



IUPAP

INTERNATIONAL UNION OF PURE AND APPLIED PHYSICS

C14 COMMISSION – PHYSICS EDUCATION - ICPE

REPORT

2019 - 2020

ROBERTO NARDI

C14 Commission (ICPE) Chair (2018-2020)

UNESP – State University of São Paulo, School of Sciences - Bauru Campus

Brazilian Society of Physics (BSP)

São Paulo, Brazil

PROF. DEENA NAIDOO

C14 Commission (ICPE) Vice Chair (2018-2020)

University of Witwatersrand, School of Physics

Johannesburg, South Africa

August, 2020

INTRODUCTION

This document is a report of the main activities of the C₁₄ Commission – Physics Education, from 2019-2020.

The main subjects of this report are:

1. The C₁₄ Commission and its members
2. International Conferences and events organized/sponsored by the Commission (IUPAP) proposed during this period
3. Presence of the ICPE chair in Physics and other Education events held during the period
4. Publications of the ICPE in the period
5. Looking forward – working through the pandemic times
6. Other

C14: PHYSICS EDUCATION COMMISSION

<http://iupap.org/commissions/>

The C14 Commission is one of the 20 IUPAP's commissions. It was established by the IUPAP in 1960, to promote the exchange of information and views among the members of the international scientific community in Physics Education. The current officers and members (2018-2020) are:

Officers

Chair: Roberto Nardi
Brazil
Vice-Chair: Deena Naidoo
South Africa
Secretary: David Sands
U.K.

Members

Tetyana Antimirova
Canada
Ian G. Bearden
Denmark
Julio Benegas
Argentina
Jenaro Guisasola
Spain
Zuzana Jeskova
Slovakia
Nathalie Lebrun
France
Eilish McLoughlin
Ireland
Manjula Sharma
Australia
David R Sokoloff
U.S.A.
Naoshi Takahashi
Japan
Mayank Vahia
India

Associate Members (2018-2021):

Mohammed Usman Degereji
Nigeria
Zulma Estela Gangoso
Argentina
Pornrat Wattanakasiwich
Thailand

International Conferences and events

Organized/Sponsored by the IUPAP C₁₄ Commission (2019-2020)

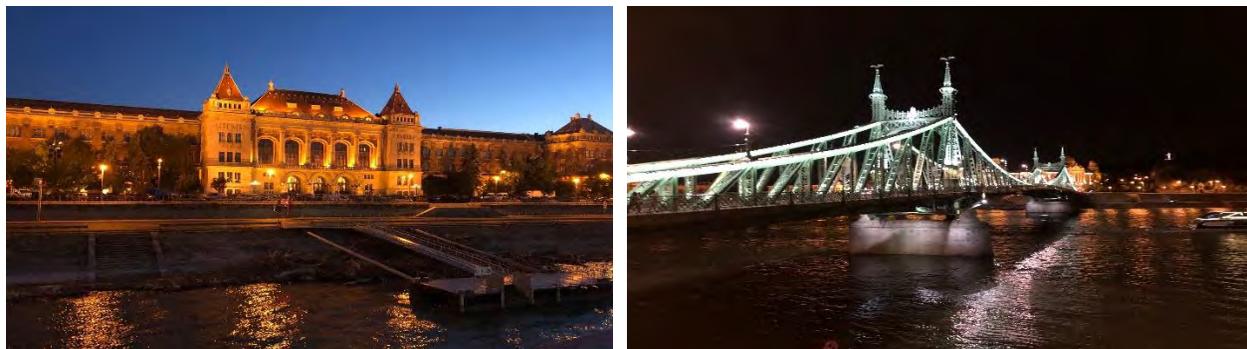
GIREP-ICPE-EPEC 2019, Budapest, Hungary, 1-5 July

The Commission agreed to join the organization with GIREP-ICPE-EPEC 2019. The conference was supported also by IUPAP. <https://girep2019.hu/>

The International Conference on Physics Education (ICPE-GIREP-EPEC-MPTL 2019)

Teaching-learning contemporary physics, from research to practice

Budapest – Hungary – 1 - 5 July, 2019 <https://girep2019.hu/>



Roland Eötvös Physical Society organized this Conference

ICPE - The International Commission on Physics Education (ICPE) of the International Union of Pure and Applied Physics (IUPAP);

GIREP - Groupe International de Recherche sur l'Enseignement de la Physique;

EPS – European Physical Society and

MPTL - The International Conference on Multimedia in Physics Teaching and Learning.

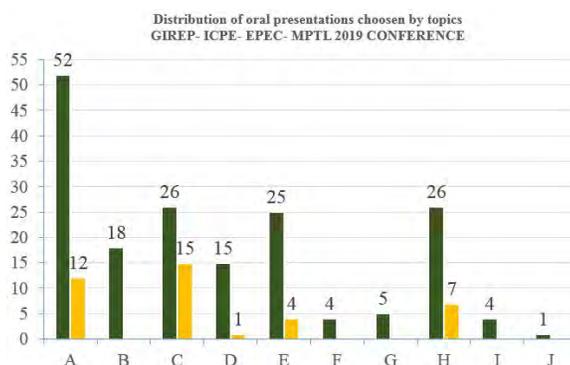
The Eötvös-Year 2019 International Conference was an opportunity not only to present the results of works, but also to communicate and discuss common research topics and best practices with colleagues.

The main theme of the conference was “*Research and practice in physics education to celebrate Eötvös centenary*”. Roland Eötvös (1848-1919) was a famous Hungarian physicist whose main achievement was to demonstrate the strict proportionality between the inertial and gravitational mass with an unprecedented precision. This result became a strong basis of the general relativity. The UNESCO has declared to be associated to commemorate the centenary of his death in 2019. That is why this conference was also associated to the Eötvös-Year.

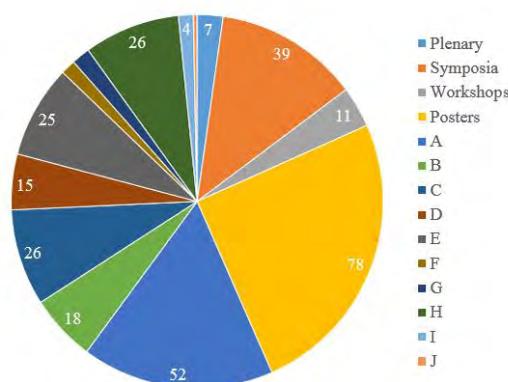
The main topics of the conference were the following:

- A. Strategies and methods to improve Physics learning and teaching
- B. Multimedia in Physics Teaching and Learning
- C. Contemporary Physics and Modern Physics in School
- D. Physics Curriculum: Development and Implementation
- E. Experiments in Physics Education
- F. Early Science Learning
- G. Environmental Physics
- H. Teacher Education and postgraduate education
- I. Informal learning and science centres
- J. Outreach of Physics

The Conference involved the following proposals: oral presentations, symposia, workshops and posters. All of them were focused on the different aspects of the essential knowledge, skills and attitudes mainly related to the topics listed above. The figure below shows the distribution of the presentations according to the topics above.



The distribution of the all accepted contributions was according to the figure below. The green colours show the number of individual oral presentations, and the yellow colours show the distribution of the topics within the symposia.



Source: <https://girep2019.hu/topics/> (Access in August 8th, 2019)

The Committees involved in the Conference, were the following:

Principal patron of the conference

- **Prof. Dr. Miklós Kásler**

Minister of Human Capacities

Patrons of the conference

- **Prof. Dr. József BÓDIS**

State Secretary for Education

- **István TARLÓS**

Mayor of Budapest, Hungary

Scientific Advisory Committee

- **Ian BEARDEN**

member of EPS-PED Board and C14 commissioner, Niels Bohr Institute, Univ. of Copenhagen, Denmark

- **Leoš DVORÁK**

GIREP and ICPE Committee member, Charles Univ. in Prague, Czech Republic

- **Ton ELLERMEIJER**

President of MPTL Board, Director of CMA Amsterdam, Netherlands

- **Raimund GIRWIDZ**

Member of MPTL Board, University Ludwig-Maximilians, Munich, Germany

- **Claudia HAAGEN-SCHÜTZENHÖFER***

GIREP Vicepresident, Univ. of Graz, Austria

- **Tomasz GRECZYLO**

University of Wrocław, Wrocław, Poland Member of MPTL Scientific Advisory Board

- **Antje KOHNLE***

Member of MPTL Advisory Board, University of St. Andrews, UK

- **Peter LÉVAI,**

Director General of Wigner Physics Research Institute, member of the Hungarian Academy of Sciences

- **Marisa MICHELINI***

GIREP President, Univ. of Udine, Italy

- **Cesar Eduardo MORA LEY**

Representing IACPE, LAPEN, IAPS, National Polytechnic Institute, Mexico

- **Roberto NARDI**

Chair IUPAP C14, Sao Paulo State University

- **Wim PEETERS**

GIREP Vice-president, Katholiek Onderwijs Vlaanderen, Belgium

- **David SANDS**

EPS-PED Chair, Univ. of Hull, UK

- **Dagmara SOKOLWSKA***

GIREP General Secretary, Jagellonian University, Cracow, Poland

- **Stamatis VOKOS**

Representative of APS, Seattle, Pacific University Seattle, USA

Local Programme Committee

- **Csaba SÜKÖSD Budapest**

Institute of Nuclear Techniques (INT) of the Budapest University of Technology and Economics (BME)

- **Tamás TÉL**

Loránd Eötvös University,

Institute for Theoretical Physics, and von Kármán Laboratory of Environmental Flows, Institute of Physics, MTA-ELTE Theoretical Physics Research Group,

- **Péter TASNÁDI**

Loránd Eötvös University,

Institute of Geography and Earth sciences Department of Meteorology

- **Sándor KATZ**

Loránd Eötvös University,

Department for Theoretical Physics

- **Zoltán TRÓCSÁNYI**

University of Debrecen,

Institute of Physics,

- **Zsuzsanna FARKAS***

University of Szeged

- **János Erostyák**

University of Pécs

Faculty of Sciences, Institute of Physics, Department of Experimental Physics

- **György Mihály**

Department of Physics

Faculty of Natural Sciences,

Budapest University of Technology and Economics (BME)

Local Organising Committee

- **Beata JAROSIEVITZ*** (GIREP representative in Hungary) – **Chair**

Dennis Gabor College

- **Csaba SÜKÖSD**

Budapest University of Technology and Economics (BME) – **Co-Chair**

Institute of Nuclear Techniques (INT) ,

Conference Secretariat

- **Bernadett KOVÁCS***

ELFT Organization Secretariat (ELFT)

- **Melinda PÓNYA***

ELFT Organization Secretariat (ELFT)

IT Committee

- **Gusztáv HENCSEY**

Institute for Computer Science and Control, Hungarian Academy of Sciences (MTA SZTAKI)

- **Zsolt László MÁRKUS**

Institute for Computer Science and Control, Hungarian Academy of Sciences (MTA SZTAKI)

- **György SZÁNTÓ**

Institute for Computer Science and Control, Hungarian Academy of Sciences (MTA SZTAKI)

- **Tibor SZKALICZKI**

Institute for Computer Science and Control, Hungarian Academy of Sciences (MTA SZTAKI)

- **Miklós VERES**

Institute for Computer Science and Control, Hungarian Academy of Sciences (MTA SZTAKI)

Volunteers involved:

- **Hungarian physics teachers, students (PhD)**

Scientific Visits:

The following scientific visits were available for participants:

- **Visit 1:** Nuclear Power Plant
- **Visit 2:** Wigner Research Centre for Physics & Centre for Energy Research
- **Visit 3:** Institute of nuclear Techniques of BME & Institute for Computer Science and Control
- **Visit 4:** ELI-ALPS Research Institute (An international, high-power, short-pulse laser research institution, initiative of the European Union).
- **Visit 5:** Low and Medium level Radioactive Waste Management Site

INVITED SPEAKERS

The invited lecturers were:

Prof. Dr. Marisa MICHELINI



*Research Unit in Physics Education,
University of Udine, Italy*

Prof. Dr. Igal GALILI



*The
Hebrew University
Jerusalem*

Prof. Dr. Raimund GIRWIDZ



*Physics Education at
Ludwig-Maximilians-Universität
München, Germany*

Prof. Dr. András PATKÓS



*Institute of Physics,
Eötvös University,
Budapest, Hungary*

Prof. Dr. Manjula Devi SHARMA



*School of Physics,
University of Sydney
Australia*

Prof. Dr. David SOKOLOFF



*Department of Physics,
University of Oregon,
Eugene, U.S.A.*

Dr. Lars-Jochen THOMS



*Physics Education
Ludwig-Maximilians-Universität
München, Germany*

Prof. Dr. Dean ZOLLMAN



*Center for Research and Innovation in STEM Education &
Department of Physics, Kansas State University,
Manhattan, Kansas USA*

ICPE Medal for the year 2018 was conferred on Marisa Michelini, Professor at The Udine University, Italy.



**Prof. Marisa Michelini (Italy) and Roberto Nardi (Brazil) – Chair of the C14 Commission
Left – Prof. Csaba Sukosd**



Prof. Marisa Michelini (Italy) – ICPE Medal 2018 and Roberto Nardi (Brazil) – ICPE Chair, among members of the Organizing Committee (Csaba Sukosd and Beata Jarosievitz – left) and ICPE commissioners: from left: Naoshi (Japan), Zulma (Argentina), David Sands (U.K.), Ian Bearden (Denmark), David Sokoloff (U.S.A.), Teatyana (Canada) and Dean Zolmann (U.S.A.).

About the ICPE Medal

(from the last ICPE Newsletter)

In 1979 George Marx, a Hungarian researcher in the field of physics education, proposed to institute a medal to recognise “outstanding contributions to physics teaching of a kind that transcends national boundaries”. The Commission succeeded in establishing the award of an ICPE Medal with the following two criteria:

The contributions to physics education should have extended over a considerable number of years;

The contributions should be international in their scope and influence.

The first award of the medal was made in 1980 to Professor Eric M. Roger during the Trieste Conference on Education for Physics Teaching. The list of recipients can be found at <http://iupap.org/commissions/physics-education/awards/>.

The medal (below) was designed by the Hungarian artist Miklós Borsos. The face shows a symbolic picture: the interaction of human beings with forces of nature in the form of the four elements of the ancient Greek philosophers – earth, water, air and fire, the last one being symbolised by powerful rays of sunlight. The human beings capture the essence of physics education, as we seek to understand and share our understandings of nature. The back of the medal bears the text: ‘Awarded to N.N. by the International Commission on Physics Education of IUPAP for long and distinguished service to physics education’.



ICPE medal faces

Submission process for the 2019 medal were concluded last year. The next honoured with medals are Prof. Alex Mazzolini (Australia) and Pratibha Jolly (India) for their relevant work on physics education in their countries and worldwide.

The medals would be conferred at the World Conference on Physical Education to be held in Vietnam (3rd WCPE) – Hanoi, Vietnam – 2020. The meeting was postponed to July 2021 due to the current pandemic.

Presence of the ICPE chair in Physics and other Education events held during the period (*)

XIII INTER AMERICAN CONFERENCE ON PHYSICS EDUCATION "**DR. ALBERTO MAIZTEGUI**"– Montevideo, Uruguay, July 8-12, 2019

<https://ciaef.edu.uy/>

(*) In these events, the IUPAP and ICPE objectives and its associated members were exposed to the delegates. Newsletters from IUPAP and ICPE were released and shared with delegates. They were asked to send matters to publish.

XIII INTER AMERICAN CONFERENCE ON PHYSICS EDUCATION “**DR. ALBERTO MAIZTEGUI**”– Montevideo, Uruguay, July 8-12, 2019

<https://ciaef.edu.uy/>

Inter-American Conferences on Physical Education (IACEF) are organized by the Council for Inter-American Conferences on Physical Education (CIAEF), composed of members from various countries of the Americas. They occur every three years in a South, Central or North American country and have been highly valued by physics teachers as an opportunity to gather and share experiences, contributing to building a community that aims to improve teaching of this subject.

This XIII CIAEF, or Inter-American Conference on Physics Education, was chaired by Professor. Dr. Leda Roldan Santamaría of the University of Costa Rica and as Vice-President Andrea Cabot Echevarría, of the Artigas Teachers Institute, Montevideo, Uruguay. The local committee was made up of teachers from Montevideo's physics institutes and schools.

The event was held from July 8 to 12, 2019, at the “Instituto de Perfeccionamiento y Estudios Superiores in Montevideo”. It aimed to present, discuss and disseminate new ideas that favour the improvement of physics teaching at various levels and the preparation of physics teachers for basic and higher education.

Physicists from several countries, such as Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, Jamaica, Mexico, Panama, Peru, United States and Venezuela, participated in the event.



XIII Inter American Conference on Physics Education Group Photograph.

Also, in this event, ICPE Commission Prof. Nardi, Chair of the ICPE was present and brought information about the IUPAP, its commissions and specifically about the C14 Commissions, the newsletter and international events sponsored by IUPAP and ICPE.

I Encuentro Virtual de Enseñanza de la Física

VI Encuentro Nacional de Didáctica de la Física 19 al 23 de junio de 2020



Universidad
Central

I Encuentro Virtual de Enseñanza de la Física
VI Encuentro Nacional de Didáctica de la Física
19 al 23 de junio de 2020

PROGRAMA

Universidad Central de Chile, *Microsoft Teams*

Viernes 19 de Junio		Sala virtual Ms Teams
20:00	Inicio #ENDFI2020 Link Streaming	Salón
20:00 – 20:15	Inauguración ENDFI2020 desde UCENTRAL	Salón
20:15 – 20:40	Presentación #ENDFI2020	Salón
20:40 – 21:40	Conferencia Dr. Roberto Nardi (UNESP – Brasil) "Enseñanza de la Física, Investigación en Enseñanza de la Física y Pos-grado en Enseñanza de la Física en Brasil".	Salón

Sábado 20 de Junio – Jornada Mañana		Sala virtual Ms Teams
9:30	Inicio Jornada 2	Salón
9:45 – 11:00	Ponencias Línea <i>Formación inicial docente en física</i>	Sala 1
	Ponencias Línea <i>Sustentabilidad, cambio climático y ciudadanía</i>	Sala 2
	Ponencias Línea <i>Experiencias, recursos y propuestas didácticas</i>	Sala 3
11:15 – 12:15	Conferencia Dra. Rosa Nidia Tuay (UPN - Colombia) "Modelos y Modelización en la estructura de una Teoría para la Enseñanza de la Física"	Salón
12:15	Cierre Jornada Mañana	Salón

SABADO 20 de JUNIO	TALLER	ENCARGADO
15:10 – 17:10	TALLER 1: <i>Aprendizaje Significativo en Física</i>	Dr. Iván Sánchez (Universidad del Bío Bío)
	TALLER 2: <i>Ciencias para la Ciudadanía</i>	Mg. Paula Urrutia (SOCHEF)
	TALLER 3: <i>Taller de Astronomía: Un Eclipse en tus manos</i>	Mg. Elizabeth Villanueva (Colegio Alberto Pérez Institución Teresiana)
17:30 – 19:30	TALLER 4: <i>Metodologías de Aprendizaje Activo para Enseñar Física en Clases Virtuales</i>	Dra. Carla Hernández (Universidad de Santiago de Chile)
	TALLER 5: <i>Experimentar en casa: Lab4U y los smartphones al servicio de la indagación</i>	Mg. Javier Baeza (Lab4U)
	TALLER 6: <i>Proyectos Experimentales con Arduinos Virtuales</i>	Dr. Nelson Sepúlveda (Universidad Central de Chile)

Sábado 20 de Junio – Jornada Noche		Sala virtual Ms Teams
22:00	Inicio Jornada 2 - Noche	Salón
22:00 – 23:00	Conferencia Dr. Basilio Solís (UCENTRAL – Chile) "Formación de estrellas en otras Galaxias: El Universo Cercano".	Salón



Universidad
Central

I Encuentro Virtual de Enseñanza de la Física
VI Encuentro Nacional de Didáctica de la Física
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	TALLER 2: <i>Ciencias para la Ciudadanía</i>	Mg. Paula Urrutia (SOCHEF)
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ICPE Newsletter

The C14 Commission publishes its Newsletter with regularity, primarily in electronic form. Professor Manjula Sharma (Australia) is the current editor. The Newsletter is published bimonthly. Issues back to 1995. The link to the latest edition is available at:

<https://mailchi.mp/d19ceefcf17f/icpe-newsletter-68-january-2019?e=abe1926b4b>

The sections of the last Newsletter are:

Editor's Corner
 Teaching Tips: Thermal Physics Concept Inventories
 Integrating Science with Society – Conference report
 Active Learning in Japan
 UNESCO/ICTP ALOP Workshop
 Exoplanets Workshop RSEF-IOP
 Science Olympiads – India
 Introducing New Members of the C14 Commission

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Assistant Editor: Dr Vicky Tzioumis
 Email: vicky.tzioumis@sydney.edu.au

Visit our website at <http://iupap-icpe.org/>

ICPE 2018 PROCEEDINGS

The International Conference on Physics Education - ICPE 2018 (ICPE-SAIP-WITS), Johannesburg, South Africa, October 1-5, 2018

This ICPE 2018 took place in Johannesburg, South Africa. Deena Naidoo was the chair of this Conference
<http://events.saip.org.za/conferenceProgram.py?confId=93>



The International Conference on Physics Education (ICPE-SAIP-WITS-2018)

University of Witwatersrand, Johannesburg, South Africa – October 01 to 05, 2018

<http://events.saip.org.za/conferenceDisplay.py?confId=93>

The proceedings of the ICPE2018 were published recently in the Journal of Physics: Conference Series – IOPscience. Link to access:

<https://iopscience.iop.org/issue/1742-6596/1512/1>

Looking forward

The next C14 Commission' Annual Meeting will held on line, on 16th of August 2020.

LOOKING FORWARD

Agenda proposed for the next years (2020-2021)

Future conferences endorsed/supported by ICPE/IUPAP (2019-2020)

- World Conference on Physics Education (WCPE) - Vietnam- 2021
- International Conference on Physics Education - ICPE 2022 – Thailand

Participation in the C&CC - Council & Commissions Meetings

- (5rd C&CC Meeting – On line Oct - 2020)

Physics Education 'Panorama' in the world (2020-2021)

- (a survey to understand physics education in all the countries associated with IUPAP)

Preparation for the IUPAP Centenary Celebrations (2022)

- participation and suggestions of activities all over the world

ICPE Publications – Newsletters, books – Upcoming

Workshops endorsed by the International Commission on Physics Education (ICPE) – Upcoming

3RD WORLD CONFERENCE ON PHYSICS EDUCATION
**Innovating Physics Education:
 From Teacher Education To School Practices**
 20 – 24, July, 2020
 Hanoi National University of Education, Vietnam

3rd WCPE
 3rd Conference on Physics Education
 Hanoi, Vietnam, 20 – 24 July 2020

wcpe2020.hnue.edu.vn
wcpe2020@gmail.com
<https://www.facebook.com/WCPE2020/>

Roberto Nardi

Deena Naido

C14 (ICPE)

São Paulo/Jophanesburg, Aug 28th, 2020.
