



# GIREP Newsletter

ISSN 2307-0366

Editor: Claudia Haagen – University of Vienna, Austrian Educational Competence Centre

## EDITOR'S SECTION

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Dear Colleagues,

Electronic GIREP newsletters are a service to active members of GIREP as well as to everybody interested in GIREP. Since summer 2012 all newsletters are available for everyone on the GIREP homepage. Following the tradition, we will announce the publishing of a new newsletter via e-mail for all members and colleagues subscribed at the GIREP mailing list.

Since February 2013 the GIREP newsletter has been recorded permanently as online publication in the ISSN register as follows:

**ISSN 2307-0366**

**Key title: GIREP newsletter**

**Abbreviated key title: GIREP newsl.**

Following the two stars and a wish strategy, I repeat and emphasise **my invitation to you to contribute to the E-Newsletter** (upcoming events, announcements, news from your countries, etc.). The deadline for messages to be included in the next issue of this newsletter **-is May 30, 2014.**

I am looking forward to your contributions. A happy 2014!

Editor of GIREP Newsletter, Claudia Haagen

## GIREP Committee

During the last months the GIREP committee, especially our president Marisa Michelini, was engaged in promoting GIREP policy goals. This newsletter will provide a rough overview of already implemented goals and future milestones.

The next GIREP committee meetings takes place in Udine in April, 2014 and in Palermo in July, 2014.

The **biannual GIREP assembly meeting** takes place during the GIREP conference in Sicily, July 9, 4:30-6:30pm.

## New Co-operations within the PER & PE Community

In our last GIREP newsletter (2013(2)) we reported about the signature of agreements on co-operations between GIREP and IACPE, CIAEF and LAPEN. These now formalized co-operations aim at the exchange of Newsletters, Web-sites and mutual reports at conferences. Starting from this big achievement, strategies for even closer co-operation are being set up.

Marisa Michelini, president of GIREP, was in the meantime successful in concluding further co-operation agreements with EPS PED, AAPT, ISEF, and MPTL.

Below you can find copies of the agreements between GIREP and EPS PED & GIREP:



### EPS PED – GIREP Agreement

The Physics Education Division of European Physical Society (EPS PED) and the Groupe International de Recherche sur l'Enseignement de la Physique (GIREP) agree to cooperate in any way possible, in particular, exchanging information through websites and newsletters and sending the informational posters prepared for the organizations' conferences to one another.

Signed by



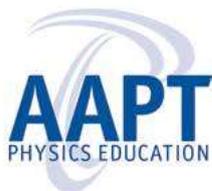
Gorazd Planinšič, Chair of EPS PED



Marisa Michelini, President of GIREP

**Agreement between EPS PED & GIREP**

Below you can find the agreement between GIREP and AAPT, which was approved by the AAPT Board during the AAPT Winter Meeting in Orlando:



#### AAPT – GIREP Agreement

The cooperation statement below was passed by the AAPT Committee on International Physics Education at its meeting in Portland, July 2013, by the GIREP Committee, “executive organ” of GIREP, at its meeting in Prague, August 2013, and by the AAPT Executive Board at its meeting in Orlando, FL, January 2014.

Cooperative Agreement:

The American Association of Physics Teachers (AAPT) and the Groupe International de Recherche sur l'Enseignement de la Physique (GIREP) agree to cooperate to promote physics education and physics education research. In particular, the AAPT and GIREP will exchange information through websites and newsletters, send informational posters about each organization's conferences to each other and offer member registration rates at their conferences to members of either organization. Thus, GIREP members will be able to attend AAPT conferences at AAPT member rates and vice versa.

Signed by

A handwritten signature in black ink that reads 'Steven Iona'.

Steven Iona, AAPT President

A handwritten signature in black ink that reads 'Marisa Michelini'.

Marisa Michelini, President of GIREP

January 22, 2014

**Agreement between AAPT & GIREP**

Below you can find copy of the agreement between GIREP and iSER:




**Mutual Agreement of Cooperation between iSER and GIREP**

International Society of Educational Research (iSER) and the Groupe International de Recherche sur l'Enseignement de la Physique (GIREP) agree to cooperate in every possible way.

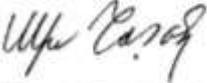
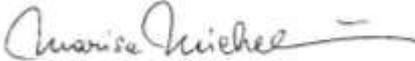
In particular, iSER and GIREP will

- exchange reciprocal iSER and GIREP conference information through their websites and newsletters, and/or emails to their members
- send informational posters and/or flyers about their organizations and/or conferences to each other
- offer member registration rates at their conferences to members of either organization. Thus, GIREP members will be able to attend iSER conferences at iSER member rates and vice versa.
- maintain open communication about relevant activities and events
- offer to develop an exchange of conference slots (in the form of a symposium, workshop, or a complete session of papers) at each other's conferences
- whenever possible and/or deemed appropriate by both parties may develop a short-term or long-term plan for mutual support for junior researchers.

iSER and GIREP authorized officers understand that based on these premises other ways of cooperation may also be developed in the future.

This Mutual Agreement will be approved for three years beginning with the date of signature of representatives of both organizations. It will be extended automatically for another two years if not terminated six months before the end of the official term.

IN WITNESS WHEREOF, the parties have executed this Mutual Agreement as of the date indicated.

<p><b>iSER – International Society of Educational Research</b></p>  <p>Mehmet Fatih TAŞAR President</p> <p>January 14, 2014</p>	<p><b>GIREP – Groupe International de Recherche sur l'Enseignement de la Physique</b></p>  <p>Marisa Michelini President</p> <p>January 14, 2014</p>
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Agreement between iSER & GIREP

Below you can find content of the agreement between **GIREP and MPTL**:

**MPTL** Multimedia in Physics Teaching and Learning



### **MPTL- GIREP Collaboration Agreement**

The Multimedia in Physics Teaching and Learning group and GIREP agree to cooperate. In particular, exchanging information through websites and newsletters and sending information posters for the organization's conferences to one another. Both organizations agree also to join every second year for their summer conferences and to offer membership fee to the other organization's members for all meetings.

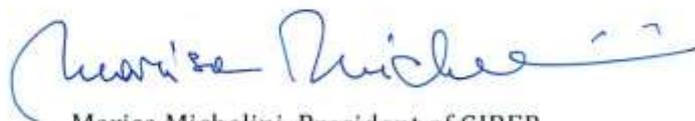
Signed by



Raimund Girwidz (President of MPTL)



Francisco Esquembre (President of MPTL)



Marisa Michelini, President of GIREP

Madrid, Spain, September 12<sup>th</sup>, 2013.

## GIREP present at Conferences of Co-operation Partners

One integral part of cooperations between originations on Physics and Science Education & Research are mutual participations at conferences. Thanks to the support of numerous very active GIREP members, GIREP was represented at several conferences. Below you can find reports on some conference activities.

### MPTL Conference in Madrid, September 2013

(by F. Esquembre, S. Dormido & R. Girwitz)

MPTL conferences are essential for the work of this organization. According to the abbreviation MPTL works on Multimedia Physics Teaching and Learning.

The MPTL-conferences provide an international forum for the discussion of recent developments and advances and ensure that the knowledge and experience in new methods and approaches are shared throughout the physics community. Innovations but also challenges for teaching and learning physics with modern media are discussed. Material for primary schools is included as well as topics for university.

The 18<sup>th</sup> international conference took place in Madrid from September 10<sup>th</sup> to September 14<sup>th</sup> 2013, hosted and organized by the National Distance Education University (UNED). Reviewed by an international advisory board, only 56 proposals were admitted, presented and discussed in 12 oral sessions. Furthermore, 1 panel discussion was organized, 3 plenary lectures, and 1 invited lecture were given. Among other topics, especially ways how to integrate modern tablets and smartphones, and how to adapt and produce software for these devices were discussed, as well as questions about adequate implementations in E-Learning platforms. The discussions provoked numerous challenging questions that we need to keep in mind in the near future.

The annual report on multimedia software is always an important presentation. Over the year multimedia applications are collected by Bruce Mason, also in cooperation with MERLOT, and evaluated by members of the advisory board. The topic of this year was about "waves and sound". New trends and the resources as such are of special interest, and it is also intended to give best practice examples how to apply multimedia. Thus, the outcome of the review process has two merits. First, there are recommended websites that can enrich lectures on physics. Second, methods and best practice examples are collected, showing how to use multimedia for learning.

Based on this review for this year, the first MPTL Excellence Award for a Multimedia Resource was given to KYLE FORINASH for his online e-book about sound and the interactive tutorials about waves. From now on every year the award will be associated with an invitation for a plenary talk or a focused session at the MPTL-conference. Next years' evaluation will be on Quantum Physics and Quantum Mechanics.

Based on corresponding intentions an agreement with the International Research Group on Physics Teaching GIREP about a more intensive collaboration was arranged. The following terms were signed:

"The Multimedia in Physics Teaching and Learning group and GIREP agree to cooperate. In particular, exchanging information through websites and newsletters and sending information posters for the organization's conferences to one another. Both organizations agree also to join every second year for their summer conferences and to offer membership fee to the other organization's members for all meetings."

As already done in former years this conference was supported by the European Physical Society (EPS), and we highly appreciate the financial and mental assistance for the annual conferences. Especially we have to thank the organizing team for the exciting days in Madrid.

The next MPTL-meeting will be in Palermo (July, 7-12, 2014), and we are looking forward for this joined conference with GIREP.

## ESERA Conference in Cyprus, 2013

GIREP was represented in ESERA with an invited symposium: **Content-focused research for innovation in teaching / learning electromagnetism: approaches from GIREP community**

**Organiser(s):** Marisa Michelini & Paula Heron

**Chairperson:** Marisa Michelini

**Discussant:** Ian Lawrence

### Participants:

- **Gesche Pospiech, Marcus Hartlapp:** Crucial aspects of the mathematics-physics relationship in electromagnetism
- **Jenaro Guisasola:** Teaching-learning intervention module on electromagnetism at University: The case of field concept
- **Paula Heron, Ryan Hazelton:** Interpreting students' errors: Examples from electrostatics
- **Willem Peeters:** PCK in pedagogical coaching: questions and needs of teachers and consequent approaches
- **Marisa Michelini, Lorenzo Santi, Alberto Stefanel, Stefano Vercellati:** Building vertical paths in exploring magnetic phenomena developing formal thinking

### Report

The symposium, organized by the Groupe International de Recherche sur l'Enseignement de la Physique (GIREP), presented a range of approaches to content-focused research and research-based instruction on a single topic area: electromagnetism. The interpretative ideas developed by physicists to account for electromagnetic phenomena and the mathematical formalism used to represent these ideas make the subject ideal for exploring issues in learning and teaching that include the impact of students' prior real-world experiences, their understanding of the nature of the interpretative process, and their ability to relate formalism to phenomena. Electromagnetism also offers the opportunity to explore the relationships between macroscopic and microscopic models, as well as the "field" concept. Thus the research findings presented will have implications that go beyond the nominal content of electricity and magnetism.

The symposium addressed learning among primary, secondary and university students pursuing careers as engineers or scientists, and pre-service teachers. The themes will include the study of conceptual knots related to the content, the implications for teacher training, and the persistence of difficulties at the university level. Instructional approaches motivated by research findings were discussed. The perspectives are vary with regard to research questions, methods, interpretative frameworks, and the role of specific research findings in driving educational innovation.

In this paper are reported the following different contributions on content research in electromagnetisms from primary to university teaching/learning and for teacher professional development are accrued under the GIREP framework: Building vertical paths in exploring magnetic phenomena developing formal thinking (Marisa Michelini, Lorenzo Santi, Alberto Stefanel, Stefano Vercellati), Crucial aspects of the mathematics-physics relationship in electromagnetism (Gesche Pospiech, Marcus Hartlapp), PCK in pedagogical coaching: questions and needs of teachers and consequent approaches (Wim Peeters), Interpreting students' errors: Examples from electrostatics (Paula Heron, Ryan Hazelton), Teaching-learning intervention module on electromagnetism at University: The case of field concept (Jenaro Guisasola and Kristina Zuza).

## GIREP Thematic Groups (GTG)

GIREP Thematic Groups (GTG) are focused communities of GIREP members interested in contributing their expertise in particular facets of physics education, from working with children, through undergraduate work, to teacher training. The aim of the GTG is to stay in touch as critical friends, exchanging thoughts, materials, and findings from the varied contexts in which we work and contribute to GIREP activities on the topic of GTG. The leader of a GTG takes responsibility for involving and organising the participation of active colleagues in the GTG in the conferences: offering an activity (workshop or poster-symposium, symposium) in each Conference or Seminar of GIREP. GTGs come into existence when someone offers to run one, and writes to the GIREP committee. If the negotiations go well the GTG is announced in the newsletter.

### Already constituted GIREP Thematic Groups

#### **GTG on Energy**

- Group Leader: Paula Heron (University of Washington, USA)
- Contact: [pheron@phys.washington.edu](mailto:pheron@phys.washington.edu)

#### **GTG Mathematics in Physics Education**

- Group Leader: Gesche Pospiech (Technical University of Dresden, Germany)
- Contact: [gesche.pospiech@tu-dresden.de](mailto:gesche.pospiech@tu-dresden.de)

#### **Physics Education Research at University (PERU)**

- Group Leader: Jenaro Guisasola (University of the Basque Country, Spain)
- Contact: [jenaro.guisasola@ehu.es](mailto:jenaro.guisasola@ehu.es)

## Newly established GIREP Thematic Groups

### GTG on Evaluation of Learning and Instruction (ELI)

(GENARO ZAVALA, Tecnológico de Monterrey, Mexico)

The Evaluation of Learning and Instruction (ELI) is a thematic group within GIREP, formed by physics education researchers and teachers who are working on methods and techniques to evaluate students' understanding and the process of instruction. The main goal of ELI is to collaborate with and disseminate research methods for evaluation among the members of GIREP.

#### **Objectives:**

- To encourage the implementation of educational cycles to improve learning by the use of innovative educational materials, instructional design and evaluation
- To disseminate methods and techniques for evaluation of learning and instruction
- To enhance the status of evaluation of learning and instruction within the physics community

#### **The objectives of ELI will be accomplished by the following actions:**

- Research on students' understanding by using innovative methods and techniques. The methods and techniques could be those that are developed within the physics education research community or those imported from other education research communities.
- Research on innovative educational methods for instruction. Instruction can be improved by implementing educational methods which have been developed by research.
- Research on methods for evaluation of learning and instruction. Any improvement in learning can be measured by methods explicitly developed for that purpose. Since the instructor is a fundamental part of education, research on the evaluation of instruction is vital.
- Dissemination of evaluation methods by GIREP workshops. ELI organizes workshops during the GIREP conferences and in-between conferences to train teachers and physics education researchers on methods and techniques to evaluate learning and instruction.
- Dissemination of research results of evaluation techniques based on research by publications and presentations in GIREP meetings. ELI encourages GIREP members to publish research results on recognized journals. In addition, ELI organizes sessions in GIREP conferences to present those research results.
- Foster collaboration in ELI among GIREP members by virtual / face to face meetings. Collaboration is an inherent activity for the organization. ELI organizes seminars and meetings to encourage that collaboration.

For further information, please email to: [genaro.zavala@itesm.mx](mailto:genaro.zavala@itesm.mx)

## GTG on Physics Preparation of Teachers in Grades K-6

(STAMATIS VOKOS, Seattle Pacific University, USA)

This GIREP Thematic Group responds to an international need for promoting the deep professional preparation of teachers to teach physics effectively in grades K-6. Weak preparation of elementary school teachers perpetuates a situation in which physics tends to be taught, if at all, as a list of facts and mathematical formulas to be memorized rather than as a set of coherent exciting ideas that are relevant to a child's life and community. Compared to the situation in mathematics education research, research on the learning and teaching of physics has concentrated more on university and high school physics than physics for younger students and their educators.

The Thematic Group invites participation by anyone who has an interest in research results in this area. Initial axes of common interest include the following:

- 1) What is known about the appropriate preparation of K-6 teachers to teach physics effectively? What is the current status of actual preparation in different countries? What are promising strategies to overcome identified obstacles?
- 2) What is the role of international societies (including GIREP) in promoting policy changes that are guided by research results in this area?
- 3) What is the role of physics departments and practicing physicists?
- 4) How can physics learning at this level be promoted through intentional connections between formal and informal educational environments (e.g., museums)?

The Thematic Group will support activities that foster communication and exchange among professionals with an interest in this area, including the organization of an Invited Symposium at the GIREP biannual Conference and actions associated with the corresponding proceedings.

GIREP members are invited to email [yokos@spu.edu](mailto:yokos@spu.edu) to express their interest in participating and to share their ideas about these issues.

## Activities of GTGs at the GIREP Conference in Sicily in July 2014

### GTG on Energy

**INVITATION TO THE GTG ENERGY WORKSHOP AT THE GIREP-MPTL 2014 CONFERENCE: Assessing student and teacher understanding of energy**

The workshop is for members of GIREP GTG .Energy (and any others who are interested) to analyze copies of questionnaires, etc., that they would use to assess student and teacher understanding of any aspect of energy. Workshop participants would then form small groups to discuss the merits of the various questionnaires with the goal of reaching some level of agreement on the types of responses that would indicate that learning had taken place.

Contact: Paula Heron, University of Washington, USA (Leader of GTG Energy, email: [pheron@phys.washington.edu](mailto:pheron@phys.washington.edu))

### GIREP Thematic Group: Mathematics in Physics Education

**INVITATION TO THE GTG MATHEMATICS SYMPOSIUM AT THE GIREP-MPTL 2014 CONFERENCE: The interplay of mathematics and physics from a teaching perspective**

The interplay of mathematics and physics shows many facets and is important for teaching and understanding physics. In order to address this complex theme from different perspectives and theoretical frameworks international efforts have to be made. Therefore, all people interested in this subject "Mathematics in Physics education", are invited to join the Group and attend the Symposium "The interplay of mathematics and physics from a teaching perspective" during the GIREP Conference. We are looking forward to new ideas concerning open questions as well as critical remarks.

Contact: Gesche Pospiech, TU Dresden, Germany (Leader of GTG Mathematics, email: [gesche.pospiech@tu-dresden.de](mailto:gesche.pospiech@tu-dresden.de))

## GIREP Thematic Group: Physics Education Research at University (PERU)

### **INVITATION TO GTG-PERU SYMPOSIUM AT GIREP-MPTL 2014 CONFERENCE: Investigating physics teaching and learning at university**

Dear GIREP members,

In the last GIREP newsletter (August 2013) the creation of GIREP Thematic Groups (GTG) was announced: "They are focused communities of GIREP members interested in contributing their expertise in particular facets of physics education." One of these groups is the Physics Education Research at University (PERU). In order to address this complex theme from different perspectives and theoretical frameworks, the PERU group is going to present the symposium "Investigating physics teaching and learning at university" at the GIREP-MPTL 2014 Conference. The symposium aims to describe and discuss some studies about analyzing the current state of teaching and learning on specific topic at university level such as limitations of learning achieved by students, teaching strategies or problem solving. In particular, two of the presentations will be on students' conceptual learning in topics like electromagnetism or modern physics. The other presentations report research on students' procedural abilities for making meaning to physics equations.

I have the pleasure to invite you to come to our symposium and to contribute, to share ideas concerning open questions, to give feedback as well as critical remarks.

Contact: Jenaro Guisasola, University of the Basque Country, Spain (Leader of GTG-PERU, email: [jenaro.guisasola@ehu.es](mailto:jenaro.guisasola@ehu.es))

## GTG on Physics Preparation of Teachers in Grades K-6

### **THE GTG PHYSICS PREPARATION OF TEACHERS IN GRADES K-6 PRESENTS THE INVITED SYMPOSIUM: Preparing Effective Teachers of Physics in Lower School Grades**

**Organiser:** Stamatis Vokos, Seattle Pacific University, USA

**Discussant:** Suzanne Gatt, University of Malta, Malta

#### **Participants:**

- **David Hammer**, Tufts University: An account of elementary teachers' epistemological progress in science
- **Josip Slisko**, Benemerita Universidad Autonoma de Puebla: Physics concepts and processes in Mexican primary school textbooks: An analysis from inquiry-based learning perspective and implications for teachers' education
- **Nikos Papadouris & Costas P. Constantinou**, University of Cyprus: Utilizing physics as a medium for promoting integrated learning in elementary science: an example in the context of energy
- **Marisa Michelini, Alberto Stefanel**, University of Udine: Research based activities and school-university cooperation in teacher professional development on optics

Contact: Stamatis VOKOS, Seattle Pacific University, USA (Leader of GTG Preparation of Teachers in Grades K-6, email: [vokos@spu.edu](mailto:vokos@spu.edu))

## GTG on Evaluation of Learning and Instruction (ELI)

### **INVITATION TO GTG-ELI WORKSHOP AT THE GIREP-MPTL 2014 CONFERENCE**

Dear members of GIREP,

The Evaluation of Learning and Instruction (ELI) is a new thematic group of GIREP in which one of the main objectives is to disseminate methods and techniques for evaluation of learning and instruction among the members to help you in your physics education research or in your physics teaching. At the GIREP-MPTL 2014 Conference, we are inviting you to the workshop "Assessing students' conceptions and instruction in physics courses" which will present some not so well known techniques used in the field of Physics Education Research: item response curves and concentration analysis. Both analyses are based on multiple-choice questions as an assessing instrument. As with many other evaluation techniques, if multiple-choice questions are carefully designed, they can form a powerful instrument to understand how students think. Item response curves and concentration analysis not only analyze whether students chose the right answer, but also analyze the incorrect answers students choose to understand better what students think. In particular item response curves can help us to test the effectiveness of a question and assess the results of instruction by comparing the curves before and after the instruction. Concentration analysis is also used to assess instruction. When an instrument is used as pre and post-test, concentration analysis can help us to analyze more than gain, since results include whether an incorrect conception is prevalent after instruction. Therefore, the results can be used as feedback to instructors.

The workshop is designed to be helpful to physics education researchers and physics instructors. I cordially invite all GIREP members to this first activity of ELI.

Contact: Genaro Zavala, Tecnológico de Monterrey, México (Leader of GTG ELI, email: [genaro.zavala@itesm.mx](mailto:genaro.zavala@itesm.mx))

## GIREP Conference Proceedings

The GIREP webpage does not only want to inform you about things going on, but is also meant to be a resource for PER & PE issues. Conference proceedings play a crucial role here. So a major task of the GIREP committee is to make sure that proceedings of GIREP conferences are not only produced, but also disseminated.

### DIGITALIZATION of Proceedings

One current project of the GIREP Committee is the digitalization of GIREP conference proceedings. **Prof. Mojca Cepic** supports the GIREP Committee in this project. She agreed to organize the scanning procedure in Slovenia. Thanks a lot!

We also have to be grateful for the support of **Zofia Golab Mayer and Robert Evans** for their help in the search for missing numbers.

We are still searching for the following books. We are very thankful, happy for any help in finding them. If you possess a copy yourself, or if you know people possessing them, please contact us: [claudia.haagen@univie.ac.at](mailto:claudia.haagen@univie.ac.at)

- 16.-18. Mar. 1972 (Kiel, Germany): Joint GIREP-UNESCO Meeting on: **Implementation of curricula in science education with special regard to physics teaching.**
- 14.-20. Oct. 1973 (Venezia, Italy): **Electricity, magnetism and mechanics in the secondary school.**
- 7.-13. Sept. 1989 (Balatonfüred, Hungary): **Energy Alternatives - Risk Education.**

Thank you!

### GIREP-ICPE-MPTL 2010 International Conference, Reims, France

Marisa Michelini, president of GIREP, has visited Wanda Kaminsky, member of the LOC of the Reims Conference, twice during the last year. Marisa and Wanda started working on the online proceedings. It is also planned to publish a paper version with all the double blind peer reviewed papers at the beginning of 2015. Prof. Kaminsky is currently looking for financial support for this paper version.

### WCPE 2012, Istanbul, Turkey

The LOC informed the GIREP Committee last December that the first part of the conference proceedings is online <http://esera2014.org/wcpe2012/proceedings.html>. The second part is to follow soon.

## Upcoming Conferences

### Symposium Frontiers of Fundamental Physics, Marseilles, July 15th-18th, 2014

We want to announce the FFP13 Symposium. This conference will be the thirteenth in a series that began in India in 1997 and then became itinerant (Europe, Australia, Canada). It covers topics in fundamental physics with the aim of stimulating interactions between involved communities. Several eminent physicists have already participated in these conferences and they follow them with interest.

The main themes are:

- Astroparticle Physics
- Cosmology (Theory and Observation)
- High Energy Physics (Phenomenology and Experiments)
- Mathematical Physics
- Quantum Gravity
- Physics Education
- Epistemology and Philosophy

### GIREP-MPTL Conference 2014, Palermo (Italy)

After a one-year break, 2014 will again be a "GIREP-conference" year. The conference will be organized by GIREP and MPTL. Thanks to Rosa Maria Sperandeo and Claudio Fazio and their team, we are looking forward to a great conference in Italy. The LOC has already done a fantastic deal of work. The GIREP Committee wants to invite you all to attend this conference:

### **GIREP Activities for teachers at the GIREP-MPTL conference in Sicily in July 2014**

(Wim Peeters, Vice President)

During the Palermo meeting **three workshops will be dedicated to physics teachers** and participants that have a close connection to daily physics teaching in class. One of them will be under the responsibility of **MPTL**, exploring **Easy Java Simulations running on tablets and iPads**. Wolfgang Christian will take the lead.

Two other workshops, directed by **Wim Peeters**, member of the GIREP committee, will deal with issues such as innovative teaching methods, assessments strategies, curriculum content and its implementation and differentiation.

Two general principles are important during these workshops: establish a connection between research and daily class experience, and high involvement of participants that exchange ideas, information and personal experiences. More details will be communicated via the conference website.

Apart from the conference program itself, this gives a **good opportunity** for physics teachers **to get in touch** and build a network around the world.

Dear Colleague,

We warmly invite you to participate in the **GIREP-MPTL International Conference** on Teaching/Learning Physics: **Integrating Research into Practice** to be held on **July 7-12, 2014 at University of Palermo, Italy**.

During the last few years, evidence based Physics Education Research provided results concerning the ways and strategies to improve student conceptual understanding, interest in Physics, epistemological awareness and insights for the construction of a scientific citizenship. However, Physics teaching practice seems resistant to adopting adapting these findings to their own situation and new research based curricula find difficulty in affirming and spread, both at school and university levels. We hope that our conference will offer an opportunity for in-depth discussions of this apparently wide-spread tension in order to find ways to do better.

The organizers invite contributions addressing the following sub-themes in the field of:

- Physics Teaching and Learning at Elementary, Secondary and University Levels;
- Physics Teaching and Learning in Informal Settings;
- In-service and Pre-service Teacher Education;
- Physics Curriculum and Content Organization;
- Pedagogical Methods and Strategies;
- History of Physics in Physics Education;
- ICT and Multi-Media in Physics Education;
- Motivational Strategies and Metacognition;
- Socio-Cultural Issues.

The conference was initiated by Groupe International de Recherche sur l'Enseignement de la Physique (**GIREP**) and the Multimedia in Physics Teaching and Learning (**MPTL**) group, and it will be sponsored by the International Commission on Physics Education (**ICPE**)-Commission 14 of the International Union for Pure and Applied Physics (**IUPAP**), the European Physical Society-Physics Education Division, the Latin American Physics Education Network (**LAPEN**) and the Società Italiana di Fisica (**SIF**).

#### SUBMISSION OF PROPOSALS

The purpose of the GIREP-MPTL 2014 International Conference is to bring together people working in physics educational research and in physics education at all types of schools from the whole world to enable them to share research results and exchange experience.

The International Scientific Committee invites both empirical and theoretical proposals for:

- Single oral presentations
- Posters
- Workshops

The official language of the conference is English. Proposals should be submitted through the conference website: <http://www.unipa.it/girep2014/>.

Before submitting your proposal, be sure to read carefully the guidance on the website about the content of proposals and the submission process.

#### IMPORTANT DATES

##### Abstract Submission:

Period 1: November 15, 2013 - January 15, 2014

Period 2: January 16, 2014 – March 30, 2014

##### Registration:

Early: November 15, 2013 - March 01, 2014;

Normal: March 02, 2014-May 15, 2014

Late: after May 15, 2014;



## What's going on? – Newsflashes from GIREP countries

This section of the GIREP newsletter is meant to inform GIREP members what's going on in the GIREP member countries. We would like to encourage you to contribute to this section.

Please, send your contributions to [claudia.haagen@univie.ac.at](mailto:claudia.haagen@univie.ac.at).

### Representations research in Australian science classrooms

(PETER HUBBER, [peter.hubber@deakin.edu.au](mailto:peter.hubber@deakin.edu.au), Deakin University, Australia)

A recent Australian Research Council (ARC) funded project, Representations in Learning Science (RILS), successfully developed a theoretically sophisticated but practical, representation construction approach to teaching and learning that links student learning and engagement with the epistemic (knowledge production) practices of science (Tytler, Hubber, Prain & Waldrup, 2013). This approach involves challenging students to generate and negotiate the representations (text, graphs, models, diagrams) that constitute the discursive practices of science, rather than focusing on the text-based, definitional versions of concepts. The representation construction approach is based on sequences of representational challenges which involve students constructing representations to actively explore and make claims about phenomena. It thus represents a more active view of knowledge than traditional structural approaches and encourages visual as well as the traditional text-based literacies. RILS has successfully demonstrated enhanced outcomes for students, in terms of sustained engagement with ideas, and quality learning, and for teachers' enhanced pedagogical knowledge and understanding of how knowledge in science is developed and communicated. This representation construction approach shows promise of resolving the tension between enquiry approaches to learning science and the need to introduce students to the conceptual canons of science.

Tytler, R., Prain, V., Hubber, P., & Waldrup, B. (Eds.), (2013). *Constructing Representations to Learn in Science*. Rotterdam, The Netherlands: Sense Publishers.

### Physics teacher education in the United States

(RACHEL SCHERR & STAMATIS VOKOS, both Seattle Pacific University, USA)

In 2013, the National Task Force on Teacher Education in Physics (T-TEP) published a report (<http://www.phystec.org/webdocs/2013TTEP.pdf>) highlighting the results of a four-year investigation on the status of physics teacher preparation in the United States. It documented the large national need for more and better prepared physics teachers and made several recommendations for overcoming the present challenges. In particular, it noted characteristics of thriving physics teacher education programs. The T-TEP work is part of a greater effort in the United States, namely the Physics Teacher Education Coalition (PhysTEC) project, which is led by the American Physical Society in partnership with the American Association of Physics Teachers.

For over a decade, physics teacher education programs have been transformed at a number of institutions around the country through support from PhysTEC. In 2012-2013, PhysTEC supported an independent study on the sustainability of its sites after project funding ends. The study sought to measure the extent to which programs have been sustained and to identify what features should be prioritized for building sustainable physics teacher education programs. Most PhysTEC legacy sites studied have sustained their production of physics teachers. A few sites studied have thriving physics teacher education programs, that is, programs that have continued to substantially increase their production of teachers since the PhysTEC award. All of the studied sites that sustained their production of physics teachers have a champion of physics teacher education and corresponding institutional motivation and commitment. The necessity of the champion was known from the T-TEP report and borne out by this study. The necessity of institutional motivation and commitment is a finding of this study. At some sites, PhysTEC support has precipitated an institutional focus on physics teacher education, leveraging other resources (including both awards and personnel) benefiting physics teacher education.

The study also documented the sustainability of components of physics teacher education programs, such as recruitment, early teaching experiences, and a teacher in residence at the university. Sustained components tend to be those that have direct benefit to undergraduates in the physics department, whereas less-sustained components seem to be those that primarily benefit secondary teachers. The number of sustained components does not appear to correspond to teacher production; that is, sites that have sustained more (or fewer) components do not produce larger (or smaller) numbers of teachers. This result further supports the finding that the presence of the champion and corresponding institutional motivation and commitment are the key features of successful physics teacher education programs.

## HOPE Project

“Horizons of Physics Education” is a European project supported by the Lifelong Learning Programme. Below you find a good overview of HOPE project, which started in October 2013.



### Newsletter November 2013 HOPE-Network

2013-3710\_540130-LLP-1-2013-1-FR-ERASMUS-ENW

The academic network HOPE - Horizons of Physics Education - has been launched for three years from October 2013 with the support of the Life Long Learning Programme of the European Union. It is effectively the sixth thematic network in physics education in a series of networks beginning in 1995 with European Physics Education Network (EUPEN).

The 71 full partners are from 31 LLP-eligible countries of the European Union along with Norway, Serbia, Switzerland and Turkey; they comprise 65 academic partners and 6 non-academic partners including the European Physical Society. The consortium is further enriched by 10 associated partners including the Institute of Physics, the American Physical Society, IBM Zurich Laboratory, Birla Science Center of Hyderabad in India, GIREP (Groupe International de Recherche sur l'Enseignement de la Physique), various universities in both North and South America, as the University of Oregon, Seattle Pacific University, University of Washington in USA and Sao Paulo University in Brasil, and Teacher Associations as Italian Association for Physics Teaching and Argentin Physics Teacher Association.



Geographical distribution of HOPE's partners. Red pins: coordinators, blue pins: academic full partners, turquoise pins: non-academic full partners, yellow pins private full partners, pink pins: European associated partners

With an overall aim of enhancing the impact of physics within Europe and its visibility in society, the network will research and share good practice within four themes: the factors influencing young people to choose to study physics; physics graduates' competences that enable them to contribute to the new needs of the European economy and society; the effectiveness and attractiveness of physics teaching in Europe's university physics departments and their competitiveness in the global student market; strategies for increasing the supply of well-trained physics school teachers and for developing links between university physics departments and the teaching of physics in schools.

#### Management

The project is being carried out by three coordinators: Nadine Witkowski – Project Leader (université Pierre et Marie Curie - FR), Marisa Michelini (University of Udine – IT) and Ivan Ruddock (University of Strathclyde - UK), with the support of an Advisory Committee: Urbaan M. Titulaer (Johannes Kepler University - AT), Jan Naudts (Universiteit Antwerpen – BE), Hendrik Ferdinande (Ghent University - BE), Evangelos G. Vitoratos (University of Patras - GR), Laura Tugulea (University of Bucharest – RO), Gareth Jones (Imperial College London – UK)

#### Activities

**WG1. Inspiring Young People to Study Physics.** leaders Marek Trippenbach (University of Warsaw – PL) and Balint M. Agneta (West University of Timisoara – RO)

To investigate and report on the factors that influence young people to choose study physics

This aim will include:

- the influence of the media, individuals,
- outreach programmes of universities and research organisations;
- young people's perception of how physics explains the world around them.
- engagement with women, ethnic minorities and other under-represented groups.
- a survey of students in the first year of physics courses within the consortium
- a study of existing outreach activities.



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**WG2. New Competences for Physics Graduates – Fostering Innovation and Entrepreneurship** leaders Hay Geurts (Radboud University Nijmegen – NL), Jos Rogiers (Leuven Universiteit – BE)

To recommend ways by which physics degrees can be enhanced so that the competences of graduates enable them better to contribute more effectively to new needs of the European economy and society, particularly through innovation and entrepreneurship.

This will involve objectives on :

- analysis and sharing of examples of good practice already underway or planned by partners including
- application of new physics knowledge and technology transfer to the market economy
- integration of physics studies with the world of work
- better appreciation of how basic physics knowledge underlies and contributes to technological developments.
- re-examination of existing physics competences to take account of innovative teaching methods and new demands placed on physics graduates.

**WG3. Improvements in Physics Teaching – Meeting Future Global Challenges in Physics Higher Education** leaders Eamonn Cunningham (Dublin City University – IR) and Fernando Cornet (Universidad de Granada – ES)

To improve the effectiveness and attractiveness of physics teaching in Europe's university physics departments to help ensure their competitiveness in the global student market.

This will be pursued through actions including :

- a survey of third country students in physics departments and strategies to attract them
- a study of the impact of ERASMUS MUNDUS programmes in physics
- an investigation into the use of innovative methods in physics teaching in a global context
- a study of the application of the results of research into physics education, and weaknesses in current methodologies.

**WG4. Improvements in the Training and Supply of Physics School Teachers** leaders Mathelitsch Leopold (Karl-Franzens-Universitaet Graz – AT), Mohoric Ales (University of Ljubljana – SL)

To recommend strategies for increasing the supply of well-trained physics school teachers and to enhance the role of university physics departments in helping the teaching of physics in schools,

This will be met partly by objectives to

- facilitate the training of future physics teachers
- contribute to the professional development of existing school teachers
- contribute more directly to physics teaching in schools, e.g. through 'master classes' and reach-out laboratories, help apply the results of physics education research.

### Agenda of the activities with HOPE Network

#### WG1 : Inspiring young physicists

Meeting Warsaw  
6-7 January 2014

Meeting Napoli  
May 2014

Forum Helsinki  
autumn 2014

#### WG2 : Competences for fostering innovation

Meeting Lille  
spring 2014

Meeting Hannover  
spring 2015

Forum Coimbra  
autumn 2015

#### WG3: Global challenges

Meeting  
November 2014

Meeting Dublin  
spring 2015

Forum Coimbra  
autumn 2015

#### WG4 : Teacher training

Meeting Croatia  
autumn fall 2015

Meeting Latvia  
spring 2015

Forum Bucharest  
autumn 2016



## GIREP Membership: renewal & fees

We want to thank all members for supporting GIREP in 2013 and hope for further support. Fees for GIREP membership are again due at the beginning of 2014. Payment information can be found on the GIREP homepage (<https://www.girep.org/information.html>)

We also invite everybody interested in physics teaching and learning as well as in physics education research to join GIREP. You can become member easily. Just follow that link: <https://www.girep.org/register.html> .

As a GIREP member you have **exclusive access** to the digital proceedings of the past GIREP conferences. In addition you can get a **reduced registration fee** for GIREP conferences.

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*Become member of  
GIREP or join the GIREP  
mailing list by registering  
electronically*

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**Please send contributions for next GIREP Newsletter till May 30, 2014!**