



# Talented researchers and professionals at #digitale21

Friday, April 13, 2018 | Lugano



SCHWEIZER JUGEND FORSCHT  
LA SCIENCE APPELLE LES JEUNES  
SCIENZA E GIOVENTÙ  
SCIENZA E GIUVNETETGNA



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OLYMPIADES DE LA SCIENCE  
OLIMPIADI DELLA SCIENZA

<b>Current profession</b>
Quality Data Scientist at Roche
<b>Curriculum</b>
Physicist with interest in applied mathematics and machine learning from Nax (VS)  2003: Bronze medal at the IPhO in Taipei Since 2003: Volunteer in the Association of the Swiss Physics Olympiad (three times Swiss Team Leader, responsible for the theory exams and training from 2011 to 2015) 2003-2008: MSc thesis in theoretical physics, ETH Zurich 2007-2008: MSc thesis in exchange at ANU, Canberra 2008-2013: PhD in mathematical physics, University of Geneva, Applications of the Batalin-Vilkovisky geometry: dualities and Chern-Simons theory with boundary 2014: self-study of data science and machine learning in preparation for a career in industry 2015-2016: member of the academic committee of the International Physics Olympiad (ipho2016.org) 2015-2017: Quantitative researcher in investment management 2017: self-study of deep learning on the TensorFlow and Keras frameworks, top 5% score in a Kaggle competition in computer vision Since 2018: Quality Data Scientist at Roche  Hobbies: ski touring, mountain biking, cycling, hiking, traveling
<b>Research field</b>
Mathematical aspects of QFT and string theory Quantitative finance Machine learning Applied statistics in the pharmaceutical industry
<b>Thoughts on digitalization and education: new educational models and creative implementations</b>
Based on my experience, I can share two thoughts, as a student and as a teacher: 1. A few selected online classes on coursera and fast.ai helped me develop my data science toolbox, but I think this would have been much more difficult without a formal university education. In particular, I found some subjects were treated only superficially and I had to go deeper with graduate textbooks. So, I feel MOOCS are a good solution for (part-time) continuing education, but they won't replace a standard university curriculum. 2. MOOCS were often praised for potential use in the developing world, but it seems they have so far fallen short of expectations. There has been a focus on tertiary education, although students in the developing world need a stronger basis in secondary education. I have seen hard-working students in Nepal, but their teachers are just not trained enough to bring them to pre-university level. Kids learn a lot of things by heart without really understanding them. Several platforms such as mathspace.co and edx.org/high-school could bridge this gap, and their deployment in these regions should be seriously considered. Language and human coaching seem to be the first two issues that need to be addressed in priority.
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<b>Current profession</b>
Postdoctoral fellow, IBM Research Zurich
<b>Curriculum</b>
<p>Michele qualified for the participated at the International Physics Olympiads in 2005. The participation helped him to shape his interest in the discipline. In 2011 he completed his curriculum with a MSc in Physics ETH, and in 2016 he graduated as Dr. sc. ETH Zurich with a thesis in Computational Physics. Since 2017 he is a postdoctoral fellow at IBM Research Zurich, in the group for Foundation of Cognitive Computing.</p> <p>Michele is a very active volunteer, engaged in various associations. He collaborated in the organization of various national and international orienteering competition. He's currently involved for the European Championships in May 2018.</p> <p>He is an active member of the Physics Olympiads and was involved in the organization of the IPhO 2016 in Zurich. The tool that he developed for the event had a large positive reception by all participants, and it is now being used in future events. For pursuing the later, he funded the OlyExams spin-off.</p> <p>Since 2016 Michele is the president of the Science Olympiad where he coordinates the collaboration between the Olympiads and the further development of the organization.</p>
<b>Research field</b>
<p>Initially, I studied highly-correlated lattice models. These systems cannot be solved analytically, hence numeric techniques are needed. I focused on a method called Density Matrix Renormalization Group which optimizes a very efficient ansatz wave function. I addressed the convergence challenges that occur in dilute systems and the exponential scaling when the method is used for higher-dimensional systems.</p> <p>Currently I switched to Cognitive Discovery challenge. This is the next revolution in knowledge consumption, which allows for deep technical search in the &gt;10'000 scientific articles published every month. We employ advance machine learning techniques to massively extract the content of documents and represent it in a knowledge graph to serve advanced queries.</p>
<b>Thoughts on digitalization and education: new educational models and creative implementations</b>
<ul style="list-style-type: none"><li>• Digital education should be a focus at school, since it is required for the future working life</li><li>• The use of simulation in science classes could make the abstract concepts more concrete and interactive</li><li>• The use of digital technologies makes the learning more global. Students also follow Youtube channels, online lectures, etc. The school should provide help educating in the selection of good/bad online material</li><li>• In primary schools, the use of online quiz with a class ranking after reading a book makes children challenge and helps the initial kick-off into reading. Similar strategies could be promoted in higher classes for more technical classes.</li><li>• Peer-learning: make students make educational videos for their colleagues</li></ul>
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**Jacqueline Mock**



<b>Current profession</b>
Master Student
<b>Curriculum</b>
<p>Education</p> <p>1999-2008 primary school in Klingnau, Switzerland</p> <p>2008-2012 Kantonsschule Wettingen including International Bacculaureate</p> <p>2012-2013 job as cabin crew member at Swiss International Airlines</p> <p>2013-2016 Bachelor studies in Interdisciplinary Sciences at ETH</p> <p>2016-2018 Master studies in Interdisciplinary Sciences at ETH</p> <p>Volunteer work</p> <p>Since 2011 volunteer for the Swiss Biology Olympiad</p> <p>Since 2013 member of the board of the Swiss Biology Olympiad</p> <p>Since 2014 member of the board of the Swiss Scientific Olympiads Association</p> <p>Since 2017 president of the Swiss Biology Olympiad</p>
<b>Research field</b>
Synthetic Biology
<b>Thoughts on digitalization and education: new educational models and creative implementations</b>
Digitalization provides novel means and more flexibility – podcasts instead of regular classes, communication during projects, novel, more interactive ways to study
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<b>Current profession</b>
Medical Student
<b>Curriculum</b>
2012-present University of Zurich, Medicine 2017 Master's thesis, Department of Plastic Surgery and Hand Surgery USZ 2012 Silver Medal International Biology Olympiad, Singapore 2012 Gold Medal Swiss Biology Olympiad 2006-2012 Gymnasium St. Antonius, Appenzell 2000-2006 Primary School, Appenzell Different side jobs in data management, IT and design.
<b>Research field</b>
Digital and automated recognition of skin diseases Computed communication with patients Cell counting methods on three dimensional scaffolds
<b>Thoughts on digitalization and education: new educational models and creative implementations</b>
Thoughts on digitalization and education: new educational models and creative implementations Digitalization as a way to support people in their lives and science to gain better outcome without absorbing their life time and quality. Importance to teach people/students with and about new and leading technologies. Digital knowledge transfer and motivational training of students by authentic interacting teaching chatbots as new educational models.
<b>Contact</b>
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<b>Current profession</b>
<ul style="list-style-type: none"> <li>- Student at the University of Zurich</li> <li>- Project-coordinator Zurich #cine (20%)</li> </ul>
<b>Curriculum</b>
<p>Birthday: 23.07.1998</p> <p><b>Education:</b></p> <ul style="list-style-type: none"> <li>- Primary School 2005-2011: Ilgen Zürichberg</li> <li>- Gymnasium 2011-2017: Realgymnasium Rämibühl, Matura with profile old languages</li> <li>- Current Education since autumn 2017: German Studies (major) and Economics (minor) at the University of Zurich</li> </ul> <p><b>Working Experience:</b></p> <ul style="list-style-type: none"> <li>- Tutor for younger students in German, Math and Latin: Since September 2015</li> <li>- Schülermanagerin–Intendanz, Project- and Eventmanagement at the Tonhalle-Gesellschaft Zürich: October 2016 – June 2017</li> <li>- Project-Coordinator #cine Zurich: Since November 2017</li> </ul> <p><b>Languages</b></p> <ul style="list-style-type: none"> <li>- German: first language</li> <li>- Croatian: other first language</li> <li>- English: fluent</li> <li>- French: good (Level B2)</li> </ul> <p><b>Interest</b></p> <ul style="list-style-type: none"> <li>- Literature: Reading and Writing (Poems, Essays etc.)</li> <li>- Theatre: As my final project in my last year in the Gymnasium I wrote a play and put it on stage. The premier took place in the Youth Center “Dynamo” in Zurich.</li> <li>- Music: Piano and Singing since 2004 (also participated in two Musical productions)</li> <li>- Sports: Ballet and Athletics</li> <li>- Social life and International Friendships are very important to me</li> </ul>
<b>Research field</b>
<p>Since I am still very young and in the middle of finding my own path, I love to observe group dynamics, especially in my own rather big circle of friends, where I can constantly find changes and adaptations in behaviour and performance.</p> <p>My observations then often turn into texts, articles and get me inspired for my writing projects. Last year I wrote and staged a play about youth, identity and social presentation in our present digitalized world.</p>
<b>Thoughts on digitalization and education: new educational models and creative implementations</b>
<p>I think it's incredibly important that educational models are adapted since we live in a modern time and our life-style wouldn't be the same without technology. Besides, why would it be beneficial to educate people like we did 200 years ago? Change is good!</p> <p>And especially for young people who knew how to handle a smartphone before they could even speak a word this adaptation is really crucial.</p> <p>Since we spend a lot of our free time on technical devices, we get very used to its simplicity and easiness. Reading a whole book after that or sitting straight and awake for hours, listening to someone holding a monologue in front of you seems almost impossible to me. Thus, it's very important to adapt educational models to the present time.</p> <p>I recognize this problem every day at university and would really wish that some things change. Even for a book lover like me it's hard to study straight out of a 600 pages long book and remember thousands of definitions by heart. To me it seems rather weird that educational methods are remaining quite the same for such a long time. I would definitely wish for a more creative, impulsive and original way.</p>
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## Current profession

I completed my Matura last summer and currently do my mandatory military service. Next autumn I will start studying interdisciplinary sciences with a focus on physics and chemistry at ETH Zürich.

## Curriculum

Coming from a family tightly connected to education – both of my parents are teachers –, the challenges both students and teachers face have been important for me from an early stage in my life. Going to school at a time of rapid technological change sure has been an interesting experience and for me, has also created awareness regarding the future of education. My major field of interest has always been natural sciences. During my time at Gymnasium, I did a variety of study weeks and internships ranging from mathematics at ETH to chemistry at BASF. My most recent project was my matura paper, for which I conducted research at the Empa (see publications). At the national competition I won the grade “excellent” and later on a gold medal at the GENIUS Olympiad in Oswego, New York. What this work in material science has taught me is that communicating the impacts of new developments is very important, but unfortunately a skill that is often neglected. After my studies at ETH, I plan going into academic research in the field of nanotechnology/nanochemistry.

## Research field

Not having started my studies yet, it would not be appropriate to talk about my “research field”. However, I can elaborate on my interests and in which directions these might take me in the future. In the last few years, I did various internships and study weeks (ETH, Empa, BASF, PSI) to further focus my interests. Having sustainability and education in mind during the selection of my studies, I decided that I want to go into academic research (physics/chemistry) in the future and connecting new developments (e.g. in the field of nanoscience) with their impact in society.

## Thoughts on digitalization and education: new educational models and creative implementations

Digitalization will induce changes in both the economy and the way we interact. In my opinion, it is not possible to stop this trend, but it is of utmost importance to be prepared and to cope with the upcoming shifts. As we have seen in the last technological and industrial revolutions, jobs will inevitably be destroyed. No one doubts that this transitional phase will be tough – also for our educational system. However, I am confident that digitalization will also be the building block for a variety of new professions. We are not capable of knowing exactly what the job of the future will look like or when precisely shifts will occur, but there are a few trends:

Education should not end before the 20th anniversary, but be a life-long journey. This will especially be important as the work process is transformed. We need to enable people to change profession during their lifetime in order to adapt to the new needs of our society. Highly entangled with this factor are interdisciplinary approaches: As the process of digitalization continues, both groups working together and people themselves will be faced with challenges from a variety of fields. In addition, it is also important to connect technological improvements with their social impact and create awareness. Without interdisciplinary knowledge, this won't be possible.

We ought not to forget that education is not only a preparation for the future job market, but also an important tool for character formation and a place to learn the values of our society. With all changes ahead of us, I sometimes fear that this might be neglected. In my opinion, digitalization does not oppose these principles, but might even complement it

## Contact

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Publications:

- Functional Cellulose Nanofiber Filters with Enhanced Flux for the Removal of Humic Acid by Adsorption  
<https://pubs.acs.org/doi/abs/10.1021/acssuschemeng.6b00698>

- Humic acid desorption from a positively charged nanocellulose surface.  
<https://www.ncbi.nlm.nih.gov/pubmed/28605713>

Article: <https://www.empa.ch/web/s604/nanocellulose-filter>

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<b>Current profession</b>
Student (MSc Physics, ETH Zurich)
<b>Curriculum</b>
Education: 2017 – present: MSc Physics, ETH Zurich 2014 – 2017: BSc Physics, ETH Zurich 2013: Swiss Maturity Certificate at Gymnasium Freudenberg, Zurich
Awards: - For a research project on the mathematics of Islamic mosaics: 2nd prize, 25th European Union Contest for Young Scientists (2013) Rating 'excellent' and Special Prize, 47th National Contest of Swiss Youth in Science (2013) 1st prize of the Youth Prize, Society of Natural Sciences of Zurich (2013) Special Prize awarded by the canton of Zurich (2013) - Highest GPA and best Maturity thesis of graduating class at Gymnasium Freudenberg, Zurich
Teaching: 2017 and 2018: Teaching assistant for Complex Analysis, ETH Zurich 2016 and 2017: Teaching assistant for Physics I & II exams preparation, ETH Zurich
Research projects and internships: 2017: Radio astronomy of the Milky Way, Institute for Astronomy, ETH Zurich 2016: Particle detection using scintillating fibres, Institute of Particle Physics, ETH Zurich 2014: Neutron diffraction studies of amyloid fibres, Institute Laue-Langevin (ILL), Grenoble, France 2014: Electron microscopy and synchrotron light studies of proteins, Paul Scherrer Institute (PSI), Switzerland
Outreach: - Board member of the Physics and Mathematics Student Society at ETH Zurich - Mentor for 1st year students and refugee students at ETH Zurich
<b>Research field</b>
Theoretical Physics
<b>Thoughts on digitalization and education: new educational models and creative implementations</b>
Despite having quite a conservative opinion on the use of digital tools in classrooms – a side effect of studying physics, where people still live in the Neolithic Age and use good old blackboards and chalk –, I see one particular aspect of digitalisation as an enormous opportunity: the dissemination of knowledge to a worldwide audience. Thanks to the Internet, education has almost become a sort of grassroots movement. Access to education is no longer the sole privilege of a select few. People of all sorts of backgrounds have gained access to education through digital media. What is more, the digital age does not only facilitate access to existing educational sources but also allows all of us to contribute to this ever-growing pool of knowledge. In that sense, digitalisation is an integral part of our modern democratic society.
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<b>Current profession</b>	
Co-founder u-blox AG, Executive Vice-President	
<b>Curriculum</b>	
<b>Born</b>	February 10, 1969
<b>Civilian Status</b>	Married, 3 children's (2008, 2010, 2012)
<b>Nationality</b>	Swiss Citizen
<b>Education</b>	
1990 – 1995	Master of Science in Electrical Engineering, ETH
1995 – 1997	Started PhD at ETH. Research work and collaboration in EU projects in the field of electronics packaging and production of high-complexity electronic systems.
1997	Co-Founder of u-blox. Stopped PhD in favor of u-blox
2000 / 2001	International Course in Management and Sales, Gustav Käser
2002 / 2003	Certified European Quality Systems Manager Education
2004	Finance for Executives, Insead Singapore
2007	Entrepreneurial Leadership Course, ETH Zurich / HSG St. Gallen
<b>Professional Career</b>	
1997 – 2011	Board Member und Management Team Member u-blox, CFO & EVP Production & Quality
2011 – today	Board Member und Management Team Member u-blox, EVP Production & Quality
<b>Research field</b>	
<ul style="list-style-type: none"><li>- Electronics for Internet of Things (GPS and communication systems (2G/3G/4G, BT, WiFi)</li><li>- Digital chips and modules</li></ul>	
<b>Thoughts on digitalization and education: new educational models and creative implementations</b>	
<ul style="list-style-type: none"><li>- Programming knowledge/thinking needed in the education</li><li>- Individual learning through digitalization</li><li>- Agile learning environment</li></ul>	
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