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

CONFERENCE PROGRAM

Monday 5th December 2022	
AEDT 13:00-14:00 WITA 10:00-11:00 ICT 09:00-10:00	**Conference Welcome** Chair: Helen Johnston (The University of Sydney, Australia)
AEDT 14:00-14:50 WITA 11:00-11:50 ICT 10:00-10:50	**ICPE Medal Talk** *Considerations about the developments in physics education research over the last decades* Roberto Nardi (São Paulo State University, Brazil) ICPE Medal awarded by Tetyana Antimirova (C14 Chair; Toronto Metropolitan University, Canada) Session Chair: Elizabeth Angstmann (University of New South Wales, Australia)
AEDT 14:50-15:40 WITA 11:50-12:40 ICT 10:50-11:40	**KEYNOTE:** *How science education is challenged by social media and how it might respond* Dietmar Höttecke (Hamburg University, Germany) **KEYNOTE:** *Addressing gender differences on physics assessment tasks* Kate Wilson (The University of New South Wales, Canberra, Australia) and David Low Session Chair: Elizabeth Angstmann (University of New South Wales, Australia)
AEDT 15:40-17:00 WITA 12:40-14:00 ICT 11:40-13:00	**Registration and orientation** This is the time to pop into the Zoom and meet our brilliant Technical Team members. A drop-in session to chat with the team and receive technical assistance if needed.

Tuesday 6th December 2022		
Workshops		
AEDT 09:00-10:30 WITA 06:00-07:30 ICT 05:00-16:30	A1: ***Innovative physics teaching spaces*** **Dr Alex Samarian, Prof Manjula Sharma** (The University of Sydney, Australia)	B1: ***The use of toys in teaching school physics*** **Dr Christine Preston** (The University of Sydney, Australia)
AEDT 11:00-12:30 WITA 08:00-09:30 ICT 07:00-08:30	A2: ***Bringing computation into the classroom*** Ian Johnston memorial workshop, **A/Prof Tristram Alexander, A/Prof Helen Johnston** (The University of Sydney, Australia)	B2: ***Makerspaces in Physics*** **Dr Helen Georgiou** (University of Wollongong, Australia), **A/Prof Pornrat Wattanakasiwich** (Chiang Mau University, Thailand)
Break		
AEDT 13:00-13:40 WITA 10:00-10:40 ICT 09:00-09:40	**PLENARY: Professor Chandralekha Singh** (University of Pittsburgh, United States) *Facilitating thinking and learning in and beyond the physics classrooms using research-based approaches* 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/

Time zones: **AEDT** (Australian Eastern Daylight Time)**, WITA** (Central Indonesian Time)**, ICT** (Indochina Time)

Tuesday 6th December 2022 continued

Contributed Talks

AEDT 13:40-15:00 WITA 10:40-12:00 ICT 09:40-11:00	Stream A1 **ACTIVE ENGAGEMENT ONLINE** Session Chair: Barbara McKinnon (Vicphysics Teachers' Network Inc, Australia)	Stream B1 **PRE-SERVICE TEACHER TRAINING** Session Chair: Jyoti Kaur (University of Western Australia, Australia)	Stream C1 **MOTIVATIONS AND ATTITUDES** Session Chair: Kate Jackson (University of New South Wales, Australia)
	KEYNOTE: *Active learning using online interactivity* Margaret J. Wegener (The University of Queensland, Australia) and Timothy J. McIntyre	**KEYNOTE:** *How to optimize physics learning digital media to stimulate higher order thinking skill in the COVID-19 era* Agus Suyatna (University of Lampung, Indonesia)	16562 *Efficacy of a blended learning mastery progression cycle on student achievement and attitude in high school science* Sam Roberson, Martin Cooper (Australia) 16563 *Gifted learners: Strategies to support and engage gifted students in the senior high school physics classroom* Andrew L. Roberts (Australia)
	16388 *Learning practices through recursive questionnaires* Charlie V. Sarmiento, Germano Maioli Penello, Lucas Sigaud (Brazil) 16374 *Critical thinking development in physics courses by Problem-Based Learning in virtual collaboration environments* Laura Muñoz Salazar, Mario Humberto Ramírez Díaz, Josip Slisko (Mexico) 16524 *Question-Solution-Reflection: A framework for encouraging reflection through linear multimedia* Petr Lebedev, Christine Lindstrøm, Manjula Sharma (Australia)	16357 *Difficulties of elementary school teachers for astronomy teaching* Cleberson José Cavalcanti, Roberto Nardi (Brazil) 16363 *The use of analogies by future physics teachers during activities of supervised internship* Murilo Henrique Alfredo Vieira, Fabiano Willian Parma, Roberto Nardi (Brazil) 16401 *Remote learning on DC circuit analysis by using the sets of video demonstrations and PhET simulations for preparing readiness of pre-service teachers* Thanida Sujatitham, Jintawat Tanamatayarat (Thailand)	16654 *Effect of interest in mathematics in students' decision to pursue physics for higher education* Vijit V. Nautiyal, Bhavna Vidhani, Ashish Tyagi (Australia, India) 16416 *An attempt to quantify Pedagogical Content Knowledge for Japanese high school physics teachers* Hideyuki Tanaka, Yamato Hasegawa, Gaku Yamamoto, Fumiko Okiharu (Japan) 16545 *Relationship between motivation and physics perceptions of eighth grade students* Ayşen Cesur, M. Sait Gokalp, (Turkey)
	Q&A	Q&A	Q&A
Break			
AEDT 15:15-15:45 WITA 12:15-12:45 ICT 11:15-11:45	**Poster Session A** See page 9		

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Tuesday 6th December 2022 continued

Contributed Talks

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

Break

Workshops

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

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Wednesday 7th December 2022

Workshops

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

Break

AEDT 13:00-13:40
WITA 10:00-10:40
ICT 09:00-09:40

PLENARY: Dr Derek Muller (Veritasium)
Revolutions in education
Session Chair: Helen Georgiou (University of Wollongong, Australia)

Contributed Talks

AEDT 13:40-14:50
WITA 10:40-11:50
ICT 09:40-10:50

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

Break

Time zones: **AEDT** (Australian Eastern Daylight Time), **WITA** (Central Indonesian Time), **ICT** (Indochina Time)

Wednesday 7th December 2022 continued		
AEDT 15:05-15:45 WITA 12:05-12:45 ICT 11:05-11:45	**PANEL:** ***Increasing gender diversity among students in physics*** Session Chair: Angela Fösel (Friedrich Alexander University of Erlangen-Nürnberg, Germany) **Panellists: Gillian Butcher** (University of Leicester, UK), **Tegan Clark** (Australian National University and IncludeHER, Australia), **Margaret Samiji** (University of Dar Es Salaam, Tanzania)	
AEDT 15:45-16:15 WITA 12:45-13:15 ICT 11:45-12:15	**Poster Session B** See page 10	
AEDT 16:15-16:45 WITA 13:15-13:45 ICT 12:15-12:45	**Poster Session C** See page 11	
Break		
Workshops		
AEDT 17:30-19:00 WITA 14:30-16:00 ICT 13:30-15:00	C3: ***Belonging in Physics*** **Jacinta den Besten** (The University of Melbourne, Australia), **Elizabeth Angstmann** (University of New South Wales, Australia)	D3: ***Introduction to Active Learning in Optics and Photonics (ALOP): A Virtual Workshop, Part 2*** **Prof Alex Mazzolini** (Swinburne University, Australia), **Prof David Sokoloff** (University of Oregon, USA)
AEDT 19:30-21:00 WITA 16:30-18:00 ICT 15:30-17:00	C4: ***Novel ways to utilise quiz tools*** **A/Prof Elizabeth Angstmann** (University of New South Wales, Australia)	D4: ***Using LEGO race cars in the Physics lab*** **Prof Maria Parappilly** (Flinders University, Australia), **Stephanie Mayes** (Flinders University, Australia)

Thursday 8th December 2022		
Workshops		
AEDT 09:00-10:30 WITA 06:00-07:30 ICT 05:00-16:30	E1: ***Finding helpful resources for physics teaching on PhysPort*** **Dr Sam McKagan**, **Dr Adrian Madsen** (PhysPort, USA)	F1: ***Going deeper with PhET interactive simulations (school teachers)*** **Dr Ariel Paul** (University of Colorado Boulder, USA)
AEDT 11:00-12:30 WITA 08:00-09:30 ICT 07:00-08:30	E2: ***The power of virtual reality for physics (and STEM) education*** **Dr John Debs** (Australian National University, Australia)	F2: ***Do less to boost students' performance*** **Paul Looyen** (CrookED Science, Australia), **Catherine Zhou** (high school physics, Jakarta Intercultural School, Indonesia)
Break		
AEDT 13:00-13:40 WITA 10:00-10:40 ICT 09:00-09:40	**PLENARY: Professor Nam-Hwa Kang** (Korea National University of Education, South Korea) *Future of physics teaching practices: How new and emerging educational technologies mediate teaching and learning* Session Chair: Jacinta den Besten (University of Melbourne, Australia)	

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Thursday 8th December 2022 continued

Contributed Talks

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

Break

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

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Thursday 8th December 2022 continued

Contributed Talks

AEDT 15:45-16:55 WITA 12:45-13:55 ICT 11:45-12:55	Stream G2 **HISTORY AND NATURE OF SCIENCE** Session Chair: Joanna Turner (University of Southern Queensland, Australia)	Stream H2 **CUTTING EDGE RESEARCH** Session Chair: Anna Phillips (Monash University, Australia)	Stream I2 **SCHOOLS AND OUTREACH** Session Chair: Steven Hinckley (Edith Cowan University, Australia)
	16425 *Training teachers for new ways of understanding the teaching of physics from its mathematization* Olga Lucía Castiblanco Abril, Luis Sebastián González Aldana (Colombia) 16385 *Active learning and historical research on educational methods in fluid pressure in 150th anniversary of the Japanese school systems* Akizo Kobayashi, Fumiko Okiharu (Japan) 16415 *From a federal road to Newton's laws* Arthur Vinícius Resek Santiago, Cristiano Mattos (Brazil) 16544 *Interdisciplinary practices in natural sciences teaching: An integration of Biology and Physics contents* Ruan das Flores de Azevedo, Mayara Moretti Vieira Palmieri (Brazil) 16553 *Inquiry-based bilingual physics course for the International Baccalaureate Diploma Teacher Education Programme* Yu Lim Chen (Taiwan)	16674 *Exploring high school students' emotions in energy illustrations by using EDA Sensors* Eman Sharaf, Martin Hopf (Austria) 16671 *Training in the inhibition of heuristics in physics education* Cédric Vanhoolandt, Arnaud Vervoort, Jim Plumat (Belgium) 16511 *Eye-tracking analysis of the educational effect of refutation text in reading science texts: Case of celestial movements and seasonal changes* Hideto Hagiwara, Shuji Ukon, Fumiko Okiharu (Japan) 16519 *Tool for assessing the level of critical thinking* Klára Velmovská, Anna Trúsiková, (Slovakia) 16565 *Analysis of kinematics graph interpretation skills using RapidMiner* Kanokporn Intakaew, Pornrat Wattanakasiwich (Thailand)	16354 *"The elegance of quantum mechanics": An at-distance proposal for secondary school students* Marco Giliberti, Ester Melli, Luisa Lovisetti (Italy) 16344 *Introducing the basic concepts of general relativity in high schools* Marco Di Mauro, Adele Naddeo, (Italy) 16342 *"I (critically) think, therefore I am": Thomson's atomic model and the ineffectiveness of physics education* Luisa Lovisetti, Marco Giliberti, (Italy) 16661 *Newtonian free fall with an Einsteinian view* Alessandro D.A.M. Spallicci, (France) 16579 *Student understanding of the direction of force due to atmospheric pressure: A tale of two models* Prithu Raj Ghosh, 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: ***Using instructional videos to improve physics education*** **Prof Christoph Kulgemeyer** (University of Bremen, Germany)	F3: ***Helping students generate physics inquiry problems*** **Prof Jongwon Park** (Chonnam National University, South Korea), **Prof Nam-Hwa Kang** (Korea National University of Education, South Korea)
AEDT 19:30-21:00 WITA 16:30-18:00 ICT 15:30-17:00	E4: ***Collaborative science inquiry with the CoSci virtual lab*** **Prof Chen-Chung Liu** (National Central University, Taiwan), **A/Prof Chia-Hui Cheng** (National Tsing Hua University, Taiwan)	F4: ***Research techniques for school teachers*** **A/Prof Sura Wuttiprom** (Ubon Ratchathani University, Thailand), **A/Prof Umporn Wutchana** (Ramkhamhaeng University, Thailand) In Thai language

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Friday 9th December 2022

AEDT 13:00-13:40 WITA 10:00-10:40 ICT 09:00-09:40	***Student Panel discussion*** Session Chair: Kate Jackson (University of New South Wales, Australia) **Panellists: Tracy Bu** (The University of Melbourne, Australia), **Dwika Sarnia Putri** (Sebelas Maret University, Indonesia), **Emma Collins** (The University of New South Wales, Australia), **Arnoldas Solovjovas** (Vilnius University, Lithuania), **Anna Klampfer** (Technical University of Vienna, Austria)		
Contributed Talks			
AEDT 13:40-14:50 WITA 10:40-11:50 ICT 09:40-10:50	Stream J1 **STUDENT WELL-BEING AND CATERING FOR DIVERSITY** Session Chair: Wade Naylor (Australian Catholic University, Australia)	Stream K1 **LABORATORY PROGRAMS** Session Chair: Tetyana Antimirova (Toronto Metropolitan University, Canada)	Stream L1 **NOVEL TEACHING IDEAS** Session Chair: Thomas Dixon (University of New South Wales, Australia)
	KEYNOTE: *Aspects of physics competitions in Thailand: Upsides, downsides and overcoming* Wittaya Kanchanapusakit (King Mongkut's University of Technology Thonburi, Thailand)	**KEYNOTE:** *The DigiPhysLab-project: Digital physics laboratory work for on-campus and distance learning* Antti Lehtinen (University of Jyväskylä, Finland), Pekka Pirinen, Simon Z. Lahme, Pascal Klein, Ana Susac, and Bruno Tomrlin	16569 *Board game Dixit as a tool for development of students' physics concepts* Ladislav Janiga, Viera Haverlíková (Slovakia) 16387 *Coleta Certa: Modern board game about radioactive waste* Ana Caroline Chagas de Almeida, Deise Miranda Vianna (Brazil)
	16512 *Women perceive less peer recognition than men controlling for actual peer recognition* Meagan Sundstrom, N. G. Holmes (USA) 16672 *Social Learning and Project-Based Learning at university: Complexity and non-linear approaches to cognitive diversity and diverse levels of physics learners* Manuel A. B. Bache (Spain) 16409 *Differences in understanding of mechanics concepts between high school students who choose 'advanced physics' and those who do not* Anju Kouno, Shuji Munejiri (Japan)	16578 *An instrument to guide instructors of undergraduate experimental programs: A comment on findings from physics* Alexandra Yeung, Scott Cornish, Ana T. Lopes, Manjula Sharma (Australia) 16532 *Post-COVID junior physics lab: The new normal* Alexander Samarian, Svetlana Postnova (Australia) 16326 *Online laboratory* Shirish Pathare, Bhagyashri Latad, Saurabhee Huli (India)	16393 *The students' problem-solving through STEM activities, walking monsters* Kanchanok Soikum, Jiradawan Huntula (Thailand) 16527 *Escape room as a stimulus for experimental activity* Tatiana Sukeľová, Klára Velmovská (Slovakia) 16378 *Development of a science show incorporating dance expression* Miki Igarashi, 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	**Conference close** Hosted live from Khon Kaen University, with **Jiradawan Huntula** (ICPE2022 Co-chair, Khon Kaen University, Thailand) and **Pornrat Wattanakasiwich** (Chiang Mai University, Thailand).		

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Poster Session A: Tuesday 6th 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 Wuttiprom (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)

Time zones: **AEDT** (Australian Eastern Daylight Time), **WITA** (Central Indonesian Time), **ICT** (Indochina Time)

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)

Time zones: **AEDT** (Australian Eastern Daylight Time), **WITA** (Central Indonesian Time), **ICT** (Indochina Time)

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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 students' 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 students' 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)

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