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MAY 2016



Dear partners,

at Queen Mary we have been dealing with the loose end from the very successful TEMI congress, once again a massive thanks to all the partners and contributors that made it such a friendly and engaging event. We have been involved in preparations for the transfer of the TEMI website to Queen Mary servers to ensure long term legacy of the online resources and have been working with Cnotinfor on finalising the TEMI app. We have also been in discussions about the final home for the TEMI mascot horse, and repairing the damage to the horse that was so well used in Leiden. We are currently working on submission of the periodic report to the European Commission. Preparations are underway for the final project meeting in Norway, where we will have the chance to finalise the legacy of the project and reflect on the lessons learned throughout TEMI.

We look forward to seeing you there in a few weeks!

Best regards

Peter and Dorothee

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## WHAT'S COOKING?

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### TEMI: Engaging in Primary Science

Anne O'Dwyer and Peter Childs developed and offered a workshop for primary teachers in Limerick on 18<sup>th</sup> April 2016. This two-hour after school workshop shared many of the ideas from the TEMI project and ideas for teaching Science in a suitable and accessible manner for the primary school teachers. In the workshop, the teachers were introduced to the TEMI project and website. A workbook of activities suitable for primary pupils was compiled for the participants. This resource



### TEMI at the Dortmund-Bremen-Symposium

The Dortmund-Bremen-Symposia on Chemistry and Science Education have a 35 year long tradition, originally started in Dortmund in 1981 by Hans-Jürgen Schmidt. In 2002, Ingo Eilks and Bernd Ralle took over the regular organization of the symposia and from 2004, the symposia became a close cooperation of the University of Bremen and TU Dortmund University. Every even year, about 100 experts in science education from all around the world come together to discuss important



### TEMI Israel at the Leiden congress

The Israeli delegation to the TEMI conference consisted of stakeholders from the Ministry of Education (Dorit Taitelbaum, Superintendent for Chemistry of the Israeli Ministry of Education and Nurit Nir, R&D Division of the Israeli Ministry of Education), TEMI teachers from all over the country and the Weizmann TEMI team. The Weizmann group presented three activities: The "Mystery Suite" took place in the beautiful dining facility. Workshop participants enjoyed a

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contained a detailed description of the engaging activities, the following possible steps to scaffold the learners' exploration and investigation as well as some explanatory support material for the teachers. The two-hour workshop was interactive and hands-on. Teachers were given the opportunity to participate in the engaging mysteries. They worked together in pairs and in small groups to experience the science lesson as learners. The topics that were explored included gravity, air as force, the existence of atmospheric pressure, sinking and floating and mixing liquids.

The four pillars of the *TEMI WAY of teaching* are transferable and applicable to the primary classroom: the use of mysteries, the 5E structure of the lesson, teaching using showmanship and the Gradual Release of Responsibility (GRR). The aims of the primary Science curriculum in Ireland merit the values of TEMI project "*...to foster the child's natural curiosity, so encouraging independent enquiry and creative action*" (Department of Education and Science, 1999)

issues of research and the advancement of science education. This year the conference takes place from May 26 to 28 and the chosen theme is 'Science Education Research and Practical Work'. We expect people from about 20 different countries to come to the IBZ at TU Dortmund University, among them guests from Australia, Brazil, Costa Rica, USA, China, Malaysia, Syria, Indonesia, Israel and many European countries. TEMI is presented with a whole series of short communications and posters by the TEMI partners from Vienna, Prague and Bremen.

short 15 minute date with an activity developed and led by TEMI teachers. Participants' engagement and enjoyment was evident, as participants did not want to leave their date and move to the next one. Our TEMI teachers highly enjoyed interacting with and learning from the multinational audience.

The "synergetic link between Showmanship and Inquiry" workshop highlighted how showmanship can build student engagement that can be channelled to conducting inquiry. We were assured by Paul McCrory, who gave the keynote lecture the previous day, that the ideas presented were fully aligned with his lecture. The Weizmann booth in the "Science fair" boasted some of our flagship demonstrations such as the "magic sand", the "lovemeter" and the disappearing ink. The fair was an opportunity to meet conference participants up close and personal and we felt that science mysteries bridged gaps between cultures and nations.

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### Publications, conferences and some Progress in Prague

In Prague, we are working hard on the legacy of the TEMI project. First of all, we are very much looking forward to the Czech version of the Book of Scientific Mysteries, which should come out soon. What's more, we are planning a national conference for science teachers both with experience with TEMI and new ones. This conference will take place in June in north Bohemia and we will look at new ways how to engage students and how to develop scientific mysteries. Also, we are working on a completely new national project called Progress. The Progress project is focused on scientific learning and



### Teaching the TEMI Way. The Teacher's experience

(an excerpt of an article by Diana Bracewell, science teacher, CPD leader and creative artist, that will be fully published on the TEMI website)

I left Leiden feeling inspired, excited and intrigued. Intrigued because I still had unresolved questions, the latest being why does the ring falling down a loop of chain end up entangled? (I think I worked out the answer as being linked to angular momentum...) I felt excited about telling others about what I had experienced. Teaching the TEMI Way works and is an excellent addition to the teaching tool box. TEMI manages to put into words some of the best learning experiences I have had,



### Eventful months for TEMI Norway

April was an eventful month for the TEMI team in Norway, with the arranging of a national TEMI-conference where approximately 400 teachers participated. The conference took place at the university campus, as a part of a TEMI-legacy initiative. TEMI methodology was a key ingredient within the conferences message, with a special focus on the 5E-model, mysteries and showmanship. Several of the teachers reported that the conference was useful and engaging, and that they hoped to be invited to a similar conference next year. They especially liked the conference because it acts as an arena where they could share experiences; create science teacher

teaching and we will try to use all we've learned from TEMI and to develop its methodology even further. We hope this project will make good use of the results of the TEMI project. We are also very much looking forward to the final project meeting in Norway - let's exchange some good practice again together!

and explains how and why they worked. Better than that we now have a blueprint for creating inspirational learning experiences, based on real teaching and valid research. I feel other participants shared this sentiment, with the feedback boards full of positive experiences and ideas moving forward. Social media was also buzzing with various TEMI hashtags as people enthused about their next TEMI steps. My next TEMI steps were to, use my new mug (tick) and write up my experiences, trying to capture the essence of TEMI to hopefully get others interested in finding out more. So I will leave you with this cliff-hanger, this mystery: What are your TEMI next steps? Where will you let TEMI take you?

networks, as well as participating in activities for the classroom. Julie Jordan from Sheffield University paid us a kind visit in the beginning of April, and this was a good opportunity to show her our teacher education. We got the chance to discuss the teacher education in both our countries, and Julie met the dean of Department and participated in some of the science lectures. The final TEMI will take place in Norway 22<sup>nd</sup>-24<sup>th</sup> of June. During the time of the meeting, people in Norway will be celebrating St John's Eve, and we hope to show you this and lots more of our country's interesting culture, history and nature.

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### Theatre as a means for reflection

The final conference of the TEMI project in Leiden, the Netherlands, was a real show in which the spaces have continuously transformed into a stage. The workshop sessions, but also snacks and dinner that brought together all the participants, were characterized by an absolutely magical atmosphere full of unusual details. The Milan team has contributed to this event so full of playfulness and joy with "Light Mystery," a play written and performed specifically for the TEMI project by Marina Carpineti, Marco Giliberti and Nicola Ludwig and directed by Emiliano Bronzino. On stage, an alleged alien, a university professor and a



### Spectacular science: controversial?

After the conclusion of the Teaching the TEMI way congress, that has been an amazing opportunity to share experiences among everyone interested in TEMI, Sterrenlab is currently busy disseminating the TEMI resources and create links with other communities reflecting on the role of science in our society. Together with the University of Leiden and Traces, we participated to the PCST conference in Istanbul – addressed to science communicators – and we will deliver a workshop at ECSITE, the biggest European conference of science museums, in collaboration with the Weizmann Institute and Traces. We report below



### Focus on "Genie in a bottle" activity

The UNIVIE-team contributed an article as well as teaching material referring to the mystery "Genie in a bottle" to the special issue of "Chemistry in Action!", which was published in May 2016. The article with the title "The 'Austrian Way' of TEMI" describes and reflects procedures and experiences from the workshops. From 30<sup>th</sup> of March until 1<sup>st</sup> of April the further education days of the Austrian association of chemistry teachers took place in Linz. The TEMI team of the University of Vienna offered two workshops relating to the mysteries "Genie in a bottle" and "The mysterious bottle". The further professional development course

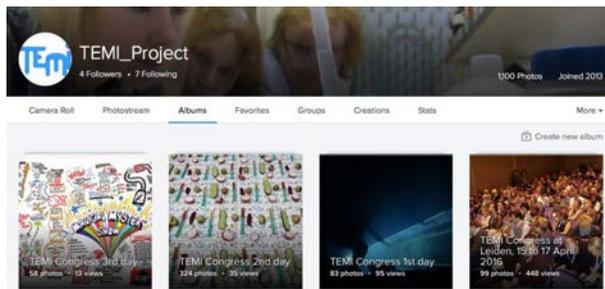
teacher meet by chance along with a class of secondary school and through a series of fun and engaging stories and experimental adventures they explore ideas about the properties of light, motion, gravity, and the electromagnetic spectrum. The performance was engaging for the audience, but it was also a critical analysis of traditional teaching methods and pedagogy where the teacher explains topics and provides answers to questions the students have never dreamed of doing. In short, it depicts the anti-TEMI way of teaching! And for those who love theatre, there was also a chance to act. In fact, the following day, the Milan team has appointed Flavio Albanese, professional actor and playwright, to run a laboratory in which, on the suggestion of "Leonardo's Codes", taken as example of creativity and love for knowledge, the participants were able to experience some theoretical and practical know-how that gives texture and form to the actor, the acting and the staging.

the abstract of the workshop.

Theatrical plays, magic shows, stand-up comedies, mystery games... are tools used to engage the public in science centres, but also in schools and research institutes. On the one hand, they represent an effective engagement tool, in particular for underserved audiences. On the other hand, they risk to reflect an old-fashioned view of communication, a way to "make the pill easier to swallow", or to take attention away from the social implications of science. Projects like TEMI and PERFORM are exploring spectacular science in a Responsible Research and Innovation perspective. They are developing an articulated methodology based on the use of mysteries and performing arts in different learning environments, such as science centres (PERFORM) and the classroom (TEMI). Considerations from a science centre explainer, a scientist and a teacher will spark a discussion on the controversial use of spectacular science for public engagement. The issue is not new, but needs a continuous update to overcome stereotypes, avoid disconnecting science learning from the real world, and stimulate a dialogue between science centres and other relevant actors such as teachers and researchers.

called "Mysteries in Practice", which started in March 2016, continues and a poster with the title "Enquiry-based Science Education in Austrian Teacher Professional Development Courses" will be presented at the 23<sup>rd</sup> Symposium on Chemistry and Science Education from May 26-28 in Dortmund, Germany. The online magazine UNI:VIE of the University of Vienna published an article which describes the activities of the Austrian TEMI team regarding the implementation of enquiry-based learning in schools:  
<http://medienportal.univie.ac.at/uniview/forschung/detailansicht/artikel/forschung-in-der-schule/>

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### The TEMI webpage and photos

Preparing for the legacy of the TEMI project, the project website will migrate to a new server at Queen Mary University of London between 24 and 26 of May. During these days it may be down for some time. Please don't upload news or other things during these days.

All the great photos from the TEMI congress are available on Flickr:

<https://www.flickr.com/photos/107822507@N08/albums>



### TEMI at CAP 2016 Conference

The Leiden University team presented *TEMI: An enquiry-based approach to astronomy education* during the Communicating Astronomy with the Public 2016 (CAP 2016) conference that took place from 16-20 May in Medellin, Colombia. CAP2016 was organized by Commission C2 of the International Astronomical Union (IAU), to promote the exchange of ideas and best practices in the field of astronomy and space communication, as well as informal education for 150 of the world's experts in this field. During the talk, the TEMI methodology, including the four innovations were introduced, as well as the TEMI guidebook and Book of Mysteries, including all



### It could be worse: it could be raining

The Leiden Congress did not only gather teachers together, but also policy makers, science education project managers or science centre professionals. During an epic workshop called "It could be worse: it could be raining", TRACES set up an investigation in the science education projects worst failures, nightmares and disasters. The congress participants shared the most emblematic failures they experienced and reflected on them through an unusual « Disaster auction ». Their input was used to assess the recurrent challenges of such projects, and will serve as a tool to evaluate where TEMI stands: which pitfalls did TEMI avoid, and which ones did it fall in? Can

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astronomy mysteries developed by the TEMI  
Leiden team.

failures, challenges and shameful memories  
become a new metric for science education  
project evaluation? These can at least give us a  
better understanding of the complexity of such  
collaborative projects.