfields to further scientists. "For us it's important that we can cover all from the youth to the old" said Clausen. A problem is the percentage of women. "Girls often consider Physics as difficult, there we need to change something". The PSI employs around 300 people per year,

half of them being economists and the other half scientists. After the student visit the SLS (Swiss Light Source), one of three accelerators in the PSI. "Physicists are needed to invent new methods", says Dr. Ana Diaz. After that, other scientists can use this new method.

It was also possible to see what is needed for a experiment with an accelerator. The focal length of one of these experiment is 7 meters, to see structure in the dimension of 1 Å.

In another laboratory, Dr. Aaron Finke showed how proteins are crystallized to further research with it. He also explained the whole process



A scientist of PSI explaining crystallization to the students.

from extracting the protein to crystallization and analysis. Only the second step is done in the PSI as an art of service. But to get access to

the accelerator you need to pay or your research must be accepted by an international committee.

*Björn Bauhofer*

# Sounds from the carbon horn

**The alpenhorn is a traditional Swiss instrument originally used by farmers to call the cows back to the stable. Ever since that time engineers and artists have taken the instrument to a totally new level.**

Musician Enrico Lenzin played the alpenhorn two times during the opening ceremony and blew the audience away. He got cheers when he brought an alpenhorn made of carbon fibre on stage unfolding it in one swift motion.

Originally, Lenzin is a drummer. He has been playing the alpenhorn for five years. He got well-known in Switzerland through “Switzerland’s Got Talent”.



Enrico Lenzin gives alpenhorn music a totally new meaning.

“I wanted to do something cultural but modern”, he said. His music is unlike the traditional alpenhorn music since it is quite fast and rhythmic.

His carbon fibre alpenhorn was developed by the engineer who designed the mast of the Alinghi, the Swiss yacht that won the America’s Cup in 2003. It weighs only 1.5 kilograms. “This is ideal for trekking. One guy even brought it on top of Mt. Everest,” Lenzin said.

The sound quality is exceptionally good. “It amazes me that people have invested so much time finding the perfect wood for alpenhorn design and then an engineer makes one from a modern material that sounds amazing,” Lenzin said.

*Atlant Bieri*

## PEOPLE & COUNTRY

### Marko Petrusik



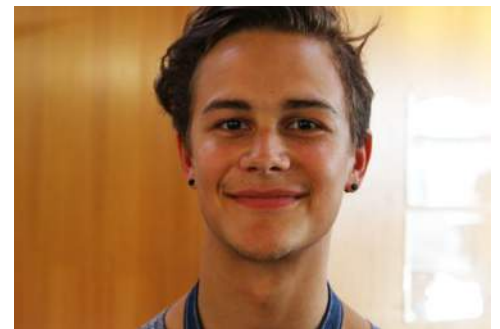
Marko, 18, from Montenegro has just finished high school and will begin to study applied computer physics in Belgrad. He’s interested in physics, computers and photography. His hobbies are building lego models and 3-D-design.

### Thomaž Cvetko

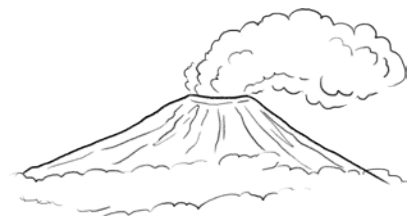


Thomaž, 19, from Slovenia will start studying physics in October in Ljubljana, he likes to run, swim, surf and listen to music

### Isak Valsson



I’m Isak (there actually is an accent on the I) from Iceland and I am 19 years old. After high school I would like to study electrical engineering. Besides physics I like singing, running and music in general. I really like Switzerland so far since I also like water and the tap water here is super good!



# Smoking Shocks

Do you smoke? Why do so many people smoke? Usually, it is because of peer pressure. When I find someone smoking in my home country, it angers me a lot and I actually snarl at them to stop smoking or very pointedly pinch my nose to stop inhaling that bad smell and walk away hurriedly or simply give them long, disgusted looks! Now, that is something that I can't do in Switzerland! I had a bit of shock when I saw so many people whether they were kids, teens, adults and senior citizens randomly smoking around here. What surprises me the most is, that everyone is educated and warned about the consequences of smoking since school, but they still continue to do it. Why do they have to start it in the first place? People smoke because it



**The Swiss love to smoke.**

is a so-called fad or style. But I honestly don't see how holding a long white roll stuffed with tobacco, tar (used for making roads), arsenic, acetone, cadmium, lead, methane, nicotine and ammonia which gives out long sick-smelling spirals of smoke is cool. So many people

want to quit, but they cannot because of the addiction. Do you know, that around 600 ingredients are used to make a cigarette, out of which, 69 are known to cause cancer. And when burnt, they create 7000 chemicals. Imagine the kind of pollution done to the environ-



## Röschi & Curry

ment, the air and the abuse done to nature and to your own body. I so wish I could actually tell off the smokers like I can do back at home, but then I don't think I have that freedom in Switzerland. When I encounter people smoking here, all I can do is to run away as quickly as possible. I wish I could stop smokers here polluting the clean and beautiful air of Zurich.

*Asira Lele*

## David Hälg

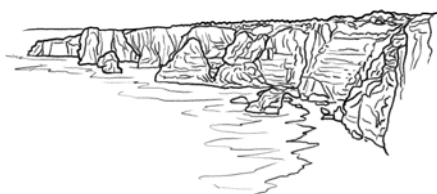


David Hälg, 21 years old, from Liechtenstein is a Senior Guide. He is a physics student at ETH. He loves climbing and high-altitude mountain tours.

## Matilde da Fonseca



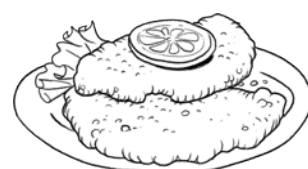
Hello, I am Matilde, 19 years old, and I'm from the team Portugal. At university, I am going to study physics. In my free time I read a lot and I hang out on the beach. I have the talent to take naps wherever I am, if it's on the beach or in a bus, I can sleep everywhere. Here in Switzerland everything seems to be in a constant, organized motion. I really like that.



## Michael Pfeifer



Servus, I'm Michael Pfeifer and I'm 18. I came not from far, namely from Austria. My biggest interests concerning physics lies in thermodynamics and quantum mechanics. I consider physics as a hobby alongside with philosophy and ancient greek. Switzerland is nice so far but a little too hot for my taste.



# The bridge that burned

Lucerne's Kappelerbrücke is the most famous bridge of Switzerland and is a major tourist magnet.

With a little bit more than 200 meters, the Kappelbrücke the 2nd longest wooden bridge in Europe. It was built to have a patrol way for the middle age city of Lucerne. The walls of the lakeside are higher than the others. This has given the guards more protection and the higher wall was better to place the crossbow.

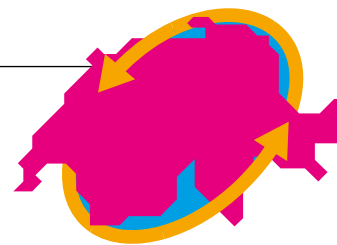
A unique feature is that the bridge has pictures at the top. In the Kappelbrücke there are 11 pictures that show important scenes of the Swiss history.

## Wasserturm

The Wasserturm was build 60 years before the Kappelbrücke. Over time it was used in different ways: as a guard tower of the city wall, as a money chamber and as a prison. Today, the tower is privately owned, and even for locals it is nearly impossible to get in.

## The big Fire

In 1993 a huge fire destroyed two thirds of the bridge. It was the darkest day in the history of Lucerne. The cause of the fire is still unknown. The most common explanation is that a cigarette was carelessly thrown under the bridge.



**IPhO Trotter**

On the very next day after the fire, the reconstruction of the bridge was initiated by the Government of Lucerne. During the fire, 78 of 111 pictures wer destroyed.

*Björn Bauhofer*



Kappelbrücke and Wasserturm.

## Master of the plan



**Richard Staub.**

Richard is the bus boss if you will. He is responsible for the safe and punctual transport of all the students and all the leaders, where he also faces some challenges. In Zurich the students are distributed over two different hotels

which requires some coordination to have the right number of seats at every hotel since the students shouldn't arrive late for the exams. Moreover, he authored the detailed schedule for the entire event, which is nearly thirty pages long. Besides his tasks at IPhO, Richard is self-employed and works as a project manager. In April for instance, he spent an entire month with a group of dancers and coordinated their stay in Switzerland.

So far, he is really happy that the first transfers went smoothly. During this event he is most looking forward to the closing ceremony, since in his eyes we are all working up to this. Until then, he hopes that the weather won't be too bad, so he doesn't have to stand in the rain during the bus boarding.

*Céline Nauer*

## In the press

*“There is nothing better than physics”*

*Basler Zeitung  
Tagesanzeiger.ch  
Bund.ch*

### Swiss Treat

Generations of Swiss grew up with this herbal-gingery refreshment and connect memories of mountain hikes and fun football games with it. Comparing it to other soft drinks it is hard to find something that tastes similar to Rivella, probably because they use a rather uncommon ingredient for the lemonade: around 35 percent of the drink is milk whey. This is quite disturb-

Nobel laureates of the University of Zurich

# The Mechanism of the Interbrain

**Walter Rudolf Hess created a cartography of the interbrain and explored its functions.**

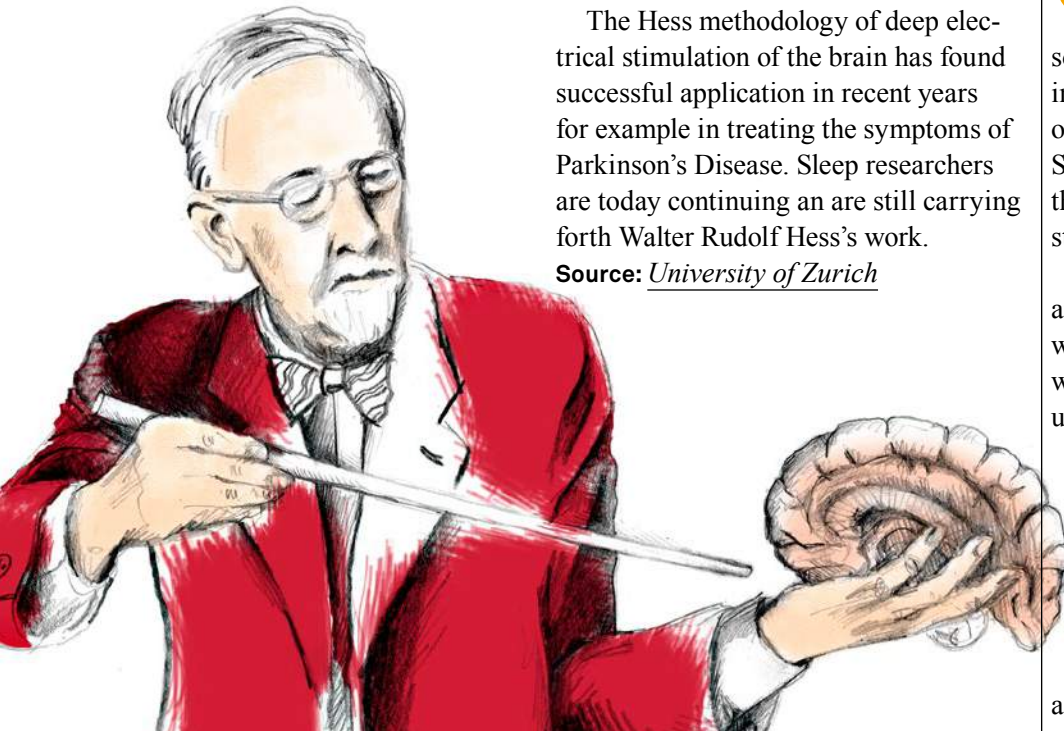
Hess studied medicine at the university of Zurich. In 1917, he was appointed professor of physiology. As head of the Institute, Hess was free to choose his own area of research and after initially investigating topics related to blood circulation, from 1929 onwards he focused on sleep.

For his research of the specific brain areas, he used cats, stimulating their interbrains with an electric current. After

being subjected to a light electric stimulus, the animals displayed, for instance, drowsiness or aggressive behavior, depending on the position of the electrodes inserted in the brain. The traces of the electrodes could then be observed in the interbrains of the euthanized animals. Thus, millimeter by millimeter, the brain tissue was explored. On the resulting maps, Hess was able to allocate individual functions to localized areas of the brain. It was for his discovery of the functional organization of the interbrain that Walter Rudolf Hess was awarded the Nobel Prize in 1949.

The Hess methodology of deep electrical stimulation of the brain has found successful application in recent years for example in treating the symptoms of Parkinson's Disease. Sleep researchers are today continuing and are still carrying forth Walter Rudolf Hess's work.

**Source:** *University of Zurich*



ing since you don't taste or see the milk. When people learn about this at a certain point they usually are a little grossed out

by it but it is soon forgotten due to the incredible taste of Rivella.

*Céline Nauer*



# Beating around the bush

**Switzerland is known for its neutral position in all sorts of conflicts. Political correctness is common courtesy and standing out with an extreme opinion is avoided in most cases. However this beating around the bush is not simply peaceful, but also can be uncomfortable and awkward.**



The Swiss would never tell you that they are annoyed by your loudly barking dog or that they are not delighted when

somebody scrambles in a queue. It is not as if they don't care or are okay with it, behind the scenes the Swiss very well know how to express their discomfort – they just can't get straight to the point when confronted.

Last week I tried to break this pattern and so went over to my neighbour who was listening to very loud techno while I was trying to sleep. It took me a moment until I was courageous enough but I was determined to ask him to turn down the music. My heart was beating after I rang the bell and then she opened the door. I asked how she was and we talked a little bit about her job, I complimented her for her taste in music and then she invited me over for a late night tea.

Trying to change the topic to the volume of her music I told her that I have trouble sleeping and so she asked me why to which I responded that I don't know. A conversation about sleeping disorder and relaxation exercises followed. After two hours I went back to my apartment trying to synchronize my breath to the bass. Maybe next time I'll tell her.

*Céline Nauer*

## Readers Letters



Dear Momentum

The delegation of Columbia and Spain went to the main building of the University of Zurich on Sunday. There they visited the exhibition “Transactions” which focussed on the fusion of science and art. Our young guests were very happy to go on this excursion.

Best wishes, Richie Gabión and Giovanni Bucher

## Solution to last days riddle



The concentrations in the two glasses are equal.

## Yoga

## Pranayam

Today is your exam. Hey, relax! Its going to be fine. Let me help you calm down. There is, of course, a Yoga exercise for that. Pran = life force and ayam = to control, so Pranayam is actually controlling your life force through breathing exercises. This is how we do it:

- 1 Sit straight and sit with your legs cross-folded inside in the Yogi pose.
- 2 Close your eyes.
- 3 With your finger, block your right nostril and inhale deeply from your left nostril. Fill up your lungs with air. Wait for around 10 seconds, then block your left nostril and exhale from your right nostril.
- 4 All this while, focus on your breathing alone. Continue this for 10 minutes or so.

*Asira Lele*



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## Write to us!

If you want to say something to the IPHO community, to Momentum or just tell everybody how you feel, write to us on [momentum@ipho2016.org](mailto:momentum@ipho2016.org) or drop us a note in your letter box at the editorial office.

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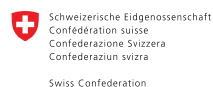
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**Game of toes**

What students wore on their feet during the exam.

Page 3

**Grandma knows best**

If you feel sick, don't just take a pill.

Page 5

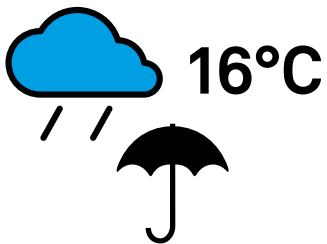
**The physics of pee**

The Swiss way of using the toilet.

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# MOMENTUM

Issue 4 – Zurich, July 13th 2016

**Today's Weather****Schedule****Students**

08:45 – 20:30

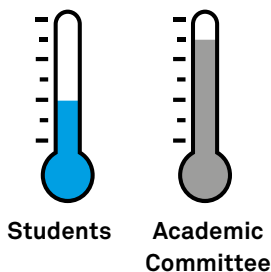
Excursion to the Principality of Liechtenstein

**Leaders**

Day at Technopark:

Discussion & Translation of the Theoretical Exams

Distribution of Copies of the Experimental Exams

**Stress Level Barometer**

## “The second question shocked me a little bit”

**Students had their five-hour practical exam yesterday. The main difficulty was drawing a logarithmic graph.**

“You have to stop writing as soon as the bell rings.” With these words said, the students only had sixty seconds left to finish their five-hour exam. One of the first students to walk towards the exit doors after cleaning up was Sven Jandura from Germany. “The most difficult thing was to

draw the logarithmic graph with the jumping grains,” he said. “I couldn't do it.”

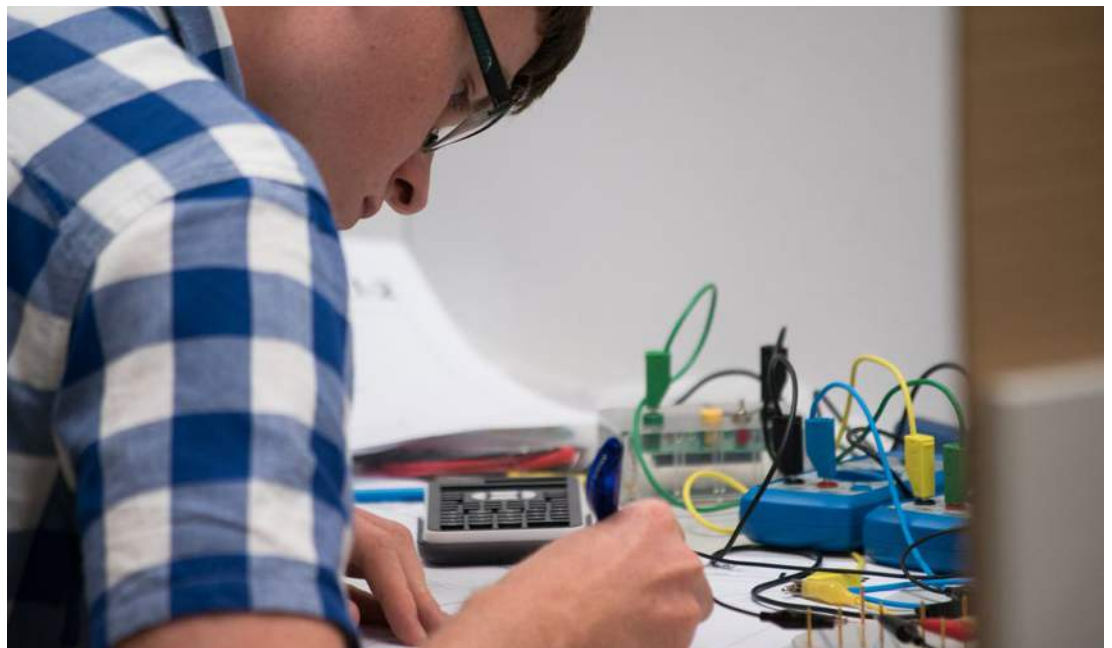
Many other students had the same problem. “The graph should have been a straight line. But mine made a zigzag,” Krittamate Tiankanon from Thailand said.

“When I read the second question for the first time, it shocked me a little bit,” Wei Wang from China said. “My results are a bit doubtful,” he said. “I could only draw a few points of the graph.”

Besides this, time management was a major issue. “I could have solved most of the tasks, but not in five hours,” Florian Rudinger from Austria said. “I was able to draw the graph but it looks horrible,” he said.

Some students got trouble with paper handling. “The exam papers should have been stapled,” said Preey Shah from India.

*Atlant Bieri*



Working hard during the practical exam.

Image: *Pascal Sommer*

# Relaxing in nature

What is your idea of relaxing? Some of us like to go clubbing at a party, maybe with lots of alcohol thrown in, while some of us prefer tending to our garden or having a quiet time reading a book with a cat in your lap and a mug of hot chocolate by your side, watching the rain. Whereas sometimes, some of us like to go trekking in the nearby hills or just spend time with the beautiful nature around. When synched with nature, relaxing works best. Your body is naturally used to nature and when

surrounded by it, your body becomes naturally refreshed and the green forests have a very nice and gentle pleasing effect on your eyes. Sometimes, one tends to wander away into nature, sit on a rock and gaze deep into a lake. We can actually contemplate our life's priorities and clear a heavy head this way. Nature is not just beautiful, but we all have a connection with it, as we all ultimately belong to it.

Asira Lele

# Yesterday in pictures

Images: *Pascal Sommer*  
*and Roman Ernst*



Prof. Ilham Al-Qaradawi (Qatar) enjoying fondue on Rigi mountain.



Top of Rigi mountain.



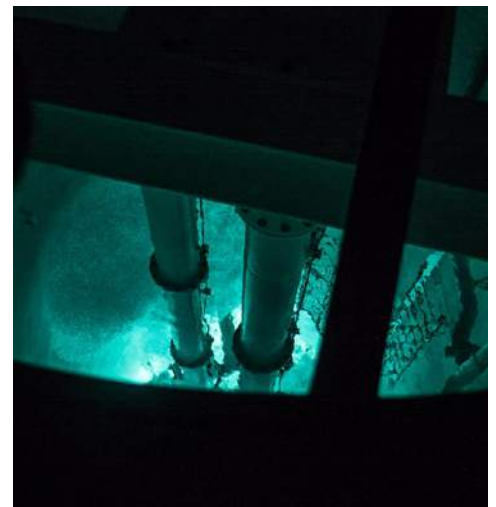
At the transformer substation in Zurich Oerlikon.



Smoking heads during the practical exams.



Markers meeting at Irchel Campus.



Learning where Zurich's water comes from.

# VBZ Operation Center

**Public transportation in Switzerland is very good, even in small villages at the end of a valley you can get a bus connection. Even in a city like Zurich public transportation is very good. In Zurich, the VBZ has taken the mission to transport around 900'000 people on a daily basis and travel around the world twice.**

Zurich is a big city that is still growing; with a lot of people who already live here and a lot of people coming to Zurich. They need to be able to get around in Zurich and with a

good public transportation they can cover over 50% of all travel within the city, also due to it being one of the most dense networks in the world. This network contains over 400 vehicles (tram, busses, cable cars). These 400 vehicles need to be coordinated and this is the mission of the VBZ Operation Center. Tramways can transport up to 200 people in a couch, but they are not flexible because they need rails. So if a tramway gets blocked, the operation center needs to find a solution immediately by diverting trams and replacing busses.

*Björn Bauhofer*



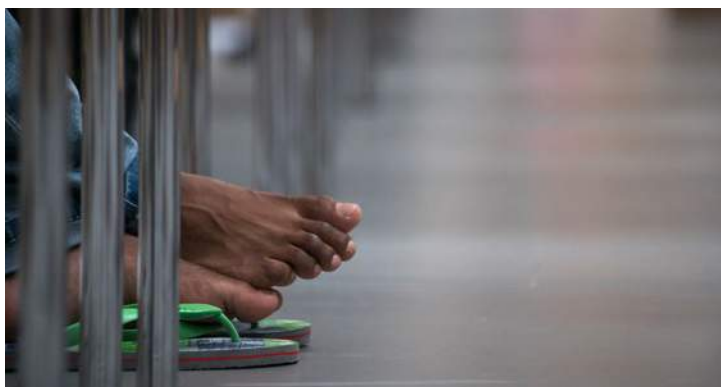
A tram labeled with 'special cruise' brings the students to the central maintenance station.

## To shoe or not to shoe

**To keep one's feet comfortable during exams is essential. Most students wore socks with enclosed footwear.**

Good footwear is essential for personal wellbeing, especially during exams. The 200 students who did their practical exam on Tuesday morning had a clear favourite: they wore socks with closed shoes as an investigation of the Momentum team showed. In total 170 students or 85 percent preferred this combination.

Only 5 Students wore closed shoes without socks. "Although this is medically not problematic, we don't recommend it as your feet start



Bare feet during practical exams were the minority.



This was the most common type of footwear.

to smell when you take off the shoes", Christian von Mitzlaff, paramedic at IPhO, said. "In the warm humid climate bacteria can proliferate", he said.

Eight students wore sandals or similar open footwear without socks. "This is a preferred solution. Like this the feet is surrounded by fresh air and thus the bacteria cannot grow", said von Mitzlaff. Another 7 students wore no shoes at all during the exam. They took off their footwear and socks. One of them was Gowtham Amirthya from India. "It is more convenient", he said. Only one combination was unseen; socks and sandals.

*Atlant Bieri*

# Unusual friends across borders

The IPhO is a conglomeration of multifarious countries. Do the countries that we think do not see eye-to-eye due to the recent Eurocup 2016 bring the football spirit along, too?

Interacting with those countries during the IPhO gives a new and completely different insight into this attitude. Team Germany and team France have a very good rapport with each other and in fact, the German team also spoke in French with team France! When team France was asked about the Football Eurocup, they very cheerfully said, ‘Oh, we don’t really mind! After all, it’s just



Macedonian and Slovakian flag.

a game. Building bonds and getting to know each other is more important than football.’ Now, that’s exactly the right spirit for the IPhO. In so many

ways, so many other countries, some even having rather hostile political situations, have known to be great friends with each other and they maintain

contact over Facebook. Let’s hope that everyone and all the countries will become friends over the IPhO week.

*Asira Lele*

## PEOPLE & COUNTRY

### Dionysios Georgiopoulos



Hello everyone, I am Dionysios and I’m from Greece. I am 18 and this is my last time participating in IPhO. After high school, I want to go study medicine. As for my hobbies, I play the guitar, I play basketball and of course going out is always a good thing. My favourite experiment is the Millikan experiment, that one is really cool.



### Farhad Allahverdiyev



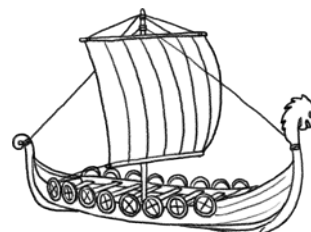
Yo I’m Farhad and I am 16 years old and I’m from Azerbaijan. This is my second time at IPhO and I also participated in APhO. Besides studying I like soccer, classical music and video games. We Azerbaijanis have not prepared that much for the experimental part of the exam so I am looking forward to Thursday’s exam more.



### Fridtjof Eikanger



Hi, I’m Fridtjof from Norway and 18. I play the guitar and I also play video games. In fact, I even try to make my own games. For sports I go climbing. Concerning IPhO I’m looking forward to the experimental exam since I find it much more enjoyable because I can be creative.



# Medicines from my Grandma's Kitchen



What do we do when we're unwell? Of course, we usually visit a doctor and then we get a huge bill and a bunch of medicines. For simple, non-serious illnesses like a sore throat, the common cold, an upset stomach (unless very serious), acidity or generic body aches do we really need to go to a doctor? What do the Swiss do when they have simple bodily illnesses like these? Well, they straightaway go to a doctor or to the pharmacy if they think they can heal themselves. When I came to Switzerland, my grandmother packed all sorts of medicines for me. And they weren't aspirins or painkillers. They are simple medicines that have originated from the ancient healing

sciences. When I have a cold, I simply crush camphor and cardamom and wrap it into a thin cloth and keep smelling it through the day. The cold will be gone by evening or the



**The Swiss love to take medicine.**

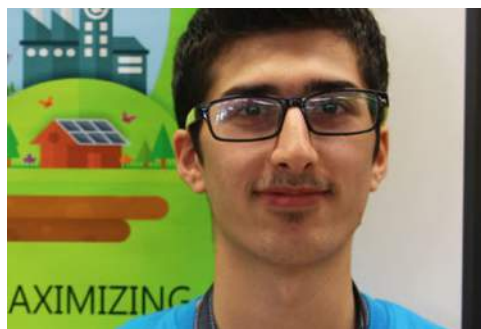
next day. To heal a sore throat, my granny made homemade tablets of turmeric and jaggery (a type of sugar) for me to keep swallowing in tiny bits throughout the day so that

my throat would be okay by night. I know one very useful technique for stomach upsets: mix some ginger and freshly squeezed lemon juice. Although it tastes very weird, it heals you very fast. Every time I have a bad bout of acidity, I simply go to the grocery store and buy a little cup of vanilla ice cream! I don't need a pill or tonic for that at all, just ice cream or a cup of cold milk and sugar works wonders. Even if I get a small cut or an injury, I usually make it a point to spread turmeric on it as first aid. I also happened to heal my cat, who was badly injured by an aggressive fellow cat. I simply put turmeric as an anti-septic on his wounds and they almost

## Röschi & Curry

disappeared on the third day! For me, I primarily reflect on why something is wrong with my body and find out the root cause and its consequent body effect. Popping pills all the time to heal yourself may not be good. So pause, reflect and analyze exactly what's wrong with you before taking that pill unless you really need to. A good long sleep can have amazing healing effects. Ancient sciences are not monkey tricks. They are as old and wise as your ancestors!  
*Asira Lele*

## Nabil Khalil



Hello, I'm Nabil from Syria. I'm 18 and this is my last time participating in IPhO. So far I really enjoy staying in Switzerland and especially in Zurich since it is a mixture between city and countryside, which I really like. In my free time I play football, chess, basketball, video games and I swim and read a lot.



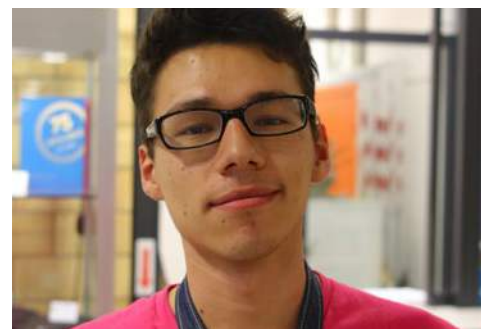
## Sarah Vermij



Hey! I'm Sarah and I'm the team guide of the Dutch team. In fact, I am originally from the Netherlands myself and I only moved to Switzerland last year in order to do my Ph.D. in biomedical sciences at the University of Berne. I find it super interesting to be surrounded by people from so many nations and also I like to be a little closer to actual physics again.

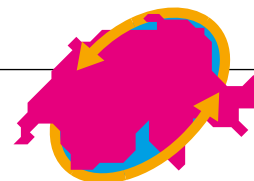


## Martin Salm Oporto



Hola! I'm Martin, 21, and I'm volunteering as the team guide of Mexico. Originally, I'm from Bolivia but now I live in Switzerland because I am studying physics at ETH Zurich. I love the student life here because the universities are amazing! Libraries are open until 11 p.m. and I can easily get home at that time with public transport. In La Paz this wouldn't be possible.





**IPhO Trotter**

# On the way to Liechtenstein

On the first part of the journey, you will travel on the motorway A3 along Lake Zurich (1). At Lachen the Linthebene (2), which is the area between Lake Zurich and Walensee, with the Linth canal. The Linth was originally formed by a glacier and a big wetland. In the 19 century, the people needed this area for agriculture, which was one of the reasons for the Linth-Correction between 1807-1822. The Linth was diverted into the Walensensee (3), and between the Walensee and Lake Zurich a canal (4) was built. With this system, it's possible to use the

Walensee as compensation pool to reduce the damage at a flooding. At Weesen (5) you will follow the Walensee. At the Walensee, the motorway was build as national route (main route but in property of the federation), the six short

tunnels (6) were used in contraflow. Throw this limitation there was a lot of traffic jam on weekends and during holidays and that's how Walensee got its nickname "Qualensee" ("Lake of torture"). At the end of the Walsensee, you can

see the seven Kurfürsten (7). This is an impressive summit-chain. The last part will be through the Bündler Herrschaft (8), famous for it's many vine grapes, to the border of Liechtenstein.

Björn Bauhofer



## The food magician



**Dominik Schenk.**

Dominik Schenk is the man who fills your stomach. He is the deputy manager responsible for catering at the IPhO. "We go wherever we have to and make sure there is food," he says. This means a lot more than just opening cans and pouring

them into a plates. "For today's 515 lunch bags, I had to hire seven mothers from the region who backed up my team," he says. Each of them packed one item into the bag and then gave the bag to the next person who packed in the next item.

Dominik also has to organise the professional cooks of UZH. "They got up at four o'clock in the morning to prepare the sandwiches," he says. Logistics is another one of Dominik's problems. "I have to make sure that the right number of lunch bags are distributed to the two hotels," he says.

He has worked for five years at Irchel Campus for the catering. His hobbies are playing ice hockey or soccer, reading and of course eating.

Atlant Bieri

## In the press

***"Physics Olympiad at Zurich University contest of brains"***

NZZ

***"3 high school students from Liechtenstein at Scientific Olympiads"***

Liechtensteiner Volksblatt

# K. Alex Müller: Nobel Prize in Physics 1987

**In 1986 K. Alex Müller and J. Georg Bednorz revolutionized solid-state physics with the discovery of the first high-temperature superconductor**

Their breakthrough came after three years of hard work at the IBM research laboratory in Rüschlikon, 80 synthesized compounds, and multiple set-backs. The two researchers discovered that the critical temperature at which this copper oxide becomes superconductive is an astonishingly high minus 238 degrees. The publication of their research unleashed a wave of enthusiasm, and laboratories around the world began to work with the findings. Soon, copper oxides with even higher critical temperatures were found, which has the advantage of enabling superconductivity through cooling with

liquid nitrogen, making technical applications much simpler and cheaper. It is used today in power stations, transformers, medical technology, power transmission and microelectronics.

K. Alex Müller only became interested in superconductor research when he was 56. He was already a recognized figure in solid-state physics, an IBM Fellow, and adjunct professor at the University of Zurich. Together with Bednorz, Müller's former doctoral student, they were jointly awarded the Nobel Prize in Physics.

Source: [nobelpreis.uzh.ch](http://nobelpreis.uzh.ch)

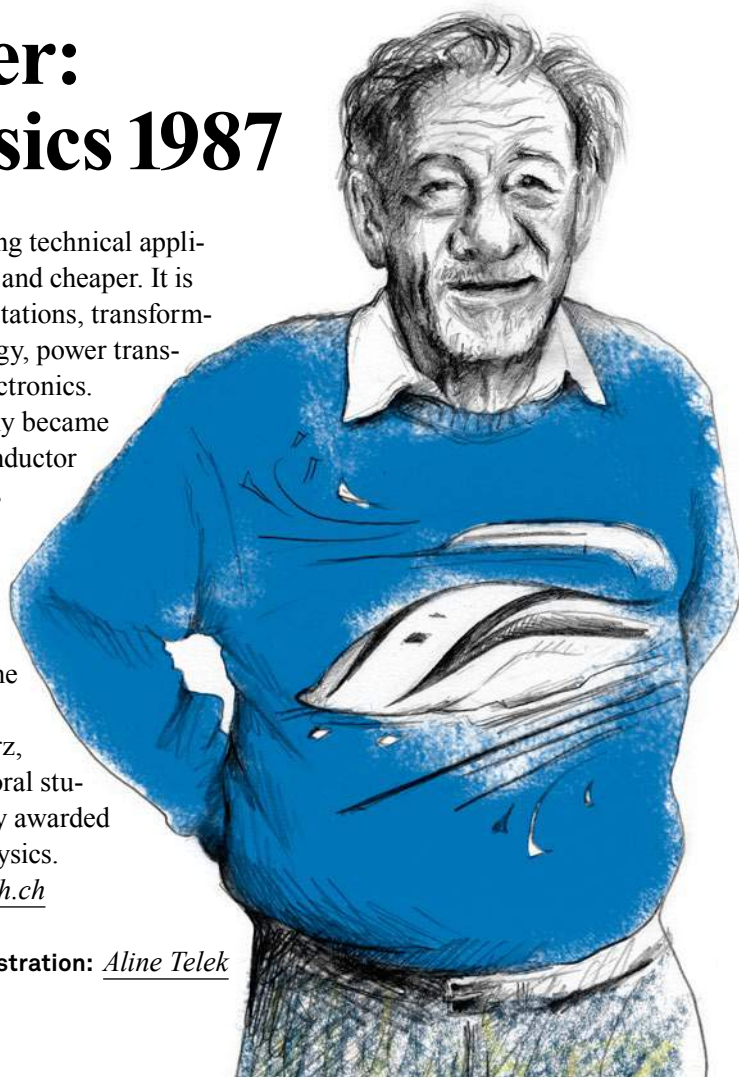


Illustration: *Aline Telek*

## Swiss Treat



The Nusstörtli is the little brother of the famous Bündner Nusstorte. Every baker has his own recipe with his own secrets. Of course, the main ingredients stay the same: flour, eggs and butter. The filling consists of caramelized nuts, which are made soft with full cream or honey. You'll get the opportunity to try the Nusstörtli today at the midterm party! A huge thank to la Conditoria who is offering you this speciality.

*Céline Nauer*



## Parabolic peeing

**Going to toilet without making a mess is something which Swiss men master from an early age.**

If you are guest in a typical Swiss household, you will always find a spotless toilet. A Swiss man using such a facility will always make sure, he leaves it in the same condition as he encountered it. To leave spots of pee on the toilet seat is a no-go.

How do we achieve this? Well, we teach our boys the laws of physics.

It all starts with the free flow model. When diapers are no longer needed, the children

learn how to sit on a potty and just let go. With this method, the force of the ejecting pee is directed almost towards the centre of the potty. Nothing ends up in a spot where it shouldn't. For a long time, this is the perfect system.

But boys grow and one day they are too big for the potty and they start using the adult's toilet. And that's where the trouble starts. Since they are too small to sit on the toilet seat, they stand and try to aim for the toilet's centre. In order to get the pee over the rim of the seat, they have to pee in a perfect parabola. The thing is that pee doesn't flow in a perfect parabola. For a start, the

emerging jet is twisted and it fans out rapidly with increasing distance from the source. Aiming at anything is nearly impossible. The result is that the entire toilet is covered in pee. This phase lasts for years and in some cases men stay in that phase for their entire life.

Luckily, most Swiss men at some stage remember their happy potty-times and how physically simple peeing was back then. Thus, after long years of trying to master the art of parabolic peeing, they just sit down on the toilet. The result is that the toilet stays clean.

*Atlant Bieri*

## Readers Letters

Hey there IPhOers,

Hope you did well in the examinations!  
IPhO is not only about competition; it's about the experience you earn and lifetime friends you can make and about globalizing the whole world.

I was an IPhO participant and I still mark my days back in Mumbai, Astana or even Damascus where I used to prepare for IPhO as some of the best days in my life!

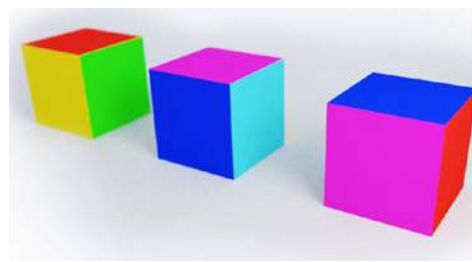
Have fun and play Mafia (one of the greatest games I learned at IPhO).

Jafar Badour

The slovenian Team (Novotel) would like to challenge any interested delegation for a soccer match or tournament. The south african team already accepted the challenge :)

The time would be after the Rigi excursion (on Friday) or on sunday afternoon (for those who are still here).

## Riddle



What is the missing colour  
on the last cube?



Happy Birthday

Algahdeer Adel,  
Visitor Saudi Arabia

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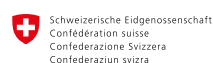
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**Country in the clouds**  
Students visit Liechtenstein.  
Page 3

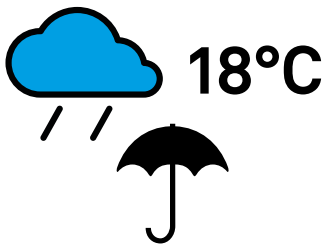
**Greetings from home**  
A double page of love from your  
parents and friends.  
Page 4

**Calm down**  
Relaxation yoga before the exam.  
Page 8

# MOMENTUM

Issue 5 – Zurich, July 14th 2016

## Today's Weather



## Schedule

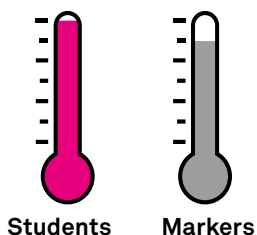
### Students

8:30 – 13:30  
Theoretical Exams  
Lunch  
17:00 – 18:00  
Inspirational Speech  
18:00 – 21:00  
Midterm Party

### Leaders

8:15 – 16:15  
Excursion to Principality of  
Liechtenstein  
18:00 – 21:00  
Midterm Party

## Stress Level Barometer



# “The participants will make the biggest discoveries”

**Highly involved in preparing for tomorrow's theoretical exam, the leaders took a break in order to listen to a refreshing speech given by physicist Derek Muller from the YouTube channel Veritasium.**

Right before lunch, Derek Muller grabbed the attention of the leaders and academic committee. With thrilling videos about how little people know about science, he tried to highlight the importance of effective education, especially in physics.

He's aware that he is surrounded by very skilled physicists. “I appreciate the knowledge everyone has, but I'm not here to challenge them in physics. I will try to expose new perspectives on education and filmmaking which they haven't seen before.”

Derek Muller is what you call a science communicator. After finishing his Ph.D. in

2008, he worked at a tutoring company until he founded Veritasium in 2011. Despite his career in physics, Derek always knew that he actually wanted to be a filmmaker – it just seemed like a bad career choice to him. He even applied for film and theatre schools but luckily he was rejected, since it allowed him to start his studies at Queen's university in Canada. “Physics is an amazing basis for problem solving and gives you a great

set of tools, which are helpful in many ways,” he says.

Derek is a fan of the IPhO. “The exams look very fun,” he states. To him, this event is very important since the best young physicists get to spend time together, which gives them an extra boost to enter physics. And after all, “some of the participants will probably make the biggest discoveries of the next generation,” he says.

*Céline Nauer*



Derek Muller.

# Stronger than gravity

So this is it. The day of the theoretical exam has come. Again, this is a stressful situation for you. Maybe there's even a bit of fear. You against physics. You against time. Separated from each other and separated from the rest of the world, you face the challenge. I'll tell you what though. You are not alone. The thoughts of your parents and friends back home are with you. I am not just saying this. It is true. We made sure of this and posted an appeal on Facebook. Your parents, brothers, sisters, and friends responded. We got over a hundred good luck wishes. You can find them printed on pages four and five. You know what this is called? Love. This is also a force. Not a physical one like gravity, but you know what, love is much stronger. The force of gravity decreases quadratically with increasing distance. Love doesn't. Love is constant, not affected by distance, time nor the presence of black holes. If you sit in today's exam, remember that love is always with you.

Atlant Bieri

## Yesterday in pictures

Images: Pascal Sommer  
and Roman Ernst



In front of the Liechtenstein Museum.



Principality of Liechtenstein.



Liechtenstein's cloudy landscape.



Cuckoo clock in Liechtenstein.



At the international board meeting.



Physicist YouTube star Derek Muller.

## “We like the friendship between our countries“



The Minister for Education (second from the left) with the Liechtenstein team.

### On Wednesday, students met Aurelia Frick, the Minister for Education of Liechtenstein.

#### *How important is the International Physics Olympiad for Liechtenstein?*

**Aurelia Frick:** Our participants are ambassadors who share knowledge and express their friendship with the world. It's great that we have 400 young people who are interested in this technical field.

It is also a good opportunity to show others our beautiful country.

#### *How do you experience your partnership with Switzerland?*

**Aurelia Frick:** We are always interested in cooperating with Switzerland, because we like the friendship between our countries. Besides, it is very nice to work together on such an international event.

**Interview:** Björn Bauhofer

## Golden wings

### In Malbun, the students got a presentation about birds of prey.

The eagle has many names, such as golden eagle or stone eagle. Yesterday, a falconer explained why the French version seems to be the only accurate one: aigle royal or king eagle.

After an interesting speech, an eagle and a falcon were shown to the audience. The eagle can produce such large pressure with its claws, which allows it to kill much bigger enemies as well.

Björn Bauhofer

## The country in the clouds

### On Wednesday, students went on an excursion to Liechtenstein.

Our journey started with 11 buses zooming from Zurich to Liechtenstein. On the way, the city gave way to greener pastures and our view was a beautiful countryside and Lake Zurich.

As we crossed the border, we were met by tall mountains towering over the little houses that were perched on their slopes. It was really wonderful to see the clouds that had descended very low around the mountains, giving off a mystical tone. After disembarking, the excited students had a look around the city.

Many of them bought stamps, Swiss knives, Liechtenstein scarves, chocolates and souvenirs from the shops for their friends and family. The Minister of Education gave a nice speech as well.

Liechtenstein is completely surrounded by mountains and we went up the long spiraling roads leading into them. Indeed, when we looked to our side, the view was as if we were in the clouds!

At the photography point, everyone had fun, since the view was stunning and several selfie rounds happened. It was very cold and the only source of warmth was huddling together in little groups. We must have looked like another

batch of mountain sheep, except wearing coats and jackets! The trip to Liechten-

stein was unforgettable and extremely valuable!

Asira Lele



Good atmosphere while having lunch together.

**We asked your families and friends  
on Facebook to send you some good luck wishes.  
Here they are:**



**Islomiddin Sodiqov:** Mur  
**Viren Ajodhia:** All the best to the Surinam  
tomorrow! • **Hazret Polar:** Good luck to the Azerbaijani  
Good luck Fahim Tajwar Swachchha!! and Best of luck Bangladesh  
persofi especially Hugo Herdianto and Kevin Limanta! Make Indonesia  
for introducing Dab. We are proud of you! Wij zijn trots op je! Мы тобой гордимся  
#Pakistan especially to dear Brother Usama Azhar... May all the best comes your way  
and Hugo Herdianto (Indonesia) • **Shamilla Pillay:** Best wishes team South Africa! We are  
for you. Wish you GOOD LUCK South Korea~ Thank you, Swiss&Liechtenstein~ • **Ann-Kathrin**  
your best Vietnam team! We believe in you! • **Eyal Cohen:** We are sending our love and best best wishes  
to all. Our gratitudes to the hosting country for their wonderful hospitality. • **Nurlan Avazlı:** I am for  
other teams to enjoy the olympiad to the fullest. Cheers. • **Rene Alejandro Villela:** To El Salvador team : a  
todas las ganas! Para poner a Mexico en alto tu puedes! Te quiero! • **Gabriela Netto:** Diogo Netto, VAI QUERER  
Good luck guys! Hope to see you guys with medals • **Ronen Friedman:** Iddo Friedman (Israel del.): sending my  
amo • **Sovathana Soun:** Good Luck Team Cambodia :) From past IPhO Cambodian candidate 2014 • **Vladimir Ve**  
& lykke! • **Zaire Zhiro:** Good luck Cambodia team, Chanmonirath Chak and other ! Hope to see all of you success for  
the Bosnian team: Sretno! :D • **Mateus Corato Zanarella:** Henrique Corato Zanarella, we are very proud and very happy  
are cheering for you and all the Brazilian team! • **Jafar A. Badour:** Good luck Guys, best wishes for team Syria! And the  
best~Even though we aren't together at this moment we are always praying for you~GOOD LUCK Woun Suk Rhee from  
Colombian team. We know that you are wonderful guys. • **Ivet Gažová:** Best of luck to Slovakian team! Don't worry and have fun  
(Indonesian team). Do the best - Ganbatte !!! GBU • **Tommy Lin:** I believe you can do your the best and grab your dream in Zurich  
whatever happens, be happy, this is your time. To Thailand team :D • **Lisbeth Aagaard Rahn:** For Frederik Lerbjerg Aagaard and  
**Sandhya Krishnan:** To Abi and the rest of US team: Best wishes and Good Luck! Go for the Gold! • **Adhed Kamal:** Kamal, I am proud of  
olympiad. Our team is top of the world. I am proud of you. Good luck luck!!! • **HA Kwonha:** I wish our South Korea Team to enjoy  
team • **Diana Saenz:** Erasmo Hinojosa Sáenz I am having a wonderful HBD, writing this post to you is a very nice present for me.  
MÉXICO!!! • **KimGuech Lim:** Good luck Cambodia team. Chanmonirath Chak and other. Hope all of you to bring back success!  
the exam! don't forget that  $b$  always less than  $3b$  for positive values of  $b$  :) • **Kazi Ridwan:** Good luck Bangladesh. Bilal Morbei. • **Siti**  
Cambodge, je sais que vous avez pas assez de temps pour vous préparer comme les autres. Mais, j'espère, grâce à vos talents, que vous  
your best... GOOD LUCK!!!! (y) • **Ignacio Oliva:** Good Luck El Salvador team! The favorites! • **Nyseth Nyseth:** Good luck! Su su su C  
• **Szonja Szegedi:** Very best of luck to the Hungarian team, we are crossing fingers for you all, especially for Kristóf Sal! HAJRA MAGYAROK!  
I would sell my grandma's soul to be there with you. But since I'm not, and since deep, deep inside I'm a good person, I wish you all m  
:D • **Lyhour Huon:** Good luck to All Cambodian contestants • **Ana María Martínez Aguilar:** Mexico, Mexico!!!! The best!!! • **Phydy**  
fingers crossed for you in Nauka Wyborcza.pl! • **Verica Petrušić:** Podrška timu iz Crne Gore: Marku, Nikoli, Mateji, Stefanu i Andriji.  
We are all supporting you and #TeamBrazil! We are all sure that you'll bring home some of those bright medals (besides some swiss)  
proud !! We'll see you on the other side !! • **Minerva Varela Lugo:** ¡Vamos México! SI SE PUEDE, SI SE PUEDE, Estamos con ustedes  
Flores, Grecia Castelazo, Chuy, les deseamos el mayor de los éxitos. • **Lyna Taing:** To Cambodia team, do your best! We Cambodian  
Hajrá Magyarok! • **Boris Lessa:** Boa sorte e sucesso Leonardo Lessa e toda a equipe do Brasil na IPhO 2016! • **Felipe Mourad:** Faça  
El te bendice a tí y a todo tu equipo. Besos!! Saludos!!! • **Cefer İsbarov:** Neynirsiz? Salamatchılığdı? #AZE • **Arron Paul:** Moha  
performance in IPhO 2015. Enjoy IPhO 2016! Not many times you'll get such opportunity in your life. • **Davi Dultra Silva:** Di  
you are happy. I'm your fan and your friend congratulations do your best. • **Rafael Tancredi:** Hey Diogo, it's very good to see  
**Tompa:** Go Hungary! Hajrá Magyarok! • **Ujjawal Krishnam:** All the best Team India! Chak de India!! • **Maria De Mora**  
Stark's • **Thiago Hideki Iwai:** congratulations Diogo Netto you deserve what you are living !! Here in Brazil we are cherring  
**Hong:** To Malaysia Team - - All the Best ! Semoga Berjaya ! • **Dulcileda Correia:** Congratulations Diogo Netto, you're a  
**Luiza Tiburcio:** Diogo Netto, congratulations on this achievement, you and your friends represent our country!!! Y  
Dennis, Bouke, Christian and all other participants! • **Magdaléna Májeková:** Good luck, all boys from Slovakia. We  
that you are a fighter .wish you all the best ..miss u so much • **Desarrollo Genético Tío Chonito Erasmo:** Dios  
the best!!!! • **Desarrollo Genético Tío Chonito:** Siempre con confianza con generosidad y también paciencia!  
y ustedes son parte de esa comunidad recuerden que sus familias están muy orgullosos de ustedes y sus lo  
To Cambodia team! Good luck and we hope we will hear the good news soon • **Zenith Gurgel:** Diogo  
uma de suas conquistas. Conhecer seus pais foi um presente de Deus! Pessoas honestas, batalhadoras  
ya ashbah. You are the best of the best in there keep going. Ebdouh: I'm proud of you. I know v  
stomata safe. You are to reach the top. • **Diego Pinheiro de Moura:** Parabéns para os mon  
que não vai dar o que!!! Boa sorte pra todos e principalmente pro Thiago Bergamaschi  
in this test, in special for the Brazilian team!!!! Let's go!!!! Diogo it's a pleasure to  
the one who inspired me in studies, you're amazing, good luck and we are  
sky. The limit is in the mind. Congratulations Diogo Netto. • **Vi**  
amamos y estamos orgullosos de ti! • **Davi Dultra Silva:** I  
with Diego and Bruno about you. We miss you r  
fan and your friend cong



od Mirjalilov good luck!•  
 e Team! • **Margarita Stanza:** Good luck for  
 an, Israel und Australia Team. • **S.m. Maskruk Uddin:**  
 lesh team. :) • **Josephine Melia:** to Indonesian team: Good luck  
 n Physics Olympiad great again! • **Mila Joosten:** Sasha Ivlev thank you  
 рдимся! Good luck Dutch team! • **Anas Azhar:** Wish you best of luck Team  
 ay...!! • **Jason Kristiano:** All the best for Indonesian team, especially Kevin Limanta  
 are so proud of you! • **Yg Lee:** Do your best, Team South Korea~ We are always praying  
**nrin:** Raab Sven Jandura hauts rein! Grüße ans ganze Team (y) • **Thu Hiên:** Keep calm and try  
 wishes to the Israeli excellent delegation - best of luck !! We are so proud, and we extend our wishes  
 rmer IPhO participant and IPhO 2014 Bronze medal winner from Azerbaijan. Wish Azerbaijan and  
 dar fuegote compañeros! • **Jennifer Lopez:** Fernando Ballesteros Flores Dios te bendice. Animo a echarle  
 E É SUA!! Good luck to the Brazil Team! We are so proud of you, guys! • **Lahiru Udara:** To sri lankan team:  
 y love and best wishes to you. Your proud father • **Ingrid de Schulz:** Éxitos Adri! Estoy súper orgullosa de ti! Te  
**eljjic:** Пуно успеха српском тиму!!! #Serbia • **Hanne Wick:** For Lukas Wick and the rest of the Danish team : Held  
 or our country. • **Sreang Kosorl:** Do your best and gook luck • **Bakir Devedžić:** For Dženan Devedžić and the rest of  
 py that you fulfilled your dream of participating in IPhO. Enjoy this experience at maximum and have lots of fun! We  
 most important of all make friends from all over the world because its awesome ! B| • **Woun Suk Rhee:** Always do your  
 a team South Korea • **Diony Pulido:** Christian David Forero Pulido: Our love and the best wishes with you and with the  
 ave lots of fun! Drzime palce! :) • **William Nathaniel:** It's time to prove you're the best my beloved brother Michael Gilbert  
 urich !!! May God bless you son Michael Gilbert (Indonesian team) • **Kann Ruaytae:** Have fun and enjoy the time of your life,  
 nd the rest of the Danish team: Good luck to all of you • **Anna Leung:** To Hong Kong Team: add oil and good luck, enjoy all!•  
 m with you by my heart, soul, and most sincere prayers, son! May Allah bless you • I wish our South Korea Team to enjoy this  
 y this olympiad. Our team is top of the world. I am proud of you. Good luck luck!!! • **Abanoub Gamil:** Good luck for the Egyptian  
 I am proud of you, all our family supports you, all of our country supports you and every member of the Mexican team! ARRIBA  
 • **Pablo Cesar Ruiz:** Good luck Erasmo Hinojosa [Mexico]!!! • **Aharanov Bohm:** have a Good luck and do your Best on the rest of  
**hiphon Sino Sawaengdee:** Good Luck #Cambodia Team ! Fighting guys, you can do it :) • **Poseng Than:** Pour l'équipe nationale du  
 allez bien y rèussir quand même. Allez les khmers!!! @EcolePolytechnique • **Noor Bint Qaiser:** Best Wishes... PAKISTAN Team ., do  
 Cambodia • **Virakbuth Seng:** Nail it, CAMBODIA Team!! Do your best, and we all are here to support you! Good luck! Su! Su! :D :D  
 YAROK! • **Paraskevi Sidiropoulou:** Dear IPhO Participants (especially the Greek team), I'm so so so so SO jealous of you right now.  
 y best. GREEK TEAM RULESSSSSSSS!!!!!!!!!!!!!!!!!!!!!! • **Moon Panha:** Best wish to CAMBODIA team ! I know you can get it ! Good luck  
**Nireach:** Chanmonirath Chak, you are my idol. Be fighting!!!! #Cambodia • **Piotr Cieśliński:** POLISH TEAM, do your best! We keep  
 ! • **Bruno Maurício Batista de Albuquerque:** Diogo Netto, Henrique Corato Zanarella e Thiago Bergamaschi: GO GO GO, BRAZIL!  
 s chocolate, of course)! You're the best! Success for you all! UHUL! • **Sarah Penn:** Come on CAMBODIA TEAM !!! Do this nation  
 , desde Los Mochis, Sinaloa reciban nuestro cariño, buenas vibras y bendiciones. Gabriel Vr, Erasmo Hinojosa, Fernando Ballesteros  
 n are so proud of you. • **Farrukhjon Barotov:** I wish good luck to TAJIKISTAN!!!! • **Dominik Kufel:** #GOPOLAND! • **Szilvia Sal:**  
 am sozinhos a prova ! • **Ana María Martínez Aguilar:** Grecia Castelazo Tú diviertete y relájate, confía en Dios nuestro Señor Jesús  
 imenul, Azmaine, Shuvo, Taosif, Swachchha, wish you all the very best for IPhO 2016. I hope you will do way better than our  
 ogo Netto I'm so proud of you. Every day at school I talk with Diego and Bruno about you. We miss you man, but we know that  
 you there, since we were little kids I knew you were going to get there! Congratulations and good luck! Diogo Netto • **Ágnes**  
**es Dino De Almeida:** Let's go Brazil!! The better you get, the more you become similar to superheroes!!! The futures Tony  
 for you!! Good luck. • **Simran Mokiem:** Good luck team Suriname. We miss you Farchanda Abdoel Wahid :) • **Lee Choon**  
 already a winner. Force warrior! • **Taghreed Al-saigh:** Good lock kemo. I know you can do it. I am proud of you. • **Maria**  
 ou deserve every success in the world... We miss you!!! • **Sander Primavera:** Good luck dutch team, Xander, Sasha,  
 keep our fingers crossed for you! Pekne zazitky :D • **Azhar Mohammed:** Good luck qatar team ...kamal you proved  
 por delante, toda sabiduría viene de Dios. Atte tu papá. • **José Juan Gonzales Perez:** Let's go Mexico!!! You are  
 !!! • **Yolanda Sepulveda:** Ya son ganadores una experiencia inolvidable disfruten esta con lo mejor de lo mejor  
 gros adelante Colombia • **Olena Goloborodko:** Veel succes, Sasha en al Nederlandse team! • **Dalina Ros:**  
 Netto, não duvides, nem por um instante do carinho e admiração que todos têm por você e por cada  
 s, divertidas, verdadeiros amigos. Observar que a me. • **Marwan Ghanem:** Egyptian Team: Gawales  
 what you are going to reach. • **Mohannad:** Gawalsa Union is waiting for you ya vice. Keep your  
 stros brasileiros que estão representando o #TeamBrazil esse ano! Vamo que vamo galera,  
 i, nosso capitão preferido! • **Caio Vaz Guimarães:** I cross my fingers for all the people  
 o meet you!!!! Diogo Netto!!!!!! • **Felipe Polanczyk:** Hey Brother, you were always  
 e together with you! Diogo Netto • **Barbara Mattos:** The limits not in the  
**viana Hernández:** ¡Vamos equipo Colombia! Christian David te  
 Diogo Netto I'm so proud of you. Every day at school I talk  
 man, but we know that you are happy . I'm your  
 ratulations do your best.





IPhO Eater

# Raclette from the shepherds

**Today you can taste a traditional Swiss meal made from cheese and bread.**

At the midterm party on Thursday evening, you will have the opportunity to try some typical Swiss dishes and treats. One of the Swiss specialties you will try is raclette, which is a traditional Swiss cheese dish.

The word “raclette” comes from the French word “to scrape.” The recipe goes back many centuries. Originally, it was enjoyed by shepherds in the fields. They would melt the cheese in front of an open

fire and then scrape off the top layer of molten cheese. At the same time, they would boil potatoes. The liquid cheese is then poured over the potatoes. Today, it is also eaten with bread.

“At the midterm party, we will serve the traditional raclette cheese,” said Dominik Schenk, responsible for catering at IPhO. “Our staff will pour it over bread for you. You can then sprinkle some paprika powder over it to give it some extra taste. Just try it!” he said.

*Atlant Bieri*



Image: Wikimedia Commons

Traditional raclette cheese ready to eat.

## Where it all started



**Andreas Schilling.**

Without Andreas Schilling, the IPhO 2016 probably wouldn't be taking place at the University of Zurich! Over two years ago, he and a few other enthusiasts convinced the other members of the physics institute that taking the IPhO to Zurich would be an awesome opportunity.

Within the IPhO, Andreas Schilling is a member of the academic committee. He is responsible for ensuring a smooth examination process, where he has to coordinate the UZH staff as well as the volunteers.

So far, everything has gone smoothly for Andreas Schilling and he was able to ring the cowbell – the start sign of the exam - with a delay of only two minutes on Tuesday.

After the IPhO, when everything goes back to normal, Andreas Schilling will take up his responsibilities as a solid-state physics professor at UZH again. He and his team are working at finding new super conductors as well as using existing super conductors as photodetectors. Besides this, he is also a cardio workout trainer at the university's sports centre ASVZ twice a week.

*Céline Nauer*

## In the press

***“Zurich woos young physics-talents“***

*Neues Bülacher Tagblatt  
Zürichsee-Zeitung, Bezirk Meilen  
Radio SRF 1*

***Physics Olympiad  
at University of Zurich***

*SRF 1, Tagesschau*

**Biberli** In the canton of Appenzell, these biscuits have been a traditional food ever since the Middle Ages. However, the Swiss population is strongly polarized by this pastry. Made with honey dough and filled with

Nobel laureates of the University of Zurich

# Quantum Leap in Physics

**Erwin Schrödinger proved that electrons could have the properties of either waves or particles, but are neither one nor the other – a discovery that revolutionized physics.**

In the fall of 1921, Erwin Schrödinger was appointed to be the chair of theoretical physics at the University of Zurich.

Schrödinger focused intensively on de Broglie's proposition that all matter has wave properties. He tried to find the properties of such waves of matter.

These efforts resulted in the first article of his *annus mirabilis*,

“Quantisierung als Eigenwertproblem. Erste Mitteilung” (Quantization as an eigenvalue problem, part one), which he sent to *Annalen der Physik* on 26 January 1926.

In this paper, he formulated his famous wave equation, which is now referred to as “Schrödinger equation.” The wave equation makes it possible to calculate the energy levels of electrons in an atom, thus solving one of the great problems in quantum physics.

After Schrödinger's wave equation, nothing in the world of physics was the same again. The dispute as to whether quantum objects such as electrons, atoms or molecules were waves or particles was settled. In a surprising fashion, however: Schrödinger demonstrated that electrons could have the properties of either waves or particles but are neither the one nor the other; their state can be calculated only as a degree of probability.

For this discovery, Erwin Schrödinger was awarded the Nobel Prize in Physics in 1933.

Source: [nobelpreis.uzh.ch](http://nobelpreis.uzh.ch)

Illustration: [Aline Telek](#)



## Swiss Treat

almond paste this treat is a delicious snack for some and absolutely horrible for others. They are definitely worth a try though, simply because they are a real piece of Switzerland.

*Céline Nauer*



# Education for everyone

**In Switzerland, every child has the right to education. You can attend public schools completely free of charge for 11 years.**



If I tell people from abroad that I went to public school, they look at me with a shocked face. They mumble something like,

“Sorry to hear that”. I am then usually quite quick to explain that in Switzerland almost everyone goes to public school.

The thing is, we have one of the best public school systems in the world. For starters, we don't have to pay for it. “Classes are free of charge. ... Teaching materials are provided gratuitously,” reads the law of the Canton of Zurich.

“Gratuitously” meaning the taxpayer bears the cost. This amounts to 20 200 CHF per child and year according to the Swiss Federal Statistical Office. Schooling consists of two years of kindergarten, six years of primary school and three years of secondary school. Thereafter, compulsory education is officially complete.

You can then go to high school, which is also free of charge. Next is university. This is the first time that you actually pay for your education. At UZH, this is a fee of 720 CHF per semester, which is still moderate compared to other countries.

Education is a right in Switzerland. This means, if one doesn't send their children to school, they get a fine. Depending on their income, it ranges from 500 CHF to as much as 5000 CHF. If this does not change anything, the government can decide to put your children in foster care.

*Atlant Bieri*

## Readers' Letters

Dear Pakistani students at IPhO, as-salamu alaykum.

We, Pakistan Students' Association Switzerland (PAKSAS) would like to congratulate you for coming this far, and we want to wish you the best of luck from all our members. We are the pride of our country, and we trust that your performance at IPhO 2016 will reflect that.

Best of luck,  
Team PAKSAS

## Solution to last days riddle



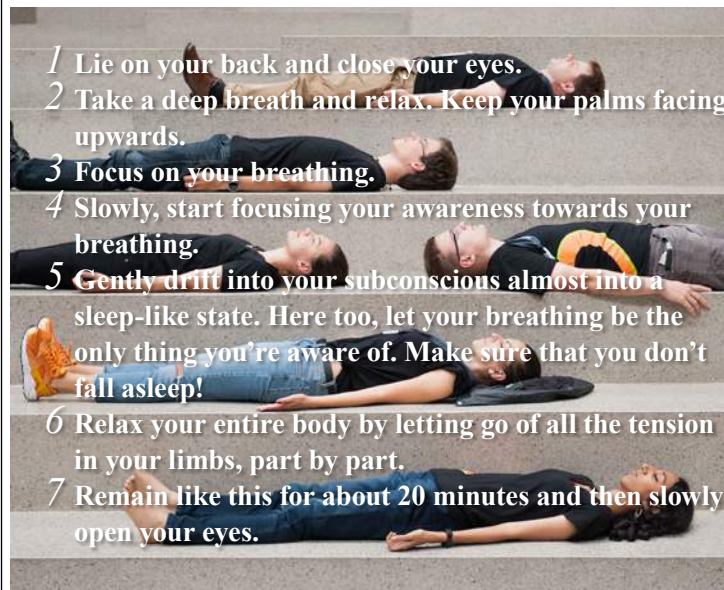
The missing surface colour is green.

# Yoga

## Shavasan

### Yoga Relaxation

This yoga exercise should be done 45 minutes before your exam. This is a deep, intensive and highly relaxing asana that requires concentration. After you wake up, you'll feel refreshed and alert. Here's how you do it:



*Asira Lele*

## Imprint

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Photography:  
**Pascal Sommer**  
Proofreading:  
**Karen Abraham**

## Write to us!

If you want to say something to the IPHO community, to Momentum or just tell everybody how you feel, write to us on [momentum@ipho2016.org](mailto:momentum@ipho2016.org) or drop us a note in your letter box at the editorial office.

### Organizers



University of Zurich  
UZH



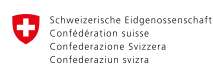
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PRINCIPALITY OF LIECHTENSTEIN



Verband Schweizer Wissenschafts-Olympiaden  
Association des Olympiades Scientifiques Suisses  
Associazione delle Olimpiadi Scientifiche Svizzere  
Association of Swiss Scientific Olympiads



### Main Partner



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**The final stroke**

Exams are over,  
the pressure is gone.

Page 3

**Gender matters**

Thoughts on segregation  
of the sexes.

Page 4

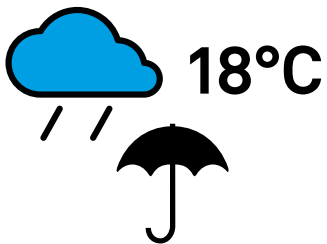
**Courageous woman**

The first female professor  
at UZH.

Page 7

# M *Girls Issue* MOMENTUM

Issue 6 – Zurich, July 15th 2016

**Today's Weather****Schedule****Students****Group 1**

7:45 – 19:00

Mount Rigi, Lake Lucern,  
City of Lucerne

**Group 2**

6:45 – 21:00

CERN and International  
Red Cross and Red Crescent  
Museum Geneva

**Leaders**

8:30 – 12:00

Distribution of Copies of Exams  
Lunch

13:15

Optional Excursion PSI

**Barometer**

Happiness  
level



Students

Stress  
level



Markers

## The Swiss party is on



Image: Roman Ernst

# A Girls Issue????!!!?

**Look at the numbers – is physics only for boys?** If you take a look at the IPhO 2016 statistics, one would really think so: only 25 out of the 400 students are female, which accounts for only 6% of all participants. Only 21 countries out of the 90 participating countries are competing with at least one girl on their team, which is only 18,9% of all teams. This means that 81,1% of all the countries came to the IPhO 2016 solely with male competitors. (You can find out more about the reasons in the article ‘gender segregation’ on page 4). **But why have a girls issue if there are so many more boys reading MOMENTUM?** This "girls issue" is dedicated to all the strong women in this world and especially to those in physics. We decided to produce this issue, not to endorse the difference between girls, boys, men and women, but rather to focus on the progression of the female role in physics, science, research, politics, in the economy and in the corporate world, where women are still under represented. What really counts however, is that physics is not only about quantity, but also about **quality**. ;)

Love, Kira

P.S. For all the feminists among us, don't take the girls issue too seriously.  
For all those who underestimate women, you better should.

## Yesterday in pictures

Images: Pascal Sommer  
and Roman Ernst



Focussing on the theoretical exam.



Waving the flag.



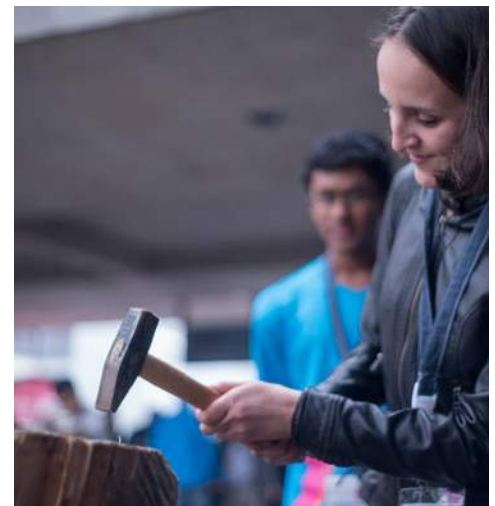
Team guides playing dodgeball during the exam.



Derek Muller giving his inspirational talk.



Milking the cows.



Nailed it.

# All are glad

**Yesterday, the second exam took place and with it the academic part of the IPhO ended.**

The theoretical exam started 25 minutes sooner than planned: “If we start 25 minutes earlier we also can end 25 minutes earlier,” said Prof. Dr. Andreas Schilling who was responsible for today's exams. The exam could be conducted without any big issues. Leonardo from Brazil is glad the pressure is now gone and he's looking forward to the results. “The exam was quite difficult especially the electro-part, but the main problem was the time.” Ajanthasingam from Sri Lanka found the theoretical exam a little bit harder than the practical exam, he is now looking forward to lunch.



**The final pencil falls. Exam is over.**

“Can I borrow your hand, I want to give 4 thumbs down,” asked Albert from Sweden. But he is also glad that now the hard part is over. Now the participants have to wait for the results, but in the spirit of the Olympiad the Lichtenstein Delegation said: “It was fun!”

*Björn Bauhofer*



**Alexander Kish**  
Academic Committee

**Castro Hernández**  
and  
**Miguel Antonio**  
Leaders El Salvador

**Brandon Markwalder**  
Academic Committee

**Ramon Stucki**  
Academic Committee

# Writer's choice

**During the theoretical exam, most students used a pen to write with. Some however, used more traditional writing tools.**



**Wood chopper.**



**Fountain pen usage without smearing.**



**Traditional tools.**

## GIRLS &amp; COUNTRY

Angela Mitrovska



Macedonia

Sofija Dimoska



Macedonia

Aletta Csapo



Sweden

## Gender segregation

**The unequal distribution of male and female participants at the IPHO shows a global trend, which is caused by segregation originating from constructed social genders.**

### Gender versus sex

While sex refers to biological traits; chromosomes, hormonal profiles, internal and external sex organs, gender describes the characteristics that a society or culture associates with masculinity or femininity and the defined expectations of the female or male role.

### The male breadwinner model

It's a question of socialization and education: living in a certain society, we get socialized, we learn about role models, we learn how to behave and we learn what people expect from us in our different roles.

Society defines "how to be male or female" or "how to be a woman or a man".

Different roles (used to) have different responsibilities, functions and tasks. The traditional, patriarchal model is called the "male-breadwinner-model". In this model, the female function is childcare and household work; taking care of the family, giving birth to children and raising them to be good humans. The male role in this model is to work, to build a career and earn money for the family.

### Gender segregation

A result of these historically grown structure is gender segregation, which impacts career choice, the job market and, later on, the position. There are two forms of segregation; horizontal and vertical.

"Horizontal segregation" in the workplace can be defined as the concentration of men and women in different kinds of jobs or different job tasks. Typical male-dominated jobs are ones with better salaries, a better reputation and a higher required educational level.

This is different to "vertical segregation," where opportunities for career progression within a company or sector for a particular gender are limited. Further, the clustering of men at the top of occupational hierarchies and of women at the bottom is called the "glass ceiling".

The European Health and Safety Agency (EU-OSHA) states that:

...horizontal segregation is where the workforce of a specific industry or sector is mostly made up of one particular gender. An example of horizontal segregation can be found in construction work, where men make up the majority of the industry's workforce, whereas childcare is almost exclusively a female occupation.

The countries that ranked best in gender segregation were found to be Estonia, Slovakia, Latvia and Finland, and the four countries with the worst score were Greece, Romania, Malta and Italy.

Grecia Castelazo Martínez



Mexico

Julia Järlebark



Sweden

Katharina Buczolich and Franchanda Aliyah Abdoel Wahid



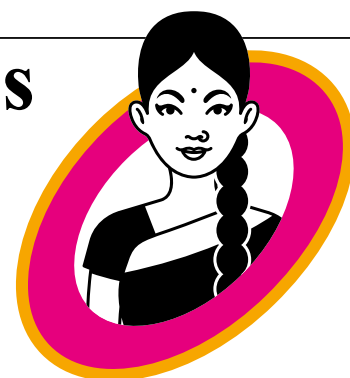
Austria and Suriname

## Gender Pay Gap

The gender pay gap is the average difference between men and women's aggregate hourly earnings. The wage gap is a consequence of gender segregation. It causes a variety of issues. Next to discrimination, such as differences in education choice or in preferred job and industries, there are differences in the types of positions, jobs and work-conditions. Another cause is the duration of education and employment, with breaks in the employment biography, often caused by pregnancy or difficulties managing work-life-balance.

*Kira Hussinger*

## The Swiss Miss



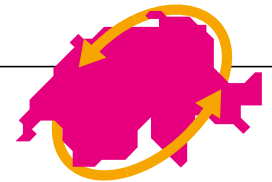
### Röschti & Curry

Switzerland is indeed an extremely progressive country, but are its women completely independent? How does the international community view the Swiss woman? How does the average Swiss miss or the Swiss missus view herself? My impression of the average Swiss lady is that, she is smart, aware, professional, hard-working, efficient and generally quite friendly. These women are (and should obviously not) be held back by any sort of obligations. Although this tends to be the norm in the modern cities, the situation is rather different in the rural areas or some mountainous villages. The people there have a more traditional mindset and the rural women still do have certain obligations. It is very surprising that Switzerland got voting rights for women later than other European countries. There are many initiatives for equality, as some Swiss women are still underpaid in jobs as compared to men. This is not just the case in Switzerland, but this is a very bad and disgusting unspoken phenomenon worldwide, which rears its

ugly face when a woman starts working in an office. Swiss women sometimes find it necessary to decide between children and work, as day care centers may be rare and may be quite expensive. Parenting can be quite a difficult task, because only women get parented leave! Then again, there are so many positive and admirable points like the Swiss miss or missus can wear whatever she likes. She is very broad-minded and makes it a point to help co-working women, by pulling them up and not pushing them down. She certainly doesn't backstab her co-workers the way that misogynistic men everywhere think women in power do. Kudos to all the lovely ladies of the Confoederatio Helvetica!

*Asira Lele*

# Female Switzerland



**IPhO Trotter**

Many women make Switzerland the country it is. This is the female way to CERN.

## Zurich

**1** Denise Biellmann, a famous figure skater, was born here. She was the Swiss sportswoman of the year in 1979 and 1981 and became world champion and European champion in 1981. She was the first female skater in the world that mastered the triple Lutz jump. Later, she invented the “Biellmann spin”.



## Baden

**2** Martine Clozel is founder and co-owner of Actelion, one of the largest biotech companies in Europe.

## Highway number 1 (A1)

**3** This road goes through the entire country. While men built most of it, the boss of this stretch of road is a woman. Doris Leuthard is the head of the Federal Department of Environment, Transport, Energy and Communications and thus responsible for all highways.

## Bern

**4** Nicoletta della Valle is the Director of the Federal Office of Police. She used to be a Judo and Kickboxing trainer and is now the head of a male-dominated institution.

## Geneva

**5** Fabiola Gianotti is an Italian particle physicist and since this year the Director-General of CERN. She worked at several experiments such as WA70, UA2, ALEPH or ATLAS. Gianotti was among the “Top 100 most inspirational women” by The Guardian newspaper, ranked 5th in Time magazine’s Personality of the Year, and considered among the “Leading Global Thinkers of 2013” by Foreign Policy magazine. *Atlant Bieri*

## The printing factory



**Johanna Nyffeler.**

Johanna Nyffeler is the manager of the printing centre during the IPhO. Being in this position, she hasn’t sleep very much during the past few days. “Normally I can get a couple of hours of sleep twice, either during the day or at night,” she says.

Usually a printing session before exams starts at midnight and lasts until four or eight in the morning. Her team consists of seven volunteers. They are incredibly fast. “We were always on time,” Johanna says. For the practical exams, they had to produce three envelopes for each of the 400 students. For the practical exams, it was even four envelopes per student. For both practical and theoretical exams, a total of 53,602 pages have been printed.

It does not, however, end there for Johanna and her team. “After printing we have to scan the exams,” she says. The scans are printed out twice, once for the markers and once for the leaders.

Johanna is doing a PhD in biology, focussing on human cell toxicology. In the little free time she has, she goes hiking.

*Atlant Bieri*

## In the press

**“Mind-athletes in the gym”**

*Neue Zürcher Zeitung*

**“Participants of the Physics Olympiad visit Liechtenstein”**

*Volksblatt Liechtenstein*

**“Lucern Participants at the Physics Olympiad”**

*Neue Luzerner Zeitung*

# The first female professor

**Emilie Kempin-Spyri became the first female professor at the University of Zurich in 1891. She has an incredible, yet almost forgotten life story.**

The courageous Emilie Kempin-Spyri (1853-1901), of whom only four pictures exist today, was far ahead of her time. Besides taking care of a family, she studied law at the University of Zurich. Emilie encountered a lot of resistance from society and from her conservative family.

Therefore, she turned down her dowry and started a new life with her modern husband Walter. After graduating, Emilie was not allowed to practice law in Switzerland by the Swiss constitution. She contested this law in front of the federal court and lost the argument. Due to this,



Emilie Kempin-Spyri.

Emilie moved to New York where she was highly acknowledged for her work for the first time in her life. Despite her success, she moved back to Switzerland to be with her family. The University of Zurich then allowed her to be a private lecturer for a few hours a week. At that employment rate, her financial difficulties forced her to move to Berlin, where she again faced rejection. Eventually, her life took a very sad turn. She ended up in a mental facility and died at the age of 48. It is still unknown whether she was really mentally ill.

Emilie Kempin-Spyri had to bear a lot of misery in her life. However, her modern mindset brought attention to gender inequality. Still, it took until 1983 until there was another female law professor at UZH.

*Céline Nauer*



Last but not least:

## Voting rights for women

**Switzerland is in many ways a very developed country, but the women only received the right to vote in 1971 and only in 1992 was it made a nationwide right.**

One of the reasons, is the political system of Switzerland. Only Swiss citizens (the men) could change the constitution. This had to be done by a vote. A vote is accepted when the majority of the cantons vote yes. This system normally helps prevent big areas (cities like Zurich) overruling the rural areas. Another problem in the constitution was that

every man needs to do military service to get full citizen rights. But Switzerland was the first country that gave the voter rights with a vote.

In the first Swiss constitution it read: "All people are the same," but the word women didn't appear and in the laws women were placed under the men. In the next 100 years, women had a lot of demonstrations, speeches, and petitions. Unfortunately, the world was interrupted the whole process. But in the 1900's, two cantons gave the voting right to the church.

In 1957, at a national vote, a small village in the mountains

let women vote, their reasoning being that the villagers are responsible for registration of the votes. The votes of the women were later declared invalid. This scandal was actually perfect, since it led to a lot of discussion. The same village also gave the right for communal votes even though the cantonal government forbade it.

An important event, in the international context, was the French revolution. Around 100 years (1893) later New Zealand introduced the right to vote to women. In the same period, two states in the USA also did. In the new century, the

Scandinavian region was first; Finland in 1906, Norway in 1913 and Denmark in 1915. Russia followed after the February Revolution in 1917. In 1918, Great Britain gave the right, since the women did an important job during the world war. In the next 30 years, a lot of countries followed. One of the last countries in western Europe was Liechtenstein in 1984. In the new millennium, Kuwait (2005) and Saudi Arabia (2015) followed.

*Björn Bauhofer*

# Self-defence against grabbing



Women are on average only 60% as strong as men, due to a lower muscle mass. With a little bit of physical know-how, you can still floor a male aggressor.

- 1 The opponent grabs your jacket or shirt with one hand.
- 2 With your opposite hand, grab the back of the opponent's hand.
- 3 Twist the opponent's hand around. At the same time push the opponent's hand towards his shoulder. This will cause him pain.
- 4 With the other hand, push down the opponent's elbow until he is on the ground.
- 5 Your opponent is on the ground. Take a victory selfie and then run away.

*Atlant Bieri and Kira Hussinger*

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## Write to us!

If you want to say something to the IPhO community, to Momentum or just tell everybody how you feel, write to us on [momentum@ipho2016.org](mailto:momentum@ipho2016.org) or drop us a note in our letter box at the editorial office.

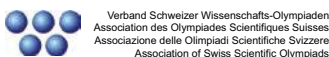
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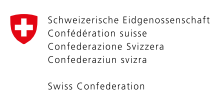
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**We are the IPhO 2016**  
Looking back in pictures.  
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How to enrol.  
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**Inspirational stories**  
New projects are born.  
Page 7

# MOMENTUM

Issue 8 – Zurich, July 17th 2016

# You are all winners



Image: *Roman Ernst*

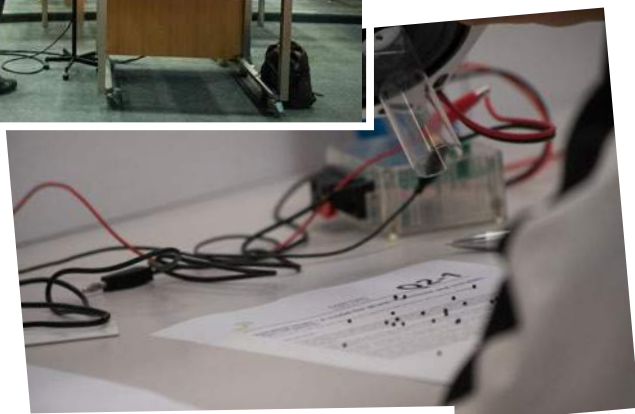
# Big Crunch

With only a few hours of the IPhO 2016 left – it's time to recap. This week was an intense experience for all of you. Learning so many new things, seeing new places, meeting people from all around the world with the same passion for physics, only begins to describe what this event will mean to each one of you. Whether you are celebrating a big success in the exams or still dwelling on how you could have done better, remember that you are the future of the scientific world. You have been chosen to represent your countries, take that with pride. So much awaits you. Beyond the excellence in physics that you have all demonstrated, we hope that you will continue to use your gift and remember the bigger picture. Strive towards a sustainable, conscious and tolerant tomorrow. Stay curious and never lose your inner child.

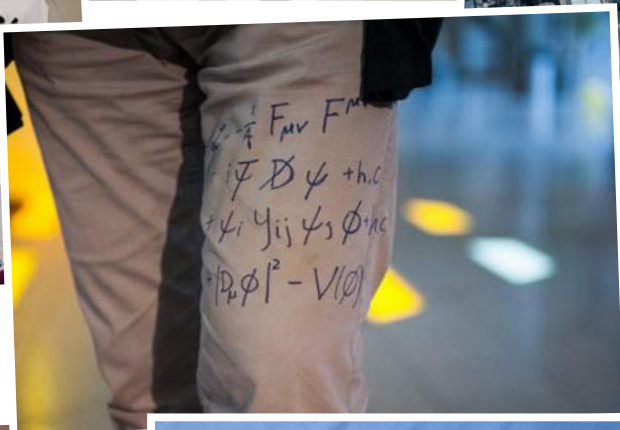
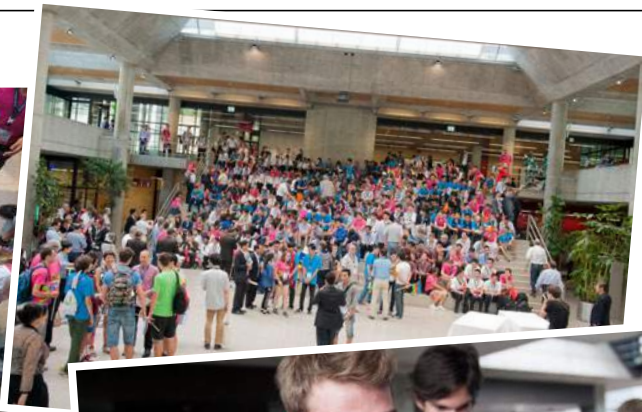
**May the force be with you!**

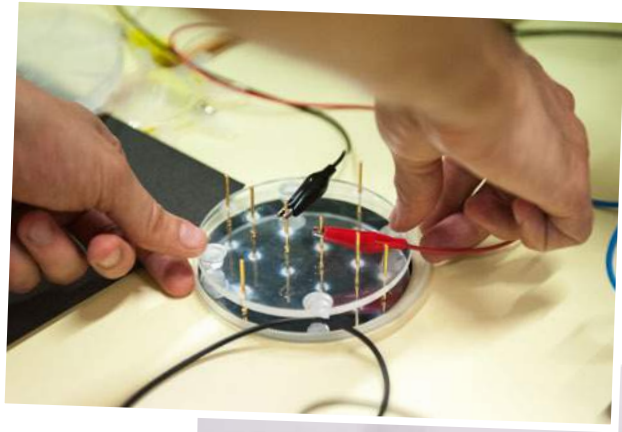
Your editorial team of MOMENTUM











## Studying at UZH

If you want to experience more of Switzerland and the University of Zurich there are two ways for international students.

### Enrol full time

You can enrol full time at UZH. International students pay a semester fee of 1220 CHF. If you are interested please contact the student advisory service of the institute where you want to study. More information on: [www.uzh.ch/en/studies/](http://www.uzh.ch/en/studies/)

Participate in an exchange program

UZH is part of a worldwide network of hundreds of other universities. Between them, there are student exchange agreements that allow you to study at UZH. More information: [www.int.uzh.ch](http://www.int.uzh.ch)

*Björn Bauhofer*  
*and Atlant Bieri*

# Where there's water, there's life

The Ghanaian team was featured on the Swiss news about their interest in purifying water in their home country. Now, the IPhO gave them the opportunity to visit Eawag, the Swiss Federal Institute of Aquatic Science and Technology.

Visiting the water plant on Tuesday was an astonishing experience for Atal from Team Ghana. “Here, even the toilet water is drinkable,” he says. This is very different from the current water situation in Ghana and Kwame, Jonas and Atal are all eager to contribute to a change.

On Thursday, Regula Meierhofer from Eawag provided the Ghanaians with some new ideas concerning water filtration. To Jonas, the most crucial one was the gravity-driven membrane filtration, which can be used to clean very polluted



Ghanaian team at Eawag.

water as well. It doesn't need any electricity and is easy to implement in lots of areas. “We collaborate with local universities a lot and having young, knowledgeable people in those countries is crucial,” Regula notes.

The Ghanaian team could profit a lot from this experience. “If these interesting

methods are improved they could change everything in Ghana. The challenge will lie in the funding though,” Jonas says. The Eawag offered the Ghanaians to consult with them for ideas and inputs concerning water issues in their country. Kwame's reaction was simply “it was awesome!”.

## “The students motivated our entire team”

**A geography Professor got a great boost of motivation for future work through the interaction with the IPhO students.**

While at the Irchel Campus, the students had the chance to visit the various institutes. Among them was the Institute of Geography. There they met Professor Jan Seibert. He showed them a model that simulates ground water flow.

The questions the students asked inspired the staff of Jan Seibert to work more intensively with such models.

“It was amazing how quick the students could analyse the flow of the groundwater and draw conclusions,” Seibert



At the Geography Institute.

said. The model looked like an aquarium filled with sand. It was then halfway filled with water, which flowed under the sand and exited on the other end.

The water table describes a downward sloping parabolic curve. “I asked the students why this is so. To my surprise all of them came up with the

correct answer in a very short time,” Seibert said. He is not used to such a quick response time. The emerging discussions and questions about the behaviour of the water table inspired him.

“My team and I are now more motivated to use this model more frequently while teaching,” Seibert said. For a long time he has planned to construct a second, slightly different one for more detailed measurements.

“Through the IPhO students, we got new impulses. We always wanted to make a second model and after this wonderful experience, we are actually going to make one,” Seibert said.

### Readers Letters

Dear MOMENTUM Team,

Thank you for your brilliant issues over the week. They amused my team very much.

Dear Students,

We hope you enjoyed your stay in Switzerland! I was a student at the last IPhO and an observer of Team Hong Kong during this IPhO. It'd be great if you consider joining IPhO in another role and feel excited (and stressful) in another way. It's a nice experience I'd recommend. Wish you safe flights back home!

Ching Yin (Brian) Lui

# Thank You



Have you ever wondered who is behind this big event, in whose hands all the strings are and who makes all the executive decisions? Who was crazy enough to say – YES, I will plan a complete International Physics Olympiad, something that has never been done before in Switzerland. Think about the programme that the students and leaders were offered, the accommodation, all the food, the events, and the excursions. This all started with one woman: Andrea Schneider. It is time to say thank you.

## Dear Andrea

More than one and a half years ago you decided to take on this large event and take on the challenge to be the General Manager of IPhO 2016. It was admirable to see with how much passion you started this project.

You found sponsors, brought together all sorts agencies and teams, attended music events to get inspired. You spoke to so many different people at the institute in order to understand their ideas, thoughts and visions and managed to unite all these people to work towards one common project, the IPhO 2016. Through you and your warm-heartedness, people that once only shared a building started to communicate. During this entire time, you also made sure that everyone's voice was heard and that everyone was taken care of.

Thank you for encouraging everyone, thank you for calming us down, thank you for supporting us, thank you for bearing us and last but not least, thank you for sharing your vision. You deserve an award of your own for working tirelessly towards IPhO 2016.

Your commitment to this project is second to none. We hope that your spirit will inspire future IPhOs.

Your team

Image: *Roman Ernst*

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## Last issue

You will find the last issue online tomorrow:  
<http://www.ipho2016.org/multimedia-and-mediacorner/printworks/>

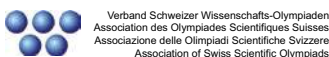
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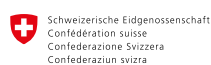
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Issue 9 – Zurich, July 18th 2016

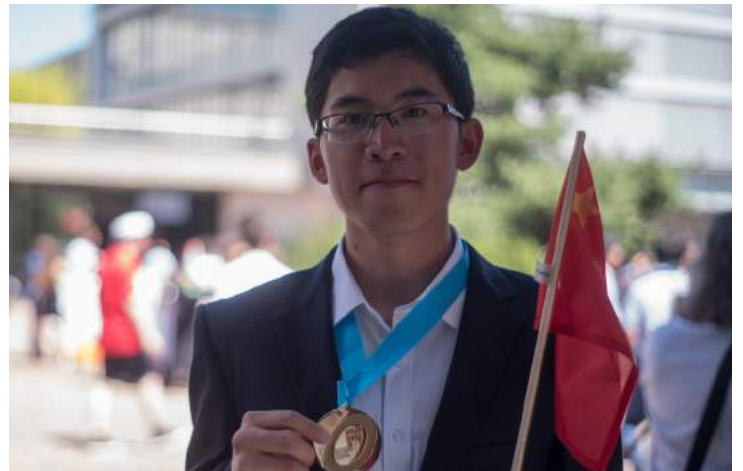
## Closing ceremony



Gold medal winners.

Images: Roman Ernst and Pascal Sommer







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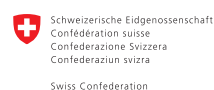
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