

**GIREP IPEC EPEC 2017  
POSTER PRESENTATIONS**

- P001 Ferrofluids in secondary schools in two different instructional approaches**  
Ovidiu Florin Caltun<sup>1</sup>, Octavian Vasile Caroaie<sup>1,2</sup>, <sup>1</sup>*Alexandru Ioan Cuza University, Faculty of Physics, Iasi, Romania*, <sup>2</sup>*"Gheorghe Rosca Codreanu" High School, Barlad, Romania*
- P002 Understanding the difficulties of acceleration concept from the perspective of historical textual analysis**  
Yun-Ju Chiu<sup>1</sup>, Feng-Yi Chen<sup>1</sup>, <sup>1</sup>*Chang Gung University, Taoyuan, Taiwan*
- P003 Einsteinian physics - new ideas in teaching relativity and gravity**  
Warren Stannard<sup>1</sup>, Mario Zadnik<sup>1</sup>, <sup>1</sup>*University of Western Australia, Perth, WA, Australia*
- P004 A teaching unit on electrically powered cars to foster students' decision-making competencies**  
Verena Spatz<sup>1</sup>, Jana Tampe<sup>1</sup>, <sup>1</sup>*Didaktik der Physik, Fachbereich Physik, Technische Universität Darmstadt, Darmstadt, Germany*
- P005 An introduction to some difficult physics concepts understanding at a kindergarten level**  
Alicja Wojtyna-Jodko<sup>1</sup>, <sup>1</sup>*The (Polish) Association of Teachers of Natural Sciences and Technology, Bydgoszcz, Poland*
- P006 Classification of previous ideas about sound phenomena: study in university students of the health sciences**  
Jhonny A. Medina Paredes<sup>1</sup>, Mario H. Ramírez Díaz<sup>2</sup>, <sup>1</sup>*Universidad Austral de Chile, Puerto Montt, Chile*, <sup>2</sup>*Instituto Politécnico Nacional, Ciudad de Mexico, Mexico*
- P007 Active learning of buoyancy: An effective way to change alternative conceptions about floating and sinking**  
Jelena Radovanovic<sup>1</sup>, Josip Slisko<sup>2</sup>, Ivana Stepanovic Ilic<sup>3</sup>, <sup>1</sup>*Primary school Slobodan Sekulic, Uzice, Serbia*, <sup>2</sup>*Facultad de Ciencias Fisico Matemáticas Benemérita Universidad Autónoma de Puebla, Puebla, Mexico*, <sup>3</sup>*Institute of Psychology, Belgrade, Serbia*
- P008 Teaching physics in a multilingual classroom - challenges and insights**  
Charles Bonello<sup>1</sup>, <sup>1</sup>*University of Malta, Msida, Malta*
- P009 Space-time maps**  
Vera Montalbano<sup>1</sup>, <sup>1</sup>*Department of Physical Sciences, Earth and Environment, University of Siena, Siena, Italy*
- P010 Diagrams to support reasoning about energy**  
Ian Lawrence<sup>1</sup>, <sup>1</sup>*Institute of Physics, London, UK*
- P011 Tutorials in a stand-alone large class**  
Haruko Uematsu<sup>1</sup>, <sup>1</sup>*Tokyo Gakugei University, Tokyo, Japan*
- P012 Houston, I need a problem**  
Jaka Banko<sup>1</sup>, <sup>1</sup>*ZRSŠ, Ljubljana, Slovenia*
- P013 Time as transversal topic in prospective primary school teacher education**  
Marisa Michelini<sup>1</sup>, Francesca Monti<sup>2</sup>, Giacomo Bozzo<sup>2</sup>, Emanuela Vidic<sup>1</sup>, <sup>1</sup>*Department of Mathematics, Computer Science and Physics, Udine, Italy*, <sup>2</sup>*Department of Computer Science, Verona, Italy*
- P014 Eye-tracking verification of the strategy used to analyze and solve physics problems by students**  
Dariusz Wcislo<sup>1</sup>, Malgorzata Godlewska<sup>1</sup>, Roman Rosiek<sup>1</sup>, Mirosława Sajka<sup>1</sup>, Anna Stolinska<sup>1</sup>, <sup>1</sup>*Pedagogical University of Cracow, Cracow, Poland*

- P015 Introduction of active-learning elements to physics lectures: lessons learned from a research-intensive university**  
Guillaume Schiltz<sup>1</sup>, Gerald Feldman<sup>1,2</sup>, Andreas Vaterlaus<sup>1</sup>, <sup>1</sup>*ETH (Swiss Federal Institute of Technology), Zurich, Switzerland,* <sup>2</sup>*The George Washington University, Washington, DC, USA*
- P016 Why do errors persist in thermodynamics?**  
Joaquim Anacleto<sup>1</sup>, <sup>1</sup>*Departamento de Física, Universidade de Trás-os-Montes e Alto Douro, 5001-801 Vila Real, Portugal*
- P017 Sector models of a gravitational wave**  
Corvin Zahn<sup>1</sup>, Ute Kraus<sup>1</sup>, <sup>1</sup>*Hildesheim University, Hildesheim, Germany*
- P018 What are the objectives and goals of physics laboratory courses? : A survey with teachers**  
Rajesh Khaparde<sup>1</sup>, <sup>1</sup>*Homi Bhabha Centre for Science Education, TIFR, Mumbai, India*
- P019 Need students deep understanding of basic concept of magnetism to imagine medical application of nanoparticles?**  
Ovidiu Florin Caltun<sup>1</sup>, Marisa Michelin<sup>1</sup>, Alberto Stefanel<sup>1</sup>, Danielo Bungiorno<sup>1</sup>, <sup>1</sup>*Alexandru Ioan Cuza University, Faculty of Physics, Iasi, Romania,* <sup>2</sup>*University of Udine, URDF at DIMF, Udine, Italy*
- P020 Pethinking physics identity: An operationalized framework for considering physics identity for black students**  
Simone Hyater-Adams<sup>1</sup>, Claudia Fracchiolla<sup>1</sup>, Noah Finkelstein<sup>1</sup>, Kathleen Hinko<sup>2</sup>, <sup>1</sup>*University of Colorado Boulder, Boulder, CO, USA,* <sup>2</sup>*Michigan State University, Lansing, OH, USA*
- P021 Spiral dance**  
Armando Cuauhtemoc Pérez Guerrero Noyola<sup>1</sup>, Ignacio Camariillo García<sup>1</sup>, <sup>1</sup>*Universidad Autonoma Metropolitana Unidad Iztalapa, Ciudad de México, Mexico*
- P022 Understanding thermoelectricity**  
Estela Margarita Puente Leos<sup>1</sup>, Marcos Ley Koo<sup>1</sup>, <sup>1</sup>*Departamento de Física, Facultad de Ciencias, UNAM, Ciudad de México, Mexico*
- P023 Bicycle physics as an activity of field.**  
Alejandro González y Hernández<sup>1</sup>, <sup>1</sup>*Facultad de Ciencias. Universidad Nacional Autónoma de México, Mexico City, Mexico*
- P024 The role of experiments in quantum physics: teaching module on photoelectric effect and Franck-Hertz experiment**  
Giovanni Ravaioli<sup>1</sup>, Giulia Tasquier<sup>2</sup>, <sup>1</sup>*University of Bologna, Bologna, Emilia-Romagna, Italy,* <sup>2</sup>*University of Bologna, Bologna, Emilia-Romagna, Italy*
- P025 Interactive demonstrative lectures in online teachers training**  
Mario Humberto Ramírez Díaz<sup>1</sup>, <sup>1</sup>*CICATA-IPN, Mexico City, Mexico*
- P026 Comparative study between the representations' of physics teachers on matter and those developed during history**  
Abdeljalil Métioui<sup>1</sup>, Louis Trudel<sup>1</sup>, Mireille Baulu Mac Willie<sup>1</sup>, <sup>1</sup>*Université du Québec à Montréal, Montreal, Quebec, Canada,* <sup>2</sup>*Université d'Ottawa, Ottawa, Ontario, Canada,* <sup>3</sup>*Université Sainte-Anne, Pointe-de-l'Église, Nouvelle Écosse, Canada*
- P027 Impact of the 10 year National Teacher Programmes organised for Hungarian physics teachers at CERN**  
Csaba Sükösd<sup>1,3</sup>, Beata Jarosievitz<sup>2</sup>, <sup>1</sup>*Roland Eötvös Physical Society, Budapest, Hungary,* <sup>2</sup>*Dennis Gabor College, Budapest, Hungary,* <sup>3</sup>*Budapest University of Technology and Economics, Budapest, Hungary*

- P028 Study of classical electrostatics from potentially significant teaching units**  
Renata Lacerda Caldas<sup>1</sup>, Nicolas Da Silva Mota<sup>1</sup>, <sup>1</sup>*IFFluminense, Rio de Janeiro/Campos dos Goytacazes, Brazil*
- P029 Practical course in school experiments for future physics teachers**  
Věra Koudelková<sup>1</sup>, Stanislav Gottwald<sup>1</sup>, <sup>1</sup>*Charles University, Prague, Czech Republic*
- P030 Live data-analysis in smartphone experiments with phyphox**  
Sebastian Kuhlen<sup>1</sup>, Simon Hütz<sup>1</sup>, Heidrun Heinke<sup>1</sup>, Christoph Stampfer<sup>1</sup>, <sup>1</sup>*RWTH Aachen University, Aachen, Germany*
- P031 Data collection and analysis process of science student teachers in a video-based laboratory in kinematics**  
Louis Trudel<sup>1</sup>, Abdeljalil Métioui<sup>2</sup>, <sup>1</sup>*University of Ottawa, Ottawa, Canada*, <sup>2</sup>*Université du Québec à Montréal, Montréal, Canada*
- P032 Starting points for a new physics curriculum**  
Vojtech Zak<sup>1</sup>, Petr Kolar<sup>1</sup>, <sup>1</sup>*Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic*
- P033 Fifty years of development of upper secondary level physics in Ireland**  
Damienne Letmon<sup>1</sup>, <sup>1</sup>*CASTel, Dublin City University, Dublin, Ireland*
- P034 The time in science: an interdisciplinary laboratorial approach**  
Vera Montalbano<sup>1,4</sup>, Antonella Castellini<sup>3</sup>, Alessandro Donati<sup>2</sup>, Emilio Mariotti<sup>1</sup>, Maria Alessandra Mariotti<sup>3</sup>, Antonella Porri<sup>4</sup>, Barbara Rossi<sup>4</sup>, Alice Severi<sup>1</sup>, Mauro Sirigu<sup>4</sup>, Stefano Veronesi<sup>5</sup>, <sup>1</sup>*Department of Physical Sciences, Earth and Environment, University of Siena, Siena, Italy*, <sup>2</sup>*Department of Biotechnology, Chemistry and Pharmacy, University of Siena, Siena, Italy*, <sup>3</sup>*Department of Information Engineering and Mathematics, University of Siena, Siena, Italy*, <sup>4</sup>*Association for Teaching Physics (AIF), Siena, Siena, Italy*, <sup>5</sup>*NEST Institute of Nanoscience, National Research Council (Cnr), Pisa, Italy*
- P035 The impact of teaching style and FCI gain on the performance in mechanics test**  
Carmel Azzopardi<sup>1</sup>, Liberato Camilleri<sup>1</sup>, Charles Bonello<sup>1</sup>, <sup>1</sup>*University of Malta, Msida, Malta*
- P036 Assessment of problem solving activity on modern physics in secondary school**  
Federica Minozzi<sup>1</sup>, Irene Marzoli<sup>1</sup>, <sup>1</sup>*Università di Camerino, Camerino (MC), Marche, Italy*
- P037 Using the electron-gas model in lower secondary schools - a binational Design-Based-Research-Project**  
Claudia Haagen-Schützenhöfer<sup>1</sup>, Jan-Phillip Burde<sup>2</sup>, Martin Hopf<sup>3</sup>, Verena Spatz<sup>4</sup>, Thomas Wilhelm<sup>2</sup>, <sup>1</sup>*University of Graz, Institute of Physics, Regional Educational Competence Centre, Graz, Austria*, <sup>2</sup>*Department of Physics Education Research, Goethe-University Frankfurt, Frankfurt, Germany*, <sup>3</sup>*University of Vienna, Austrian Education Competence Centre Physics, Vienna, Austria*, <sup>4</sup>*Didaktik der Physik, Fachbereich Physik, Technische Universität Darmstadt, Darmstadt, Germany*
- P038 Establishing the force concept inventory using free-text questions**  
Mark Parker<sup>1</sup>, Christine Leach<sup>1</sup>, David Sands<sup>2</sup>, Ross Galloway<sup>3</sup>, Sally Jordan<sup>1</sup>, <sup>1</sup>*The Open University, Milton Keynes, UK*, <sup>2</sup>*University of Hull, Hull, UK*, <sup>3</sup>*University of Edinburgh, Edinburgh, UK*
- P039 Scientific Literacy: The urgent need for an inquiry-based physics teaching to low class learners**  
Nicola Pizzolato<sup>1,2</sup>, Dominique Persano Adorno<sup>1</sup>, Onofrio Rosario Battaglia<sup>1</sup>, Claudio Fazio<sup>1</sup>, <sup>1</sup>*University of Palermo, Palermo, Italy*, <sup>2</sup>*ITET Pio La Torre, Palermo, Italy*
- P040 Students' use of representations in university modeling instruction - E&M**  
Daryl McPadden<sup>1</sup>, Eric Brewster<sup>1</sup>, <sup>1</sup>*Florida International University, Miami, FL, USA*, <sup>2</sup>*Drexel University, Philadelphia, PA, USA*

- P041 Assessment of student achievements in the form of group board game**  
Daniel Dziob<sup>1</sup>, <sup>1</sup>*Smoluchowski Institute of Physics, Jagiellonian University, Krakow, Poland*
- P042 The knowledge of the Hungarian students in the light of the Mechanics Baseline Test**  
Péter Tasnádi<sup>1</sup>, Csilla Wiener<sup>1</sup>, Péter Nagy<sup>2</sup>, <sup>1</sup>*ELTE, Budapest, Hungary*, <sup>2</sup>*GAMF, Kecskemét, Hungary*
- P043 Evaluation of final year grade 12 physics examination paper using Bloom's taxonomy**  
Abraham Motlhabane<sup>1</sup>, <sup>1</sup>*University of South Africa, Pretoria, South Africa*
- P044 Learning by Teaching: How big social-scientific events might support an inquiry-based physics lab**  
 Nicola Pizzolato<sup>1,2</sup>, Dominique Persano Adorno<sup>1</sup>, Onofrio Rosario Battaglia<sup>1</sup>, Claudio Fazio<sup>1</sup>, <sup>1</sup>*University of Palermo, Palermo, Italy*, <sup>2</sup>*ITET Pio La Torre, Palermo, Italy*
- P045 The Augmented Lecture: Benefits of supporting physics teaching with the theatre**  
 Marco Giliberti<sup>1</sup>, Dominique Persano Adorno<sup>2</sup>, Nicola Pizzolato<sup>2</sup>, Onofrio R. Battaglia<sup>2</sup>, Claudio Fazio<sup>2</sup>, <sup>1</sup>*University of Milan, Milano, Italy*, <sup>2</sup>*University of Palermo, Palermo, Italy*
- P046 Understanding informal physics environments through physics education research**  
Kathleen Hinko<sup>1</sup>, Claudia Fracchiolla<sup>2</sup>, <sup>1</sup>*Michigan State University, East Lansing, MI, USA*, <sup>2</sup>*National University of Ireland Galway, Galway, Ireland*
- P047 Sources of motivation of high school students for participation in physics competitions**  
Karel Kolar<sup>1</sup>, <sup>1</sup>*Charles University, Prague, Czech Republic*
- P048 Why pop culture may be important for learning physics?**  
Claudia Fracchiolla<sup>1</sup>, Noah Finkelstein<sup>1</sup>, Kathleen Hinko<sup>2</sup>, <sup>1</sup>*University of Colorado Boulder, colorado, USA*, <sup>2</sup>*Michigan State University, michigan, USA*
- P049 From primary schools to universities - physics for everyone in "Chain Experiment". Five years' evolution.**  
Tomasz Kolodziej<sup>1</sup>, Daniel Dziob<sup>1</sup>, Urszula Górka<sup>1,2</sup>, <sup>1</sup>*Smoluchowski Institute of Physics, Jagiellonian University, Kraków, Poland*, <sup>2</sup>*Donders Institute, Radboud University, Nijmegen, The Netherlands*
- P050 Artistic expression of physics - prospect of marriage between physics and art**  
Shinjiro Ogawa<sup>1</sup>, <sup>1</sup>*Waseda University High School, Tokyo, Japan*
- P051 Wondering with physics: Engage public and teachers in science communication**  
Vera Montalbano<sup>1,2</sup>, Anna Maria D'Onghia<sup>2</sup>, Maurizio Giombolini<sup>2</sup>, Riccardo Montorzi<sup>2</sup>, Barbara Rossi<sup>2</sup>, Mauro Sirigu<sup>2</sup>, <sup>1</sup>*Department of Physical Sciences, Earth and Environment, University of Siena, Siena, Italy*, <sup>2</sup>*Association for Teaching Physics (AIF), Siena, Italy*
- P052 Teaching of free, forced and damped oscillations through the construction of low cost prototypes and project based learning**  
Carlos Collazos<sup>1</sup>, <sup>1</sup>*Faculty of Natural Sciences, Colombian School of Engineering, Ak. 45 No. 205-59, Autopista Norte, Bogotá D. C., Colombia*