



EUROPEAN PHYSICAL SOCIETY

**HEP2015**

Education & Outreach

**First “Education & Outreach”  
Session at EPS-HEP**

David Barney & Uta Bilow

<https://indico.cern.ch/event/356420/session/7/#20150725>

# 4 Activities designed to help attendees

## Invited & submitted presentations



D. Kaplan on the importance of E&O

## Practice interviews with journalists



A. Blondel with Nature's Leonie Mueck

## Panel discussion on E&O Resources



>1 hour of audience conversation

## Physics Slam: EPS physics in 3 minutes



12 participants, mostly poster presenters

# Excellent Audience Participation



Photo: C. Nellist

Around **60 people** in the E&O talks



Photo: C. Nellist

Around **80 people** in the Physics Slam



Photo: C. Nellist

**Virtually no laptops open!**

# Personal highlights of the talks

## 1: David Kaplan



- Completely **engaging** presenter
- Showed that “**less is more**”: bare-bones slides
- Outtakes from **Particle Fever** – never before seen!

# Personal highlights of the talks

2: Clara Nellist



## Involving other communities through challenges and cooperation



Clara Nellist (LAL-Orsay)  
on behalf of the ATLAS Collaboration



EPS - HEP 2015 (22-29th July 2015), Vienna, Austria

- Used **Prezi!**
- ATLAS@home: **8<sup>th</sup> biggest computer resource in ATLAS!**
- “Higgs Machine Learning” competition: **professional software engineers** developed better algorithms for  $H \rightarrow \tau\tau$  analysis than ATLAS physicists!

# Personal highlights of the talks

## 3: Marzena Lapka



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### ATLAS and CMS Virtual Visits: Bringing Cutting Edge Science into the Classroom and Beyond

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Marzena Lapka,  
The CMS experiment, CERN  
On behalf of ATLAS and CMS Outreach Teams

EPS Conference, Vienna, Austria, 25 July 2015

- Focused on **key messages**; no “padding”
- **Being used** as-is by ATLAS
- Benefitted from **rehearsal** beforehand

# Personal highlights of the talks

4: Camila Rangel Smith



## Virtual research & learning communities in Latin America: The CEVAL2VE case

Camila Rangel Smith  
Uppsala University  
On behalf of the CEVALE2VE team



Vienna  
25th July 2015.

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- Showed the power of **young people** getting involved in E&O, with very **few resources**, and **making a difference**

# Highlights of the Panel Discussion

- **Personal touch** in E&O activities is the best (not e-learning, lectures, seminars)
- Interactions with high-school teachers **sometimes difficult**
- Many initiatives to address **gender imbalance** in HEP
- Use of **art** to interest people is growing, but needs adequate **follow-up**
- Presentations at the E&O session were **high quality** – better than other sessions!



# Lessons learned

- **Advertising!**
- **Engage** the audience
- People are interested in participating:  
**need encouragement & support**
- **“Physics Slam”**: great opportunity to tune presentation skills (but **needs more preparation**); **Poster presenters** are eager to do more!

# E&O Session Flyer

## Panel Discussion: E&O Resources



**Camila Rangel Smith**

Originally from Venezuela, Camila co-founded the CEVALEIVE project, a virtual research and learning community aiming to contribute to the scientific dissemination of fundamental physics and the generation of new researchers in high-energy physics in Venezuela.

**Ivan Melo**



Ivan became involved in the organization of the first International Particle Physics Masterclasses for high schools in 2005 and fell in love with the program. He became a national coordinator for Masterclasses in Slovakia and the organizer of a successful competition for high school students - Cascade project.



**Christine Kourkouvelis**

Christine has been active in E&O outreach for more than 25 years. She co-authored the HYDRATIA ATLAS event analysis tool and coordinated two EU outreach projects: LAP@CERN and Discover the COSMOS. She served as the co-coordinator of the ATLAS outreach committee and shared the EPS 2011 HEP outreach award.

**Claire Adam**



Like many ATLAS physicists, Claire started outreach activities as a guide for visits to CERN. The success of the 2013 open days was largely due to a number of fun activities like games and mini-lectures and it led Claire to be increasingly interested in citizen science and volunteer involvement via competition and cooperation.



**Michael Kobel**

Michael has led several education projects and sits on several advisory boards for education and outreach initiatives. Since 2005 Michael has been project leader of TPOGG's "International Masterclass" and, since 2010, project leader of the German "Network Talkshow", bringing basic science to the public.

**Angelos Alexopoulos**



Angelos joined the CERN E&O Group in 2012, contributing to the further development and impact of its work internationally. After three years, and having managed several EU projects, he joined the Communications Group of the CMS Experiment, where he designs and implements E&O programmes, including ATLAS.



## EUROPEAN PHYSICAL SOCIETY HEP2015 Education & Outreach

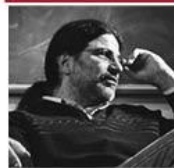
E&O is a key part of our work as particle physicists. It is our "end product": sharing our discoveries with policy makers, educators, students and the general public. Perhaps more importantly, participating in E&O will help you become a better scientist. This session aims at providing you with ideas and resources so that you too can participate in this rewarding and crucial activity.

- 09:00 David Kaplan  
*Stepping outside: a perspective on outreach*
- 09:20 Silke Zollinger  
*Accelerating public engagement*
- 09:35 Carlos Lacasta  
*Lecturing on silicon sensors using the Alibaba system*
- 09:50 Clara Nellist  
*Involving other communities through challenges & cooperation*
- 10:05 Marzena Lapka  
*ATLAS and CMS virtual visits*
- 10:20 Katharine Leney  
*Inspiring students I*
- 10:35 Kate Shaw  
*Outreaching part II*
- 10:50 Benoit Blossier  
*Adversity in life*



## EUROPEAN PHYSICAL SOCIETY HEP2015 Education & Outreach

### Speakers



**David Kaplan**

David is a particle physicist and professor at Johns Hopkins University (US). He researches possible extensions to the standard model, with emphasis on model building, phenomenology, and particle astrophysics. Kaplan has been named Outstanding Junior Investigator by the US Department of Energy, Kavli Priziers Fellow of the National Academy of Sciences, and Alfred P Sloan Fellow. He has also produced the 2014 documentary "Particle Fever", winner of prestigious awards. He has appeared in and consulted for science programs for National Geographic and the History Channel.

**Silke Zollinger**



Silke is Public Engagement Development Manager for the Science & Technology Facilities Council (UK). In her work she leads a long-term resource development plan for PE activities and resources, based around five key research themes: Inside the Atom, Big Data and Computing, Big Telescopes, Our Material World and Dark Sky. Silke also coordinates large scale exhibitions and the Art of Science project. To increase the impact through online engagement, Silke developed an efficient standardised web-content framework. Prior to this role, Silke was the Press & PR Officer at the Max Planck Institute for Physics (Munich).



**Carlos Lacasta**

Carlos is a Spanish particle detector physicist who began his career at CERN. He has participated in the design and construction of detectors since the era of the LEP collider, with the DELPHI Time of Flight detector, until the LHC collider era with the silicon microstrip tracker for ATLAS and its upgrade for the HL-LHC. He also works for the silicon pixel detector in the Belle II detector at the KEK collider in KEK, Japan. He is now the CTO of a small spin-off company in Valencia, Spain, offering custom solutions to the physics community.



**Clara Nellist**

Clara is a particle physicist working on the ATLAS experiment and is a passionate science communicator. Her research focuses on improvements to the ATLAS pixel detector and the study of the Higgs boson decay into two taus. Her outreach work focuses on high energy physics and improving the balance of women in science. After gaining her PhD at the University of Manchester (UK) she began a post-doctoral research position at the Laboratoire de l'Accélérateur Linéaire in France.



**Katharine Leney**

Katharine has been working on the ATLAS experiment since 2005. Following her PhD at the University of Liverpool (UK) she moved to the University of the Witwatersrand (South Africa) and then to the University College London. Her research interests include di-Higgs production in future final states, as an indication of physics beyond the Standard Model and for the long-term prospects of measuring the Higgs self-coupling. She participates in a wide range of outreach projects to communicate high energy physics to a wider audience, and to educational projects that encourage students to study physics.



**Marzena Lapka**

For nearly a decade Marzena has been Communications Officer for the CMS experiment. She began her career in Poland in sales and marketing. Her business background and an MBA from the University of Geneva, with a specialisation in Communication, Marketing and e-business, bring remarkable value to the environment she is now working in. Marzena develops strategies aimed at increasing awareness, appreciation and relevance of high-energy physics to all audiences.



**Kate Shaw**

Kate is a post-doctoral fellow at the Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, working on the ATLAS experiment. Kate's present research focuses on the physics of the Higgs boson and top quarks, as well as luminosity calibration. Along with her research Kate is the Outreach Co-ordinator for ATLAS. Kate is passionate about outreach, being an ICTP Ambassador promoting physics in less developed countries, with some focus on the Middle East, so that science may become the backbone to social and economic development.

**Benoit Blossier**



Benoit is an associate researcher at CNRS and a staff member of Laboratoire de Physique Théorique d'Orsay. He is an expert in numerical simulations of lattice QCD. Benoit is also involved in making the French school system as accessible as possible to students with disabilities, especially by improving teacher instruction. As he is visually impaired, he has an interesting opportunity to advocate the benefits of policies that favor an inclusive society to consider different points of view, from disabled people themselves as well as from people who think about disability. An interactive demonstration will follow his presentation, showing scientific material adapted to visually impaired pupils.



**Farid Ould-Saada**

At 13 Farid decided to become a physicist and opted for particle physics when he started university in Algeria. Farid lectures at Oslo University and is a physicist in the ATLAS Network. His current research includes searches for new physics and grid computing. He co-initiated NordGrid, being a chairperson since 2002, and is the leader of various related R&D and education projects. Farid is Norway's representative to IPPOG and developed the ATLAS "Z-path" Masterclass. This allows high school students to explore real LHC data. "This is a very exciting time. We are able to share real data, allowing individuals to participate in this process of discovery"

**Hans-Peter Bretz**



Hans-Peter studied Physics in Aachen (Germany) where he wrote his thesis about Anisotropy in Cosmic Rays with the Pierre Auger Observatory. He then moved to DESY in Zeuthen where he is working on his PhD thesis on atmospheric muon measurements with the IceCube experiment. Beside his PhD work, he takes part in the outreach activities of DESY and Network Teichweh and organizes experiments for high school students as well as Masterclasses based on data and analyses of the Pierre Auger Observatory and IceCube.



## EUROPEAN PHYSICAL SOCIETY HEP2015 Education & Outreach

# "Physics Slam" Flyer



## Physics Slam

Cutting-edge physics in 3 minutes!

27 July, 19:30-21:00, Room: Audimax

EUROPEAN PHYSICAL SOCIETY  
CONFERENCE ON HIGH ENERGY PHYSICS 2015

22 - 29 JULY 2015  
VIENNA, AUSTRIA



**Simon Vercaemer**

*Neutron identification in the SoLid experiment*

The SoLid experiment aims to make a short baseline neutrino oscillation measurement at the BR2 reactor in Belgium. Neutrinos are detected via inverse beta decay (IBD) on a proton, yielding a positron and a neutron. Crucial for IBD reconstruction is a highly efficient neutron ID.



**Erica Brondolin**

*CMS tracking challenges yesterday, today and tomorrow*

I will give an overview of the iterative track reconstruction used in CMS, one of the two general-purpose experiments at the LHC, with the performance obtained yesterday (Run1), recent tracking improvements for today (Run2), and some ideas (and foreseen results) for tomorrow (Phase2).



**Alex Birnkraut**

*b-flavour tagging in pp collisions (LHCb)*

Measurements of flavour oscillations and time-dependent CP asymmetries in neutral B meson systems require knowledge of the b quark flavour at production. This identification is performed by the Flavour Tagging



**Manfred Valentan**

*The Belle II Pixel Detector in its high radiation environment*

The Pixel Detector of the Belle II experiment has to operate in a hostile environment with high radiation levels. I will show you a few tricks how we make sure that our sensors deliver meaningful measurements nonetheless.



**Alexandra Oliveira**

*Study of HH production at CMS*

The production of pairs of Higgs bosons provides a direct handle on the structure of the Higgs field potential. While HH production within the SM is very small, several beyond-SM theories foresee an enhancement that can be already probed with the available data.



**Valerio Vagelli**

*Measurement of the cosmic ray e<sup>±</sup>-flux with the AMS experiment on the International Space Station*

Our planet is continuously bombarded by subatomic particles, like protons and electrons, coming from outer space: the "cosmic rays". Why are cosmic rays so many? Where do they originate? To answer these questions, and more, physicists launched the AMS experiment into space to study cosmic rays and the origin of the Universe.



**Linda Cremonesi**

*Status of the Hyper-Kamiokande Project*

Hyper-Kamiokande is a future experiment in Japan which will use almost one MegaTon of water under 1 km of rock to see the most elusive particles in the universe, neutrinos, and in turn discover the secrets of the asymmetry between matter and antimatter in the universe.



**Valerio Rossetti**

*Performance of the ATLAS calorimeters and commissioning for LHC Run-2*

The ATLAS experiment at the LHC is equipped with electromagnetic and hadronic liquid-argon (LAr) calorimeters and a hadronic scintillator-steel sampling calorimeter (TileCal) for measuring energy and direction of final state particles. We review the main commissioning and performance results of data-taking from 2009 until now.



**Badder Marzocchi**

*Precision electromagnetic calorimetry at the energy frontier: The CMS ECAL at the LHC Run 2*

The LHC Run 2 has recently begun, at energy of 13 TeV. After the successful Higgs boson discovery via the diphoton decays, the CMS electromagnetic calorimeter is at the forefront of the search for new physics and precision measurements. Its excellent performance relies on precision calibration maintained over time, despite severe irradiation conditions.



**Hideyuki Oide**

*Improvements to ATLAS track reconstruction for Run 2*

In this talk, improvements of ATLAS Inner Detector track reconstruction for the LHC Run2, and the early results using commissioning and the collision data will be shortly reviewed and discussed.



**Andrew Wharton**

*What's the matter with antimatter?*

At the time of the big bang, the universe contained almost equal amounts of matter and antimatter, however by about three minutes later almost all the antimatter had disappeared! In this talk I'll explain one way we might try to unravel this mystery, by understanding the breaking of the charge-parity symmetry in weak interactions.



**Suchita Kulkarni**

*The answer is 42!*

Several experiments are searching for the answers of fundamental questions and nature of laws of physics today. I will explain the important of exploiting the complementarity between different fields.