

# Conference Agenda

## SEFI Annual Conference 2022

**Date: Sunday, 18/Sept/2022**

**9:30am - 6:00pm** | **Doctoral Symposium**  
Location: **Sala Àgora**

**Date: Monday, 19/Sept/2022**

8:00am - 9:00am	<b>Welcome &amp; Info Desk</b> Location: <b>Vestíbul Auditori Vèrtex</b>
9:00am - 9:30am	<b>Opening Session</b> Location: <b>Auditori Vèrtex</b>
9:30am - 10:30am	<b>Keynote 1 - Lourdes Reig - New scenarios that European alliances of tech universities open up</b> Location: <b>Auditori Vèrtex</b>
10:30am - 11:00am	<b>Coffee Break</b> Location: <b>Jardins Vèrtex</b>
11:00am - 12:00pm	<b>PS 19-1 Entrepreneurship Education; Architecture (Research)</b> Location: <b>Vèrtex VS208</b> Session Chair: <b>Gareth Thomson</b>
	<b>ID: 1264</b> Research Paper Oral presentation <i>Topics:</i> Entrepreneurship Education <i>Keywords:</i> Entrepreneurship education; Challenge-Based Learning; Entrepreneurial intention; Student entrepreneurship; Theory of Planned Behavior <b>Fostering the entrepreneurial intention of university students: the role of Challenge-Based Learning approach</b> <b>Colombelli, Alessandra; Serraino, Francesco; Cannata, Eugenio</b> Politecnico di Torino, Italy
	<b>ID: 1168</b> Research Paper Oral presentation <i>Topics:</i> Entrepreneurship Education, Engineering Skills <i>Keywords:</i> Innovation skills, Capstone Project, Access grades, Project-based learning <b>Correlation study between the access mark and the performance in project-based and standard subjects.</b> <b>Braçós, Ramon<sup>1</sup>; Aoun, Louay<sup>1</sup>; Charosky, Guido<sup>2</sup>; Bermejo, Sandra<sup>1</sup>; Rey, Francesc<sup>1</sup>; Pegueroles, Josep<sup>1</sup></b> <sup>1</sup> UPC - Technical University of Catalonia, Spain; <sup>2</sup> Drop Innovation, Barcelona, Spain
	<b>ID: 1375</b> Research Paper Oral presentation <i>Topics:</i> Entrepreneurship Education <b>Learning and Progression in (too much?) of an Entrepreneurial Challenge during Covid-19</b> <b>Haneberg, Dag Håkon<sup>1</sup>; Solvoll, Sølvi<sup>2</sup></b> <sup>1</sup> NTNU, Norway; <sup>2</sup> Nord University, Norway
	<b>ID: 1191</b> Research Paper Oral presentation <i>Topics:</i> Architecture Education <i>Keywords:</i> Architecture Education, Grade Correlation, Academic Results, Educational data mining, Data Visualization <b>Course clustering based on the phylogenic tree of students' grades in architectural degree</b> <b>García-Escudero, Daniel; Bardí-Milà, Berta; Fayos, Francesc; Valls, Francesc</b> Universitat Politècnica de Catalunya, Spain
11:00am - 12:00pm	<b>PS 19-2 Student Engagement (Research)</b> Location: <b>Sala Àgora</b> Session Chair: <b>Ariadna Llorens</b>
	<b>ID: 1389</b> Research Paper Oral presentation

*Topics:* Student Engagement, Fostering Engineering Education Research  
*Keywords:* challenge-based learning, self-regulated learning, portfolio

### **Analyzing student-teacher interactions in a challenge-based learning course**

**Doulougeri, Karolina; Vermunt, Jan D.; Bombaerts, Gunter; Bots, Michael**  
EINDHOVEN UNIVERSITY OF TECHNOLOGY, Netherlands, The

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**ID: 1385**

Research Paper  
Oral presentation

*Topics:* Student Engagement

*Keywords:* Engineering culture, Disciplinary culture, Engineering identity, Comparative study

### **Exploring students' perceptions of engineering culture: A comparative analysis between Chile, Colombia, Ecuador, and the United States**

**Murzi, Homero<sup>1</sup>; Marquez, Mervyn<sup>4</sup>; Morris, Lloyd<sup>2</sup>; Guerra, Miguel Andres<sup>3</sup>**

<sup>1</sup>Virginia Tech, United States of America; <sup>2</sup>Universidad Tecnológica de Perira; <sup>3</sup>Universidad San Francisco de Quito; <sup>4</sup>Universidad Austral

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**ID: 1363**

Research Paper  
Oral presentation

*Topics:* Student Engagement, Co-creation with students

*Keywords:* Expectations, new space, electrical engineering, learning environment, culture

### **First year engineering students' internal and perceived expectations**

**Berg, Veslemøy; Wallin, Patric; Bolstad, Torstein**

The Norwegian University of Science and Technology, Norway

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11:00am - 12:00pm

### **PS 19-3 Mathematics at the heart of Engineering (Research)**

Location: **Vèrtex VS218**

Session Chair: **Deolinda Maria L. Dias Rasteiro**

**ID: 1144**

Research Paper  
Oral presentation

*Topics:* Mathematics at the heart of Engineering

*Keywords:* Mathematics, Modelling, Engineering

### **Mathematics education in engineering: a triple discontinuity?**

**Florensa, Ignasi; Fraga, Iria; Martínez-Junza, Víctor**

Escola Universitària Salesiana de Sarrià, Spain

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**ID: 1358**

Research Paper  
Oral presentation

*Topics:* Mathematics at the heart of Engineering, Assessment

*Keywords:* time spent on studying, COVID-19, productivity, engineering students

### **Changes in learning strategy and learning time in the wake of the pandemic**

**Sipos, Bence<sup>1</sup>; Berezvai, Szabolcs<sup>1</sup>; Szilágyi, Brigitta<sup>1,2</sup>**

<sup>1</sup>Budapest University of Technology and Economics, Hungary; <sup>2</sup>Corvinus University of Budapest, Hungary

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**ID: 1155**

Research Paper  
Oral presentation

*Topics:* Mathematics at the heart of Engineering

*Keywords:* Engineering curriculum, mathematics, double integrals, misconceptions

### **STUDENTS' UNDERSTANDING OF DOUBLE INTEGRALS – IMPLICATIONS FOR THE ENGINEERING CURRICULUM**

**Khemane, Thabiso; Padayachee, Pragashni; Shaw, Corrinne**

University of Cape Town, South Africa

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**ID: 1280**

Research Paper

**Oral presentation**

*Topics:* Mathematics at the heart of Engineering

*Keywords:* conceptual understanding, differential equations, undergraduate mathematics

**Understanding of differential equations in a highly heterogeneous student group**

**Fuhrmann, Tina A.<sup>1</sup>; Kautz, Christian<sup>2</sup>**

<sup>1</sup>University of Applied Sciences Merseburg, Germany; <sup>2</sup>Hamburg University of Technology, Germany

11:00am - 12:00pm

**PS 19-4 Ethics in Engineering Education (Research)**

Location: **Vèrtex VS219**

Session Chair: **Sarah Junaid**

**ID: 1345**

Research Paper

Oral presentation

*Topics:* Ethics in Engineering Education

*Keywords:* personality traits, global education, ethics education, case studies

**Personality Dimensions, Global and Ethical Perspectives and Engineering Students' Ethical Decisions**

**Snyder, Samyel<sup>1</sup>; Bairaktarova, Diana<sup>1</sup>; Giménez Carbó, Esther<sup>2</sup>**

<sup>1</sup>Virginia Tech, United States of America; <sup>2</sup>Universitat Politècnica de València

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**ID: 1404**

Research Paper

Oral presentation

*Topics:* Ethics in Engineering Education, Curriculum Development

*Keywords:* engineering ethics, social issues, feasibility study, text analyzer, interviews

**A Feasibility Study for inclusion of Ethics and Social issues in Engineering and Design Coursework in Australia**

**Boshuijzen-van Burken, Christine; Singh, Shreyansh; Baggiarini, Bianca**

University of New South Wales Canberra, Australia

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**ID: 1247**

Research Paper

Oral presentation

*Topics:* Ethics in Engineering Education

*Keywords:* Ethics, Gender, Engineering Education, Computer Science Education, Entry-level

**An Investigation of Entry Level Engineering and Computer Science Students Ethical Perceptions**

**Watterson, Craig Alan; Lundqvist, Karsten; Quilty, James**

Victoria University of Wellington, New Zealand, New Zealand

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**ID: 1124**

Research Paper

Oral presentation

*Topics:* Fostering Engineering Education Research, Ethics in Engineering Education

*Keywords:* Emotions, Ethical Decision-Making, Engineering Education, Moral Reasoning, Moral Emotions

**EMOTIONAL EMPATHY AND ENGINEERING STUDENTS' MORAL REASONING**

**Kotluk, Nihat; Tormey, Roland**

Ecole polytechnique federale de Lausanne EPFL, Switzerland

11:00am - 12:00pm

**PS 19-5 Sustainability. Sustainable Development Goals (Research)**

Location: **Sala d'Actes Vèrtex**

Session Chair: **Jordi Segalas**

**ID: 1108**

Research Paper

Oral presentation

*Topics:* Sustainability. Sustainable Development Goals

*Keywords:* Sustainability, social, society

## **The Powerless Engineer: Questioning Approaches to Teaching Social Responsibility**

**Wint, Natalie**

SWANSEA UNIVERSITY, United Kingdom

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**ID: 1424**

Research Paper

Oral presentation

*Topics:* Sustainability, Sustainable Development Goals, Teaching methods

*Keywords:* Sustainability, Engineering education, Teaching Framework, Innovation

### **D4i: A FRAMEWORK FOR TEACHING SUSTAINABILITY IN ENGINEERING DESIGN**

**Kunrath, Kamila; Beliatis, Michail**

Aarhus University, Denmark

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**ID: 1436**

Research Paper

Oral presentation

*Topics:* Sustainability, Sustainable Development Goals, Teaching methods

*Keywords:* sustainability, earth-centered design, systems thinking, design thinking, working life skills

### **Developing future working life competencies with earth-centered design**

**Väätäjä, Heli; Tihinen, Maarit**

Lapland University of Applied Sciences, Finland

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11:00am - 12:00pm

## **PS 19-6 Physics and Engineering Education; Challenges of new European Universities (Research)**

Location: **Aula Máster CN**

Session Chair: **Herminio Martínez-García**

**ID: 1354**

Research Paper

Oral presentation

*Topics:* Physics and Engineering Education, Attractiveness of Engineering

*Keywords:* physics, popular science, motivation, perceived learning, conceptual understanding

### **"It's not like it's popular science we are doing" - Popular science, motivation, calculations, and conceptual understanding among physics and engineering students**

**Kjelsberg, Ronny; Thorseth, Trond Morten**

Department of Physics, NTNU, Norwegian University of Science and Technology, Norway

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**ID: 1377**

Research Paper

Oral presentation

*Topics:* Physics and Engineering Education, Assessment

*Keywords:* Fuzzy logic, objective tests, multiple-choice questionnaires, grade correction, students' assessment

### **A Contribution to Students' Assessment Adjusts of Multiple Choice Questionnaires with Fuzzy Logic**

**Martínez-García, Herminio; Domingo-Peña, Joan**

Technical University of Catalonia (UPC)-EEBE, Spain

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**ID: 1325**

Research Paper

Oral presentation

*Topics:* Physics and Engineering Education, Challenges of new European Universities

*Keywords:* student selection, mathematics skills, physics skills

### **ADVANCED MATHEMATICAL SKILLS AND RELATING FACTORS OF ENGINEERING APPLICANTS: A CROSS-SECTIONAL STUDY**

**Vierula, Jonna<sup>1</sup>; Tiili, Juho<sup>2</sup>; Björkman, Jouni<sup>3</sup>; Miekkala, Ulla<sup>2</sup>; Ojanen, Jussi<sup>4</sup>; Talman, Kirsi<sup>5</sup>**

<sup>1</sup>Laurea University of Applied Sciences, Finland; <sup>2</sup>Tampere University of Applied Sciences, Finland; <sup>3</sup>Seinäjoki University of Applied Sciences, Finland; <sup>4</sup>Vaasa University of Applied Sciences, Finland; <sup>5</sup>Metropolia University of Applied Sciences, Finland

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**ID: 1420**

Research Paper  
Oral presentation

*Topics:* Physics and Engineering Education, Teaching methods

*Keywords:* simulation game, engineering education, model-based systems engineering

### **Development and Application of Simulation Games for Model-based Systems Engineering**

**Schumacher, Thomas; Ammersdörfer, Theresa; Inkermann, David**

TU Clausthal, Institut für Maschinenwesen, Germany

11:00am - 12:00pm

### **PS 19-7 Teaching methods; Digitalisation & Hybrid models (Research)**

Location: **Vèrtex VS216**

Session Chair: **Balázs Vince Nagy**

**ID: 1303**

Research Paper  
Oral presentation

*Topics:* Teaching methods, Digitalisation & Hybrid models

*Keywords:* digitalisation, digital education, teaching methods

### **Relevance of Digital Education and its different aspects of development**

**Macan, Anja; Yilmaz Yildirim, Ali; Cojan, Claudia; Pipidis, Vasileios**

Board of European Students of Technology, Belgium

**ID: 1312**

Research Paper  
Oral presentation

*Topics:* Teaching methods, Digitalisation & Hybrid models

*Keywords:* e-learning, blended learning, didactic shift, COVID-19 response

### **Post-Pandemic Intended Use of Remote Teaching and Digital Learning Media in Higher Education. Insights from a Europe-wide Online Survey.**

**Huth, Margaux Antonia<sup>1,2</sup>; Meyer, Bea<sup>3</sup>; Tscheikner-Gratl, Franz<sup>4</sup>; Cominola, Andrea<sup>1,2</sup>**

<sup>1</sup>Chair of Smart Water Networks, Technische Universität Berlin, Berlin, Germany; <sup>2</sup>Einstein Center Digital Future; <sup>3</sup>e-learning team, Technische Universität Berlin; <sup>4</sup>Department of Civil and Environmental Engineering, Norwegian University of Science and Technology, Trondheim, Norway

**ID: 1233**

Research Paper  
Oral presentation

*Topics:* Teaching methods

*Keywords:* Engineering (STEM) universities, teaching structures, teaching practices, pedagogical and didactic approaches, students' perception

### **Students' perception of applied educational and pedagogical approaches at STEM universities: a European overview**

**Nørqaard, Bente<sup>1</sup>; Beagon, Una<sup>2</sup>; Koponen, Jenny<sup>3</sup>; Kövesi, Klara<sup>4</sup>**

<sup>1</sup>Aalborg University, Aalborg, Denmark; <sup>2</sup>Technological University Dublin, Dublin, Ireland; <sup>3</sup>Metropolia University, Helsinki, Finland; <sup>4</sup>ENSTA Bretagne, Brest, France

11:00am - 12:00pm

### **PS 19-8 Building Communities and Coordination; Mentorship and Tutorship**

Location: **Aula Teleensenyament**

Session Chair: **Belén Onecha**

**ID: 1268**

Short Paper  
Oral presentation

*Topics:* Building Communities and Coordination, Student Mobility

*Keywords:* Sustainability, Timber Engineering, Experiential Learning, Industry Engagement

### **Developing Strategic Partnerships through a Sustainability Enrichment Week**

**Hitt, Sarah Jayne<sup>1</sup>; Hairstans, Robert<sup>2</sup>; Leitch, Kenneth<sup>3</sup>; Connell-Skinner, Kirsty<sup>4</sup>**

<sup>1</sup>New Model Institute for Technology and Engineering, United Kingdom; <sup>2</sup>New Model Institute for Technology and Engineering, United Kingdom; <sup>3</sup>Edinburgh Napier University; <sup>4</sup>Edinburgh Napier University

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**ID: 1267**

Short Paper

Oral presentation

*Topics:* Building Communities and Coordination, Cooperation for Development

*Keywords:* educator's competences, identity, agency, educational transformation

**Identity and agency of engineering educators in Zimbabwe**

**Ventura-Medina, Esther<sup>1</sup>; Mamuse, Antony<sup>2</sup>**

<sup>1</sup>University of Strathclyde, United Kingdom; <sup>2</sup>Midlands State University, Zimbabwe

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**ID: 1250**

Research Paper

Oral presentation

*Topics:* Mentorship and Tutorship

*Keywords:* Peer Mentoring, Needs Assessment, Mentorship, Phenomenology

**Peer Mentorship: Exploring the Unmet Needs of Current Mentees During COVID-19**

**Christensen, Darcie<sup>1</sup>; Villanueva Alarcón, Idalis<sup>2</sup>**

<sup>1</sup>Minnesota State University Mankato, United States of America; <sup>2</sup>University of Florida, United States of America

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**ID: 1381**

Short Paper

Oral presentation

*Topics:* Mentorship and Tutorship, Co-creation with students

*Keywords:* peer mentorship, transition, EDI, Students-as-Partners, mentor training

**Students designing for students: a peer mentorship toolkit for a cross-campus, EDI engineering transition scheme**

**Economides, Sophia B.; Gou, Beilei; Dai, Dina; Noskova, Karin; Waring, Sophie; Preston, Anne**

UCL, United Kingdom

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11:00am - 12:00pm

**PS 19-9 Engineering Skills (Research); Physics and Engineering Education**

Location: **Aula Post-grau**

Session Chair: **Francesc Torres**

**ID: 1122**

Research Paper

Oral presentation

*Topics:* Curriculum Development, Engineering Skills

*Keywords:* Engineering Education, Future Skills, Competencies, Problem Solving, RRI

**Mind the Gap – Students' Perspective on Relevant Competencies Needed and Gained in Engineering Education**

**Winkens, Ann-Kristin; Lemke, Clara; Leicht-Scholten, Carmen**

Research Group Gender and Diversity in Engineering, RWTH Aachen University

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**ID: 1323**

Research Paper

Oral presentation

*Topics:* Curriculum Development, Engineering Skills

*Keywords:* focus groups, course design, team based learning, project based learning, learning technology

**Student perceptions on a collaborative engineering design course**

**van Helden, Gitte<sup>1,2,3</sup>; Zandbergen, Barry<sup>1</sup>; Specht, Marcus<sup>2,3</sup>; Gill, Eberhard<sup>1</sup>**

<sup>1</sup>Space systems engineering, Delft University of Technology; <sup>2</sup>Leiden Delft Erasmus Centre for Education and Learning; <sup>3</sup>TU Centre for Engineering Education

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**ID: 1109**

Research Paper

**Oral presentation**

*Topics:* Engineering Skills, Assessment

*Keywords:* Skills, Competences, Graduate, Assessment

**A SITUATIONAL JUDGEMENT TEST FOR ENGINEERS TO EVALUATE THEIR PROFESSIONAL STRENGTHS & WEAKNESSES**

**Carthy, Darren<sup>1</sup>; Craps, Sofie<sup>2</sup>; Langie, Greet<sup>2</sup>; Gaughan, Kevin<sup>3</sup>; Bowe, Brian<sup>3</sup>**

<sup>1</sup>Engineers Ireland, Ireland; <sup>2</sup>LESEC, KU Leuven, Belgium; <sup>3</sup>CREATE, TU Dublin, Ireland

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**ID: 1232**

**Short Paper**

**Oral presentation**

*Topics:* Physics and Engineering Education

*Keywords:* reasoning skills, logistics, hydrodynamics

**Investigation of student reasoning skills about flow processes in logistics**

**Uzulis, Max Vincent; Kautz, Christian**

Hamburg University of Technology (TUHH), Germany

12:15pm - 1:15pm

**Parallel SIG-Workshops 19-1**

Location: **Aula Måster CN**

**ID: 1471**

**FOR SEFI SIG: SEFI Working Group Workshop**

**Workshop 60 min (only for workshop proposals)**

*Topics:* Fostering Engineering Education Research, Engineering Skills

*Keywords:* engineering education, project team, soft skills

**Teaching soft skills for engineers of the future by using projects**

**Mikhridinova, Nargiza<sup>1,3</sup>; Ngereja, Bertha Joseph<sup>2</sup>; Wolff, Carsten<sup>3</sup>; Van Petegem, Wim<sup>1</sup>**

<sup>1</sup>KU Leuven, Belgium; <sup>2</sup>The Norwegian University of Science and Technology (NTNU);

<sup>3</sup>Dortmund University of Applied Sciences and Arts

12:15pm - 1:15pm

**Parallel SIG-Workshops 19-2**

Location: **Vèrtex VS208**

**ID: 1466**

**FOR SEFI SIG: SEFI Working Group Workshop**

**Workshop 60 min (only for workshop proposals)**

*Topics:* Ethics in Engineering Education, Social and Service Learning, Co-creation with students

*Keywords:* responsibility, ethics, teacher, university, eco-system

**How can you contribute to the social responsibility of your university's education?**

**Bombaerts, Gunter<sup>1</sup>; Kovacs, Helena<sup>2</sup>; Martin, Diana<sup>1</sup>; Tormey, Roland<sup>2</sup>**

<sup>1</sup>TU Eindhoven, Netherlands, The; <sup>2</sup>EPFL, Lausanne, Switzerland

12:15pm - 1:15pm

**Parallel SIG-Workshops 19-3**

Location: **Vèrtex VS218**

**ID: 1470**

**FOR SEFI SIG: SEFI Working Group Workshop**

**Workshop 60 min (only for workshop proposals)**

*Topics:* Lifelong Learning

*Keywords:* Continuing engineering education (CEE); CEE practice; CEE strategies

**A Panoramic View of Strategy, Organisation and Practice in Continuing Engineering Education**

**Nørgaard, Bente**

AAU, Denmark

12:15pm - 1:15pm

**Parallel SIG-Workshops 19-4**

Location: **Aula Teleensenyament**

**ID: 1472**

**FOR SEFI SIG: SEFI Working Group Workshop**

**Workshop 60 min (only for workshop proposals)**

*Topics:* Student Engagement, Teaching methods, Assessment

*Keywords:* active learning, assessment, digital tools, learning and pedagogical technologies

**Promoting Active Learning in STEM Subjects**

**Rinneheimo, Kirsi-Maria<sup>1</sup>; Kinnari-Korpela, Hanna<sup>1</sup>; Velichová, Daniela<sup>2</sup>; L. Dias**

Rasteiro, Deolinda<sup>3</sup>



<sup>1</sup>Tampere University of Applied Sciences (TAMK); <sup>2</sup>Slovak University of Technology;  
<sup>3</sup>IPC/ISEC, Portugal

12:15pm - 1:15pm

**Parallel SIG-Workshops 19-5**

Location: **Vèrtex VS216**

**ID: 1467**

**FOR SEFI SIG: SEFI Working Group Workshop  
Workshop 60 min (only for workshop proposals)**

*Topics:* Building Communities and Coordination, Navigating Open Learning Environments, Co-creation with students

*Keywords:* Open Education Resources, community building, co-creation

**Are We Open to Being Open? Discussing the role of Open Educational Resources in post-secondary education**

**de los Arcos, Bea<sup>1</sup>; Gomez Puente, Sonia<sup>2</sup>; Rans, Calvin David<sup>1</sup>**

<sup>1</sup>Delft University of Technology, Netherlands; <sup>2</sup>Eindhoven University of Technology, Netherlands

12:15pm - 1:15pm

**Parallel SIG-Workshops 19-6**

Location: **Sala Àgora**

**ID: 1468**

**FOR SEFI SIG: SEFI Working Group Workshop  
Workshop 60 min (only for workshop proposals)**

*Topics:* Ethics in Engineering Education, Social and Service Learning, Curriculum Development

*Keywords:* Responsible Innovation. Ethics. Social Responsibility.

**Responsible Innovation as a vehicle for teaching ethical and social dimensions of technology**

**Roach, Kate; Tilley, Emanuela; Nyamapfene, Abel; Seren Smith, Matthew; Hughes, Stephen**

University College London, United Kingdom

12:15pm - 1:15pm

**Parallel SIG-Workshops 19-7**

Location: **Vèrtex VS219**

**ID: 464**

**FOR SEFI SIG: SEFI Working Group Workshop  
Workshop 60 min (only for workshop proposals)**

*Topics:* Student Engagement, Engineering Skills, Teaching methods

*Keywords:* professional skills

**Emerging professional skills: Insights and methods**

**Cooke, Neil<sup>1</sup>; Wint, Natalie<sup>2</sup>; Johannsen, Thies<sup>3</sup>; Manzini, Raffaella<sup>4</sup>; Thomson, Gareth<sup>5</sup>; Wood, Gary<sup>6</sup>; Hawwash, Kamel<sup>1</sup>; Hadgraft, Roger<sup>7</sup>**

<sup>1</sup>University of Birmingham, United Kingdom; <sup>2</sup>University of Swansea, United Kingdom;

<sup>3</sup>Technical University Berlin, Germany; <sup>4</sup>Universita' Carlo Cattaneo - Liuc, Italy; <sup>5</sup>University of Aston, United Kingdom; <sup>6</sup>NMITE, United Kingdom; <sup>7</sup>University of Technology Sydney, Australia

1:15pm - 2:30pm

**Lunch + Corner for Newcomers lunch**

Location: **Jardins Vèrtex**

2:30pm - 3:30pm

**PS 19-10 Navigating Open Learning Environments**

Location: **Vèrtex VS208**

Session Chair: **Tinne De Laet**

**ID: 1132**

**Research Paper  
Oral presentation**

*Topics:* Navigating Open Learning Environments, Teaching methods

*Keywords:* self-directed learning, guided learning, lesson activities, Moodle

**Self-Directed versus Guided Learning – Searching for the Sweet Spot with Lesson Activities in Moodle**

**Deckert, Carsten; Mohya, Ahmed**

Hochschule Düsseldorf, Germany

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**ID: 1202**

**Short Paper**

**Oral presentation**

*Topics:* Navigating Open Learning Environments, Joint Programmes  
*Keywords:* Challenge based learning, motivation, interdisciplinarity, expertise

**Student motivation and disciplinary expertise in Challenge-Based Learning**

**MacLeod, Miles; Johnston, Coralie; Poortman, Cindy; Visscher, Klaasjan**  
University of Twente, Netherlands, The

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**ID: 1175**

Concept Paper  
Oral presentation

*Topics:* Navigating Open Learning Environments  
*Keywords:* Online courses, Engineering mathematics, Open Educational Resources, ERASMUS+ projects, Assessment tools

**EngiMath online course. Effective feedback from UPC mathematics teachers.**

**Serrat, Carles; Estela, M. Rosa; Bruguera, M. Montserrat; Pantazi, Chara**  
Universitat Politècnica de Catalunya-BarcelonaTECH, Spain

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**ID: 1274**

Concept Paper  
Oral presentation

*Topics:* Navigating Open Learning Environments, Engineering Skills  
*Keywords:* Autonomous Vehicles, Learning by doing, Low-cost AV, Undergraduate students

**Introducing Autonomous Vehicles into an Undergraduate Engineering Course**

**Blesa, Joaquim; Ponsa, Pere; Calomarde, Antonio; Garcia, Jonathan; Repecho, Victor**  
Universitat Politècnica de Catalunya, Spain

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2:30pm - 3:30pm

**PS 19-11 Student Engagement; Teaching methods**

Location: **Vèrtex VS216**  
Session Chair: **Klara Kövesi**

**ID: 1146**

Short Paper  
Oral presentation

*Topics:* Student Engagement, Physics and Engineering Education  
*Keywords:* Educational development, Students as Partners, Multicampus courses, Physics.

**RECOMMENDATIONS FOR A MULTICAMPUS COURSE DEVELOPED THROUGH A "STUDENTS AS PARTNERS" PROJECT**

**Korpås, Guri Sivertsen; Abel, Roger; Gunvaldsen, Lina Mathea; Hansen, Catharina; Nordahl, Johan Olav; Åsen, Kristin; Andersen, Trine Højberg**  
Department of Physics, Norwegian University of Science and Technology, Norway

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**ID: 1387**

Concept Paper  
Oral presentation

*Topics:* Student Engagement, Teaching methods  
*Keywords:* collaborative work, innovative software, project development

**Application of innovative software to the subject Project I of the Degree in Engineering in Industrial Technologies (GETI)ECHNOLOGIES (GETI)**

**Buj Corral, Irene**  
Universitat Politècnica de Catalunya, Spain

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**ID: 1433**

Short Paper  
Oral presentation

*Topics:* Student Engagement  
*Keywords:* first-generation students, bricolage, coping, engineering students, COVID-19

**Coping in pandemic times: bricolage employed by first-generation engineering students**

**Smit, Renee<sup>1,2</sup>; Junck, Leah<sup>3,2</sup>**

<sup>1</sup>Centre for Research in Engineering Education (CREE); <sup>2</sup>University of Cape Town; <sup>3</sup>Institute for Humanities in Africa (HUMA)

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**ID: 1235**

Concept Paper

Oral presentation

*Topics:* Student Engagement, Teaching methods

*Keywords:* Pedagogical training, activating methods, learning gains

**Teach as you preach – Activating pedagogical training for university teachers in LUT University**

**Suhonen, Sami<sup>1</sup>; Tiili, Juho<sup>1</sup>; Meriläinen, Jenni<sup>2</sup>; Karjalainen, Kristiina<sup>2</sup>**

<sup>1</sup>Tampere University of Applied Sciences, Finland; <sup>2</sup>Lappeenranta-Lahti University of Technology

2:30pm - 3:30pm

**PS 19-12 Mathematics at the heart of Engineering**

Location: **Aula Mäster CN**

Session Chair: **Josep Solé Pareta**

**ID: 1373**

Concept Paper

Oral presentation

*Topics:* Mathematics at the heart of Engineering, Physics and Engineering Education

*Keywords:* Engineering Education, Active Learning, Problem-Based Learning, Real-life Applications, Interdisciplinary

**Active Learning in Mathematics for STEM: Real-life Engineering Applications**

**Salim, Salim Mohamed**

Swansea University, United Kingdom

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**ID: 1126**

Concept Paper

Oral presentation

*Topics:* Mathematics at the heart of Engineering, Co-creation with students

*Keywords:* statistics education, project-based teaching, study and research paths, anthropological theory of the didactic, lifelong learning

**A practical approach to Statistics through SRP**

**Freixanet, Maria-Josep<sup>1</sup>; Alsina, Montserrat<sup>1</sup>; Bosch, Marianna<sup>2</sup>**

<sup>1</sup>Universitat Politècnica de Catalunya, Spain; <sup>2</sup>Universitat de Barcelona, Spain

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**ID: 1411**

Concept Paper

Oral presentation

*Topics:* Mathematics at the heart of Engineering, Attractiveness of Engineering

*Keywords:* mathematic education, high school, freshmen, study entrance level

**Integrated concept for the Enhancement of mathematical competencies at the Transition from high school Student to Freshmen in engineering studies**

**Nasarow, Alexander; Schmitt, Patrick; Kreis, Oliver**

Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany, Department of Mechanical Engineering

2:30pm - 3:30pm

**PS 19-13 Ethics in Engineering Education; Curriculum Development**

Location: **Vèrtex VS219**

Session Chair: **Ester Gimenez-Carbo**

**ID: 1251**

Concept Paper

Oral presentation

*Topics:* Sustainability. Sustainable Development Goals, Ethics in Engineering Education

*Keywords:* Transversal Skills, Engineering Education, Organizing Framework, Curriculum Development

**Bringing Visibility to Transversal Skills in Engineering Education: Towards an Organizing Framework**

**Jalali, Yousef; Kovacs, Helena; Isaac, Siara; Dehler Zufferey, Jessica**

École polytechnique fédérale de Lausanne

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**ID: 1234**

Short Paper

Oral presentation

*Topics:* Ethics in Engineering Education  
*Keywords:* ethics, macroethics, civil engineering, grounded theory

### **Macroethical Development in Civil Engineering Education**

**Polmear, Madeline**

Vrije Universiteit Brussel, Belgium

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**ID: 1360**

**Short Paper**

**Oral presentation**

*Topics:* Ethics in Engineering Education

*Keywords:* engineering ethics education, Sub-Saharan Africa, systemic change

### **Engineering Ethics Education for Systemic Change: A Case for Sub-Saharan Africa**

**Nyamapfene, Abel<sup>2</sup>; Magara, Irene<sup>1</sup>**

<sup>1</sup>Mbarara University Of Science And Technology, Uganda; <sup>2</sup>University College London, United Kingdom

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**ID: 1285**

**Concept Paper**

**Oral presentation**

*Topics:* Student Engagement, Curriculum Development

*Keywords:* Challenge-based learning, vertical learning, community of practice, self-directed learning

### **CHALLENGE-BASED LEARNING CURRICULUM DEVELOPMENT: A SUITABLE FRAMEWORK FOR ENGINEERING EDUCATION**

**Gomez Puente, Sonia M.; Doulougeri, Karolina**

Eindhoven University of Technology, Netherlands, The

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2:30pm - 3:30pm

### **PS 19-14 Sustainability. Sustainable Development Goals**

Location: **Sala Àgora**

Session Chair: **MaríaPilar Almajano**

**ID: 1452**

**Concept Paper**

**Oral presentation**

*Topics:* Sustainability. Sustainable Development Goals, Co-Teaching

*Keywords:* engineer education; seminar; CSR; LCA

### **Seminar as a way to educate engineering students on environmental challenges in the textile industry**

**Benkirane, Romain<sup>1</sup>; Perwuelz, Anne<sup>1</sup>; Pruvost, Sophie<sup>2</sup>; Thomassey, Sébastien<sup>1</sup>; Ternynck, Elise<sup>1</sup>**

<sup>1</sup>Univ. Lille, ENSAIT, ULR 2461 - GEMTEX - Génie et Matériaux Textiles, F-59000 Lille, France; <sup>2</sup>Synergy and people, F-59000 Lille, France

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**ID: 1162**

**Concept Paper**

**Oral presentation**

*Topics:* Sustainability. Sustainable Development Goals

*Keywords:* SDG, Civil and Environmental Engineering, Sustainability

### **INTEGRATING SUSTAINABILITY AND SOCIAL COMMITMENT (S&SC) COMPETENCES IN THE CURRICULUM AT THE BARCELONA SCHOOL OF CIVIL ENGINEERING**

**Roca Bosch, Elisabet; Real, Esther; Ferrer, Ivet**

Universitat Politècnica de Catalunya, Spain

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**ID: 1261**

**Concept Paper**

**Oral presentation**

*Topics:* Sustainability. Sustainable Development Goals, Virtual and Remote Labs

*Keywords:* Programming 1, Sustainability, Carbon footprint, SDG, Automatic Evaluation.

### **Programming 1 and Sustainability**

**Castro, Jorge**<sup>1</sup>; **Cortadella, Jordi**<sup>1</sup>; **Gabarro, Joaquim**<sup>1</sup>; **García, Albert**<sup>2</sup>; **Vidal, Eva**<sup>1</sup>

<sup>1</sup>Universitat Politècnica de Catalunya, UPC, Spain; <sup>2</sup>Col·legi d'Economistes de Catalunya, CEC, Spain

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**ID: 1405**

Concept Paper

Oral presentation

*Topics:* Sustainability, Sustainable Development Goals

*Keywords:* digital era, challenges for education, new competences, sustainability

**Challenges to the higher education to ensure sustainable development**

Szpytko, Janusz

AGH University of Science and Technology, Krakow, Poland

2:30pm - 3:30pm

**PS 19-15 Lifelong Learning**

Location: **Sala d'Actes Vèrtex**

Session Chair: **Mike Murphy**

**ID: 1265**

Research Paper

Oral presentation

*Topics:* Engineering Skills, Lifelong Learning

*Keywords:* Learning, mindfulness in practice, innovation, creativity

**MINDFULNESS AS A MEANS FOR ENHANCING LEARNING IN ENGINEERING EDUCATION**

Forster, Kai; Shaw, Corrinne

University of Cape Town, South Africa

**ID: 1153**

Research Paper

Oral presentation

*Topics:* Engineering Skills, Lifelong Learning

*Keywords:* Living labs, critical reflection, uncertainty, complex problems, design methodology

**Reflection in action: a critical reflection tool to help students deal with uncertainties in designing solutions for complex problems**

Wehrmann, Caroline; Smits, Casper

Delft University of Technology, Netherlands, The

**ID: 1161**

Concept Paper

Oral presentation

*Topics:* Lifelong Learning, Teaching methods

*Keywords:* professional influencing skills, leadership skills, self-management practices, peer networking, continuous learning

**DEVELOPING PROFESSIONAL INFLUENCING SKILLS OF YOUNG ACADEMIC ENGINEERS – CASE: YOUNG PROFESSIONALS' FORUM (YPF)**

Ylitalo, Jari; Kostamo, Tuukka

Aalto University, Finland

**ID: 1105**

Concept Paper

Oral presentation

*Topics:* Fostering Engineering Education Research, Cooperation for Development, Curriculum Development, Lifelong Learning

*Keywords:* capabilities, professions, expertise, integration

**Developing future engineers with broad views and deep skills - emergence of a new T2-capability profile**

Saukkonen, Juha

JAMK University of Applied Sciences, Finland

2:30pm - 3:30pm

**PS 19-16 Teaching methods; Fostering Engineering Education Research**

Location: **Vèrtex VS218**

Session Chair: **John Mitchell**

**ID: 1368**

Short Paper

**Oral presentation**

*Topics:* Fostering Engineering Education Research, Teaching methods

*Keywords:* Variation theory, Phenomenography, Engineering education, Teacher education, Student learning

**Variation theory in teaching and phenomenography in learning: What's their impact when applied in engineering classrooms?**

**Hasan, Mahbub<sup>1</sup>; Khan, Md Shahadat Hossain<sup>1</sup>; Ahmed, A. K. M. Foysal<sup>4</sup>; Karim, Azharul<sup>2</sup>; Hossain, Md. Akbar<sup>3</sup>; Iqbal, A.K.M Parvez<sup>4</sup>**

<sup>1</sup>Islamic University of Technology (IUT), Bangladesh; <sup>2</sup>Queensland University of Technology (QUT), Australia; <sup>3</sup>Manukau Institute of Technology, New Zealand; <sup>4</sup>International University of Business Agriculture and Technology (IUBAT), Bangladesh

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**ID: 1135**

**Short Paper**

**Oral presentation**

*Topics:* Teaching methods

*Keywords:* Instructors, Change, Adaptability

**A Case Study of Engineering Instructor Adaptability Through Evidence of Course Complexity Changes**

**Diefes-Dux, Heidi; Panther, Grace**

University of Nebraska Lincoln, United States of America

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**ID: 1256**

**Short Paper**

**Oral presentation**

*Topics:* Fostering Engineering Education Research, Teaching methods

*Keywords:* Challenge-Based Learning, learning process, learning gains, context

**What do we need to consider when designing and researching student learning in Challenge-Based Learning?**

**Helker, Kerstin; Lazendic-Galloway, Jasmina; Bruns, Miguel; Reymen, Isabelle M.M.J.; Vermunt, Jan D.**

Eindhoven University of Technology, Netherlands

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**ID: 1270**

**Short Paper**

**Oral presentation**

*Topics:* Curriculum Development, Teaching methods

*Keywords:* teaching resources, engineering education, learning styles, teaching styles, project based learning

**Developing Engaging Engineering Education Resources Based on Students Learning and Educators' Teaching Styles**

**Chakrabarti, Soma; Fredriksson, Claes**

ANSYS, Inc.

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2:30pm - 3:30pm

**PS 19-17 Curriculum Development; Challenges of new European Universities (Research)**

Location: **Aula Teleensenyament**

Session Chair: **Joan Antoni Pastor Collado**

**ID: 1380**

**Research Paper**

**Oral presentation**

*Topics:* Curriculum Development

*Keywords:* cognitive load, working memory, open design, PBL

**Towards a New Pedagogy for Engineering Education in the 21st Century**

**Ó Sioradáin, Domhnall; Carr, Michael**

Technological University Dublin, Ireland

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**ID: 1382**

**Research Paper**

**Oral presentation**

*Topics:* Challenges of new European Universities, Curriculum Development

*Keywords:* curriculum reform, engineering education, multicampus, merger

### Students' perceptions of a major engineering curriculum shake-up

Langie, Greet; Craps, Sofie; Van den Broeck, Lynn

KU Leuven, Belgium

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**ID: 1396**

Research Paper

Oral presentation

*Topics:* Fostering Engineering Education Research, Curriculum Development

*Keywords:* challenge-based learning, curriculum design, evidence-informed, innovation

### Organising evidence-informed innovation

Van Den Beemt, Antoine; Van de Watering, Gerard; Bots, Michael

Eindhoven University of Technology, Netherlands, The

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**ID: 1139**

Research Paper

Oral presentation

*Topics:* Fostering Engineering Education Research, Curriculum Development

*Keywords:* Complementary studies, Curriculum, Socio-technical, Qualitative research

### Engineers' perceptions of their role in society: the South African case

Kloot, Bruce Charles; Shaw, Corrinne Bonita

University of Cape Town, South Africa

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2:30pm - 3:30pm

### PS 19-18 Engineering Skills (Research mainly)

Location: **Aula Post-grau**

Session Chair: **Joana d'Arc Prat**

**ID: 1343**

Research Paper

Oral presentation

*Topics:* Curriculum Development, Engineering Skills

*Keywords:* Challenge Based Education, Reflection, Professional Capabilities, Deliberate professional

### A cross curricular Comparison of Professional Capabilities in Engineering Education

Klaassen, Renate G.<sup>1</sup>; Bossen, Linette R.H.<sup>2</sup>; Sies, Puk H.J.<sup>3</sup>; Hellendoorn, Hans<sup>4</sup>

<sup>1</sup>TU Delft, Netherlands, 4TU Centre for Engineering Education; <sup>2</sup>TU Delft, Netherlands, Fac. 3ME; <sup>3</sup>TU Delft, Netherland, Fac. 3ME; <sup>4</sup>TU Delft, Netherlands, 3ME - Robotics Institute

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**ID: 1225**

Research Paper

Oral presentation

*Topics:* Engineering Skills

*Keywords:* Communication challenges, virtual teams, distributed software development, student projects, case study

### Communication Challenges in Distributed Student Projects

Huomonen, Jere; Poranen, Timo; Zhang, Zheyang

Tampere University, Finland

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**ID: 1230**

Research Paper

Oral presentation

*Topics:* Curriculum Development, Engineering Skills

*Keywords:* Engineering Education; Computational Thinking; Curriculum; Intervention Methods; Assessment Methods

### An Investigation on Integration of Computational Thinking into Engineering Curriculum at Delft University of Technology

Zhang, Xiaoling<sup>1</sup>; Specht, Marcus<sup>2</sup>; Valle Torre, Manuel<sup>3</sup>

<sup>1</sup>Delft University of Technology, Netherlands, The; <sup>2</sup>Delft University of Technology, Netherlands, The; <sup>3</sup>Delft University of Technology, Netherlands, The

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**ID: 1201**

Concept Paper

Oral presentation

Topics: Curriculum Development, Engineering Skills

Keywords: Interdisciplinarity, PBL, authentic complex problem solving

**Challenges for Engineering students working with authentic complex problems**

**Routhe, Henrik Worm; Winther, Maiken; Nguyen, Nhung Tuyet; Holgaard, Jette Egelund; Kolmos, Anette**

AAU, Denmark

3:45pm - 5:15pm	<b>SIGs Meetings for Engineering Education Research</b> Location: <b>Sala d'Actes Vèrtex</b>
3:45pm - 5:15pm	<b>SIGs Meetings for Curriculum Development</b> Location: <b>Vèrtex VS219</b>
3:45pm - 5:15pm	<b>SIGs Meetings for Capacity Building</b> Location: <b>Vèrtex VS207</b>
3:45pm - 5:15pm	<b>SIGs Meetings for Physics</b> Location: <b>Vèrtex VS201</b>
3:45pm - 5:15pm	<b>SIGs Meetings for Mathematics</b> Location: <b>Vèrtex VS215</b>
3:45pm - 5:15pm	<b>SIGs Meetings for Continuing Engineering Education and Lifelong Learning</b> Location: <b>Vèrtex VS208</b>
3:45pm - 5:15pm	<b>SIGs Meetings for Gender and Diversity</b> Location: <b>Vèrtex VS216</b>
3:45pm - 5:15pm	<b>SIGs Meetings for Open and Online Education</b> Location: <b>Vèrtex VS213</b>
3:45pm - 5:15pm	<b>SIGs Meetings for Sustainability</b> Location: <b>Vèrtex VS203</b>
3:45pm - 5:15pm	<b>SIGs Meetings for Attractiveness</b> Location: <b>V209 Sala de Reunions Jocelyn Bell</b>
3:45pm - 5:15pm	<b>SIGs Meetings for Engineering Skills</b> Location: <b>Vèrtex VS218</b>
3:45pm - 5:15pm	<b>SIGs Meetings for Ethics</b> Location: <b>Vèrtex VS214</b>
5:30pm - 6:30pm	<b>Welcome Reception (Maffioli &amp; Fellowship Awards)</b> Location: <b>Auditori Vèrtex + Jardins Vèrtex</b>
6:45pm - 8:15pm	<b>Social Programme (limited places - will require specific booking)</b>



**Date: Tuesday, 20/Sept/2022**

8:00am - 9:00am	<b>Info Desk</b> Location: <b>Vestíbul Auditori Vèrtex</b>
9:00am - 10:30am	<b>Industry Panel</b> Location: <b>Auditori Vèrtex</b>
10:30am - 11:00am	<b>Coffee Break</b> Location: <b>Jardins Vèrtex</b>
11:00am - 12:00pm	<b>PS 20-1 Entrepreneurship Education</b> Location: <b>Vèrtex VS208</b> Session Chair: <b>Janusz Szpytko</b>
	<b>ID: 1300</b> Research Paper Oral presentation Topics: Entrepreneurship Education Keywords: Entrepreneurship education; RCT; Human Capital; Decision-Making <b>The implications of entrepreneurs' previous experiences on using a scientific approach to decision making: Evidence from a randomized control trial</b> <b>Panelli, Andrea; Colombelli, Alessandra</b> Politecnico di Torino, Italy
	<b>ID: 1335</b> Concept Paper Oral presentation Topics: Entrepreneurship Education, Teaching methods Keywords: Innovation, Entrepreneurship, International Education, CBP, Urban Mobility <b>I&amp;E Project Concept for Urban Mobility Education</b> <b>Sayrol, Elisa<sup>1</sup>; Roncoli, Claudio<sup>2</sup>; Aba, Attila<sup>3</sup>; Banfi, Miklos<sup>3</sup>; Bloemer, Alexander<sup>4</sup>; Bragós, Ramon<sup>1</sup>; Estrada, Miquel<sup>1</sup>; Macario, Rosario<sup>7</sup>; Marques da Costa, Nuno<sup>8</sup>; Minner, Stefan<sup>4</sup>; Mohammadi, Roozbeh<sup>2</sup>; Pinhas, Nathan<sup>6</sup>; Shiftan, Yoram<sup>6</sup>; Ribas, Imma<sup>1</sup>; Witlox, Frank<sup>5</sup></b> <sup>1</sup> Universitat Politècnica de Catalunya, Spain; <sup>2</sup> Department of Built Environment, Aalto University, Finland; <sup>3</sup> Department of Transport Technology and Economics, Budapest University of Technology and Economics, Hungary; <sup>4</sup> School of Management, Technical University of Munich, Germany; <sup>5</sup> Department of Geography, Ghent University, Belgium.; <sup>6</sup> TECHNION - Israel Institute of Technology, Israel; <sup>7</sup> CERIS, Instituto Superior Técnico, Universidade de Lisboa, Portugal; <sup>8</sup> CEG, IGOT – Instituto de Geografia e Ordenamento do Território, Universidade de Lisboa, Portugal
	<b>ID: 1204</b> Concept Paper Oral presentation Topics: Entrepreneurship Education, Attractiveness of Engineering Keywords: prestige, engineering wave, engineering knowledge, disruptive innovation <b>Restoring the prestige of the engineering education through a fourth engineering wave in the development of the fundamental scientific knowledge of economy</b> <b>Stefanov, Stefan Trifonov<sup>1</sup>; Stefanov, Trifon Trifonov<sup>2</sup></b> <sup>1</sup> Foundation "Informational Technologies and the Future of Economic Science", Sofia, Bulgaria; <sup>2</sup> Institute for Systemic Economic Engineering, Sofia, Bulgaria
	<b>ID: 1104</b> Short Paper Oral presentation Topics: Entrepreneurship Education, Fostering Engineering Education Research, Curriculum Development Keywords: entrepreneurship, context, culture, program design, entrepreneurial engineers <b>Educating Entrepreneurial Engineers - to be context-aware or generic?</b> <b>Saukkonen, Juha</b> JAMK University of Applied Sciences, Finland
11:00am - 12:00pm	<b>PS 20-2 Student Engagement (Research mainly)</b> Location: <b>Vèrtex VS216</b> Session Chair: <b>Emanuela Tilley</b>

**ID: 1114**

Research Paper  
Oral presentation

*Topics:* Student Engagement, Building Communities and Coordination  
*Keywords:* Covid-19, transition, online learning, in-person teaching, student experience

**The experiences of students transitioning back to in-person learning post-Covid-19**

**Pick, Louise Therese; McCartan, Charles; Fee, Kathryn; Hermon, John Paul**

Queens University Belfast, United Kingdom

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**ID: 1223**

Research Paper  
Oral presentation

*Topics:* Student Engagement, Mathematics at the heart of Engineering  
*Keywords:* task design, proof without words, mathematics, calculus, integral.

**Exploring engineering students' engagement with proof without words: The case of calculus**

**Radmehr, Farzad<sup>1,2</sup>; Ezzati, Mahnaz.<sup>2</sup>**

<sup>1</sup>Norwegian University of Science and Technology; <sup>2</sup>Ferdowsi University of Mashhad

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**ID: 1357**

Concept Paper  
Oral presentation

*Topics:* Student Engagement, Physics and Engineering Education  
*Keywords:* PBL, Electronic Engineering Education.

**PBL ACTIVITIES AS LINK ELEMENT IN THE BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATION ENGINEERING**

**Martínez-García, Herminio; García-Vílchez, Encarna**

Technical University of Catalonia (UPC)-EEBE, Spain

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**ID: 1458**

Research Paper  
Oral presentation

*Topics:* Student Engagement, Social and Service Learning  
*Keywords:* service-learning, skills, engagement

**Service-learning experience through outreach and engagement with science and technology museums**

**Alsina, Montserrat<sup>1</sup>; Gaona, Roger<sup>1</sup>; Bel, Guillem<sup>1</sup>; Fornell, David<sup>2</sup>; Ventura, Pau<sup>3</sup>**

<sup>1</sup>Universitat Politècnica de Catalunya, Spain; <sup>2</sup>Escola Vedruna El Carne; <sup>3</sup>Framun enterprise

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11:00am - 12:00pm

**PS 20-3 Mathematics at the heart of Engineering (Research)**

Location: **Vèrtex VS218**

Session Chair: **Deolinda Maria L. Dias Rasteiro**

**ID: 1446**

Research Paper  
Oral presentation

*Topics:* Mathematics at the heart of Engineering, Teaching methods  
*Keywords:* ordinary differential equations; conceptual understanding; non-standard problems; small group work

**PROMOTING CONCEPTUAL UNDERSTANDING OF DIFFERENTIAL EQUATIONS THROUGH INQUIRY TASKS**

**Rogovchenko, Yuriy; Rogovchenko, Svitlana**

University of Agder, Norway

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**ID: 1383**

Research Paper  
Oral presentation

*Topics:* Mathematics at the heart of Engineering, Assessment  
*Keywords:* similarity, knowledge based, classification

**Investigation of processing test results based on knowledge similarity**

**Sipos, Bence<sup>1</sup>; Szilágyi, Brigitta<sup>1,2</sup>**

<sup>1</sup>Budapest University of Technology and Economics, Hungary; <sup>2</sup>Corvinus University of Budapest, Hungary

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**ID: 1454**

Research Paper

Oral presentation

*Topics:* Mathematics at the heart of Engineering, Co-creation with students

*Keywords:* Interdisciplinary engineering education, theory-based engineering course, design for non-engineering students, practice-based learning concepts

### **AN INTRODUCTION TO SLIDING MODE CONTROL FOR INTERDISCIPLINARY EDUCATION**

**Block, Brit-Maren; Haus, Benedikt; Schitz, Philipp; Dethmann, Jannis; van Rossum, Felix Malte; Mercorelli, Paolo**

Leuphana University of Lueneburg, Germany

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**ID: 1365**

Research Paper

Oral presentation

*Topics:* Mathematics at the heart of Engineering, Engineering Skills

*Keywords:* Learning to learn, assessment

### **Learning to learn, bolt-on, or integrated? Analysis of student feedback from a pilot with learning to learn integrated into first-year engineering mathematics.**

**Thorseth, Trond Morten**

Norwegian university of science and technology, NTNU, Norway

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11:00am - 12:00pm

### **PS 20-4 Ethics in Engineering Education (Research)**

Location: **Vèrtex VS219**

Session Chair: **Diana Bairaktarova**

**ID: 1336**

Research Paper

Oral presentation

*Topics:* Ethics in Engineering Education

*Keywords:* Engineering Ethics, Accreditation, Global Analysis

### **What is the role of ethics in accreditation documentation from a global view?**

**Junaid, Sarah<sup>1</sup>; Gwynne-Evans, Alison<sup>2</sup>; Kovacs, Helena<sup>3</sup>; Lönngrén, Johanna<sup>4</sup>; Jiménez Mejía, José Fernando<sup>5</sup>; Natsume, Kenichi<sup>6</sup>; Polmear, Madeline<sup>7</sup>; Serreau, Yann<sup>8</sup>; Shaw, Corrinne<sup>2</sup>; Tobişaru, Mircea<sup>9</sup>; Martin, Diana A<sup>10</sup>**

<sup>1</sup>Aston University, United Kingdom; <sup>2</sup>University of Cape Town, South Africa; <sup>3</sup>École Polytechnique Fédérale de Lausanne, Switzerland; <sup>4</sup>Umeå University, Sweden; <sup>5</sup>Ingeniero Civil de la Universidad Nacional de Colombia, Colombia; <sup>6</sup>Kanazawa Institute of Technology, Japan; <sup>7</sup>Vrije Universiteit Brussel, Belgium; <sup>8</sup>Linéact CESI, France; <sup>9</sup>Politehnica University of Bucharest, Romania; <sup>10</sup>Eindhoven University of Technology, The Netherlands

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**ID: 1133**

Research Paper

Oral presentation

*Topics:* Ethics in Engineering Education

*Keywords:* ethics by design, covid-19 tracing apps, responsible design, privacy

### **Introducing Ethics by Design in engineering education: Covid-19 tracing apps**

**Domingo-Pascual, Jordi**

Universitat Politècnica de Catalunya (UPC), Spain

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**ID: 1364**

Research Paper

Oral presentation

*Topics:* Ethics in Engineering Education

*Keywords:* ethics, morals, technology ethics, ethical theories

### **Debates on tech-related moral dilemmas using ethical theories to teach engineering ethics**

**Casañ, Maria Jose; Alier, Marc**

UPC, Spain

11:00am - 12:00pm

**PS 20-5 Sustainability. Sustainable Development Goals (Research mainly)**

Location: **Sala d'Actes Vèrtex**

Session Chair: **Raffaella Manzini**

**ID: 1101**

Research Paper

Oral presentation

*Topics:* Industry and Companies liaison. Regional Involvement and Innovation, Sustainability. Sustainable Development Goals

*Keywords:* Competence, Skills, Employability, Curriculum Development, Survey

**Wheel of Competencies. Industry Demands of Competencies for Research and Innovation**

**Johannsen, Thies**

TU Berlin, Germany

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**ID: 1430**

Research Paper

Oral presentation

*Topics:* Sustainability. Sustainable Development Goals, Engineering Skills

*Keywords:* sustainability competencies, green skills, engineering education, environmental engineering, Hungary

**Integrating Green Competencies and Skills in the Hungarian Environmental Engineering Education**

**Barna, Orsolya; Szalmáné Csete, Mária**

Department of Environmental Economics and Sustainability, Faculty of Economic and Social Sciences, Budapest University of Technology and Economics (BME)

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**ID: 1185**

Research Paper

Oral presentation

*Topics:* Sustainability. Sustainable Development Goals

*Keywords:* Sustainability awareness, Engineering education, SDG

**What about Sustainability? Investigating Engineering Students' Sustainability Awareness and Attitude**

**Nakad, Mantoura<sup>1</sup>; Kövesi, Klara<sup>2</sup>**

<sup>1</sup>University of Balamand, Lebanon (Lebanese Republic); <sup>2</sup>ENSTA Bretagne, France

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**ID: 1372**

Concept Paper

Oral presentation

*Topics:* Sustainability. Sustainable Development Goals, Gender and Diversity

*Keywords:* gender mainstreaming, nautical marine and naval engineering, teaching innovation project

**A UPC innovation teaching project for the incorporation of the gender perspective in nautical, marine and naval engineering**

**Barahona-Fuentes, Claudia; Castells-Sanabra, Marcella; Ruiz, Ángela; Codina, Mercè; Fernández-Cantí, Rosa Maria; Vela, Montserrat; Ordás, Santiago; Isalgué, Antonio; Martín, Agustí**

Universitat Politècnica de Catalunya, Spain

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11:00am - 12:00pm

**PS 20-6 Physics and Engineering Education**

Location: **Aula Màster CN**

Session Chair: **Juho Tiili**

**ID: 1314**

Concept Paper

Oral presentation

*Topics:* Physics and Engineering Education, Teaching methods

*Keywords:* Flipped-classroom, teacher collaboration, short videos, physics, multi-campus

**Experiences with short videos in a flipped classroom design in physics**

**Rolstad, Knut Bjørkli; Andersen, Trine Høiberg**

Norwegian University of Science and Technology (NTNU), Norway

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**ID: 1333**

**Concept Paper**

**Oral presentation**

*Topics:* Fostering Engineering Education Research, Physics and Engineering Education

*Keywords:* Concept development, Conceptual understanding, Cultural-historical theory, Work analysis, Microengineering

**Concept development in microengineering: unpacking underlying processes and developmental paths**

**Vergara, Martín**

University of Neuchâtel, Switzerland

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**ID: 1273**

**Concept Paper**

**Oral presentation**

*Topics:* Physics and Engineering Education, Assessment

*Keywords:* computerized adaptive testing, item response theory, online test, physics, prospective students

**First Results of Computerized Adaptive Testing for an Online Physics Test**

**Müller, Ute Carina<sup>1,3</sup>; Huelmann, Thorben<sup>4</sup>; Haustermann, Michael<sup>5</sup>; Hamann, Fabian<sup>3</sup>; Bender, Esther<sup>2</sup>; Sitzmann, Daniel<sup>1,3</sup>**

<sup>1</sup>Arbeitsstelle MINTFIT Hamburg (AMH), Germany; <sup>2</sup>Hamburg University of Applied Sciences (HAW), Germany; <sup>3</sup>Hamburg University of Technology (TUHH), Germany; <sup>4</sup>University Medical Center Hamburg-Eppendorf (UKE Hamburg), Germany; <sup>5</sup>Universität Hamburg (UHH), Germany

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**ID: 1158**

**Concept Paper**

**Oral presentation**

*Topics:* Physics and Engineering Education, Teaching methods

*Keywords:* Gamification; game-based learning; improving classroom teaching; mechanical engineering; Interactive learning environments

**APPLICATION OF A GAMIFICATION LEARNING SYSTEM IN MECHANICAL ENGINEERING STUDIES.**

**Pàmies-Vilà, Rosa<sup>1</sup>; Fabregat-Sanjuan, Albert<sup>2</sup>; Puig-Ortiz, Joan<sup>1</sup>; Jordi Nebot, Lluïsa<sup>1</sup>; Hernández Fernández, Antoni<sup>1</sup>**

<sup>1</sup>Universitat Politècnica de Catalunya, Spain; <sup>2</sup>Universitat Rovira i Virgili, Spain

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11:00am - 12:00pm

**PS 20-7 Teaching methods; Engineering Skills; Assessment (Research)**

Location: **Sala Àgora**

Session Chair: **Neil Cooke**

**ID: 1246**

**Research Paper**

**Oral presentation**

*Topics:* Engineering Skills, Teaching methods

*Keywords:* electrochemistry, engineering science education, inquiry-based learning in higher education, conceptual modelling, levels of complexity, recurrent difficulties

**Action research on electrochemistry learning. Conceptual modelling intervention to promote disciplinary understanding, scientific inquiry, and reasoning.**

**Orozco, Mariana; Boon, Mieke; Susarrey Arce, Arturo**

University of Twente, Netherlands, The

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**ID: 1148**

**Research Paper**

**Oral presentation**

*Topics:* Teaching methods, Assessment

*Keywords:* Doctoral teaching assistants, self-efficacy, pedagogical training, practise-intensive course, academic career preparation

**Effect of a practice-intensive course on doctoral teaching assistants teaching self-efficacy and priorities**

**Isaac, Siara; de Lima, Joelyn**

École polytechnique fédérale de Lausanne (EPFL), Switzerland

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**ID: 1263**

Research Paper

Oral presentation

*Topics:* Engineering Skills, Teaching methods

*Keywords:* student-active learning, engineering competence, non-technical skills, statistical analysis, learning outcomes

**How does the extent of student-active learning in engineering programmes influence students' perceived learning outcomes?**

**Øien, Geir Egil Dahle; Pettersen, Ivar; Bodsberg, Nils Rune**

Norwegian University of Science and Technology (NTNU), Norway

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**ID: 1134**

Research Paper

Oral presentation

*Topics:* Engineering Skills, Teaching methods

*Keywords:* STEAM education, teacher training, digital competence; soft skills, higher education

**Profile of the participants in a STEAM Lecturer-Training Program Based on Competencies. Lessons for the future.**

**Perez-Poch, Antoni; Alcober Segura, Jesús; Alier, Marc; Llorens, Ariadna; López, David**

Universitat Politècnica de Catalunya, Spain

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11:00am - 12:00pm

**PS 20-8 Teaching methods**

Location: **Aula Teleensenyament**

Session Chair: **Greet Langie**

**ID: 1341**

Short Paper

Oral presentation

*Topics:* Teaching methods, Digitalisation & Hybrid models

*Keywords:* engineering education, modular approach, course design

**Challenge Based Modular Education Upscaled: Piloting and Evaluating an Implementation Procedure**

**Mesutoglu, Canan; Stollman, Saskia; Lopez Arteaga, Ines**

Eindhoven University of Technology, Netherlands, The

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**ID: 1271**

Concept Paper

Oral presentation

*Topics:* Engineering Skills, Teaching methods

*Keywords:* flipped learning, electronics

**Experiences from the First Implementation Round of Two Electronics Courses Utilizing Flipped Learning Method**

**Laine, Katja; Sipilä, Erja**

Tampere University, Finland

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**ID: 1332**

Concept Paper

Oral presentation

*Topics:* Teaching methods

*Keywords:* seminar series, journal club, paper reading, digital learning, feedback driven

**Departmental seminar series and journal club with enhanced learning outcomes**

**Rullmann, Edward; Forbrig, Christian; Rappsilber, Juri**

Technische Universität Berlin, Chair of Bioanalytics, 10623 Berlin, Germany

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11:00am - 12:00pm

**PS 20-9 Engineering Skills; Challenges of new European Universities**

Location: **Aula Post-grau**

Session Chair: **Sebastian Tornil**

**ID: 1297**

Concept Paper

Oral presentation

*Topics:* Challenges of new European Universities, Engineering Skills

*Keywords:* European University Alliance, multilingualism, multiculturalism, global competence, engineering education, Internationalisation

## Struggling at the core: multilingualism and multiculturalism in a European University Alliance

Kjellgren, Björn<sup>1</sup>; Taylor, Danielle<sup>2</sup>; Serrano Van Der Laan, Marta<sup>3</sup>

<sup>1</sup>KTH Royal Institute of Technology, Sweden; <sup>2</sup>Université Grenoble Alpes, France; <sup>3</sup>Politecnico di Torino, Italy

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**ID: 1208**

Concept Paper

Oral presentation

*Topics:* Industry and Companies liaison. Regional Involvement and Innovation, Engineering Skills

*Keywords:* Teaching Proof-Of-Concept Design, Project-Based-Learning, Innovation and Design, Industrial Projects, Engineering Skills

### Teaching engineering students how to design a Proof-Of-Concept: A way to experience the value of reflexive practices for engineers?

Thomas, Maxime; Lafkihi, Mariam; Jobin, Caroline; Ballot, Eric; Le Masson, Pascal; Weil, Benoit

MINES Paris, PSL University, Centre de Gestion Scientifique (CGS), i3 UMR CNRS, 60 Bd St Michel 75006 Paris, France

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**ID: 1252**

Concept Paper

Oral presentation

*Topics:* Curriculum Development, Engineering Skills

*Keywords:* skills, project, first-year, design

### Implementing a suite of skills modules in a first-year engineering project-based subject

Buskes, Gavin; Chan, Huey Yee

The University of Melbourne, Australia

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**ID: 1284**

Concept Paper

Oral presentation

*Topics:* Engineering Skills

*Keywords:* collaborative robot, project based learning

### EXPLORING THE PRACTICAL USE OF A COLLABORATIVE ROBOT FOR ACADEMIC PURPOSES

Ponsa, Pere; Tornil, Sebastian

Universitat Politècnica Catalunya Barcelona Tech, Spain

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12:15pm - 1:15pm

#### Parallel Workshops 20-1

Location: Vèrtex VS219

**ID: 1428**

Workshop final

Workshop 60 min (only for workshop proposals)

*Topics:* Building Communities and Coordination, Mentorship and Tutorship

*Keywords:* education-focussed academics, academic career framework, teaching-focussed academics, education-focussed career pathway

#### Career Development Workshop for Education-focussed Academics

Nyamafene, Abel<sup>1</sup>; Griffiths, Jenny<sup>1</sup>; Wint, Natalie<sup>2</sup>; Tilley, Emanuela<sup>1</sup>; Mitchell, John<sup>1</sup>

<sup>1</sup>University College London, United Kingdom; <sup>2</sup>Swansea University, United Kingdom

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12:15pm - 1:15pm

#### Parallel Workshops 20-2

Location: Vèrtex VS208

**ID: 1283**

Workshop final

Workshop 60 min (only for workshop proposals)

*Topics:* Artificial Intelligence in Education, Ethics in Engineering Education

*Keywords:* Ethics education, Game-based learning, Artificial Intelligence

### A game-based approach to develop engineering students' awareness about artificial intelligence ethical challenges

**Hardebolle, Cécile**; Kovacs, Helena; Simkova, Ester; Pinazza, Alexandre; Di Vincenzo, Maria Carla; Jermann, Patrick; Tormey, Roland; Dehler Zufferey, Jessica  
Ecole Polytechnique Fédérale de Lausanne, Switzerland

12:15pm - 1:15pm

**Parallel Workshops 20-3**

Location: **Vèrtex VS216**

**ID: 1410**

Workshop final

Workshop 60 min (only for workshop proposals)

Topics: Lifelong Learning

Keywords: personal development process, lifelong learning, role of faculty

**The role of lecturers in engineering students' personal development process and the promotion of lifelong learning competencies**

**Naukkarinen, Johanna**<sup>1</sup>; **Van Den Broeck, Lynn**<sup>2</sup>; **Craps, Sofie**<sup>2</sup>; **Beagon, Una**<sup>3</sup>

<sup>1</sup>LUT University, Finland; <sup>2</sup>KU Leuven, Belgium; <sup>3</sup>TU Dublin, Ireland

12:15pm - 1:15pm

**Parallel Workshops 20-4**

Location: **Vèrtex VS218**

**ID: 1369**

Workshop final

Workshop 60 min (only for workshop proposals)

Topics: Digitalisation & Hybrid models, Assessment

Keywords: Peer assessment, Peer Evaluation, Hybrid Learning, Blended Learning

**Using Peer Assessment in Inclusive Digital Education**

**Saunders-Smiths, Gillian**<sup>1,3</sup>; **van Helden, Gitte**<sup>1,3</sup>; **van der Werf, Vivian**<sup>2,3</sup>; **Specht, Marcus**<sup>1,2,3</sup>

<sup>1</sup>Delft University of Technology, Netherlands, The; <sup>2</sup>Leiden University; <sup>3</sup>Leiden-Delft-Erasmus Centre for Education and Learning

12:15pm - 1:15pm

**Parallel Workshops 20-5 - Sponsor Workshop**

Location: **Vèrtex VS202**

**ID: 1474**

FOR SPONSORS: Sponsor Workshop

Workshop 60 min (only for workshop proposals)

Topics: Student Engagement, Mathematics at the heart of Engineering

Keywords: mathematics, sponsor, matlabs, cloud, moodle

**Hands-on workshop: active teaching and learning made real in MATLAB**

**Sanchis, Carlos**<sup>1</sup>; **Susin Sanchez, Antonio**<sup>2</sup>

<sup>1</sup>MathWorks; <sup>2</sup>Universitat Politècnica de Catalunya · BarcelonaTech (UPC)

12:15pm - 1:15pm

**Parallel Workshops 20-6 - Sponsor Workshop**

Location: **Vèrtex VS213**

**ID: 1477**

FOR SPONSORS: Sponsor Workshop

Workshop 60 min (only for workshop proposals)

Topics: Niche & Novel

Keywords: sponsor, mcgraw-hill

**Engineering More Time for your Research**

**Sheahan, Garry**<sup>1</sup>; **Mulvihill, John**<sup>2</sup>

<sup>1</sup>McGraw-Hill; <sup>2</sup>University of Limerick

12:15pm - 1:15pm

**Parallel Workshops 20-7**

Location: **Vèrtex VS203**

**ID: 391**

Workshop final

Workshop 60 min (only for workshop proposals)

Topics: Engineering Skills, Teaching methods

Keywords: Teaching tools, real-world problem-solving, active learning

**Teaching analytics skills in Engineering: A hands-on introduction using JMP**

**Kraft, Volker**

JMP, Germany

1:15pm - 2:30pm

**Lunch + Corner for SEFI Corporate partners lunch**

Location: **Jardins Vèrtex**



2:30pm - 3:30pm

## PS 20-10 Digitalisation & Hybrid models (Research mainly)

Location: **Vèrtex VS208**

Session Chair: **Antoine Lanthony**

**ID: 1476**

Research Paper

Oral presentation

Topics: Engineering Skills, Digitalisation & Hybrid models

Keywords: postdigital education, digital education, digital tools, labs, design projects

**Is “digital education” the right way forward? – Or is, maybe, postdigital education what is needed!**

**Bernhard, Jonte<sup>1</sup>; Ryberg, Thomas<sup>2</sup>; Davidsen, Jacob Gorm<sup>2</sup>**

<sup>1</sup>Linköping University, Sweden; <sup>2</sup>Aalborg University, Denmark

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**ID: 1164**

Research Paper

Oral presentation

Topics: Engineering Skills, Digitalisation & Hybrid models

Keywords: Problem, Case, Project based learning, technology enhance learning

**A landscape review of the literature focussing upon the use of technology to support Problem, Case and Project based learning in Higher Education STEM disciplines.**

**Wood, Ruth<sup>1</sup>; Malik, Manish<sup>2</sup>**

<sup>1</sup>Kingston University; <sup>2</sup>University of Portsmouth

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**ID: 1131**

Research Paper

Oral presentation

Topics: Fostering Engineering Education Research, Digitalisation & Hybrid models

Keywords: students' preferences, higher education, blended learning, survey

**Learning in a blended learning environment: needs and influencing factors**

**Uukkivi, Anne; Labanova, Oksana; Murulaid, Tiia; Nõuakas, Kati; Petjärv, Britt; Retšnoi, Vitali**

TTK University of Applied Sciences, Estonia

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**ID: 1116**

Concept Paper

Oral presentation

Topics: Curriculum Development, Digitalisation & Hybrid models

Keywords: Digital Transformation, Engineering Education, Multimedia Studio, Global Production Engineering

**Transformation of a traditional face-to-face engineering study program into an digital online program - A case study of Global Production Engineering**

**Eingartner, Valentin; Severengiz, Mustafa; Muschard, Bernd; Kohl, Holger**

Technische Universität Berlin, Germany

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2:30pm - 3:30pm

## PS 20-11 Student Engagement

Location: **Aula Màster CN**

Session Chair: **Pere Ponsa**

**ID: 1326**

Short Paper

Oral presentation

Topics: Student Engagement, Co-creation with students

Keywords: Student engagement, talent, learning innovation, learning communities

**The UPV Design Factory, what is it good for?**

**Collado López, M. Francisca; Villalonga Grañana, Inmaculada; Giménez Carbó, Esther; Gómez-Martín, M. Esther**

Universitat Politècnica de València, Spain

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**ID: 1178**

Short Paper

Oral presentation

Topics: Student Engagement, Curriculum Development

*Keywords:* higher engineering education, challenge-driven education, self-determination theory, student learning, motivation

### **ENGINEERING STUDENTS' MOTIVATION FOR LEARNING IN CHALLENGE-DRIVEN PROJECT COURSES: A QUALITATIVE PILOT STUDY**

**Pantzos, Panagiotis<sup>1</sup>; Rosén, Anders<sup>1</sup>; Buckley, Jeffrey<sup>1,2</sup>; Gumaelius, Lena<sup>1</sup>**

<sup>1</sup>Royal Institution of Technology, KTH, Sweden, Sweden; <sup>2</sup>Technological University of the Shannon, Midlands Midwest, Ireland

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**ID: 1167**

Short Paper

Oral presentation

*Topics:* Student Engagement, Physics and Engineering Education

*Keywords:* STEM education, undergraduate research, compressible flow, fluid mechanics, water table

### **Promoting lab engagement in experimental compressible flow modelling**

**Armengol, Sílvia; Gamez-Montero, Pedro J; Raush, Gustavo**

Department of Fluid Mechanics, Universitat Politècnica de Catalunya, Campus Terrassa, Terrassa, Spain

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**ID: 1194**

Short Paper

Oral presentation

*Topics:* Student Engagement, Navigating Open Learning Environments

*Keywords:* Feedback, Virtual learning environments, Professional development, Supporting innovation

### **The technical and pedagogical challenges for implementing feedback strategies in a virtual learning environment**

**Iqbal, Asima; Masood, Maryam; Schrock, Lauren; Makrinov, Ninna**

WMG, University of Warwick, United Kingdom

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2:30pm - 3:30pm

### **PS 20-12 Mathematics at the heart of Engineering**

Location: **Vèrtex VS218**

Session Chair: **Esteve Juanola-Feliu**

**ID: 1160**

Short Paper

Oral presentation

*Topics:* Mathematics at the heart of Engineering, Teaching methods

*Keywords:* quantitative techniques, heuristics, engineering, competitive project

### **Teaching advanced quantitative techniques through a competitive project**

**Domenech, Bruno; García-Villoria, Alberto; Maquirriain, Javier; Pastor, Rafael**

Department of Management (DOE), Universitat Politècnica de Catalunya (UPC), Spain

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**ID: 1224**

Short Paper

Oral presentation

*Topics:* Mathematics at the heart of Engineering, Co-Teaching

*Keywords:* team teaching, skills diversity, mathematics assessment

### **The increasing necessity of diversity of skills in team teaching**

**Craig, Tracy S; Redeker, Stach**

University of Twente, Netherlands, The

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**ID: 1216**

Concept Paper

Oral presentation

*Topics:* Mathematics at the heart of Engineering, Virtual and Augmented Reality in Education

*Keywords:* service mathematics, augmented reality, student engagement, motivation, technology-enhanced learning

### **AUGMENTED REALITY FOR LEARNING MATHEMATICS: A PILOT STUDY WITH WEBXR AS AN ACCESSIBLE TOOL**

**Wong, Jacqueline<sup>1</sup>; Bayoumy, Sharif<sup>2</sup>; Freeke, Arno<sup>2</sup>; Cabo, Annoesjka J<sup>1</sup>**

<sup>1</sup>Delft Institute of Applied Mathematics, TU Delft, the Netherlands; <sup>2</sup>New Media Centre, TU Delft, the Netherlands

2:30pm - 3:30pm

**ID: 1450**

Short Paper

Oral presentation

*Topics:* Mathematics at the heart of Engineering, Assessment

*Keywords:* self-assessment accuracy, Dunning-Kruger effect, feedback, drop-out

**Is the engineering students' self-assessment accurate? Analysing midterm tests in terms of self-assessment accuracy**

**Kulcsár, Nárcisz**

Széchenyi István University, Hungary

**PS 20-13 Industry and Companies liaison; Challenges of new European Universities**

Location: **Vértex VS219**

Session Chair: **Mike Murphy**

**ID: 1210**

Concept Paper

Oral presentation

*Topics:* Industry and Companies liaison. Regional Involvement and Innovation, Curriculum Development

*Keywords:* work-based learning, programme co-design, curriculum co-design, online collaboration, Signature Pedagogy

**Online co-design of a university Work-Based Learning degree programme: lessons learned from comparing cases in United Kingdom and Country X**

**Smith, Christopher<sup>1</sup>; Knowles, Graeme<sup>2</sup>; Jones, Edwina<sup>2</sup>; Martin, Celine<sup>2</sup>; Dlamini, Patience<sup>3</sup>; Mahlalela, John<sup>3</sup>**

<sup>1</sup>Glasgow Caledonian University, United Kingdom; <sup>2</sup>University of Warwick, United Kingdom;

<sup>3</sup>University of Eswatini, Eswatini

**ID: 1171**

Concept Paper

Oral presentation

*Topics:* Industry and Companies liaison. Regional Involvement and Innovation

*Keywords:* Internship, Online, Remote work, Industry liaison

**Perceptions and Experiences of Online Internship**

**Tepsa, Tauno; Mielikäinen, Maisa; Angelva, Juhani**

Lapland University of Applied Sciences, Finland

**ID: 1305**

Short Paper

Oral presentation

*Topics:* Challenges of new European Universities, Flexible Study Pathways

*Keywords:* Flexible Study Pathways, European Universities Initiative, European Degree, Survey Results

**Unite! European University: Main difficulties regarding Flexible Study Pathways identified by Partners with Impact on Joint Programmes – Results of a survey across Europe**

**Bossuyt, Sven<sup>1</sup>; Broqueira, Pedro<sup>2</sup>; Castro, Carlos<sup>3</sup>; David, Filipa<sup>2</sup>; Dellabale, Anne<sup>4</sup>; Freihöfer, Jana<sup>5</sup>; Valero García, Miguel<sup>6</sup>; Gonçalves, Isabel<sup>2</sup>; Hack, Jochen<sup>7</sup>; Nordström, Katrina<sup>1</sup>; Simões, Francisca<sup>2</sup>; Simões, Patrícia<sup>2</sup>**

<sup>1</sup>Aalto University; <sup>2</sup>Instituto Superior Técnico, Universidade de Lisboa; <sup>3</sup>Politecnico di Torino;

<sup>4</sup>UGA - Grenoble INP; <sup>5</sup>Technical University of Darmstadt; <sup>6</sup>Universitat Politècnica De

Catalunya - Barcelona Tech; <sup>7</sup>Leibniz University Hanover

**ID: 1254**

Short Paper

Oral presentation

*Topics:* Entrepreneurship Education, Challenges of new European Universities

*Keywords:* University networks, Entrepreneurship ecosystems, Entrepreneurial skills, EntRenew, Entrepreneurship Education program

**Fostering university networks and entrepreneurship education programs: The case of the EntRenew Project at Ideas UPV.**

**Morant-Martinez, Oscar**; Lucas del Rosal, Alexandra; Márquez Gómez, Maria; Gómez-Martin, M. Esther

Universitat Politècnica de València, Spain

2:30pm - 3:30pm

**PS 20-14 Engineering Skills; Challenges of new European Universities**

Location: **Sala d'Actes Vèrtex**

Session Chair: **Marc Alier**

**ID: 1400**

Concept Paper

Oral presentation

*Topics:* Curriculum Development, Engineering Skills

*Keywords:* Global Competence, Competence Integration, Curriculum Development, Teaching and Learning, Comprehensive Internationalization

**Supporting global competence learning for engineering students: Insights gained and lessons to be learnt**

**Richter, Tanja**; Kjellgren, Björn

KTH Royal Institute of Technology, Sweden

**ID: 1403**

Concept Paper

Oral presentation

*Topics:* Challenges of new European Universities, Engineering Skills

*Keywords:* EELISA-European University, Future Engineering Education, Cities and Communities, Disciplinary Broadening, Skills

**IN THE SEARCH FOR THE FUTURE ENGINEER: THE EELISA DISCIPLINARY BROADENING WORKSHOP EXPERIENCE**

**Gorgul, Emine**<sup>1</sup>; **Erden, Hamza Salih**<sup>2</sup>

<sup>1</sup>Faculty of Architecture, Istanbul Technical University, Turkey; <sup>2</sup>Informatics Institute, Istanbul Technical University, Turkey

**ID: 1453**

Concept Paper

Oral presentation

*Topics:* Engineering Skills, Assessment

*Keywords:* academic dishonesty, cheating, integrity, ethics, assessment, skills

**Cheating in engineering education: Modern methods and potential counter measures**

**Cooke, Neil**; **Hawwash, Kamel**

University of Birmingham, United Kingdom

**ID: 1255**

Concept Paper

Oral presentation

*Topics:* Curriculum Development, Engineering Skills

*Keywords:* systemic, educational reform, programme re-design, engineering and technology, engineering competence

**A roadmap for engineering and technology education reform at The Norwegian University of Technology (NTNU)**

**Øien, Geir Egil Dahle**; **Bodsberg, Nils Rune**

Norwegian University of Science and Technology (NTNU), Norway

2:30pm - 3:30pm

**PS 20-15 Lifelong Learning (Research)**

Location: **Vèrtex VS216**

Session Chair: **Gareth Thomson**

**ID: 1327**

Research Paper

Oral presentation

*Topics:* Engineering Skills, Lifelong Learning

*Keywords:* Lifelong learning, interventions

**Lifelong learning as an explicit part of engineering programmes: What can we do as engineering educators? – a scoping review**

**Van Den Broeck, Lynn**<sup>1</sup>; **Craps, Sofie**<sup>1</sup>; **Beagon, Una**<sup>2</sup>; **Naukkarinen, Johanna**<sup>3</sup>; **Langie, Greet**<sup>1</sup>

**ID: 1409**

Research Paper

Oral presentation

*Topics:* Engineering Skills, Lifelong Learning

*Keywords:* skills; competencies; evolution; 21st-century competencies; engineering education; initiation

**21st-century competencies in engineering competencies: initiation, evolution, current, and now whither to**

**Sangwan, Devika; Sangwan, Kuldip Singh; Raj, Punita**

BITS, Pilani, India

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**ID: 1282**

Research Paper

Oral presentation

*Topics:* Fostering Engineering Education Research, Lifelong Learning

*Keywords:* professional identity, professional belonging, students, engineering

**A quantitative exploration of engineering students' professional belonging**

**Sanna, Camilla<sup>1</sup>; Wallin, Patric<sup>2</sup>**

<sup>1</sup>Department of Education and Lifelong Learning, Norwegian University of Science and Technology, Norway; <sup>2</sup>Department of Education and Lifelong Learning, Norwegian University of Science and Technology, Norway

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**ID: 1347**

Research Paper

Oral presentation

*Topics:* Engineering Skills, Lifelong Learning

*Keywords:* Transversal Competencies, Sustainability, Engineering Education, Lifelong Learning

**ESSENTIALITY OF KNOWING TRANSVERSAL COMPETENCIES: TOWARDS ENGINEERING EDUCATION SUSTAINABILITY AND INDUSTRY READINESS OF ENGINEERING STUDENTS**

**Sangwan, Devika; Venugopal, Abhijith**

Birla Institute of Technology and Science, India

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2:30pm - 3:30pm

**PS 20-16 Teaching methods**

Location: **Sala Àgora**

Session Chair: **Lluïsa Jordi Nebot**

**ID: 1260**

Short Paper

Oral presentation

*Topics:* Industry and Companies liaison. Regional Involvement and Innovation, Teaching methods

*Keywords:* teachers' conceptions, phenomenography, teaching approach, industry-oriented teaching

**Associations between TAFE teachers' conceptions of, and approaches to, ICT-enhanced teaching and their conceptions of ICT use in the workplace**

**Khan, Md Shahadat<sup>1</sup>; Markauskaite, Lina<sup>2</sup>**

<sup>1</sup>Islamic University of Technology (IUT), Bangladesh,; <sup>2</sup>Professor, The University of Sydney, NSW, 2006, Australia

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**ID: 1152**

Short Paper

Oral presentation

*Topics:* Engineering Skills, Teaching methods

*Keywords:* Interdisciplinary skills, project-based learning, interdisciplinary teamwork, interprofessional collaboration, teacher as coach.

**Skills for learning across disciplines in project-based learning**

**van Harmelen, Erwin; van Otten, Leonie; Visscher-Voerman, Irene**

Saxion University of Applied Sciences, Netherlands, The

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**ID: 1188**

Short Paper

Oral presentation

*Topics:* Teaching methods, Digitalisation & Hybrid models

*Keywords:* on-line course, learning material, development of educational materials

**Aspects of online educational materials massive development**

**Zeman, Tomáš; Hrad, Jaromír**

Czech Technical University in Prague, Faculty of Electrical Engineering, Czech Republic

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**ID: 1407**

Short Paper

Oral presentation

*Topics:* Building Communities and Coordination, Teaching methods

*Keywords:* interdisciplinary, psychological safety, virtual, team learning

**FACTORS OF EFFECTIVE INTERDISCIPLINARY ONLINE TEAM LEARNING**

**Saarikoski, Lotta<sup>1</sup>; Lautamäki, Satu<sup>2</sup>**

<sup>1</sup>VAMK, Vaasa University of Applied Sciences, Finland; <sup>2</sup>SEAMK, Seinäjoki University of Applied Sciences, Finland

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2:30pm - 3:30pm

**PS 20-17 Curriculum Development; Challenges of new European Universities**

Location: **Aula Teleensenyament**

Session Chair: **Ramon Bragós**

**ID: 1321**

Concept Paper

Oral presentation

*Topics:* Attractiveness of Engineering, Curriculum Development

*Keywords:* spatial intervention, spatial ability, secondary school education, engineering

**An Ongoing Spatial Intervention Project in Irish Secondary Schools for Improved Engineering Education**

**Benedičič, Urša<sup>1</sup>; Duffy, Gavin<sup>1</sup>; Sorby, Sheryl<sup>2</sup>**

<sup>1</sup>Technological University Dublin, Ireland; <sup>2</sup>University of Cincinnati, USA

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**ID: 1222**

Concept Paper

Oral presentation

*Topics:* Building Communities and Coordination, Curriculum Development

*Keywords:* teamwork, intercultural skills, engineering education, higher education

**DEVELOPING TEAMWORK SKILLS BEYOND CROSS-CULTURAL BARRIERS: A CASE STUDY FOR ENGINEERING STUDENTS IN HIGHER EDUCATION**

**Krab-Hüsken, Leonie E.; Pei, Linlin; Benes, Nieck E.**

University of Twente, Netherlands, The

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**ID: 1140**

Concept Paper

Oral presentation

*Topics:* Challenges of new European Universities, Curriculum Development

*Keywords:* challenge-based learning, CDIO framework

**ON THE CONNECTIONS BETWEEN CHALLENGE-BASED LEARNING AND THE CDIO FRAMEWORK**

**Gunnarsson, Svante; Swartz, Maria**

Linköping University, Sweden

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**ID: 1190**

Concept Paper

Oral presentation

*Topics:* Challenges of new European Universities, Curriculum Development

*Keywords:* Professional development, agile education, skills development, refugee education, flexible study pathways

**Implementing Agile Continuous Education (ACE) at MIT and beyond: The MIT Refugee Action Hub (ReACT) case**

Bagiati, Aikaterini; Salazar Gomez, Andres Felipe; Masic, Admir; Cook, Lana; Sastry, Anjali; Westerman, George; Breazeal, Cynthia; Kumar, Vijay MS; Kennedy, Kathleen D; Sarma, Sanjay E  
Massachusetts Institute of Technology, United States of America

3:45pm - 4:00pm

**Group Picture Campus**

Location: **Vertex Entrance stairs**

4:00pm - 6:15pm

**SEFI General Assembly**

Location: **Sala d'Actes Vèrtex**

6:30pm - 8:00pm

**Social Programme (limited places - will require specific booking)**

**Date: Wednesday, 21/Sept/2022**

8:00am - 9:00am	<b>Info Desk</b> Location: <b>Vestíbul Auditori Vèrtex</b>
9:00am - 10:00am	<b>Keynote 2 - Alicia García-Holgado - Gender mainstreaming in Engineering Education</b> Location: <b>Auditori Vèrtex</b>
10:00am - 10:30am	<b>Poster Pitch</b> Location: <b>Auditori Vèrtex</b>
10:30am - 11:00am	<b>Coffee Break</b> Location: <b>Jardins Vèrtex</b>
11:00am - 12:00pm	<b>PS 21-1 Entrepreneurship Education</b> Location: <b>Aula Teleensenyament</b> Session Chair: <b>Silvia Zurita</b>
	<b>ID: 1242</b> Short Paper Oral presentation <i>Topics:</i> Entrepreneurship Education, Mentorship and Tutorship <i>Keywords:</i> entrepreneurial ecosystem, know-how, university entrepreneurship, startups, entrepreneurship training <b>Know-how transfer in an entrepreneurial ecosystem</b> <b><u>Pedrés Cayo, Lorena</u>; Márquez Gómez, María; Giménez Carbó, Ester; Gómez-Martín, M. Esther</b> Universitat Politècnica de València, Spain
	<b>ID: 1220</b> Short Paper Oral presentation <i>Topics:</i> Entrepreneurship Education, Mentorship and Tutorship <i>Keywords:</i> entrepreneurial ecosystem, mentoring, startups, business accelerator, business incubator <b>STARTUPV: Different approaches in mentoring and tutorship for entrepreneurs in the three stages of a university entrepreneurial ecosystem</b> <b><u>Griol-Barres, Israel</u>; Márquez Gómez, María; Giménez Carbó, Esther; Gómez-Martín, M. Esther</b> Universitat Politècnica de València, Spain
	<b>ID: 1236</b> Short Paper Oral presentation <i>Topics:</i> Entrepreneurship Education, Assessment <i>Keywords:</i> formative feedback, entrepreneurship <b>Experiences from using formative feedback in a course with focus on entrepreneurship</b> <b><u>Løje, Hanne</u></b> DTU, Denmark
	<b>ID: 1266</b> Research Paper Oral presentation <i>Topics:</i> Entrepreneurship Education, Mentorship and Tutorship <i>Keywords:</i> Entrepreneurship, problem based learning, project facilitation, design based research <b>When problem based learning becomes entrepreneurial – a facilitator view on student challenges</b> <b>Holgaard, Jette Egelund; <u>Du, Xiangyun</u>; Guerra, Aida</b> Aalborg Centre for Problem Based Learning in Engineering Science and Sustainability under the auspices of UNESCO, Aalborg Universitet, Denmark
11:00am - 12:00pm	<b>PS 21-2 Student Engagement; Mentorship and Tutorship</b> Location: <b>Vèrtex VS216</b> Session Chair: <b>Raffaella Manzini</b>



**ID: 1330**

Concept Paper  
Oral presentation

*Topics:* Student Engagement, Physics and Engineering Education

*Keywords:* Challenge-based learning, thesis writing, Sustainable Development Goal 11, ECIU University

**Collaborative, multidisciplinary, international, and societal relevant: A framework combining challenge-based learning and thesis writing across European universities**

**Stahlberg, Nadine; Brose, Andrea; Diedler, Sascha; Kuchta, Kerstin**  
Hamburg University of Technology, Germany

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**ID: 1200**

Concept Paper  
Oral presentation

*Topics:* Student Engagement, Teaching methods

*Keywords:* Metacognitive process, Self-efficacy, Problem solving, self-awareness, self-management, Vignette questions

**Introduction of process in embedded programming supporting student's self-efficacy - case study**

**Schultz, Ole; Blaszczyk, Tomasz**  
DTU Engineering Technology, Denmark

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**ID: 1209**

Concept Paper  
Oral presentation

*Topics:* Student Engagement, Mentorship and Tutorship

*Keywords:* Academic performance, Electronics course, University newcomer students, Student engagement

**Actions for Academic Performance Improvement of University Newcomer Students in an Electronics Introductory Subject**

**Gasulla, Manel; Jordana, Josep; Robert, Francesc Josep**  
Universitat Politècnica de Catalunya, Spain

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**ID: 1413**

Concept Paper  
Oral presentation

*Topics:* Student Engagement, Mentorship and Tutorship

*Keywords:* student support services, first year, student perception, study success

**Student perceptions of support services for first-year engineering students**

**Van Dyck, Annelies; Koppen, Els; Van den Broeck, Lynn; Langie, Greet**  
KU Leuven, Belgium

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11:00am - 12:00pm

**PS 21-3 Mathematics at the heart of Engineering; Physics and Engineering Education (Research mainly)**

Location: **Aula Post-grau**

Session Chair: **Ramon Costa Castelló**

**ID: 1457**

Research Paper  
Oral presentation

*Topics:* Mathematics at the heart of Engineering, Co-creation with students

*Keywords:* Interdisciplinary engineering education, theory-based engineering course, design for non-engineering students, practice-based learning concepts

**AN INTRODUCTORY LECTURE ON CHAOTIC SYSTEMS THROUGH LORENZ ATTRACTOR AND FORCED LOTKA VOLterra EQUATION FOR INTERDISCIPLINARY EDUCATION**

**Kim, Geunjeong; Haus, Benedikt; Block, Brit-Maren; Mercorelli, Paolo**  
Leuphana University of Lueneburg, Germany

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**ID: 1451**

Research Paper  
Oral presentation

*Topics:* Mathematics at the heart of Engineering, Teaching methods  
*Keywords:* Mathematical modelling, assessment, ordinary differential equations, mechatronics students, projects

**Promoting engineering students' learning with mathematical modelling projects**

**Rogovchenko, Svitlana; Rogovchenko, Yuriy**  
University of Agder, Norway

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**ID: 1141**

Concept Paper  
Oral presentation

*Topics:* Mathematics at the heart of Engineering  
*Keywords:* SEFI MSIG, EU programmes, cooperation, mathematics in engineering, students' feedback

**SEFI umbrella for teaching mathematics in engineering**

**Velichová, Daniela**  
Slovak University of Technology in Bratislava, Slovak Republic

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**ID: 1399**

Short Paper  
Oral presentation

*Topics:* Virtual and Remote Labs, Mathematics at the heart of Engineering  
*Keywords:* Videos, Self-learning, Lab sessions, Testing progress

**IT'S YOUR DAY! TAKE ACTION AND CLICK ON THE VIDEO ZONE: UNDERSTANDING, IMAGINING, DOING AND REVIEWING.**

**Carmona, Ángeles; Claverol, Mercè; Encinas, Andrés M; Jiménez, María José; Martín, Alvar; Mas, Albert; Mitjana, Margarida; Ruiz, Magda Liliana**  
Universitat Politècnica de Catalunya, Spain

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11:00am - 12:00pm

**PS 21-4 Ethics in Engineering Education**

Location: **Vèrtex VS219**  
Session Chair: **Gunter Bombaerts**

**ID: 1344**

Concept Paper  
Oral presentation

*Topics:* Ethics in Engineering Education  
*Keywords:* ethics, engineering, education, social sciences, humanities

**Why Change Engineering Education?: Pragmatic Perspectives from the Humanities and Social Sciences**

**Staley, Thomas; Bairaktarova, Diana**  
Virginia Tech, United States of America

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**ID: 1422**

Concept Paper  
Oral presentation

*Topics:* Ethics in Engineering Education, Cooperation for Development  
*Keywords:* Interdisciplinary Education, Engineering Ethics, Integrated Ethics, Situated Knowledge, Curriculum Development

**The Berlin Ethics Certificate: Conceptualizing Interdisciplinarity as a Core Building Block of Ethics in Engineering Education**

**Ammon, Sabine; Kljagin, Alexandra; Rettschlag, Juliane; Vortel, Martina**  
Technical University of Berlin, Germany

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**ID: 1398**

Concept Paper  
Oral presentation

*Topics:* Artificial Intelligence in Education, Ethics in Engineering Education  
*Keywords:* Digital Education, Virtual Labs, Ethics, Artificial Intelligence

**To be fAIr: Ethical and Fair Application of Artificial Intelligence in Virtual Laboratories**

**Caccavale, Fiammetta; Gargalo, Carina L.; Gernaey, Krist V.; Krühne, Ulrich**

Process and System Engineering Centre (PROSYS), Department of Chemical and Biochemical Engineering, Technical University of Denmark

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**ID: 1359**

**Concept Paper**

**Oral presentation**

*Topics:* Ethics in Engineering Education, Curriculum Development

*Keywords:* decolonising the curriculum, AI ethics, engineering education, curriculum development, cognitive load

**Can decolonising the curriculum provide an enhanced engineering education?**

**Collins, Graham John**

University College London, United Kingdom

11:00am - 12:00pm

**PS 21-5 Sustainability. Sustainable Development Goals; Curriculum Development**

Location: **Sala d'Actes Vèrtex**

Session Chair: **John Mitchell**

**ID: 1173**

**Concept Paper**

**Oral presentation**

*Topics:* Sustainability. Sustainable Development Goals

*Keywords:* PbL, Sustainability, SDG, Short-term PbL, Engineering Education

**A Research Program about a short-term PBL approach based on the SDG**

**Braga, Marco<sup>1</sup>; d'Escoffier, Luiz<sup>1,2</sup>; Guerra, Aida<sup>3</sup>**

<sup>1</sup>CEFET/RJ, Centre for Engineering Education of Rio de Janeiro - Brazil; <sup>2</sup>FIOCRUZ - Oswaldo Cruz Foundation - Brazil; <sup>3</sup>Aalborg Centre for PbL in Engineering Science and Sustainability - Aalborg University

**ID: 1406**

**Concept Paper**

**Oral presentation**

*Topics:* Sustainability. Sustainable Development Goals, Curriculum Development

*Keywords:* systemic approach, transition issues, project based learning, co-creation with students, engineering skills

**Co-designing a curriculum for a sober techno- and eco-responsible engineering : transition to a new professional identity for a sustainable world**

**Feron, Aurelie<sup>1,2</sup>; Poinsotte, Fanny<sup>1,3</sup>; Jossic, Laurent<sup>1,4</sup>**

<sup>1</sup>Grenoble INP, France; <sup>2</sup>DET PerForm; <sup>3</sup>Phelma; <sup>4</sup>Ense3

**ID: 1435**

**Concept Paper**

**Oral presentation**

*Topics:* Sustainability. Sustainable Development Goals

*Keywords:* Sustainable Development Goals (SDGs), Evaluation

**Demonstrating the Engineering School's commitment to the achievement of the SDGs: The ALCAEUS Evaluation Programme / Agenda 2030. A case study**

**Yagüe Fabra, José Antonio<sup>1</sup>; Murillo Esteban, María Benita<sup>1</sup>; García Ramos, Francisco Javier<sup>2</sup>; Martín Ramos, Pablo<sup>2</sup>; Serrano González, Antonio<sup>3</sup>; Ortega Pardos, Ana Isabel<sup>3</sup>**

<sup>1</sup>Escuela de Ingeniería y Arquitectura de la Universidad de Zaragoza. C/ María de Luna, 3. 50018 Zaragoza, Spain; <sup>2</sup>Escuela Politécnica Superior - Huesca de la Universidad de Zaragoza. C. de Cuarte, s/n. 22071 Huesca, Spain; <sup>3</sup>Agencia de Calidad y Prospectiva Universitaria de Aragón (ACPUA). Av. Ranillas, 5 D, 50018 Zaragoza, Spain

11:00am - 12:00pm

**PS 21-6 Physics and Engineering Education; Challenges of new European Universities**

Location: **Aula Màster CN**

Session Chair: **Antonio Marzoa**

**ID: 1203**

**Short Paper**

**Oral presentation**

*Topics:* Physics and Engineering Education, Challenges of new European Universities

*Keywords:* Course development, Teacher collaboration, Multi-campus course, Physics

## Teachers' views on collaborating in multi-campus course cluster for engineering students

**Kahrs, Magnus Strøm**; Korpås, Guri Sivertsen

Department of Physics, Norwegian University of Science and Technology, Norway

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**ID: 1286**

Short Paper

Oral presentation

*Topics:* Niche & Novel, Physics and Engineering Education

*Keywords:* Practical teaching, scalable lab, multidisciplinary, timetable management

### Scaling-up Practical Teaching: the one-thousand student week

**Di Benedetti, Matteo**; Day, Harry; Archibald, Sarah

The University of Sheffield, United Kingdom

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**ID: 1308**

Short Paper

Oral presentation

*Topics:* Virtual and Remote Labs, Physics and Engineering Education

*Keywords:* Optical Astronomy, Optical communications, Atmospheric turbulence, Adaptive Optics, Active Optics, Great Telescopes, Optical propagation

### Two applications for teaching and illustrating Telecommunication

### Engineering students the atmospheric effects on the optical channels.

### Applications in Astronomy, Mechanical Engineering and Telecommunications

**Salazar, Ferran<sup>1</sup>**; **Marzoa, Antonio<sup>1,2</sup>**; **Crusellas, Marc<sup>2</sup>**

<sup>1</sup>Universitat Politècnica de Catalunya, Spain; <sup>2</sup>SENER Aeroespacial, S.A., Spain

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**ID: 1329**

Short Paper

Oral presentation

*Topics:* Physics and Engineering Education, Curriculum Development

*Keywords:* Multidisciplinary teamwork, challenge-based education

### Factors that Influence Multidisciplinary Teamwork in a Challenge-Based Learning Course

**Mesutoglu, Canan**; Bayram-Jacobs, Dürdane Dury

Eindhoven University of Technology, Netherlands, The

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11:00am - 12:00pm

## PS 21-7 Teaching methods

Location: **Sala Àgora**

Session Chair: **Rosa Pàmies Vilà**

**ID: 1219**

Concept Paper

Oral presentation

*Topics:* Engineering Skills, Teaching methods

*Keywords:* Continuous assessment, self-checking

### Continuous assessment with self-checking tasks

**Korhonen, Juhamatti**; Naukkarinen, Johanna; Niemelä, Hanna; Järvisalo, Heikki;

**Silventoinen, Pertti**

LUT University, Finland

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**ID: 1240**

Concept Paper

Oral presentation

*Topics:* Teaching methods

*Keywords:* student empowerment, theoretical engineering course, iterative process, course framework, self-driven learning

### From student to expert in a week

**Forbrig, Christian**; Rullmann, Edward; Rappsilber, Juri

Technische Universität Berlin, Chair of Bioanalytics, 10623 Berlin, Germany

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**ID: 1401**

Concept Paper

Oral presentation

*Topics:* Co-creation with students, Teaching methods

*Keywords:* Transdisciplinarity, project-based learning, hybrid education, competence profiles, individual learning goals

**Broadening personal competence profiles through transdisciplinary project modules**

**Marckwardt, Anja Sophie; Kühne, Stefan; Behme, Jonas Friedrich; Bleszynski, Charlotte Maria; Bullerdieck, Philip; Dang, Tra Mi; Ghazi, Mohamed; Oberschmidt, Dirk**  
Technische Universität Berlin, Department of Micro and Precision Devices, Germany

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**ID: 1346**

Concept Paper

Oral presentation

*Topics:* Student Mobility, Teaching methods

*Keywords:* simulations, project-based learning, remote learning

**Simulating an engineering workplace: A new approach to prototype-based team project**

**Chan, Brian; Bin Asad, Talha; Bairaktarova, Diana**  
Virginia Tech, United States of America

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11:00am - 12:00pm

**PS 21-8 Engineering Skills**

Location: **Vèrtex VS208**

Session Chair: **Roland Tormey**

**ID: 1374**

Concept Paper

Oral presentation

*Topics:* Fostering Engineering Education Research, Engineering Skills

*Keywords:* competence profile, engineering education, project team, soft skills

**Developing and improving competence profiles of project teams in engineering education**

**Mikhridinova, Nargiza<sup>1,4</sup>; Ngereja, Bertha Joseph<sup>2</sup>; Sastoque Pinilla, Edwar Leonardo<sup>3</sup>; Wolff, Carsten<sup>4</sup>; Van Petegem, Wim<sup>1</sup>**

<sup>1</sup>KU Leuven; <sup>2</sup>The Norwegian University of Science and Technology (NTNU); <sup>3</sup>Dortmund University of Applied Sciences and Arts; <sup>4</sup>University of the Basque Country (UPV/EHU)

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**ID: 1342**

Concept Paper

Oral presentation

*Topics:* Niche & Novel, Engineering Skills

*Keywords:* value creation, productivity, engineering practice

**Where's the Value in Engineering?**

**Williams, Bill<sup>1,3</sup>; Trevelyan, James<sup>2</sup>**

<sup>1</sup>CEG-IST, Instituto superior Técnico, Universidade de Lisboa, Portugal; <sup>2</sup>University of Western Australia, Australia; <sup>3</sup>TUDublin, Ireland

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**ID: 1218**

Short Paper

Oral presentation

*Topics:* Engineering Skills

*Keywords:* reflection skills, reflection activities, need for reflection, student perceptions

**Reflection in Technical Higher Education: Student Perceptions**

**Eshuis, Elise; Mittendorff, Kariene; Daggenvoorde-Baarslag, Heleen**

Saxion University of Applied Sciences, Netherlands, The

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**ID: 1408**

Concept Paper

Oral presentation

*Topics:* Engineering Skills, Assessment

*Keywords:* Experiential learning, hands-on approach, engineering education, skills, learning

**Experiential learning: integrating learning and experience in shaping the future of the engineers**

Sangwan, Devika; Singh, Rajni; Sangwan, Kuldip Singh  
BITS, Pilani, India

11:00am - 12:00pm

**PS 21-9 Engineering Skills**

Location: **Vèrtex VS218**  
Session Chair: **Tinne De Laet**

**ID: 1386**

Short Paper

Oral presentation

Topics: Engineering Skills

Keywords: empathy, care, engineering practice, professional skills, employability

**Engineers' perceptions of the importance of empathy and care: initial insights from engineers practicing in Australia**

Marinelli, Melissa Jane<sup>1</sup>; Male, Sally Amanda<sup>1</sup>; Chapman, Elaine<sup>2</sup>; Strobel, Johannes<sup>3</sup>

<sup>1</sup>The University of Melbourne, Australia; <sup>2</sup>The University of Western Australia, Australia; <sup>3</sup>SRI International

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**ID: 1334**

Short Paper

Oral presentation

Topics: Curriculum Development, Engineering Skills

Keywords: Critical thinking, career development, skills and competences

**Tackling perception and deception in STEM: A critical thinking skill for early-career development**

Torres, Francesc<sup>1</sup>; Moura Santos, Ana<sup>2</sup>; Elias, Antoni<sup>1</sup>; Teixeira, Miguel C.<sup>2</sup>; Montemor, Fatima<sup>2</sup>

<sup>1</sup>Universitat Politècnica de Catalunya (UPC), Spain; <sup>2</sup>Instituto Superior Técnico (IST). Universidade de Lisboa. Portugal

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**ID: 1159**

Short Paper

Oral presentation

Topics: Mentorship and Tutorship, Engineering Skills

Keywords: reflection, guidance, teacher skills, professionalisation

**Professionalising teachers in guiding reflection of students**

Mittendorff, Kariene; Eshuis, Elise; van der Heijden, Karin; Daggenvoorde-Baarslag, Heleen

Saxion, Netherlands, The

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**ID: 1291**

Short Paper

Oral presentation

Topics: Fostering Engineering Education Research, Engineering Skills

Keywords: educational innovation, higher education, meta-skills, education 4.0 skills, industry 4.0

**Exploring engineering skills transformation through a comparison of institutional practices in Mexico and Scotland**

Caratozzolo, Patricia<sup>1,2</sup>; Smith, Christopher J.M.<sup>3</sup>; Muñoz-Escalona, Patricia<sup>4</sup>; Membrillo-Hernández, Jorge<sup>1,2</sup>

<sup>1</sup>Institute for the Future of Education, Mexico; <sup>2</sup>School of Engineering and Sciences, Tecnológico de Monterrey, Mexico; <sup>3</sup>Institute for University to Business Education, Glasgow Caledonian University, United Kingdom; <sup>4</sup>School of Computing, Engineering and Built Environment, Glasgow Caledonian University, United Kingdom

12:00pm - 1:15pm

**Student Perspective**

Location: **Sala d'Actes Vèrtex**

12:15pm - 1:15pm

**Poster Session**

Location: **Sala Polivalent CN**

**ID: 1290**

Research Paper

Poster pitch & presentation/discussion

*Topics:* Mentorship and Tutorship, Assessment

*Keywords:* assessment of competency development, coaching, challenge-based learning, grading biases, engineering education

**Assessment of competency development in challenge-based learning course: Can coaches be objective assessors?**

**Petrová, Nikola; Chapel, Leonie; Buunk, Luuk G. A.; Kaptijn, Rianne**

University of Twente, The Netherlands

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**ID: 1463**

Research Paper

Poster pitch & presentation/discussion

*Topics:* Industry and Companies liaison, Regional Involvement and Innovation

*Keywords:* Digital Skills, Regional Ecosystem, LifeLong Learning

**COMPASS addressing the challenge of DigitalSkills skilling from the Regional Ecosystem Perspective**

**Vilanova, Ramon<sup>1</sup>; Ariño, Xavier<sup>2</sup>; Palou, Laura<sup>2</sup>; Gali, Mireia<sup>2</sup>; Palma, Julia<sup>3</sup>**

<sup>1</sup>School of Engineering, UAB, Spain; <sup>2</sup>UAB, Spain; <sup>3</sup>Parc Recerca UAB, Spain

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**ID: 1150**

Research Paper

Poster pitch & presentation/discussion

*Topics:* Student Engagement, Teaching methods

*Keywords:* Flipped classroom; continuous assessment; leadership; self-study

**DESIGN AND EVALUATION OF A CHEMISTRY SUBJECT IN AN ENGINEERING DEGREE**

**Almajano, MaríaPilar; Darbra, Rosa Mari; Lalueza, Joana**

Chemistry Engineering Department, Universitat Politècnica de Catalunya

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**ID: 1293**

Concept Paper

Poster pitch & presentation/discussion

*Topics:* Building Communities and Coordination, Teaching methods

*Keywords:* academic leadership, leadership development, student expectations, role models

**Engaging leaders from students' perspective and the impact of professors as role models**

**Krén, Heléna; Sélei, Beatrix**

Budapest University of Technology and Economics, Hungary

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**ID: 1302**

Concept Paper

Poster pitch & presentation/discussion

*Topics:* Entrepreneurship Education

*Keywords:* Entrepreneurship education, educational bootcamp, skills development, innovation, startups

**How do students transform good solutions from an educational challenge in a startup? A case study to entrepreneurship education.**

**Braga, Marco<sup>1</sup>; Pifano, Frederico<sup>1,2</sup>; Boehm, Rodney<sup>3</sup>; Maria, Alves<sup>3</sup>**

<sup>1</sup>CEFET/RJ, Federal Centre for Engineering Education of Rio de Janeiro - Brazil; <sup>2</sup>IFES - Federal Institute of Espirito Santo - Brazil; <sup>3</sup>Texas A&M University - USA

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**ID: 1110**

Short Paper

Poster pitch & presentation/discussion

*Topics:* Student Engagement, Mentorship and Tutorship

*Keywords:* first year of university, efficiency

**How to help students to be more efficient?**

**Amante García, Beatriz; Sánchez, Montse; Macarulla, Marcel; Roca, Xavier; Macanas, Jorge; Amer, Rafael; Haro, jaume; Hernández, Francisco; Cañadas, Juan Carlos; Vela, Patricia; Sunye, Marta**

UPC, Spain

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**ID: 1324**

Short Paper

Poster pitch & presentation/discussion

*Topics:* Sustainability. Sustainable Development Goals, Engineering Skills

*Keywords:* Photovoltaic Engineering. PBL.

### **Innovation Strategies to Develop Specific Professional Skills on Photovoltaic Systems Engineering**

**Silvestre, Santiago**

UPC, Spain

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**ID: 1289**

Short Paper

Poster pitch & presentation/discussion

*Topics:* Student Engagement, Mentorship and Tutorship

*Keywords:* Failures, first-year, gap, guidance, transition

### **Minding the gap between secondary school and university**

**Fabregat, Jaime; Jiménez, Patricia; Balanya, Teresa; Blanco, Mònica; Boza, Santiago; Coll, Maria Teresa; Ginovart, Marta**

Universitat Politècnica de Catalunya- Barcelona Tech, Spain

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**ID: 1423**

Short Paper

Poster pitch & presentation/discussion

*Topics:* Entrepreneurship Education, Engineering Skills

*Keywords:* Engineering Project Management, Professional Practice, Flipped Classroom, Student Centred Learning

### **Online vs in-person: flipped classroom approaches to a 3rd Year Electrical and electronic engineering project management module**

**Perea Borobio, Esther<sup>1</sup>; Gotham, Simon<sup>2</sup>**

<sup>1</sup>Imperial College London, United Kingdom; <sup>2</sup>S M Gotham Ltd

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**ID: 1393**

Concept Paper

Poster pitch & presentation/discussion

*Topics:* Curriculum Development, Engineering Skills

*Keywords:* Project based learning, Applied mathematics, Ethics

### **Project Based Learning for Mathematics in General Engineering Curriculum**

**Delacour, Julia; Boy-Dalverny, Agnès; Cossoniere, Anne; Marty-Guilhaumon, Marilyne; Trajin, Baptiste**

ENIT, France

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**ID: 1145**

Short Paper

Poster pitch & presentation/discussion

*Topics:* Sustainability. Sustainable Development Goals

*Keywords:* Sustainability, green wall, grey water treatment, civil engineering, environmental engineering, active learning methodology

### **PROMOTING SUSTAINABILITY IN EDUCATION THROUGH THE IMPLEMENTATION OF GREEN WALLS FOR GREYWATER TREATMENT**

**Uggetti, Enrica<sup>1</sup>; Biosca, Alex<sup>2</sup>; Pagans, Estel-la<sup>3</sup>; Díez-Montero, Rubén<sup>4</sup>**

<sup>1</sup>UPC, Spain; <sup>2</sup>UPC, Spain; <sup>3</sup>Insitut Les Salines, El Prat del Llobregat, Spain; <sup>4</sup>UPC, Spain

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**ID: 1397**

Short Paper

Poster pitch & presentation/discussion

*Topics:* Attractiveness of Engineering, Engineering Skills

*Keywords:* Research Club, engineering education, interest development, self-efficacy expectations, project-based learning

### **Setting-Up a Research Club for High School Students: an Engineering Educational Concept Based on Increasing Both Interest and Self-Efficacy**



**Al-Kharabsheh, Dina; Geese, Anne; Müller, Rainer**  
TU Braunschweig, Germany

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**ID: 1170**

Concept Paper

Poster pitch & presentation/discussion

*Topics:* Student Engagement

*Keywords:* Strengthening learning outcome, engaging students, quizzes

**Strengthening Students' Learning Outcomes through Quiz Work**

**Posselt, Charlotte; Stisen Flyger, Charlotte; Kjaersgaard, Niels**

Technical University of Denmark, Department of Engineering Technology and Didactics

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**ID: 1443**

Short Paper

Poster pitch & presentation/discussion

*Topics:* Mathematics at the heart of Engineering, Physics and Engineering Education

*Keywords:* Student learning experiences, challenge-based education, applied mathematics, modelling course

**Studying mathematics students' learning experiences in Challenge-based education**

**Kilic, Ayse; Salinas-Hernández, Ulises; Kock, Zeger-Jan; Pepin, Birgit**

Eindhoven University of Technology, Eindhoven School of Education, Netherlands

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**ID: 1258**

Concept Paper

Poster pitch & presentation/discussion

*Topics:* Engineering Skills, Teaching methods

*Keywords:* AI Education, Project-based learning, Open Educational Resources, Engineering Curricula, Teaching Methods

**Teaching AI Competencies in Engineering using Projects and Open Educational Resources**

**Schleiss, Johannes<sup>1</sup>; Hense, Julia<sup>2</sup>; Kist, Andreas<sup>3</sup>; Schlingensiepen, Jörn<sup>4</sup>; Stober, Sebastian<sup>1</sup>**

<sup>1</sup>Otto von Guericke University Magdeburg; <sup>2</sup>mmb Institut; <sup>3</sup>Friedrich-Alexander-University Erlangen-Nürnberg; <sup>4</sup>TH Ingolstadt

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**ID: 1445**

Concept Paper

Poster pitch & presentation/discussion

*Topics:* Navigating Open Learning Environments, Mathematics at the heart of Engineering

**The engagement of students using the virtual platform tools. A successful case in a required subject of 1st year in mathematics in engineering (UPC)**

**Prat, Joana d'Arc; Massana, Immaculada**

Dept. Matemàtiques, EPSEVG, UPC, Spain

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**ID: 1151**

Short Paper

Poster pitch & presentation/discussion

*Topics:* Engineering Skills, Assessment

*Keywords:* Peer Review, Interdisciplinarity, Project-based Learning, Challenge-based Learning, Engineering Education.

**THE UTILITY OF A PEER REVIEW APPLICATION IN INTERDISCIPLINARY TEAMWORK ARRANGEMENTS**

**Johnson, Coralie; Macleod, Miles; Visscher, Klaasjan**

University of Twente, Netherlands, The

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**ID: 1429**

Concept Paper

Poster pitch & presentation/discussion

*Topics:* Sustainability. Sustainable Development Goals, Cooperation for Development  
*Keywords:* Cooperation, agri-food, food conservation, agriculture, development

### **UNIVERSITY ACTIVITIES AND DEVELOPMENT COOPERATION IN THE AGRI-FOOD FIELD: KITEGA CC CASE**

**Collado López, M. Francisca<sup>1</sup>; Albors Sorolla, Ana María<sup>1</sup>; Gutiérrez Chávez, Jesús Anthony<sup>1</sup>; Clemy, David<sup>2</sup>**

<sup>1</sup>Universitat Politècnica de València, Spain; <sup>2</sup>Kitega Community Center, Uganda

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**ID: 1376**

Concept Paper

Poster pitch & presentation/discussion

*Topics:* Student Engagement, Teaching methods

*Keywords:* Synchronous online teaching, workshop, interaction in online session

### **Utilizing Zoom-stamps in synchronous online workshop implementations**

**Sipilä, Erja; Vihriälä, Tanja; Elo, Charlotta; Ihalainen, Tiina; Virkki, Johanna**

Tampere University, Finland

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**ID: 1157**

Concept Paper

Poster pitch & presentation/discussion

*Topics:* Ethics in Engineering Education, Engineering Skills

*Keywords:* cross curricular competence, engineering ethics, professional responsibility

### **What works (and what does not) to incorporate ethics as a cross curricular competence?**

**Giménez Carbó, Esther; Gómez-Martín, María Esther; Andrés-Doménech, Ignacio**

Universitat Politecnica de Valencia, Spain

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1:15pm - 2:30pm

**Lunch + Corner for European Convention of Engineering Deans -ECED- lunch**

Location: **Jardins Vèrtex**

2:30pm - 3:30pm

**PS 21-10 Digitalisation & Hybrid models**

Location: **Vèrtex VS208**

Session Chair: **Sebastian Tornil**

**ID: 1257**

Concept Paper

Oral presentation

*Topics:* Industry and Companies liaison. Regional Involvement and Innovation, Digitalisation & Hybrid models

*Keywords:* entry-level employee training, individualization, aerospace software development

### **LESSONS LEARNED DURING A BLENDED TRAINING FOR NEW EMPLOYEES IN AEROSPACE COMPANIES**

**Pourtoulidou, Despoina; Frey, Andreas**

Technische Hochschule Ingolstadt, Germany

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**ID: 1149**

Short Paper

Oral presentation

*Topics:* Building Communities and Coordination, Digitalisation & Hybrid models

*Keywords:* Blended learning, sense of community, social engagement, perceptions and practices

### **Teachers' and students' perceptions and practices in promoting a sense of community for blended education**

**Pei, Linlin; Poortman, Cindy; Schildkamp, Kim; Benes, Nieck E.**

University Twente, Netherlands, The

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**ID: 1262**

Short Paper

Oral presentation

*Topics:* Curriculum Development, Digitalisation & Hybrid models

*Keywords:* curriculum design, digital competences, engineering education, problem-based learning

**A matrix for making sense of digital competences in formal engineering education curricula**

**Lyngdorf, Niels Erik Ruan**; Bertel, Lykke Brogaard; Lindsay, Euan  
Aalborg University, Denmark

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**ID: 1269**

Short Paper

Oral presentation

*Topics:* Curriculum Development, Digitalisation & Hybrid models

*Keywords:* e-portfolio, engineering design, project-based learning, digital laboratory

**Digital documentation and planning of student projects in engineering and product design using e-portfolios**

**Riess, Christian**; Walter, Michael S. J.; Tyroller, Maria  
University of Applied Sciences Ansbach, Germany

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2:30pm - 3:30pm

**PS 21-11 Student Engagement; Teaching methods**

Location: **Aula Måster CN**

Session Chair: **Mireia López-Beltran**

**ID: 1287**

Short Paper

Oral presentation

*Topics:* Student Engagement, Teaching methods

*Keywords:* STEM higher education, peer feedback, meta-analysis

**A Meta-Analysis of the Effect of Peer Feedback on Academic Achievement in the STEM Fields of Higher Education**

**Pereira, Priyanka Donald**; Heitink, Maaïke; Schildkamp, Kim; Veldkamp, Bernard; Feskens, Remco

University of Twente, Netherlands, The

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**ID: 1281**

Short Paper

Oral presentation

*Topics:* Student Engagement, Navigating Open Learning Environments

*Keywords:* Student progress, Monitoring system, Virtual learning environment, Student wellbeing

**Promoting progress and personalising online learning journeys: monitoring student engagement in a virtual learning environment for a research methods module**

**Schrock, Lauren**; Iqbal, Asima; Masood, Maryam

WMG, University of Warwick, United Kingdom

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**ID: 1137**

Short Paper

Oral presentation

*Topics:* Student Engagement, Attractiveness of Engineering

*Keywords:* STEM Partnership, Role Model, Engineering, Collaborative and Creativity

**THE IMPACT OF A STEM PARTNERSHIP ON TRANSFORMATIVE TEACHING AND LEARNING**

**Muñoz-Escalona, Patricia**<sup>1</sup>; Rigmand, David<sup>2</sup>; Pinder, Christopher David<sup>3</sup>; Miles, Emma<sup>4</sup>; Cox, Jo<sup>5</sup>

<sup>1</sup>Glasgow Caledonian University, United Kingdom; <sup>2</sup>Todholm Primary School, Paisley, UK;

<sup>3</sup>Royal Navy, HMNB Clyde, UK; <sup>4</sup>Royal Navy, DES Ships – T26, UK; <sup>5</sup>Royal Society, UK

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**ID: 1259**

Short Paper

Oral presentation

*Topics:* Student Engagement, Teaching methods

*Keywords:* challenge-base, hackaton, creativity

**Challenge-based learning as a tool for creativity and talent expression DigiEduhack as a successful case study from the University of Trento**

**Fiore, Francesca**<sup>1</sup>; Scroccaro, Alessandra<sup>1</sup>; Conci, Arianna<sup>2</sup>; Montresor, Alberto<sup>1</sup>

<sup>1</sup>University of Trento, Italy; <sup>2</sup>HIT, Hub Innovazione Trentino

2:30pm - 3:30pm

## PS 21-12 Virtual and Remote Labs; Challenges of new European Universities

Location: **Vèrtex VS218**

Session Chair: **Calvin David Rans**

**ID: 1253**

Research Paper

Oral presentation

*Topics:* Virtual and Remote Labs, Engineering Skills

*Keywords:* Engineering, Laboratory, Learning Objectives, Skills

### **A European vs Australasian Comparison of Engineering Laboratory Learning Objectives Rankings**

**Nikolic, Sasha<sup>1</sup>; Suesse, Thomas<sup>1</sup>; Grundy, Sarah<sup>2</sup>; Haque, Rezwani<sup>3</sup>; Lyden, Sarah<sup>4</sup>; Hassan, Ghulam<sup>5</sup>; Daniel, Scott<sup>6</sup>; Belkina, Marina<sup>7</sup>; Lal, Sulakshana<sup>8</sup>**

<sup>1</sup>University of Wollongong, Australia; <sup>2</sup>University of New South Wales; <sup>3</sup>University of the Sunshine Coast; <sup>4</sup>University of Tasmania; <sup>5</sup>University of Western Australia; <sup>6</sup>University of Technology Sydney; <sup>7</sup>Western Sydney University; <sup>8</sup>Curtin University

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**ID: 1183**

Short Paper

Oral presentation

*Topics:* Virtual and Remote Labs

*Keywords:* Online Learning, Distance Education, Engineering Education Research, Evidenced-Based Practice, PBL, Teamwork

### **Evidence-Based Practice to the Forefront: A Case Study of Engineering Team Project-Based Learning in an Online Learning Environment**

**O'Connor, Sean P.; Power, Jason R.; Blom, Nicolaas; Tanner, David A.**

University of Limerick, Ireland

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**ID: 1301**

Concept Paper

Oral presentation

*Topics:* Virtual and Remote Labs, Virtual and Augmented Reality in Education

*Keywords:* Augmented Reality, Assisted reality, Remote learning, Remote coaching, Digital active learning

### **Remote Learning and Examination based on Augmented Reality**

**Acevedo-Reveron, Aaron M.<sup>1</sup>; Camilleri, Christian<sup>2</sup>; De-Raffalle, Clifford<sup>2</sup>; Deguara, David<sup>2</sup>; Zammit, Edwin<sup>2</sup>; Smallegange, Jan<sup>3</sup>; Butnaru, Adrian<sup>3</sup>; Mora, Carlos E.<sup>1</sup>**

<sup>1</sup>Universidad de La Laguna, Spain; <sup>2</sup>Malta College of Arts, Science & Technology, Malta; <sup>3</sup>STC Group, the Netherlands

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**ID: 1107**

Short Paper

Oral presentation

*Topics:* Virtual and Remote Labs, Challenges of new European Universities

*Keywords:* European University, Remote Lab, Online Teaching

### **Remote Energy Lab – Experience and Improvements of European Cooperation in Remote Labs**

**Klüh, Daniel<sup>1</sup>; Baqain, Mais<sup>2</sup>; Lyons Ceron, Alejandro<sup>2</sup>; Novak, Ondrej<sup>3</sup>; Bily, Tomas<sup>3</sup>; Konist, Alar<sup>2</sup>; Gaderer, Matthias<sup>1</sup>**

<sup>1</sup>Technical University of Munich, Campus Straubing for Biotechnology and Sustainability, Professorship of Regenerative Energy Systems, Schulgasse 16, 94315 Straubing, Germany; <sup>2</sup>Tallinn University of Technology, Department of Energy Technologies, Ehitajate tee 5, 12616 Tallinn, Estonia; <sup>3</sup>Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering, Department of Nuclear Reactors, V Holesovickach 2, Prague 8, Czech Republic

2:30pm - 3:30pm

## PS 21-13 Attractiveness of Engineering, Gender and Diversity (Research mainly)

Location: **Vèrtex VS219**

Session Chair: **Ines Direito**

**ID: 1361**

Research Paper

Oral presentation

*Topics:* Attractiveness of Engineering, Gender and Diversity

*Keywords:* early career, women in engineering, career paths, gender, engineering practice

**Early career patterns, experiences, and influences: reflections from women engineers in senior roles**

**Marinelli, Melissa Jane<sup>1</sup>; Lord, Linley Anne<sup>2</sup>; Male, Sally Amanda<sup>1</sup>**

<sup>1</sup>University of Melbourne, Australia; <sup>2</sup>Curtin University, Singapore

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**ID: 1367**

Research Paper

Oral presentation

*Topics:* Attractiveness of Engineering, Gender and Diversity

*Keywords:* identity, belonging, gender, migration background, attractiveness, retention

**Enhancing (future) students' professional awareness to increase diversity and inclusion in engineering education**

**Craps, Sofie<sup>1</sup>; Cannaerts, Mieke<sup>1</sup>; Veldman, Jenny<sup>2</sup>; Draulans, Veerle<sup>1</sup>; Van Laar, Colette<sup>1</sup>; Langie, Greet<sup>1</sup>**

<sup>1</sup>KU Leuven, Belgium; <sup>2</sup>New York University Abu Dhabi

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**ID: 1205**

Research Paper

Oral presentation

*Topics:* Attractiveness of Engineering, Gender and Diversity

*Keywords:* workplace diversity, gender, aerospace engineering, careers

**The Future of Women Aerospace Engineers in Academia – a numbers game**

**Saunders-Smiths, Gillian**

Delft University of Technology, Netherlands, The

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**ID: 1444**

Concept Paper

Oral presentation

*Topics:* Attractiveness of Engineering, Gender and Diversity

*Keywords:* Bachelor in engineering, gender, broadening participation

**Efforts to Improve Attractiveness of Lower Level Engineering Education**

**Cronhjort, Mikael; Nobuoka, Jakob; Ängskog, Per; Haga, Andreas; Mårtensson, Gunilla**

University of Gävle, Sweden

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2:30pm - 3:30pm

**PS 21-14 Fostering Engineering Education Research**

Location: **Sala d'Actes Vértex**

Session Chair: **Fiona Truscott**

**ID: 1276**

Research Paper

Oral presentation

*Topics:* Fostering Engineering Education Research

*Keywords:* Engineering education research, UK, Ireland

**Mapping the engineering education research landscape in Ireland and the UK**

**Wint, Natalie<sup>1</sup>; Murphy, Mike<sup>2</sup>; Valentine, Andrew<sup>3</sup>; Williams, Bill<sup>2,4</sup>**

<sup>1</sup>Swansea University, United Kingdom; <sup>2</sup>TU Dublin, Ireland; <sup>3</sup>University of Melbourne, Australia; <sup>4</sup>CEG-IST, Instituto superior Técnico, Universidade de Lisboa, Portugal

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**ID: 1384**

Research Paper

Oral presentation

*Topics:* Building Communities and Coordination, Fostering Engineering Education Research

*Keywords:* : Pedagogical Agents, eLearning community, Multimedia, Technology acceptance, Software Engineering, Practical ability

**Acceptance of Pedagogical Agent (PA) enhanced eLearning communities by software engineering students in Southern Africa.**

**Chikasha, Samuel<sup>1</sup>; Van Petegem, Wim<sup>1</sup>; Goeman, Katie<sup>1</sup>; Valcke, Martin<sup>2</sup>; Mbiza, Servious<sup>3</sup>**

<sup>1</sup>KU Leuven, Belgium; <sup>2</sup>University Of Ghent; <sup>3</sup>Zimbabwe Open University

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**ID: 1295**

Short Paper

Oral presentation

*Topics:* Fostering Engineering Education Research, Gender and Diversity

*Keywords:* Gender, Phenomenology, Methodology, Sociology, STEM

**An argument for incorporating sociological approaches into phenomenological analyses in engineering education research**

**Cruz Moreno, Sandra Ileri; Chance, Shannon; Bowe, Brian**

Technological University Dublin, Ireland

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**ID: 1199**

Research Paper

Oral presentation

*Topics:* Building Communities and Coordination, Fostering Engineering Education Research

*Keywords:* Teaching collaboration, networking activities, software engineering teachers, motivation to collaborate

**Software engineering teacher networks in Finland - what motivates teachers to collaborate?**

**Kilamo, Terhi<sup>1</sup>; Knutas, Antti<sup>2</sup>; Korhonen, Ari<sup>3</sup>; Poranen, Timo<sup>1</sup>; Sievi-Korte, Outi<sup>1</sup>**

<sup>1</sup>Tampere University, Finland; <sup>2</sup>LUT University, Finland; <sup>3</sup>Aalto University, Finland

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2:30pm - 3:30pm

**PS 21-15 Niche & Novel (Research mainly)**

Location: **Vértex VS216**

Session Chair: **Sophia Economides**

**ID: 1279**

Research Paper

Oral presentation

*Topics:* Niche & Novel

*Keywords:* capacity building, teaching staff's professional development, comparative study

**International practice of capacity building in engineering education: a comparative case study**

**Kövesi, Klara<sup>1</sup>; Langie, Greet<sup>2</sup>; Gardner, Anne<sup>3</sup>; Griffiths, Jennifer<sup>4</sup>; Kálmán, Anikó<sup>5</sup>; Lönngren, Johanna<sup>6</sup>; Ruth-Polmear, Madeline<sup>7</sup>**

<sup>1</sup>ENSTA Bretagne, France; <sup>2</sup>KU Leuven, Belgium; <sup>3</sup>University of Technology Sydney, Australia; <sup>4</sup>University College London, UK; <sup>5</sup>Budapest University of Technology and Economics, Hungary; <sup>6</sup>Umeå University, Sweden; <sup>7</sup>Vrije Universiteit Brussel, Belgium

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**ID: 1187**

Concept Paper

Oral presentation

*Topics:* Niche & Novel, Building Communities and Coordination

*Keywords:* Mental health, Newer Academic Communities

**The Positive Start Project: A Proactive Approach to Promoting Positive Mental Health in the Newer Engineering Academic Community.**

**Knowles, Nicola; Andrews, Jane; Knowles, Graeme; Clark, Robin**

University of Warwick, United Kingdom

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**ID: 1163**

Research Paper

Oral presentation

*Topics:* Niche & Novel, Gender and Diversity

*Keywords:* Neurologically atypical, ASD, ADHD, Collaborative learning, Computer supported collaboration (CSCL) at computer

**Triggering and internalising teamworking skills in neuro-typical and neuro-atypical students with a computer orchestrated group learning environment: A multi case study**

**Malik, Manish<sup>1</sup>; Sime, Julie-Ann<sup>2</sup>**

<sup>1</sup>University of Portsmouth, United Kingdom; <sup>2</sup>Lancaster University

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**ID: 1182**

Research Paper

Oral presentation

*Topics:* Niche & Novel, Gender and Diversity  
*Keywords:* Hybrid Research, Grounded Theory, Applied Scholarship

**Hybrid Engineering Education Research: The Challenges & Benefits of an Emergent Methodology.**

**Andrews, Jane; Knowles, Nicola; Palmer, India; Knowles, Graeme; Clark, Robin**  
University of Warwick, United Kingdom

2:30pm - 3:30pm

**PS 21-16 Gender and Diversity; Cooperation for Development**

Location: **Sala Àgora**  
Session Chair: **Nuria Salan**

**ID: 1128**

Research Paper  
Oral presentation

*Topics:* Gender and Diversity, Assessment  
*Keywords:* Assessment, Group exam, Problem-based learning, PBL, Gender differences

**LACK OF GENDER DIFFERENCES IN ENGINEERING STUDENTS' ASSESSMENT OF GROUP-BASED PROJECT EXAMS**

**Dahl, Bettina**

Aalborg University, Denmark

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**ID: 1169**

Concept Paper  
Oral presentation

*Topics:* Gender and Diversity  
*Keywords:* spatial abilities, STEM education, intersectionality, STEM outreach, inclusive

**The phantom menace: spatial abilities and STEM outreach to fight underrepresentation in STEM**

**Velho, Mariana; Dorran, David; Duffy, Gavin**

Technological University of Dublin, Ireland

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**ID: 1379**

Short Paper  
Oral presentation

*Topics:* Gender and Diversity  
*Keywords:* spatial abilities, gender stereotypes, gender gap

**The influence of gender stereotypes on women's spatial abilities and their underrepresentation in the field of engineering**

**Malkogeorgou, Styliani; Duffy, Gavin**

Technological University of Dublin, Ireland

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**ID: 1456**

Research Paper  
Oral presentation

*Topics:* Social and Service Learning, Cooperation for Development  
*Keywords:* service-learning, cooperation, development, skills

**Service-Learning in Engineering: analysis of students' experiences in development cooperation**

**Alsina, Montserrat; Alfonso, Pura; Sidki-Rius, Nor; Bel, Guillem; Gaona, Roger**

Universitat Politècnica de Catalunya

2:30pm - 3:30pm

**PS 21-17 Curriculum Development; Engineering Skills**

Location: **Aula Teleensenyament**  
Session Chair: **Manel Gasulla**

**ID: 1318**

Short Paper  
Oral presentation

*Topics:* Curriculum Development  
*Keywords:* Challenge-based learning, engagement, authentic learning, learner roles

**Dimensions of Engagement beyond the classroom in Challenge-based learning**

**Jimarkon, Pattamawan; Shahverdi, Masoumeh; Dikilitas, Kenan**

University of Stavanger, Norway

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**ID: 1417**

Short Paper

Oral presentation

Topics: Curriculum Development

Keywords: curriculum agility, curriculum innovation, change management, flexible education, co-creation

### **Curriculum Agility at Faculty, Department, Program, and Course Level**

**Brink, Suzanne<sup>1</sup>; Schedin, Staffan<sup>1</sup>; Vikström, Susanne<sup>1</sup>; Mejtoft, Thomas<sup>1</sup>; Sjoer, Ellen<sup>2</sup>**

<sup>1</sup>Umeå University, Sweden; <sup>2</sup>The Hague University of Applied Sciences

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**ID: 1431**

Research Paper

Oral presentation

Topics: Curriculum Development

Keywords: complementary studies, industrial engineering, repertory grid technique

### **An analysis of Engineering Educators' understanding of Complementary Studies Courses using the Repertory Grid Technique**

**Tendayi, Tinashe George<sup>1</sup>; Shaw, Corrinne<sup>2</sup>; Wolmarans, Nicky<sup>2</sup>**

<sup>1</sup>Cape Peninsula University of Technology, South Africa; <sup>2</sup>University of Cape Town, South Africa

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**ID: 1292**

Short Paper

Oral presentation

Topics: Attractiveness of Engineering, Engineering Skills

Keywords: digital awareness, network engineering, degree competences, attractiveness of engineering, social impact of engineering

### **Including Digital Awareness as a Competence in a Network Engineering Degree**

**Vidal, Rafael; Alcober Segura, Jesús; Cervelló-Pastor, Cristina; Garcia-Villegas, Eduard; Yúfera Gómez, José M.**

Network Engineering Department, Universitat Politècnica de Catalunya (UPC), Spain

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3:45pm - 4:45pm

#### **Parallel Workshops 21-1**

Location: **Vèrtex VS203**

**ID: 1278**

Workshop final

Workshop 60 min (only for workshop proposals)

Topics: Engineering Skills, Lifelong Learning

Keywords: Reflection, implementation, co-creation, local embedding, longevity

### **Shaping the embedding of reflection in engineering education**

**Hermesen, Pleun; Van Dommelen, Sjoerd; Hueso Espinosa, Paula**

Delft University of technology, Netherlands, The

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3:45pm - 4:45pm

#### **Parallel Workshops 21-2**

Location: **Vèrtex VS213**

**ID: 1366**

Workshop final

Workshop 60 min (only for workshop proposals)

Topics: Cooperation for Development, Engineering Skills

Keywords: STEM education, Challenge based learning, STEM projects, Secondary Education

### **MONDRAGON ZTIM HUB: tematic challenges to promote STEM vocations among students**

**Anaya Rodríguez, Maite<sup>1</sup>; Iriondo Gabilondo, Jaione<sup>2</sup>; González Atutxa, Patricia Aránzazu<sup>3</sup>; Otaegi Gurrutxaga, Maialen<sup>4</sup>; Bilbao Eraña, Ainara<sup>5</sup>; Vivar Simon, María<sup>6</sup>**

<sup>1</sup>Mondragon Goi Eskola Politeknikoa, Spain; <sup>2</sup>Mondragon Goi Eskola Politeknikoa, Spain;

<sup>3</sup>Humanitate eta hezkuntza zientzien fakultatea, Spain; <sup>4</sup>Mondragon Goi Eskola Politeknikoa,

Spain; <sup>5</sup>Humanitate eta hezkuntza zientzien fakultatea, Spain; <sup>6</sup>Mondragon Goi Eskola Politeknikoa, Spain

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3:45pm - 4:45pm

#### **Parallel Workshops 21-3**

Location: **Vèrtex VS208**



**ID: 1237**

Workshop final

Workshop 60 min (only for workshop proposals)

Topics: Ethics in Engineering Education, Digitalisation & Hybrid models

Keywords: Digital tools, Ethics, Responsible design, Teacher training

### A canvas for the ethical design of learning experiences with digital tools

**Hardebolle, Cécile<sup>1</sup>; Jermann, Patrick<sup>1</sup>; Tormey, Roland<sup>1</sup>; Dehler Zufferey, Jessica<sup>1</sup>; Gillet, Denis<sup>1</sup>; Holzer, Adrian<sup>2</sup>; Felber, Pascal<sup>2</sup>; Bentel, Katrin<sup>3</sup>; Brändel, Urs<sup>3</sup>; Kortemeyer, Gerd<sup>3</sup>**

<sup>1</sup>Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; <sup>2</sup>Université de Neuchâtel (UniNe), Switzerland; <sup>3</sup>Eidgenössische Technische Hochschule Zürich (ETHZ), Switzerland

3:45pm - 4:45pm

### Parallel Workshops 21-4

Location: **Vèrtex VS216**

**ID: 1340**

Workshop final

Workshop 60 min (only for workshop proposals)

Topics: Niche & Novel, Fostering Engineering Education Research

Keywords: Mapping, Engineering Education Research, Europe

### Mapping Engineering Education Research in Europe

**Wint, Natalie<sup>2</sup>; Williams, Bill<sup>1,3</sup>; Murphy, Mike<sup>3</sup>; Valentine, Andrew<sup>4</sup>**

<sup>1</sup>CEG-IST, Universidade de Lisboa, Portugal; <sup>2</sup>Swansea University, UK; <sup>3</sup>TUDublin, Ireland; <sup>4</sup>University of Melbourne, Australia

3:45pm - 4:45pm

### Parallel Workshops 21-5

Location: **Vèrtex VS214**

**ID: 1244**

Workshop final

Workshop 60 min (only for workshop proposals)

Topics: Student Engagement, Teaching methods

Keywords: Escape room, Game-based Learning, Design of Student Activities, Active Learning

### Game-based Learning in Computer Engineering: A Workshop

**Farreras Esclusa, Montserrat; Bofill, Pau; Armengol, Jesus; Hernandez, Angels**

UPCBarcelonaTech, Spain

3:45pm - 4:45pm

### Parallel Workshops 21-6

Location: **Vèrtex VS218**

**ID: 1172**

Workshop final

Workshop 60 min (only for workshop proposals)

Topics: Attractiveness of Engineering, Engineering Skills

Keywords: integrated STEM, key principles, STEM pipeline

### Key principles of integrated STEM: cross-fertilization between Engineering and secondary STEM education

**Deprez, Hanne<sup>1</sup>; Spikic, Sascha<sup>1</sup>; Møller, Maria<sup>2</sup>; Rubeck Stenz, Ian<sup>2</sup>; Rasmussen Mølgaard Lunde, Søren<sup>2</sup>; Kersánszki, Tamás<sup>3</sup>; Sanda, István Dániel<sup>3</sup>; Holik, Ildikó<sup>3</sup>; Mettouris, Christos<sup>4</sup>; Vanezi, Evangelia<sup>4</sup>; Petsa, Katerina<sup>4</sup>; Papadopoulos, George A.<sup>4</sup>; De Meester, Jolien<sup>1</sup>**

<sup>1</sup>KU Leuven, Belgium; <sup>2</sup>University College Northern Denmark, Denmark; <sup>3</sup>Óbuda University, Hungary; <sup>4</sup>University of Cyprus, Cyprus

3:45pm - 4:45pm

### Parallel Workshops 21-7

Location: **Vèrtex VS219**

**ID: 1475**

Workshop final

Workshop 60 min (only for workshop proposals)

Topics: Mentorship and Tutorship, Curriculum Development

Keywords: sponsor, reviews, peer-reviewed, research, journal

### Reviewing Manuscripts in Engineering Education Research Journals: fairly, constructively, effectively

**Edström, Kristina<sup>1</sup>; Mitchell, John<sup>2</sup>; Male, Sally<sup>3</sup>; Bernhard, Jonte<sup>4</sup>; Chance, Shannon<sup>5</sup>; Nikolic, Sasha<sup>6</sup>; Roach, Kate<sup>2</sup>; Beagon, Una<sup>5</sup>**

<sup>1</sup>KTH Royal Institute of Technology, Sweden; <sup>2</sup>University College London, UK; <sup>3</sup>University of Melbourne, AU; <sup>4</sup>Linköping University, Sweden; <sup>5</sup>TU Dublin, Ireland; <sup>6</sup>University of Wollongong, AU

<b>5:00pm - 6:30pm</b>	<b>Siemens Skills for Sustainability Network Roundtable</b> Location: <b>Vèrtex VS213</b>
<b>5:00pm - 6:30pm</b>	<b>Social Programme (limited places - will require specific booking)</b>
<b>7:30pm - 11:00pm</b>	<b>Group Picture, Gala Dinner (will require specific booking) &amp; Leonardo da Vinci Award</b> Location: <b>Hotel Sofia</b>

**Date: Thursday, 22/Sept/2022**

**9:30am - 10:00am**

**Info Desk**

Location: **Vestíbul Auditori Vèrtex**

**10:00am - 11:00am**

**PS 22-1 Entrepreneurship Education; Student Engagement; Assessment**

Location: **Vèrtex VS208**

Session Chair: **Olga Muñoz Medina**

**ID: 1192**

**Concept Paper**

**Oral presentation**

*Topics:* Entrepreneurship Education, Industry and Companies liaison. Regional Involvement and Innovation

*Keywords:* Extracurricular teaching, Sharing creativity, Cross-fertilization, Cooperation, Knowledge Transfer

**From creativity to value creation**

**Citraro, Mauro; Carcano, Cristina; Carpanzano, Emanuele; Puiatti, Alessandro; Sommaruga, Lorenzo; Vignati, Sara**

University of Applied Sciences and Arts of Southern Switzerland (SUPSI), Switzerland

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**ID: 1416**

**Short Paper**

**Oral presentation**

*Topics:* Student Engagement, Navigating Open Learning Environments

*Keywords:* Virtual Learning Environment; Learning Management System; Education; Covid-19; 13 Moodle indicators; Engineering education

**The teaching involvement of the users, the units and the whole UPC measured through the Moodle indicators of the virtual platform Atenea. An extension proposal of Atenea's BI platform**

**Prat, Joana d'Arc; Llorens, Ariadna; Alier, Marc**

Institut de Ciències de l'Educació (ICE), UPC, Spain

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**ID: 1319**

**Short Paper**

**Oral presentation**

*Topics:* Student Engagement, Attractiveness of Engineering

*Keywords:* maker education, spatial ability, pedagogy, STEM, hands-on learning

**Making spatial pedagogy: using insights from spatial ability research to develop maker education pedagogy**

**Westerhof, Marten Berend; O'Kane, Colm; Duffy, Gavin**

TU Dublin, Ireland

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**ID: 1277**

**Short Paper**

**Oral presentation**

*Topics:* Assessment

*Keywords:* peer review; communication skills; peer review assessment; engineering education;

**Exploring usage of summative peer assessments in engineering education**

**Petrović, Juraj; Pale, Predrag**

Faculty of electrical engineering and computing University of Zagreb, Croatia

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**10:00am - 11:00am**

**PS 22-2 Student Engagement**

Location: **Vèrtex VS216**

Session Chair: **Herminio Martínez-García**

**ID: 1195**

**Concept Paper**

**Oral presentation**

*Topics:* Student Engagement, Co-creation with students

*Keywords:* challenge-based learning, interdisciplinarity, project-based learning, learning experience, co-creation

**Making sense of interdisciplinarity in challenge-based learning: A two-step co-creation approach towards educational redesign**

**Ming, Xin<sup>1</sup>; MacLeod, Miles<sup>1</sup>; van der Veen, Jan<sup>2</sup>**

<sup>1</sup>University of Twente, Netherlands, The; <sup>2</sup>Eindhoven University of Technology, Netherlands, The

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**ID: 1434**

Concept Paper

Oral presentation

Topics: Student Engagement, Physics and Engineering Education

Keywords: Guided activity, puzzle technique, PBL

**Evolution of Guided Activities in the Teaching of Analog Electronics in Bachelor's Degree in Industrial and Automatic Electronic Engineering to Increase the Students' Motivation**

**Martínez-García, Herminio; García-Vílchez, Encarna**

UPC-EEBE, Spain

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**ID: 1419**

Concept Paper

Oral presentation

Topics: Student Engagement, Industry and Companies liaison. Regional Involvement and Innovation

Keywords: Innovation, Entrepreneurship, International Education, Citizen Engagement, Urban Mobility

**Project Concept Citizen Engagement of Engineering Students and High School Students**

**Sayrol, Elisa<sup>1</sup>; Monteil, Thierry<sup>2</sup>; Arquilué, Inés<sup>3,1</sup>; Pérez, Mar<sup>3,1</sup>; Desjeux, Benoît<sup>4,5</sup>; Bruyère, Nathalie<sup>6</sup>; Julliot, Mélanie<sup>7</sup>; Alarcon, Eduard<sup>1</sup>**

<sup>1</sup>Universitat Politècnica de Catalunya, Spain; <sup>2</sup>IRIT, University of Toulouse, INSA Toulouse, France; <sup>3</sup>CARNET, Technology Center UPC, Spain; <sup>4</sup>Lycée Joseph Gallieni, France; <sup>5</sup>Campus des métiers et des qualifications d'excellence Mobilité et Transport Intelligent, France; <sup>6</sup>ISDAT, Institut Supérieure des Arts et du Design de Toulouse, France; <sup>7</sup>Toulouse Métropole, France

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**ID: 1432**

Short Paper

Oral presentation

Topics: Student Engagement, Engineering Skills

Keywords: Problem-solving, data skills, employability

**Empowering master students to solve real-world engineering problems**

**Kraft, Volker<sup>1</sup>; Marco-Almagro, Lluís<sup>2</sup>**

<sup>1</sup>JMP, Germany; <sup>2</sup>Universitat Politècnica de Catalunya · BarcelonaTech (UPC), Spain

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10:00am - 11:00am

**PS 22-3 Mathematics at the heart of Engineering**

Location: **Vèrtex VS218**

Session Chair: **Maria-Josep Freixanet**

**ID: 1418**

Concept Paper

Oral presentation

Topics: Mathematics at the heart of Engineering, Co-creation with students

Keywords: peer teaching, math lecture for engineers, engineering teaching, student participation

**Authentic application examples in math lectures through peer teaching**

**Hilger, Susanne; Schmitz, Angela**

TH Köln – University of Applied Sciences, Germany

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**ID: 1117**

Concept Paper

Oral presentation

Topics: Mathematics at the heart of Engineering, Digitalisation & Hybrid models

Keywords: peer assessment, reflective learning, mathematics, continuous assessment, rubri

**A Mathematics Peer Assessment Process for Flexible Modes of Delivery**

**Pick, Louise Therese; Manda, Krishnagoud; Cole, Jonathan; McCartan, Charles; Hermon, John Paul**

School of Mechanical and Aerospace Engineering, Queen's University Belfast

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**ID: 1310**

Concept Paper

Oral presentation

*Topics:* Fostering Engineering Education Research, Mathematics at the heart of Engineering

*Keywords:* service mathematics, engineering education, mathematical competencies, scoping review, curriculum development

### **RESEARCH ON MATHEMATICAL COMPETENCIES IN ENGINEERING EDUCATION: WHERE ARE WE NOW?**

**Wong, Jacqueline; Papageorgiou, Elli; Klaassen, Renate G.; van der Wal, Nathalie J.; Menschaart, Laura; Cabo, Annoesjka J.**

Delft Institute of Applied Mathematics, TU Delft, the Netherlands,

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**ID: 1394**

Concept Paper

Oral presentation

*Topics:* Mathematics at the heart of Engineering, Attractiveness of Engineering

*Keywords:* Programming; mathematics; secondary education; computational thinking

### **Integrated Programming and Mathematics in Schools - A Solid Foundation for a Future Engineering Education?**

**Berge, Runar L.; Sæterås, Bjørnar; Brandsæter, Andreas**

Volda University College, Norway

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10:00am - 11:00am

### **PS 22-4 Ethics in Engineering Education; Teaching methods**

Location: **Vèrtex VS219**

Session Chair: **Siara Isaac**

**ID: 1207**

Concept Paper

Oral presentation

*Topics:* Ethics in Engineering Education, Teaching methods

*Keywords:* Debating, Communication Skills, Engineering Ethics, Assessment

### **Enhancing student communication skills via debating Engineering Ethics**

**Mackay, Isobel; Miller, Thomas**

University College London, United Kingdom

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**ID: 1392**

Concept Paper

Oral presentation

*Topics:* Ethics in Engineering Education, Teaching methods

*Keywords:* Engineering Ethics, Challenge-Based Learning, Course Design

### **EVERYTHING YOU WANT TO KNOW AND NEVER DARED TO ASK — A PRACTICAL APPROACH TO EMPLOYING CHALLENGE-BASED LEARNING IN ENGINEERING ETHICS**

**Herzog, Christian<sup>1</sup>; Breyer, Sabrina<sup>1</sup>; Leinweber, Noah-Art<sup>1</sup>; Sonar, Arne<sup>1</sup>; Bombaerts, Gunter<sup>2</sup>**

<sup>1</sup>Ethical Innovation Hub, University of Lübeck, Germany; <sup>2</sup>Industrial Engineering and Innovation Sciences, Philosophy & Ethics, Eindhoven University of Technology, The Netherlands

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**ID: 1390**

Concept Paper

Oral presentation

*Topics:* Fostering Engineering Education Research, Ethics in Engineering Education

*Keywords:* Engineering Ethics; Assemblage Theory, Responsible Innovation, Socio-Technical Systems, Artificial Intelligence

### **TEACHING ETHICS THROUGH THE BACK DOOR? – EMPLOYING IDEAS FROM ASSEMBLAGE THEORY TO FOSTER A RESPONSIBLE INNOVATION MINDSET**

**Herzog, Christian<sup>1</sup>; Diebel-Fischer, Hermann<sup>2</sup>**

<sup>1</sup>Ethical Innovation Hub, University of Lübeck, Germany; <sup>2</sup>ScaDS.AI Dresden/Leipzig, TU Dresden, Germany

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**ID: 1217**

Concept Paper

Oral presentation

*Topics:* Sustainability. Sustainable Development Goals, Ethics in Engineering Education

*Keywords:* Sustainability, education for sustainable development, sustainable development goals, EDINSOST project, sustainability map

### **The Edinsost2-SDG project: Introducing SDGs in Higher Education**

**Sánchez-Carracedo, Fermín; Segalàs, Jordi; Tejedor, Gemma**

Universitat Politècnica de Catalunya, Spain

10:00am - 11:00am

### **PS 22-5 Sustainability. Sustainable Development Goals**

Location: **Sala d'Actes Vèrtex**

Session Chair: **Carles Serrat**

**ID: 1337**

Concept Paper

Oral presentation

*Topics:* Sustainability. Sustainable Development Goals, Teaching methods

*Keywords:* problem based learning, public participation, online collaboration

### **Establishing a new seminar to combine learning about Technology and Society**

**Berbuir, Ute**

Ruht-Universität Bochum, Germany

**ID: 1315**

Concept Paper

Oral presentation

*Topics:* Sustainability. Sustainable Development Goals, Engineering Skills

*Keywords:* 21st Century Skills, SDGs, CIPP, Challenge-based Learning

### **Towards 21st Century Citizenship through Sustainable Development Goals in Foreign Language Education**

**Ulker, Nilufer; Ayar Gemalmaz, Ozlem; Yilmaz Yuksek, Yasemin**

Istanbul Technical University, Turkey

**ID: 1231**

Concept Paper

Oral presentation

*Topics:* Sustainability. Sustainable Development Goals, Curriculum Development

*Keywords:* Sustainability, integration process, electric engineering, study programme, academic staff involvement

### **Integrating sustainability in an electronic engineering program: insights and experiences on academic staff involvement**

**Verhulst, Elli; Bolstad, Torstein; Reppe Lunde, Solveig; Randem Lunde, Helene; Berntsen Henriksen, Robin**

Norwegian University of Science and Technology, Norway

**ID: 1425**

Concept Paper

Oral presentation

*Topics:* Sustainability. Sustainable Development Goals, Cooperation for Development

*Keywords:* Sustainability, Environment, Artisanal Mining Cooperation for Development, Engineering Education, Sustainable Development Goals

### **Experiences of mining engineering students in cooperation for development**

**Sidki-Rius, Nor<sup>1</sup>; Alfonso, Pura<sup>1</sup>; Martinez, Arnau<sup>1</sup>; Gaona, Roger<sup>1</sup>; Sendros, Miquel<sup>1</sup>; Bel, Guillem<sup>1</sup>; Bascompta, Marc<sup>1</sup>; Anticoi, Hernan<sup>2</sup>; Yubero, Maria Teresa<sup>1</sup>; Jimenez-Franco, Abigail<sup>3</sup>**

<sup>1</sup>Universitat Politècnica de Catalunya (UPC), Spain; <sup>2</sup>Universidad de Cantabria (UC), Spain;

<sup>3</sup>Universitat de Barcelona (UB), Spain

10:00am - 11:00am

### **PS 22-6 Physics and Engineering Education; Sustainability. Sustainable Development Goals (Research)**

Location: **Vèrtex VS213**

Session Chair: **Montserrat Alsina**

**ID: 1138**

Concept Paper  
Oral presentation

Topics: Physics and Engineering Education, Engineering Skills  
Keywords: poster, physics project, skills.

**PROJECT-BASED LEARNING USING SCIENTIFIC POSTER AS A TOOL FOR LEARNING AND ACQUISITION OF SKILLS IN PHYSICS SUBJECTS OF ENGINEERING BACHELOR'S DEGREES.**

Cuenca-Gotor, Vanesa Paula; Salinas Marín, Isabel; Giménez Valentín, Marcos H.; Castro Palacio, Juan Carlos; Sans Tresserras, Juan Ángel; Ferrando Martín, Vicente; Sánchez-Ruiz, Luis Manuel; Monsoriu-Serra, Juan Antonio  
Universitat Politècnica de València, Spain

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**ID: 1317**

Short Paper  
Oral presentation

Topics: Physics and Engineering Education, Virtual and Augmented Reality in Education  
Keywords: virtual reality, engineering education, computational fluid dynamics, complex learning

**Preliminary investigation of a CFD-assisted virtual reality experience in engineering education**

Solmaz, Serkan<sup>1</sup>; Kester, Liesbeth<sup>2</sup>; Van Gerven, Tom<sup>1</sup>  
<sup>1</sup>KU Leuven, Belgium; <sup>2</sup>Utrecht University, The Netherlands

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**ID: 1121**

Concept Paper  
Oral presentation

Topics: Physics and Engineering Education  
Keywords: exercise & project-based learning; computer laboratory; chemistry; physics; practical courses

**Introduction to molecular modeling of materials in an undergraduate engineering degree**

Torras, Juan; Zanuy, David  
Universitat Politècnica de Catalunya, Spain

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**ID: 1441**

Research Paper  
Oral presentation

Topics: Fostering Engineering Education Research, Sustainability. Sustainable Development Goals  
Keywords: sustainable engineering education, engineering education, sustainability in engineering degrees, sustainability competencies

**Sustainable Engineering Education in Research and Practice**

Block, Brit-Maren; Guerne, Marie Gillian  
Leuphana University Lüneburg, Germany

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10:00am - 11:00am

**PS 22-7 Teaching methods; Digitalisation & Hybrid models; Engineering Skills**

Location: **Vèrtex VS214**  
Session Chair: **Josep Fernández-Ruzafa**

**ID: 1448**

Concept Paper  
Oral presentation

Topics: Teaching methods, Digitalisation & Hybrid models

**Interactive courseware to support blended learning**

De Laet, Tinne  
KU Leuven, Belgium

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**ID: 1298**

Concept Paper  
Oral presentation

Topics: Teaching methods, Digitalisation & Hybrid models  
Keywords: Digital tools, factors of acceptance, 3DEXperience

**Factors of acceptance of digital tools: the example of the 3DExperience platform in the context of collaborative projects**

**Lanthon, Antoine**<sup>1</sup>; **Konan, Patern-Rodrigue**<sup>1</sup>; **Fedler, Filogene**<sup>1,2</sup>

<sup>1</sup>ISAE-Supmecca, France; <sup>2</sup>UPEC, France

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**ID: 1249**

Concept Paper

Oral presentation

*Topics:* Engineering Skills, Teaching methods

*Keywords:* Collaborative skills, problem- and project-based learning, multi-actor context

**Engineering schools facing the thorny issue of training students in collaborative skills: feedback from the field**

**Lanthon, Antoine**<sup>1</sup>; **Konan, Patern-Rodrigue**<sup>1</sup>; **Filogene, Fedler**<sup>1,2</sup>

<sup>1</sup>ISAE-Supmecca, France; <sup>2</sup>UPEC, France

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**ID: 1176**

Concept Paper

Oral presentation

*Topics:* Engineering Skills, Teaching methods

*Keywords:* Interdisciplinary education, Transdisciplinary education, Challenge-based learning, Problem-solving competences

**Multi-, inter- and transdisciplinarity in challenge-based engineering education**

**Visscher, Klaasjan**<sup>1</sup>; **Johnson, Coralie**<sup>1</sup>; **MacLeod, Miles**<sup>1</sup>; **van der Veen, Jan**<sup>2</sup>

<sup>1</sup>University of Twente, Netherlands, The; <sup>2</sup>Eindhoven University of Technology, Netherlands, The

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10:00am - 11:00am

**PS 22-8 Artificial Intelligence in Education**

Location: **Vèrtex VS215**

Session Chair: **Antoni Hernández**

**ID: 1288**

Concept Paper

Oral presentation

*Topics:* Artificial Intelligence in Education, Curriculum Development

*Keywords:* AI Education, AI Literacy, Cross-Discipline Learning, Engineering Curricula, Future Skills

**An Interdisciplinary Competence Profile for AI in Engineering**

**Schleiss, Johannes**; **Bieber, Michelle Ines**; **Manukjan, Anke**; **Kellner, Lars**; **Stober, Sebastian**

Otto von Guericke University Magdeburg, Germany

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**ID: 1189**

Concept Paper

Oral presentation

*Topics:* Artificial Intelligence in Education, Curriculum Development

*Keywords:* AI curriculum development, training in AI, diverse learners, skills development, scalability

**Learning Journeys for Scalable AI Education: An MIT - USAF Collaboration**

**Salazar Gomez, Andres Felipe**<sup>1</sup>; **Bagiati, Aikaterini**<sup>1</sup>; **Breazeal, Cynthia**<sup>1</sup>; **Radovan, John**<sup>1,2</sup>; **Kennedy, Kathleen D**<sup>1</sup>

<sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>United States Air Force

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**ID: 1339**

Concept Paper

Oral presentation

*Topics:* Artificial Intelligence in Education

*Keywords:* Artificial intelligence, impacts, literature survey, interaction with people

**Life in the AI era - First result of the Erasmus+ HEDY project**

**Careglio, Davide**<sup>1</sup>; **Angulo Bahón, Cecilio**<sup>1</sup>; **Dimova, Rozalina**<sup>5</sup>; **Dovramadjiev, Tihomir**<sup>5</sup>; **Ejubovic, Adisa**<sup>4</sup>; **Jakobi, Antonia**<sup>3</sup>; **Kollar, Csaba**<sup>2</sup>; **Alves Moreira, Ana Isabel**<sup>3</sup>; **Sukhovii, Evgenia**<sup>4</sup>; **Szabo, Gyula**<sup>2</sup>



<sup>1</sup>IDEAI-UPC, Universitat Politècnica de Catalunya, Spain; <sup>2</sup>Óbuda University, Budapest, Hungary; <sup>3</sup>AidLearn, Lisbon, Portugal; <sup>4</sup>ACEEU, Muenster, Germany; <sup>5</sup>BAEHF, Varna, Bulgaria

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**ID: 1143**

Concept Paper  
Oral presentation

*Topics:* Artificial Intelligence in Education, Engineering Skills

*Keywords:* AI emotion analysis discussion PBL

**Understanding and utilizing students' attitudes toward participation in discussions by using emotion analysis**

**Tanaka, Mikiko Sode<sup>1</sup>; Ito, Takao<sup>2</sup>; Miyazaki, Keisuke<sup>2</sup>**

<sup>1</sup>International college of Technology, Japan; <sup>2</sup>Kanazawa Institute of Teconology, Japan

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10:00am - 11:00am

**PS 22-9 Engineering Skills; Curriculum Development**

Location: **Vértex VS203**

Session Chair: **Rolando Chacón**

**ID: 1331**

Short Paper  
Oral presentation

*Topics:* Curriculum Development, Engineering Skills

*Keywords:* Career development, transition to labour market, skills and competences

**New tools to motivate STEM students towards early-career self-management**

**Torres, Francesc<sup>1</sup>; Kopecká, Eva<sup>2</sup>; Garrido, Núria<sup>1</sup>; Pechová, Helena<sup>2</sup>; Silvestre, Santiago<sup>1</sup>; Hrad, Jaromír<sup>2</sup>; Zeman, Tomáš<sup>2</sup>**

<sup>1</sup>Universitat Politècnica de Catalunya (UPC), Spain; <sup>2</sup>Czech Technical University in Prague (CTU), Czech Republic

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**ID: 1350**

Concept Paper  
Oral presentation

*Topics:* Attractiveness of Engineering, Engineering Skills

*Keywords:* tinkering, STEAM, Construction

**Learning path for Construction 4.0 based on tinkering and STEAM**

**Chacón, Rolando**

Universitat Politècnica de Catalunya. School of Civil Engineering, Spain

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**ID: 1197**

Short Paper  
Oral presentation

*Topics:* Curriculum Development, Engineering Skills

*Keywords:* Agile development, flipped classroom, smart systems, rapid manufacturing, condition monitoring

**Smart Products, Engineering and Services – an example of modern engineering education**

**Schmitt, Florian<sup>1</sup>; Rudolph, Kris<sup>1</sup>; Blat Belmonte, Benjamin<sup>2</sup>; Kappes, Aaron Ben<sup>2</sup>; Kirchner, Eckhard<sup>1</sup>; Rinderknecht, Stephan<sup>2</sup>**

<sup>1</sup>Fachgebiet Produktentwicklung und Maschinenelemente, Technische Universität Darmstadt, Germany; <sup>2</sup>Institut für mechatronische System, Technische Universität Darmstadt, Germany

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**ID: 1307**

Short Paper  
Oral presentation

*Topics:* Co-creation with students, Engineering Skills

*Keywords:* 3D printing, 3D printers, astronomy, telescopes, design

**A 3D printed f5 Newtonian telescope: Development of a student project for outreach, education, and dissemination**

**Macías, Roger<sup>1</sup>; Casamor, Oriol<sup>1,2</sup>; Marzoa, Antonio<sup>1,2</sup>**

<sup>1</sup>Universitat Politècnica de Catalunya, Spain; <sup>2</sup>SENER Aeroespacial, S.A., Spain

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11:00am - 11:30am

**Best Papers Committee coffee meeting**

<b>11:00am - 11:30am</b>	<b>Coffee Break</b> Location: <b>Jardins Vèrtex</b>
<b>11:30am - 12:30pm</b>	<b>Keynote 3 - Arnold Pears - The Future of Engineering Education in a Post-pandemic World</b> Location: <b>Auditori Vèrtex</b>
<b>12:30pm - 1:00pm</b>	<b>Best Papers Awards + Closing Ceremony</b> Location: <b>Auditori Vèrtex</b>
<b>1:15pm - 2:30pm</b>	<b>Lunch</b> Location: <b>Jardins Vèrtex</b>
<b>2:45pm - 4:15pm</b>	<b>Social Programme (limited places - will require specific booking)</b>
<b>2:45pm - 4:45pm</b>	<b>Board of Directors Meeting</b> Location: <b>Sala Llac-Rectorat</b>