



Hosted By:  
**AUSTRALIA**  
**THAILAND**  
**INDONESIA**  
 Online Conference  
 5-9 December 2022

## CONFERENCE PROGRAM

### Monday 5<sup>th</sup> December 2022

AEDT 13:00-14:00 WITA 10:00-11:00 ICT 09:00-10:00	<b>Conference Welcome</b>
AEDT 14:00-14:50 WITA 11:00-11:50 ICT 10:00-10:50	<b>ICPE Medal Talk</b> <i>Considerations about the developments in physics education research over the last decades</i> <b>Roberto Nardi</b> (São Paulo State University, Brazil)  ICPE Medal awarded by Tetyana Antimirova (C14 Chair; Toronto Metropolitan University, Canada) Session Chair: Manjula Sharma (The University of Sydney, Australia)
AEDT 14:50-15:40 WITA 11:50-12:40 ICT 10:50-11:40	<b>KEYNOTE:</b> <i>How science education is challenged by social media and how it might respond</i> <b>Dietmar Höttecke</b> (Hamburg University, Germany)  <b>KEYNOTE:</b> <i>Addressing gender differences on physics assessment tasks</i> <b>Kate Wilson</b> (The University of New South Wales, Canberra, Australia) and David Low  Session Chair: Manjula Sharma (The University of Sydney, Australia)
AEDT 15:40-17:00 WITA 12:40-14:00 ICT 11:40-13:00	<b>Registration and orientation</b>

### Tuesday 6<sup>th</sup> December 2022

<b>Workshops</b>		
AEDT 09:00-10:30 WITA 06:00-07:30 ICT 05:00-16:30	<b>A1: Innovative physics teaching spaces</b> <b>Dr Alex Samarian, Prof Manjula Sharma</b> (The University of Sydney, Australia)	<b>B1: The use of toys in teaching school physics</b> <b>Dr Christine Preston</b> (The University of Sydney, Australia)
AEDT 11:00-12:30 WITA 08:00-09:30 ICT 07:00-08:30	<b>A2: Bringing computation into the classroom</b> Ian Johnston memorial workshop, <b>A/Prof Tristram Alexander, A/Prof Helen Johnston</b> (The University of Sydney, Australia)	<b>B2: Makerspaces in Physics</b> <b>Dr Helen Georgiou</b> (University of Wollongong, Australia), <b>A/Prof Pornrat Wattanakasiwich</b> (Chiang Mau University, Thailand)
<b>Break</b>		
AEDT 13:00-13:40 WITA 10:00-10:40 ICT 09:00-09:40	<b>PLENARY: Professor Chandralekha Singh</b> (University of Pittsburgh, United States) <i>Facilitating thinking and learning in and beyond the physics classrooms using research-based approaches</i> Session Chair: Elizabeth Angstmann (University of New South Wales, Australia)	

ICPE 2022 follows the IUPAP policy on conferences.

You can find the full policy at the following link: <https://iupap.org/conferences/conference-policies/>

**Tuesday 6<sup>th</sup> December 2022 continued**

**Contributed Talks**

AEDT 13:40-15:00 WITA 10:40-12:00 ICT 09:40-11:00	Stream A1 <b>ACTIVE ENGAGEMENT ONLINE</b> Session Chair: Alexander Mazzolini (Swinburne University of Technology, Australia)	Stream B1 <b>PRE-SERVICE TEACHER TRAINING</b> Session Chair: Jyoti Kaur (University of Western Australia, Australia)	Stream C1 <b>MOTIVATIONS AND ATTITUDES</b> Session Chair: Kate Jackson (University of New South Wales, Australia)
	<p><b>KEYNOTE:</b> <i>Active learning using online interactivity</i>  <a href="#">Margaret J. Wegener</a> (The University of Queensland, Australia) and Timothy J. McIntyre</p>	<p><b>KEYNOTE:</b> <i>How to optimize physics learning digital media to stimulate higher order thinking skill in the COVID-19 era</i>  <a href="#">Agus Suyatna</a> (University of Lampung, Indonesia)</p>	<p>16562 <i>Efficacy of a blended learning mastery progression cycle on student achievement and attitude in high school science</i>  <a href="#">Sam Roberson</a>, Martin Cooper (Australia)</p> <p>16563 - <i>Gifted learners: Strategies to support and engage gifted students in the senior high school physics classroom</i>  <a href="#">Andrew L. Roberts</a> (Australia)</p> <p>16417 <i>Promoting systems thinking skill in grade 10 students using scientific argumentation in the area of force and motion</i>  <a href="#">Sahachart Chuanjit</a>, Chaiyapong Ruangsuan (Thailand)</p> <p>16654 <i>Effect of interest in mathematics in students' decision to pursue physics for higher education</i>  <a href="#">Vijit V. Nautiyal</a>, Bhavna Vidhani, Ashish Tyagi (Australia, India)</p> <p>16416 <i>An attempt to quantify Pedagogical Content Knowledge for Japanese high school physics teachers</i>  <a href="#">Hideyuki Tanaka</a>, Yamato Hasegawa, Gaku Yamamoto, Fumiko Okiharu (Japan)</p> <p>16545 <i>Relationship between motivation and physics perceptions of eighth grade students</i>  <a href="#">Aysen Cesur</a>, M. Sait Gokalp, (Turkey)</p>
16388 <i>Learning practices through recursive questionnaires</i> <a href="#">Charlie V. Sarmiento</a> , Germano Maioli Penello, Lucas Sigaud (Brazil)		16357 <i>Difficulties of elementary school teachers for astronomy teaching</i> <a href="#">Cleberson José Cavalcanti</a> , Roberto Nardi (Brazil)	
16374 <i>Critical thinking development in physics courses by PBL in virtual collaboration environments</i> <a href="#">Laura Muñoz Salazar</a> , Mario Humberto Ramírez Díaz, Josip Slisko (Mexico)		16363 <i>The use of analogies by future physics teachers during activities of supervised internship</i> Murilo Henrique Alfredo Vieira, Fabiano Willian Parma, <a href="#">Roberto Nardi</a> (Brazil)	
16524 <i>Question-Solution-Reflection: A framework for encouraging reflection through linear multimedia</i> <a href="#">Petr Lebedev</a> , Christine Lindstrøm, Manjula Sharma (Australia)		16401 <i>Remote learning on DC circuit analysis by using the sets of video demonstrations and PhET simulations for preparing readiness of pre-service teachers</i> <a href="#">Thanida Sujatitham</a> , Jintawat Tanamatayarat (Thailand)	
		16602 <i>Co-designing interdisciplinary activities in initial teachers' education</i> <a href="#">Ľubomíra Valovičová</a> , Janka Medová (Slovakia)	
Q&A	Q&A	Q&A	Q&A

**Break**

AEDT 15:15-15:45 WITA 12:15-12:45 ICT 11:15-11:45	<b>Poster Session A</b> See page 9
---	---------------------------------------

**Tuesday 6<sup>th</sup> December 2022 continued**

**Contributed Talks**

AEDT 15:45-16:55 WITA 12:45-13:55 ICT 11:45-12:55	Stream A2 <b>TECHNOLOGY AND LABS</b> Session Chair: John Debs (The Australian National University, Australia)	Stream B2 <b>CAPACITY BUILDING FOR IN-SERVICE TEACHERS</b> Session Chair: Angela Fösel (Friedrich Alexander University of Erlangen-Nürnberg, Germany)	Stream C2 <b>ACTIVITIES AND LABS SUITABLE FOR SCHOOL STUDENTS</b> Session Chair: Andrew Roberts (Virtual Academy Teacher Catholic School Office, Australia)
	<p><b>KEYNOTE:</b> <i>A world of smartphone experiments with the app phyphox</i>  <b>Sebastian Staacks</b> (RWTH Aachen University, Germany), Dominik Dorsel, Heidrun Heinke, and Christoph Stampfer</p> <p>16420 <i>Phyphox smartphone labs in physics education: Breaking the vicious circle of student disengagement</i>  <b>Marina Milner-Bolotin</b>, Valery Milner (Canada)</p> <p>16413 <i>Effectiveness of using video analysis software in Introductory Physics</i>  <b>Fumiko Okiharua</b>, Yamato Hasegawab, Akizo Kobayashi (Japan)</p> <p>16400 <i>SSLEQ-Physics: Developing and validating a survey to measure student engagement in science laboratories</i>  <b>Srividya D Kota</b>, Jacinta den Besten, Jasmina Lazendic-Galloway, Manjula D. Sharma (Australia)</p>	<p>16375 <i>An online physics degree for science teachers</i>  <b>Elizabeth Angstmann</b> (Australia)</p> <p>16361 <i>The presence of physics education research outcomes in physics education programs in Angola</i>  <b>Josias da Assunção de Deus Oliveira</b>, Roberto Nardi (Brazil)</p> <p>16558 <i>Changing times mean changing professional development: How access to PD has changed in recent years for NSW high school physics teachers</i>  <b>Simon Crook</b> (Australia)</p> <p>16561 <i>Addressing skills shortages in middle school physical science teaching</i>  <b>Barbara McKinnon</b>, Bridget Blackburn, Neil Champion, Jane Coyle, John Cripps Clark (Australia)</p> <p>16508 <i>Benefits of year long placements of high school teachers at universities</i>  <b>Troy Garrett, Elizabeth Angstmann</b> (Australia)</p>	<p>16380 <i>Smartphone astrophotography</i>  <b>Andrew Fisher, Steven Hinckley</b> (Australia)</p> <p>16365 <i>Practices to imagine the shape dependence of electrical resistance</i>  <b>Michiya Shintsuruta</b>, Hirokazu Okubo, Tsutomu Iwayama (Japan)</p> <p>16668 <i>Astronomy during the school day</i>  <b>Paul Butler</b> (Australia)</p> <p>16371 <i>A study of students' learning pathways on the buoyant force through the CoSci learning platform</i>  <b>Wachirawut Wongsuwan</b>, Jiradawan Huntula, Chen-Chung Liu (Thailand)</p> <p>16382 <i>Teaching momentum and collision with high-speed videos</i>  <b>Theerawat Bunfong</b>, Pongrawee Phanbunplook, Phakin Buranakruea, Pornrat Wattanakasiwich (Thailand)</p>
Q&A	Q&A	Q&A	Q&A

**Break**

**Workshops**

AEDT 17:30-19:00 WITA 14:30-16:00 ICT 13:30-15:00	<b>A3: Advanced Physics Laboratories Workshop: Challenges and Opportunities</b> <b>A/Prof Tetyana Antimirova</b> (Toronto Metropolitan University, Canada)	<b>B3: Introduction to Active Learning in Optics and Photonics (ALOP): A Virtual Workshop, Part 1</b> <b>Prof Alex Mazzolini</b> (Swinburne University, Australia), <b>Prof David Sokoloff</b> (University of Oregon, USA)
---	---	---

### Wednesday 7<sup>th</sup> December 2022

#### Workshops

AEDT 09:00-10:30 WITA 06:00-07:30 ICT 05:00-16:30	C1: <b>Going deeper with PhET interactive simulations (academics)</b> <b>Dr Ariel Paul</b> (University of Colorado Boulder, USA)	D1: <b>Einstein First</b> <b>Prof David Blair, Dr Jyoti Kaur</b> (The University of Western Australia, Australia)
AEDT 11:00-12:30 WITA 08:00-09:30 ICT 07:00-08:30	C2: <b>Increasing student motivation in astronomy; Online and in the classroom</b> <b>Dr Kate Jackson</b> (University of New South Wales, Australia)	D2: <b>STEP-UP</b> <b>Joe Muise</b> (high school physics, Canada)

#### Break

AEDT 13:00-13:40 WITA 10:00-10:40 ICT 09:00-09:40	<b>PLENARY: Dr Derek Muller</b> (Veritasium) <i>Revolutions in education</i> Session Chair: <b>Manjula Sharma</b> (The University of Sydney, Australia)
---	---

#### Contributed Talks

Time	Stream D1 <b>RESEARCH, STUDENT MINDSET, WELL-BEING AND ENGAGEMENT</b> Session Chair: <b>Kate Wilson</b> (University of New South Wales, Canberra, Australia)	Stream E1 <b>CULTURAL SIDE OF TEACHER TRAINING</b> Session Chair: <b>Maria Parappilly</b> (Flinders University, Australia)	Stream F1 <b>NEW SYLLABI AND ENROLMENT CHOICES</b> Session Chair: <b>Helen Johnston</b> (The University of Sydney, Australia)
AEDT 13:40-14:50 WITA 10:40-11:50 ICT 09:40-10:50	<b>KEYNOTE: Changing classroom culture through short belonging and mindset activities</b> <b>Z. Yasemin Kalender</b> (Rochester Institute of Technology, United States)	<b>KEYNOTE: Incorporating Balinese Indigenous science into the classroom to promote physics education based on local wisdom</b> <b>I Wayan Suastra</b> (Ganesha University of Education, Bali-Indonesia) and <b>I Gede Arjana</b>	<b>KEYNOTE: Online French Physical Society questionnaire: A way to identify students' difficulties at the entrance at university</b> <b>Estelle Blanquet</b> (University of Bordeaux, France) and <b>Daniel Hennequin</b>
	16338 <i>Fostering a growth mindset in physics</i> <b>Laura Goldhorn</b> , <b>Thomas Wilhelm</b> , <b>Verena Spatz</b> (Germany)	16414 <i>Cultural Astronomy: A possibility for teacher training</i> <b>Milton Soares dos Santos</b> , <b>Roberto Nardi</b> (Brazil)	16605 <i>Exploring the change across a generation: First-year Physics students' conceptions and study approaches between 2002-2018</i> <b>Jules Rankin</b> , <b>Helen Georgiou</b> , <b>Gabriel Nguyen</b> , <b>Manjula D. Sharma</b> (Australia)
	16531 <i>Understanding student engagement: Improving enrolments and grades in the high school Physics classroom</i> <b>Stephen Pinel</b> (Australia)	16366 <i>Brazilian physics education curriculum from a decoloniality lens</i> <b>Carlos Mometti</b> , <b>Tanja Tajmel</b> , <b>Mauricio Pietrocola</b> (Brazil)	16580 <i>What goes around comes around: Perspectives on different physics curricula in Australia</i> <b>Helen Georgiou</b> , <b>Jessy Abraham</b> , <b>Maree Skillen</b> (Australia)
	16583 <i>"What do I get out of It?": Characterising students' main takeaways from a physics class for non-STEM students</i> <b>Ali Mazrui</b> , <b>Emily Stump</b> , <b>Matthew Dew</b> , <b>Natasha Holmes</b> (USA)	16577 <i>Informal physics with the MENA region and public</i> <b>Shams El-Adawy</b> , <b>Maryam H. Esmat</b> , <b>George Iskander</b> (USA)	16575 <i>Explicit teaching of models to enrich physical science learning</i> <b>Barbara McKinnon</b> , <b>Neil Champion</b> , <b>John Cripps Clark</b> , <b>Colin Hopkins</b> , <b>Dan O'Keeffe</b> (Australia)
	Q&A	Q&A	Q&A

#### Break

### Wednesday 7<sup>th</sup> December 2022 continued

AEDT 15:05-15:45 WITA 12:05-12:45 ICT 11:05-11:45	<b>PANEL: <i>Increasing gender diversity among students in physics</i></b> Session Chair: Manjula Sharma (The University of Sydney)  <b>Panellists:</b> <b>Gillian Butcher</b> (University of Leicester, UK), <b>Tegan Clark</b> (Australian National University and IncludeHER, Australia), <b>Margaret Samiji</b> (University of Dar Es Salaam, Tanzania)	
AEDT 15:45-16:15 WITA 12:45-13:15 ICT 11:45-12:15	<b>Poster Session B</b> See page 10	
AEDT 16:15-16:45 WITA 13:15-13:45 ICT 12:15-12:45	<b>Poster Session C</b> See page 11	
<b>Break</b>		
<b>Workshops</b>		
AEDT 17:30-19:00 WITA 14:30-16:00 ICT 13:30-15:00	<b>C3: <i>Belonging in Physics</i></b> <b>Jacinta den Besten</b> (The University of Melbourne, Australia), <b>Elizabeth Angstmann</b> (University of New South Wales, Australia)	<b>D3: <i>Introduction to Active Learning in Optics and Photonics (ALOP): A Virtual Workshop, Part 2</i></b> <b>Prof Alex Mazzolini</b> (Swinburne University, Australia), <b>Prof David Sokoloff</b> (University of Oregon, USA)
AEDT 19:30-21:00 WITA 16:30-18:00 ICT 15:30-17:00	<b>C4: <i>Novel ways to utilise quiz tools</i></b> <b>A/Prof Elizabeth Angstmann</b> (University of New South Wales, Australia)	<b>D4: <i>Using LEGO race cars in the Physics lab</i></b> <b>Prof Maria Parappilly</b> (Flinders University, Australia), <b>Stephanie Mayes</b> (Flinders University, Australia)

### Thursday 8<sup>th</sup> December 2022

<b>Workshops</b>		
AEDT 09:00-10:30 WITA 06:00-07:30 ICT 05:00-16:30	<b>E1: <i>Finding helpful resources for physics teaching on PhysPort</i></b> <b>Dr Sam McKagan, Dr Adrian Madsen</b> (PhysPort, USA)	<b>F1: <i>Going deeper with PhET interactive simulations (school teachers)</i></b> <b>Dr Ariel Paul</b> (University of Colorado Boulder, USA)
AEDT 11:00-12:30 WITA 08:00-09:30 ICT 07:00-08:30	<b>E2: <i>The power of virtual reality for physics (and STEM) education</i></b> <b>Dr John Debs</b> (Australian National University, Australia)	<b>F2: <i>Do less to boost students' performance</i></b> <b>Paul Looyen</b> (CrookED Science, Australia), <b>Catherine Zhou</b> (high school physics, Jakarta Intercultural School, Indonesia)
<b>Break</b>		
AEDT 13:00-13:40 WITA 10:00-10:40 ICT 09:00-09:40	<b>PLENARY: Professor Nam-Hwa Kang</b> (Korea National University of Education, South Korea) <i>Future of physics teaching practices: How new and emerging educational technologies mediate teaching and learning</i> Session Chair: Jacinta den Besten (University of Melbourne, Australia)	

**Thursday 8<sup>th</sup> December 2022 continued**

**Contributed Talks**

AEDT 13:40-14:50 WITA 10:40-11:50 ICT 09:40-10:50	Stream G1 <b>MOVING ONLINE</b> Session Chair: Nam-Hwa Kang (Korea National University of Education, South Korea)	Stream H1 <b>QUANTUM AND COMPUTATIONAL</b> Session Chair: Margaret Wegener (The University of Queensland, Australia)	Stream I1 <b>OUTREACH</b> Session Chair: Pornrat Wattanakasiwich (Chiang Mai University, Thailand)
	<p>16323 <i>Making effective videos for (live) online learning quickly</i>  <a href="#">Robert R. Kellner</a> (Germany)</p> <p>16390 <i>Development of a choose-your-own adventure physics course</i>  <a href="#">Kate Jackson</a>, Thomas Dixon, Elizabeth Angstromann (Australia)</p> <p>16518 <i>Changes in the use of resources in teaching physics due to the influence of distance learning</i>  <a href="#">Tünde Kiss</a> (Slovakia)</p> <p>16576 <i>Challenging and supporting student learning during COVID-19: Optics relevant to optometry and vision science</i>  <a href="#">Maitreyee Roy</a> (Australia)</p> <p>16402 <i>Using an in-class project to enhance high school students' learning about galaxies in an online physics classroom</i>  <a href="#">Arune Eambaipreuk</a>, Somsak Techakosit (Thailand)</p>	<p>16345 <i>Deriving electromagnetism from special relativity: A novel teaching-learning module</i>                      Marco Di Mauro, Salvatore Esposito, <a href="#">Adele Naddeo</a> (Italy)</p> <p>16370 <i>Levitating Dzhaniibekov effect on Earth: Classroom demonstrations</i>  <a href="#">Adam Bzdak</a>, Paweł Janowski (Poland)</p> <p>16551 <i>Development of a general education course on quantum information science</i>  <a href="#">Hongbin Song</a> (China)</p> <p>16550 <i>The role of pragmatic and epistemic agency in supporting engagement in computational physics practices</i>  <a href="#">Anna McLean Phillips</a>, Ezra Gouvea, Brian Gravel, P.-H. Bauchemin, Timothy Atherton (Australia, USA)</p> <p>16542 <i>Recasting the pedagogy of derivations as loading of reality into mathematics</i>  <a href="#">Shanize Forte</a>, Ravi Sinha, Aamir Sahil Chandroth, Sanjay Chandrasekharan, K.K. Mashood (India)</p>	<p><b>KEYNOTE:</b> <i>Promoting scientific thinking in children with magic and toys</i>  <a href="#">Pongsorn Saipetch</a> (Mahidol University International College, Thailand)</p> <p>16381 <i>Exponential thinking for early understanding of the scale of the universe</i>  <a href="#">Anastasia Popkova</a>, David Blair (Australia)</p> <p>16322 <i>High school excursions to a university physics laboratory</i>  <a href="#">Thomas Dixon</a>, Neil Lawrence, Harry Rathbone and Elizabeth Angstromann (Australia)</p> <p>16800 <i>The International Particle Physics Outreach Group: Engaging the world with science</i>  <a href="#">Jackie Bondell</a> and Steven Goldfarb (on behalf of the IPPOG Collaboration, Switzerland/Australia)</p>
	Q&A	Q&A	Q&A

**Break**

AEDT 15:05-15:45 WITA 12:05-12:45 ICT 11:05-11:45	<p><b>PANEL: Lessons Learned from COVID-19: What works for online physics teaching and learning?</b>                      Session Chair: Jacinta den Besten (The University of Melbourne, Australia)</p> <p><b>Panellists:</b> <a href="#">Svetlana Postnova</a> (The University of Sydney, Australia), <a href="#">Sukrit (Nick) Sucharitakul</a> (Chiang Mai University, Thailand), and <a href="#">Bethany Wilcox</a> (University of Boulder Colorado, USA)</p>
---	--

**Thursday 8<sup>th</sup> December 2022 continued**

**Contributed Talks**

AEDT 15:45-16:55 WITA 12:45-13:55 ICT 11:45-12:55	Stream G2 <b>HISTORY AND NATURE OF SCIENCE</b> Session Chair: Joanna Turner (University of Southern Queensland, Australia)	Stream H2 <b>CUTTING EDGE RESEARCH</b> Session Chair: Anna Phillips (Monash University, Australia)	Stream I2 <b>SCHOOLS AND OUTREACH</b> Session Chair: Steven Hinckley (Edith Cowan University, Australia)
	16425 <i>Training teachers for new ways of understanding the teaching of physics from its mathematization</i> <b>Olga Lucía Castiblanco Abril</b> , Luis Sebastián González Aldana (Colombia)	16674 <i>Exploring high school students' emotions in energy illustrations by using EDA Sensors</i> <b>Eman Sharaf</b> , Martin Hopf (Austria)	16354 <i>"The elegance of quantum mechanics": An at-distance proposal for secondary school students</i> <b>Marco Giliberti</b> , Ester Melli, Luisa Lovisetti (Italy)
	16385 <i>Active learning and historical research on educational methods in fluid pressure in 150th anniversary of the Japanese school systems</i> <b>Akizo Kobayashi</b> , Fumiko Okiharu (Japan)	16671 <i>Training in the inhibition of heuristics in physics education</i> <b>Cédric Vanhoolandt</b> , Arnaud Vervoort, Jim Plumet (Belgium)	16344 <i>Introducing the basic concepts of general relativity in high schools</i> <b>Marco Di Mauro</b> , Adele Naddeo, (Italy)
	16415 <i>From a federal road to Newton's laws</i> <b>Arthur Vinícius Resek Santiago</b> , Cristiano Mattos (Brazil)	16511 <i>Eye-tracking analysis of the educational effect of refutation text in reading science texts: Case of celestial movements and seasonal changes</i> <b>Hideto Hagiwara</b> , Shuji Ukon, Fumiko Okiharu (Japan)	16342 <i>"I (critically) think, therefore I am": Thomson's atomic model and the ineffectiveness of physics education</i> <b>Luisa Lovisetti</b> , Marco Giliberti, (Italy)
	16544 <i>Interdisciplinary practices in natural sciences teaching: An integration of Biology and Physics contents</i> Ruan das Flores de Azevedo, <b>Mayara Moretti Vieira Palmieri</b> (Brazil)	16519 <i>Tool for assessing the level of critical thinking</i> <b>Klára Velmovská</b> , Anna Trúsiková, (Slovakia)	16661 <i>Newtonian free fall with an Einsteinian view</i> <b>Alessandro D.A.M. Spallicci</b> , (France)
	16553 <i>Inquiry-based bilingual physics course for the IBDP Teacher Education Programme</i> <b>Yu Lim Chen</b> (Taiwan)	16565 <i>Analysis of kinematics graph interpretation skills using RapidMiner</i> <b>Kanokporn Intakaew</b> , Pornrat Wattanakasiwich (Thailand)	16579 <i>Student understanding of the direction of force due to atmospheric pressure: A tale of two models</i> <b>Prithu Raj Ghosh</b> , Tripti Bameta, Deepa Chari, K.K. Mashood (India)
	Q&A	Q&A	Q&A

**Break**

**Workshops**

AEDT 17:30-19:00 WITA 14:30-16:00 ICT 13:30-15:00	E3: <i>Using instructional videos to improve physics education</i> <b>Prof Christoph Kulgemeyer</b> (University of Bremen, Germany)	F3: <i>Helping students generate physics inquiry problems</i> <b>Prof Jongwon Park</b> (Chonnam National University, South Korea), <b>Prof Nam-Hwa Kang</b> (Korea National University of Education, South Korea)
AEDT 19:30-21:00 WITA 16:30-18:00 ICT 15:30-17:00	E4: <i>Collaborative science inquiry with the CoSci virtual lab</i> <b>Prof Chen-Chung Liu</b> (National Central University, Taiwan), <b>A/Prof Chia-Hui Cheng</b> (National Tsing Hua University, Taiwan)	F4: <i>Research techniques for school teachers</i> <b>A/Prof Sura Wuttiptom</b> (Ubon Ratchathani University, Thailand), <b>A/Prof Umporn Wutchana</b> (Ramkhamhaeng University, Thailand) In Thai language

## Friday 9<sup>th</sup> December 2022

AEDT 13:00-13:40 WITA 10:00-10:40 ICT 09:00-09:40	<b>Student Panel discussion</b> Session Chair: Kate Jackson (University of New South Wales, Australia)  <b>Panellists:</b> <a href="#">Tracy Bu</a> (The University of Melbourne, Australia), <a href="#">Dwika Sarnia Putri</a> (Sebelas Maret University, Indonesia), <a href="#">Emma Collins</a> (The University of New South Wales, Australia), <a href="#">Arnoldas Solovjovas</a> (Vilnius University, Lithuania), <a href="#">Anna Klampfer</a> (Technical University of Vienna, Austria)
---	--

### Contributed Talks

AEDT 13:40-14:50 WITA 10:40-11:50 ICT 09:40-10:50	Stream J1 <b>STUDENT WELL-BEING AND CATERING FOR DIVERSITY</b> Session Chair: Wade Naylor (Australian Catholic University, Australia)	Stream K1 <b>LABORATORY PROGRAMS</b> Session Chair: Tetyana Antimirova (Toronto Metropolitan University, Canada)	Stream L1 <b>NOVEL TEACHING IDEAS</b> Session Chair: Thomas Dixon (University of New South Wales, Australia)
	<b>KEYNOTE:</b> <i>Aspects of physics competitions in Thailand: Upsides, downsides and overcoming</i> <a href="#">Wittaya Kanchanapusakit</a> (King Mongkut's University of Technology Thonburi, Thailand)	<b>KEYNOTE:</b> <i>The DigiPhysLab-project: Digital physics laboratory work for on-campus and distance learning</i> <a href="#">Antti Lehtinen</a> (University of Jyväskylä, Finland), Pekka Pirinen, Simon Z. Lahme, Pascal Klein, Ana Susac, and Bruno Tomrlin	16569 <i>Board game Dixit as a tool for development of students' physics concepts</i> <a href="#">Ladislav Janiga</a> , Viera Haverlíková (Slovakia)
	16512 <i>Women perceive less peer recognition than men controlling for actual peer recognition</i> <a href="#">Meagan Sundstrom</a> , N. G. Holmes (USA)	16578 <i>An instrument to guide instructors of undergraduate experimental programs: A comment on findings from physics</i> <a href="#">Alexandra Yeung</a> , Scott Cornish, Ana T. Lopes, <a href="#">Manjula Sharma</a> (Australia)	16387 <i>Coleta Certa: Modern board game about radioactive waste</i> <a href="#">Ana Caroline Chagas de Almeida</a> , Deise Miranda Vianna (Brazil)
	16672 <i>Social Learning and Project-Based Learning at university: Complexity and non-linear approaches to cognitive diversity and diverse levels of physics learners</i> <a href="#">Manuel A. B. Bache</a> (Spain)	16532 <i>Post-COVID junior physics lab: The new normal</i> <a href="#">Alexander Samarian</a> , <a href="#">Svetlana Postnova</a> (Australia)	16393 <i>The students' problem-solving through STEM activities, walking monsters</i> <a href="#">Kanchanok Soikum</a> , Jiradawan Huntula (Thailand)
	16409 <i>Differences in understanding of mechanics concepts between high school students who choose 'advanced physics' and those who do not</i> <a href="#">Anju Kouno</a> , Shuji Munejiri (Japan)	16527 <i>Post-COVID junior physics lab: The new normal</i> <a href="#">Alexander Samarian</a> , <a href="#">Svetlana Postnova</a> (Australia)	16527 <i>Escape room as a stimulus for experimental activity</i> <a href="#">Tatiana Sukeřová</a> , Klára Velmovská (Slovakia)
	16326 <i>Online laboratory</i> <a href="#">Shirish Pathare</a> , Bhagyashri Latad, Saurabhee Huli (India)	16378 <i>Development of a science show incorporating dance expression</i> <a href="#">Miki Igarashi</a> , Yasufumi Kawamura (Japan)	
	Q&A	Q&A	Q&A

### Break

AEDT 15:05-15:35 WITA 12:05-12:35 ICT 11:05-11:35	<b>Conference close</b>
---	-------------------------



**Poster Session A: Tuesday 6<sup>th</sup> December 2022** 15:15-15:45 (AEDT), 12:15-12:45 (WITA), 11:15-11:45 (ICT)

**A1: LABORATORY EXERCISES**

- 16566 *Using a laser pointer to demonstrate the decrease in the wavelength of light in water*  
 Stephen Hughes, Margaret Wegener, Som Gurung (Australia/Bhutan)
- 16564 *Thermal conductivity: Concept and apparatus*  
 Alexander Samarian, Adam Israel, Manjula D. Sharma (Australia)
- 16568 *The impact of inquiry based laboratories on improving pre-service teachers' experimental competency*  
 Thanh Loan Nguyen, Van Bien Nguyen, Ngoc Chat Tran (Vietnam)

**A2: MEDICAL PHYSICS AND SEISMOLOGY**

- 16559 *Teaching medical radiation physics during the COVID-19 pandemic*  
 Pradip Deb (Australia)
- 16509 *Medical physics as an anchor for physics learning*  
 Jessica M. Fagerstrom (USA)
- 16716 *Activities for the incorporation of seismology in physics education*  
 Ruth Paulina Martínez Victoria (Mexico)

**A3: TEACHER TRAINING**

- 16394 *Engineering professors' conceptions on basic topics of electromagnetism in Mexico*  
 Felipe López-Garduza, Mario H. Ramírez Díaz, Luis G. Cabral-Rosetti (Mexico)
- 16546 *Bilingualism in physics teaching for a Deaf preservice teacher*  
 Danila Ribeiro Gomes, Carlos Antonio Jacinto, Cristiano Mattos (Brazil)
- 16403 *Case study: Physics gifted students' use of multiple representation in problem solving*  
 Sayyai Chaiwan, Pornrat Wattanakasiwich (Thailand)

**A4: ACTIVITIES FOR SCHOOL CLASSROOMS**

- 16405 *Effectiveness of using momentum vector diagrams to teach collisions*  
 Trai Unyapoti, Kwan Arayathanitkul, Narumon Emarat (Thailand)
- 16407 *Mechanical wave concepts of Thai high school students: Comparing learned and unlearned groups*  
 Supachoke Puttisanwimona, Sura Wuttiptom (Thailand)
- 16418 *Practical report on energy and environmental education using the contents of the "STEAM Library"*  
 Kazumitsu Sakurai, Yasufumi Kawamura (Japan)

**A5: TEACHING METHODOLOGIES AND RESEARCH**

- 16362 *The use of active methodologies in the Physics Teaching and Learning process: Initiation of scientific research in science and technology*, Pedro Sérgio Rosa, Aguinaldo Robinson de Souza (Brazil)
- 16543 *Translation and adaptation of "Study Processes Questionnaire for Physics" to the Turkish language*  
 Hilal Sultan Alkan, M. Sait Gokalp (Turkey)
- 16557 *A tool to strategise undergraduate physics teaching*  
 Chitrabhanu Nanduri, Gouripeddi Sai Preeti (India)

**A6: CURRICULUM DESIGN**

- 16408 *Master of Science in Physics Education at the University of Guadalajara: The curricular design process*  
 José Luis Santana Fajardo, Liliana Vázquez Mercado, María Elena Rodríguez Pérez (Mexico)
- 16522 *The quality of feedback and its influence on the preparation of the future teacher*  
 Barbora Gejdošová, Klára Velmovská (Slovakia)
- 16717 *Interview survey of first-year university students on mechanical wave propagation: Analysis of the thought process in solving a problem*, Asuka Hamada, Shuji Munejiri (Japan)

**Poster Session B: Wednesday 7th December 2022** 15:45-16:15 (AEDT), 12:45-13:15 (WITA), 11:45-12:15 (ICT)

**B1: LABORATORY EXERCISES**

- 16404 *A study of horizontal circular motion by using a wireless sensor kit*  
Teewin Mahachok, Surawut Wicharn, Chokchai Puttharugsa, Suwan Plaipichit (Thailand)
- 16302 *Physics experiments with internal or external sensors using self-made apps for the smartphone*  
Akira Adachi (Japan)
- 16520 *The development of scientific concept on the topic of buoyant force for grade 12 students using the buoyant force experiment set, Nattapong Joysriket, Jiradawan Huntula (Thailand)*

**B2: ACTIVITIES FOR SCHOOL CLASSROOMS**

- 16332 *STEM approach to teaching and learning physics at high school: A damped oscillation application of tuned mass damper, Savrin Thy, Tsutomu Iwayama (Japan)*
- 16567 *Siphons and climate change*  
Stephen Hughes (Australia)
- 16384 *Real simple harmonic motion problem solving with high-speed videos*  
Peem Ubonsri, Theerawat Bunfong, Pornrat Wattanakasiwich (Thailand)

**B3: SCHOOL SYLLABI AND CLASSROOMS**

- 16554 *Implementation of the Queensland 2019 Physics syllabus*  
David Madden, Amber Salmon (Australia)
- 16560 *Motivation and metacognitive science learning constructs of eighth grade students*  
Esra Harsi, M. Sait Gokalp (Turkey)
- 16406 *Online teaching sequences and inquiry levels during the COVID-19 pandemic: A case study of Thai pre-service physics teachers, Kreetha Kaewkhong (Thailand)*

**B4: ELECTROMAGNETISM AND RELATIVITY**

- 16398 *Revisiting the image of a magnetic dipole in front of a superconducting sphere*  
Hemansh Alkesh Shah, Kolahal Bhattacharya (India)
- 16538 *The displacement current between the plates of a capacitor and electromagnetic waves*  
Toshio Hyodo (Japan)
- 16676 *Analysis of the relativistic dynamics approach in high school and university textbooks*  
Richard González, María Rita Otero, Marcelo Arlego (Argentina/Uruguay)

**B5: TEACHER TRAINING**

- 16329 *A longitudinal study on the development of the professional identity of future physics teachers*  
Jéssica dos Reis Belíssimo, Roberto Nardi (Brazil)
- 16330 *Study of the professional profiles and teacher training of physics teachers between Chile and Mexico*  
Mario Humberto Ramírez Díaz, Jhonny Alexis Medina Contreras, Irene Gómez Jiménez (Mexico/Chile)
- 16574 *STEM subjects and Generation Alpha*  
Renata Holubova (Czech Republic)

**Poster Session C: Wednesday 7th December 2022** 16:15-16:45 (AEDT), 13:15-13:45 (WITA), 12:15-12:45 (ICT)

**C1: ADAPTING TO COVID**

- 16313 *A culturally diverse learners' conceptual physics progression: A COVID transition in 2020 and onwards*  
Wade Naylor, Emanuela Carleschi, Anna Chrysostomou, Alan S. Cornell (Australia)
- 16475 *Online Mode: A challenge for students and teachers*  
Shirish. R. Pathare, Saurabhee Huli (India)
- 16506 *Engaging students' experiences of practical activities with simulation lab during the COVID-19 pandemic: A sample with direct current circuits*, Chanwit Kamcharean, Kuanhathai Kuadnok (Thailand)

**C2: SCHOOL STUDENT PEDAGOGIES**

- 16356 *The everyday scientific dialogue in physics teaching from the Freirean perspective*  
Graziele Aparecida Correa Ribeiro, Thaís Rafaela Hilger (Brazil)
- 16555 *Finding assessment regimes in an instructional system*, Dina Izadi, Rojan Abdollahzade Mirali, Ramin Abdollahzadeh, Kiana Kamali Poorshiraz, Yas Meshkin, Seyed Zahra Hosseini (Iran)
- 16556 *Developing student's conception of Refraction of Light in grade eleven by Predict –Share– Observe –Explain approach (PSOE)*, Thitisan Buchathip, Jiradawan Huntula (Thailand)

**C3: ACTIVITIES FOR SCHOOL CLASSROOMS**

- 16426 *The study of grade eleven student's representations of electricity through model-based inquiry*  
Wilaiporn Boonmak, Jiradawan Huntula (Thailand)
- 16547 *Particle physics and its applications in schools*  
Aesha Bhansali (Australia)
- 16399 *The teachers' problem-solving process in applying the specific application of physics on a STEM activity through Open Approach*, Pisit Sansook, Jiradawan Huntula (Thailand)

**C4: HISTORY AND NATURE OF SCIENCE**

- 16660 *Teaching fluid mechanics at university: How history of science can help*  
Clément Crastes (France)
- 16340 *A case study on the teaching of Physics of Sound and Acoustics in Brazilian federal public universities*  
Roberto Barreto de Moraes, Deise Miranda Vianna (Brazil)
- 16364 *Gender issues in science for physics teacher educators: The case of Antonia Maury and her star catalog*  
Lisbeth Lorena Alvarado Guzmán, Roberto Nardi (Brazil)

**C5: ASTRONOMY FOR TEACHERS AND SCHOOL STUDENTS**

- 16336 *Origin of the universe: Speech by teacher graduates in physics*  
Matheus Henriques Ribeiro de Aguiar, Roberto Nardi (Brazil)
- 16395 *Introduction to astronomy didactics for basic education teachers using the Diary of the Sky as a methodological strategy*, Telma Cristina Dias Fernandes, Roberto Nardi, Nicoletta Lanciano (Brazil)
- 16737 *Out of this world with high school physics education (International Space Station experiments)*  
Sara Webb, Rebecca Allen (Australia)

# PARTNERS OF THE IUPAP INTERNATIONAL CONFERENCE ON PHYSICS EDUCATION 2022

## CO-HOSTS



**International Commission on Physics Education (C14)**  
<https://iupap.org/who-we-are/internal-organization/commissions/c14-physics-education/>



**UNSW**  
 SYDNEY

**The University of New South Wales**  
 Sydney NSW 2052, Australia  
<https://www.unsw.edu.au/>



**Khon Kaen University**  
 มหาวิทยาลัยขอนแก่น  
 Muang District, Khon Kaen  
 40002, Thailand  
<https://www.kku.ac.th/>



**Institute for Research and Development in Teaching Profession for ASEAN**  
 Muang District, Khon Kaen  
 40002, Thailand  
<https://ednet.kku.ac.th/>



**University of Mataram**  
 Universitas Mataram  
 Mataram, West Nusa Tenggara, Indonesia  
<https://unram.ac.id/>

## SPONSORS



**International Union of Pure and Applied Physics**  
<https://iupap.org/>



**Chiang Mai University**  
 มหาวิทยาลัยเชียงใหม่  
 Muang District, Chiang Mai  
 50200, Thailand  
<https://www.cmu.ac.th/en/>



**THE UNIVERSITY OF SYDNEY**

**The University of Sydney**  
 Sydney NSW 2006, Australia  
<https://www.sydney.edu.au/>



**The University of Melbourne**  
 Parkville VIC 3010,  
 Australia  
<https://www.unimelb.edu.au/>