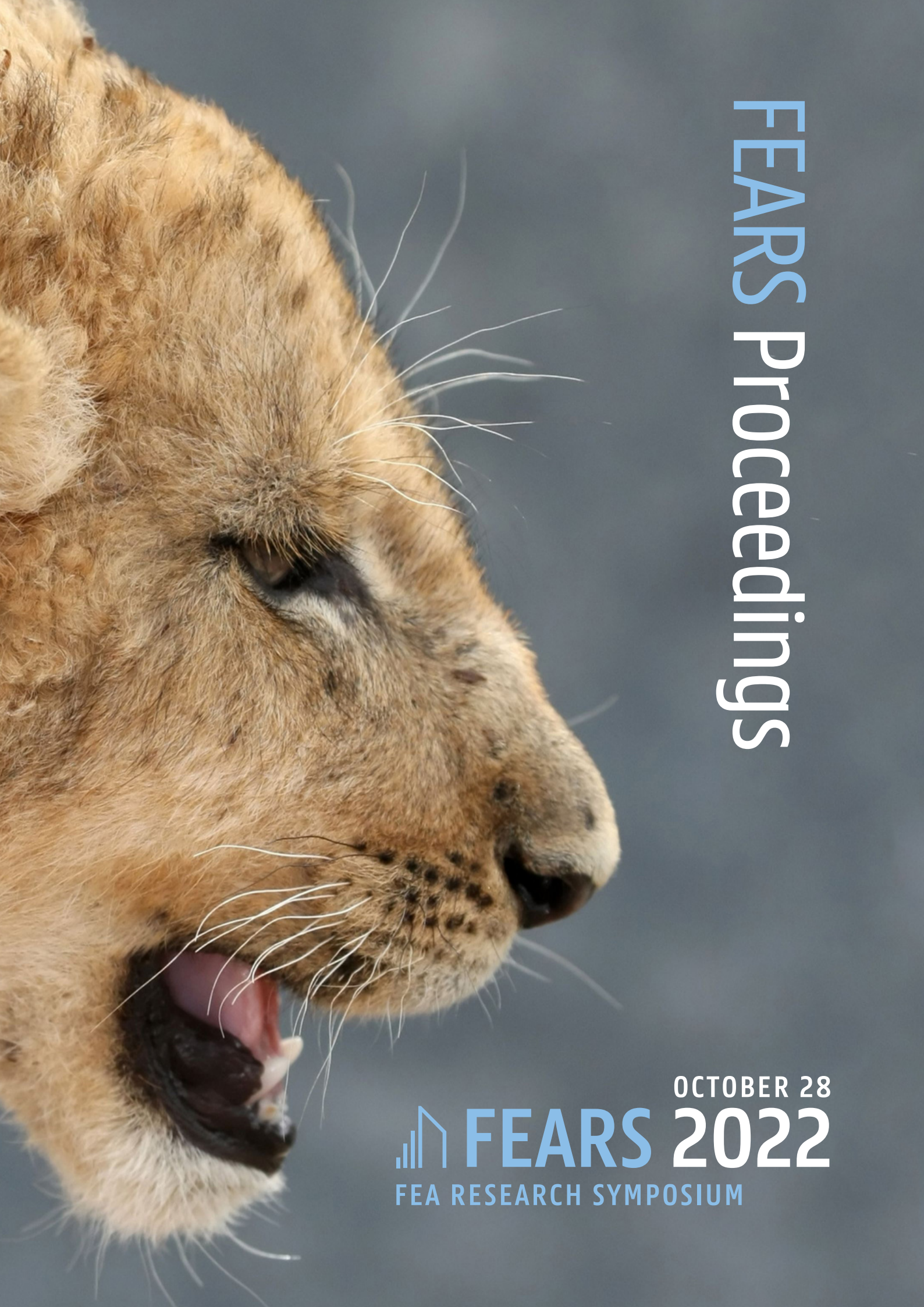

FEARS Proceedings

OCTOBER 28

FEARS 2022

FEA RESEARCH SYMPOSIUM

FACULTY OF ENGINEERING AND ARCHITECTURE

Proceedings of the 20th FEA Research Symposium

Huis van de Bouw, 28 October 2022

GHENT UNIVERSITY

Contents

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Preface

By the end of 2022, Oxford's word of the year was elected by the public: "Goblin mode". The term is defined as "a type of behaviour which is unapologetically self-indulgent, lazy, slovenly or greedy, typically in a way that rejects social norms or expectations," according to a statement from Oxford Languages. Seemingly, the concept captures the notion and prevailing mood of individuals who reject the return to post-COVID "normal life". Throughout the COVID crisis people longed for a normal social life again, and return to the normal situation. However, a succession of other crises hinted to the fact that the concept of normality is perhaps only a social construct in retrospect.

By now, one must be wondering how this relates to FEARS. Well, FEARS is not an official research symposium: it did not allow students to travel, it did not entail official credits, and it does not add to the statistics. On top of that: it was not mandatory. FEARS is an internal event of the Faculty of Engineering and Architecture of Ghent University to showcase ongoing research to colleagues within the faculty. Hence, it was anticipated that it would be difficult to motivate people to participate. Research did not stop during the different crises, and everybody is always "busy", so why put this on the list as well? Why not a bit of Goblin mode?

It seems that the FEA-researchers did not switch to Goblin mode in the end. With 124 active participants and well over 300 participants in total, the expectations were exceeded. A lively crowd participating in the different demonstrations, elevator pitches, poster sessions, and workshops. People working in the same faculty often met for the first time face to face. There was a need to communicate with each other. It was interesting to see what else is happening at this faculty. Hidden away in different buildings on different campuses, we are often facing the same types of struggles whilst working on different topics. And surprisingly, many found research topics in other groups that were much closer to their subject than expected.

As chair of the symposium, I can happily say that the organization of FEARS was supported by a bunch of motivated researchers who really make everything happen. The organizing committee consisted of a small group but with a lot of enthusiasm. Given that we had to start over since the last edition in 2019, this event felt like it was the first in its series. In contrast, it was the 20th edition.

Finally, this symposium was only feasible with the help from our industrial partners. Their engagement and interest are crucial, and we hope that the research at our faculty also finds it way to the industry. Several industrial partners made it clear that their primary reason for collaboration was to showcase their company to prospective employees. Engineers are hard to get, and in an ever-changing society facing critical technical challenges, every single one of them can make a difference. Smart, ambitious, an analytic approach and determination to pursue a PhD, are characteristics that will also be valued when researchers switch from academia to industry.

FEARS generates an overview of ongoing research projects in the different fields of engineering affecting a wide range of challenges. More importantly, however, FEARS is also a snapshot of the women and men that will make a difference. In academia, in industry, and in society.

Prof. Nathan Van Den Bossche

Program

13.00	Registration
13.30	Welcome and speech
13.40	Interactive quiz
14.00	Workshop on storytelling by The Online Scientist
	Pitch session 1
	Poster and demo session 1
15.20	Coffee break
15.40	Workshop on social media by The Online Scientist
	Pitch session 2
	Poster and demo session 2
17.00	Keynote on impact with science by Liesbeth Smit
	Info session on starting a PhD
17.45	Award ceremony
18.00	Closing reception
20.00	After-work party AIG - Engage

Organizing Committee

General Chair	Nathan Van Den Bossche
Program Co-Chairs	Jeroen van der Hooft and Rahul Iyer Kumar
Sponsoring	Bruno Vanderschelden
Communication	Dennis Maes, Jeroen Ongenae and Ruben Janssens
Venue and Catering	Peggy De Smet
Awards	Ellen De Vos
Support and Feedback	Xiaolin Chen, Femke De Backere, Herbert De Smet, Maarten Liefooghe, Andrea Lucherini, Ljiljana Platisa and Sabine Wittevrongel

Publications

All demonstrations, pitches and posters have been made available through Zenodo, an online digital academic repository for scientific publications and data, sponsored by the European Commission. All abstracts, slides and posters can be found in the FEARS community, although publications can also be consulted directly through the overview below. Enjoy!

Demonstrations

Bringing Real Life Into VR Using Videos

Julie Artois

The Importance of Establishing Baselines in ML Classification Tasks

Laurens D'hooge

Walk-Through Total Body PET: Very Efficient Patient Throughput and Detector Usage With Low-Cost Monolithic High-Resolution Flat Panel Detectors

Florence Marie Muller, Jens Maebe, Maya Abi Akl, Meysam Dadgar, Nadia Withofs, Christian Vanhove, Stefaan Vandenberghe

Pitches

A Data-Driven Approach Towards Evacuation From Buildings in Fire Conditions

Soheila Bigdeli, Bart Merci, Steven Verstockt, Nico Van de Weghe, Pieter Pauwels, Melchior Schepers

A New Biofuel From Wood Waste for Sustainable Transportation

Tom Robeyn, Tara Larsson, Sebastian Verhelst

A Personalized Approach to Model the Interstitial Fluid Flow in Solid Tumors: The Role of Interstitium Permeability

Hooman Salavati, Wim Ceelen, Pim Pullens, Charlotte Debbaut

Adaptive Query Processing in Link Traversal

Jonni Hanski

Approximate Pattern Matching Using Search Schemes and In-Text Verification

Luca Renders, Lore Depuydt, Jan Fostier

Capturing Human Opinions, Emotions and Complexities With Knowledge Graphs

Jonas Steinbach

Characterization of the D-Band Radio Channel for Future Wireless Communication Systems

Brecht De Beelde

Data Storage in Solid Data Vaults

Vidyashree Tarikere, Ruben Taelman

Electromechanical Impedance-Based Structural Health Monitoring for Damage Detection in Steel Structures

Mojtaba Khayatazad, Wim De Waele

ExperienceDNA: A Framework to Conduct and Analyse User Tests in VR

Jamil Joundi, Klaas Bombeke, Jelle Saldien, Wouter Durnez, Jonas De Bruyne, Charlotte Vanroelen, Aleksandra Zheleva

Experimental Verification of Cross-Sectional Curved Steel Plates in Shear

Gilles Van Staen, Philippe Van Bogaert, Hans De Backer

Fracture and Fatigue Properties of Thick Structural Adhesives

Rahul Iyer Kumar, Wim De Waele

Electrical Conductivity Measurements for Improved Metal Recycling Efficiency

Pieter-Jan Boeykens, Inge Bellemans, Kim Verbeken

New Gold Standard for Olefin Production: Supersonic Steam Cracking

Mike Bonheure, Rejish L. Johnson, Tom Verstraete, Kevin M. Van Geem

Numerical Device Modelling of Direct Z-Scheme Heterojunctions Using Solar Cell Simulator (SCAPS)

Nithin Thomas Jacob, Jeroen Lauwaert, Bart Vermang, Johan Lauwaert

Oxymethylene Ethers as Fossil Fuel Alternative to Reach Carbon Neutrality

Kevin De Ras, Joris W. Thybaut, Kevin M. Van Geem

PowerShap: A Power-Full Shapley Feature Selection Method

Jarne Verhaeghe, Jeroen Van Der Donckt, Femke Ongenae, Sofie Van Hoecke

The Future of Preoperative Planning for Liver Cancer: From CT-Scan in the 20th Century to Computational Model in the 21st Century

Tim Bomberna, Charlotte Debbaut

Trilateral Research for Optimal Investments in Adequate Cross-Border Energy Infrastructure

Nienke Dhondt, Greet Van Eetvelde

Vision-Based Condition Monitoring of Lubricated Gearboxes

Djordy Van Maele, Jean Poletto

Posters

3D Flow and Mixing in Open-Channel Confluences

Tian Jin, Pedro X. Ramos, Tom De Mulder

60 GHz Network Planning for Fixed Wireless Access

German Castellanos

A Comparative Analysis on Genome Pleiotropy for Evolved Soft Robots

Dries Marzougui, Matthijs Biondina, Francis wyffels

A Multiscale Experimental Abrasion Characteristics of Cutting Tool Materials

Naveenkumar Rajendhran, Kannaki Pondicherry, Patrick De Baets

A New Biofuel From Wood Waste for Sustainable Transportation

Tom Robeyn, Tara Larsson, Sebastian Verhelst

A Review of Vascular Networks for Self-Healing Applications

Yasmina Shields, Nele De Belie, Anthony Jefferson, Kim Van Tittelboom

A Semi-Supervised Anomaly Detection Approach Detecting Mechanical Failures

Colin Soete, Michaël Rademaker, Sofie Van Hoecke

A Study of Migrants in Urban China Based on Unfinished Housing Projects

Miao Luo

A Two-Class Queueing System with Service Times Dependent on the Presence of a Certain Class

Sara Sasaninejad, Joris Walraevens, Hossein Moradi, Sabine Wittevrongel

Abrasive Wear Investigation of Rotating Shaft/Sealing Units in Lunar and Martian Environment

Ádam Kalácska, Patrick De Baets, Laszlo Zsidai, Robert Keresztes, Ewelina Ryszawa, Gabor Kalácska, György Barkó

Adapting Routing Algorithms to Programmable Photonic Circuits

Ferre Vanden Kerchove, Xiangfeng Chen, Didier Colle,Wim Bogaerts, Mario Pickavet

Adaptive Spectral Band Integration in Thermographic Inspection of Composites

Gaétan Poelman, Saeid Hedayatrasa, Mathias Kersemans

Allocation of Inspection Stations in a Multi-Product Serial Assembly Line With Delayed Inspection

Sajjad Hedayati, Stijn De Vuyst, Birger Raa

An Integrated Data-Driven Two-Stage Stochastic Capacitated Lot-Sizing Problem in a Two-Plants Industrial Symbiosis Supply Chain

Cheshmeh Chamani, El-Houssaine Aghezzaf

Comparison of Drivetrain Topologies: An Ankle Gait Cycle
Yentl Joos, Peter Sergeant, Hendrik Vansompel, Tom Verstraten

Computer Vision-Based Gate Crossing Detection for Timing and Analysis of Ski and Snowboard Races
Robbe Decorte, Jelle De Bock, Maarten Slembrouck, Steven Verstockt

Context-Aware Visualization Recommendations Reduce Decision Overload for Operators
Pieter Moens, Bruno Volckaert, Sofie Van Hoecke

Data-Efficient Feasible Region Identification for Engineering Design
Ioana Nikova, Ivo Couckuyt, Tom Dhaene

Decay of Building Facades May Increase Due to Climate Change
Isabeau Vandemeulebroucke, Steven Caluwaerts, Nathan Van Den Bossche

Deposition of Thiol-Rich Coatings on Nanofibrous Scaffolds Via Atmospheric Pressure DBD Plasma for Tissue Engineering Applications
Pegah Zahedifar, Rouba Ghobeira, Sheida Aliakbarshirazi, Rino Morent, Nathalie De Geyter

Depth-Averaged Idealized Modelling of Morphodynamic Equilibria in Short Semi-Enclosed Meso-Tidal Basins
Tian Qi, Thomas Boelens, Henk Schuttelaars, Tom De Mulder

Design of 224/448 Gbps Nrz/Pam4 Wireline Transmitter Using 28Nm CMOS- and 250Nm InP-Technology
Thomas Gorzka

Designing a Drone Sensor Fusion Rig and Processing Pipeline
Laurens Diels, Michiel Vlaminck, Bart De Wit, Wilfried Philips, Hiep Luong

Designing Data-Driven Ecosystems: A Parametric Value Mapping
Maarten de Mildt

Deterioration of Historic Chinese Masonry Buildings Subject to Climate Change
Xiaolin Chen, Daphne Guilbert, Nathan Van Den Bossche

Developing a New Hybrid Kinetic Model for Chemical Recycling of Vinyl Polymers
Daniël Withoeck, Onur Dogu, Paul H. M. Van Steenberge, Kevin M. Van Geem

Development a Question Answering System Considering Uncertainty Using a Language Platform in the Assembly Line
Fatemeh Besharati Moghaddam, Stijn De Vuyst, Sidharta Gautama

Dissecting Conformational Dynamics of A-1 Acid Glycoprotein (AGP): A Study of Glycosylated and Un-Glycosylated Mutants

Bhawna Dixit, Wim Vranken, An Ghysels

Do Motors With Identical Nameplates Have Identical High Frequency Parameters?

Karel Vanthuyne, Mehmet Güleç, Peter Sergeant

Does Interior Insulation Damage Our Heritage?

Kaat Janssens, Valentina Marincioni, Nathan Van Den Bossche

Dynamic Voltage Control Strategy for Increasing the E iciency of an LVDC Backbone With BESS and Converter-Less PV Integration

Hakim Azaioud, Arash Farnam, Jos Knockaert, Lieven Vandevelde, Jan Desmet

Effects of Haptic Feedback on User Perception and Performance in Interactive Projected Augmented Reality

Sam Van Damme, Joris Heyse, Nicolas Legrand, Femke De Backere, Filip De Turck, Maria Torres Vega

Electrospinning of Silica Nanofibers: How the Sol Viscosity Influences the Taylor Cone

Sofie Verschraegen, Klaartje De Buysser, Dagmar R. D'hooge, Karen De Clerck

Experimental Analysis of Recirculating Lubrication and Oil Bath Lubrication on Tapered Roller Bearings

Manjunath Manjunath, Wouter Ost, Patrick De Baets, Dieter Fauconnier

Fatigue Strength Degradation of Structural Steel in Sea Environment Due to Pitting Corrosion

Seyed Ahmad Elahi, Farid Mehri Sofiani, Somsubhro Chaudhuri, Wim De Waele

Fire Inception in Microgravity: Orbital Experiment BRE-Flamenco Onboard the International Space Station, 2019-2021

Alexander Snegirev

Fixing the Foundations: Towards Generalization for Machine Learning

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Floating Wind Turbine Platform in Waves: Computationally-Efficient Algorithm for Numerical Simulation

Ajie B. K. Pribadi, Gael Verao Fernandez, Evert Lataire

Full-Field Measurement of Strain and Temperature in Tensile Testing of Short Fibre-Reinforced Thermoplastic Composites

Daniele Finazzi, Ruben Sevenois, Wim Van Paepegem

High-Speed Coherent Receivers for Data Center Links

Jakob Declercq

High-Speed Optical Transceivers for Data Centers

Tinus Pannier, Peter Ossieur, Johan Bauwelinck, Xin Yin, Guy Torfs

HoloWrist: Holographic Skeletons for Wrist Surgery

Ata Solouki, Brian Booth, Gianni Allebosch, Hiep Luong, Peter Veelaert

Hybrid Machine Learning for Leak Localization in the Drinking Water Grid

Ganjour Mazaev, Michael Weyns, Femke Ongenae, Sofie Van Hoecke

Hydrogen Embrittlement in Pipeline Steels and Welds

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Imitating a Tuned Vibration Absorber With an Euler-Lagrange Controller: Comparing Different Stability Proofs

Jasper Juchem, Mia Loccufier

Improving Flubendazole Efficiency Through Time-Stable Electrospun Amorphous Solid Dispersions

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Improving Irregular ELM Detection With Machine Learning

Jerome Alhage, Geert Verdoolaege

Influence of the Viscosity on the Degradation During Processing of PETG

Hannelore Ohnmacht, Lynn Trossaert, Mariya Edeleva, Dagmar R. D'hooge, Ludwig Cardon

Inorganic Membranes Allow for a More Clever Use of Nanoparticles As CO2 Conversion Catalyst

Eva Loccufier, Geert Watson, Yingrui Zhao, Maria Meledina, Pascal Van Der Voort, Damien Debecker, Dagmar R. D'hooge, Klaartje De Buysser, Karen De Clerck

Insights Into Natural Organic Matter and Its Removal By Ion Exchange Resins

Elien Laforce, Ingeborg Stals, Emile R. Cornelissen, Pieter Vermeir, Jeriffa De Clercq

Investigating the Caveolin Protein Role in Mitochondrial Oxygen Consumption

Samaneh Davoudi, Qi Wang, Hemal H. Patel, Sally C. Pias, An Ghysels

Investigation of the Orthogonal Degrees of Freedom in Protein-Drug Unbinding Pathways of the ABL Protein Using Replica Exchange Transition Interface Sampling

Wouter Vervust, An Ghysels

Ion-Exchange Nanofiber Membranes for Advanced Water Treatment Applications

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Thomas Lips, Victor-Louis De Gusseme, Francis wyffels

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Sander De Witte, Thijs Van Hauwermeiren, Tom Lefebvre, Guillaume Crevecoeur

Look Into Past: A Different Perspective to Explore Cultural Heritage Datasets

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Mastering and Fine-Tuning Elementary Reaction and Transport Phenomena in the Reductive Catalytic Fractionation of Lignocellulosic Biomass

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Measurement of Renal Perfusion Using ASL-MRI and Renal Oxygenation Using BOLD-MRI in Dogs

Luis Sanmiguel, Amber Hillaert, Pim Pullens

Micro-CT Analysis Applied to Lime Mortars for Damage Assessment Due to Accelerated Weathering

Dulce Elizabeth Valdez Madrid, Nele De Belie, Veerle Cnudde

Molecular Simulation of Alkane and Alkene Diffusion in Nanoporous Membranes to Allow for an Energy-Efficient Separation

Bernd Schmidt, Louis Vanduyfhuys, Veronique Van Speybroeck

Multi-Die Heterogeneous FPGAs: How Balanced Should Netlist Partitioning Be?

Raveena Raikar, Dirk Stroobandt

Multilevel Clustering in Point-To-Point Fiber Network Design

Simon Van den Eynde, Pieter Audenaert, Didier Colle, Mario Pickavet

Multi-Objective Optimization: Which Solution Do You Prefer?

Arash Heidari, Tom Dhaene, Ivo Couckuyt

Multi-Physic Design of Ultra-Efficient Smart Motor Enabled by Additive Manufacturing

Ahmed Selema, Matty Van Coppenolle, Mohamed Ibrahim, Peter Sergeant

Multiscale Characteristics of Layer Interface in 3D Printed Cement-Based Materials

Yi Zhang, Geert De Schutter, Kim Van Tittelboom

Multi-Scale Modelling of Oil Lubricated Contacts in Machine Elements

Peyman Havaej, Gözdenur Toraman, Joris Degroote, Dieter Fauconnier

Multi-User Beamforming Remote Radio Units Using Bit-Interleaved Sigma-Delta Modulated Radio-Over-Fiber

Caro Meysmans

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Olivier Verschatse, Lode Daelemans, Wim Van Paepegem, Karen De Clerck

Overload Clutch With Integrated Torque Sensing for Hybrid Industrial Cobots

Frederik Ostyn, Bram Vanderborght, Guillaume Crevecoeur

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Photonic On-Chip THz Antenna Arrays for 6G Wireless Communication

Reinier Broucke

Pitting Corrosion and Its Transition to Crack in Offshore Wind Turbine Supporting Structures

Farid Mehri Sofiani, Seyed Ahmad Elahi, Somsubhro Chaudhuri, Wim De Waele

Advanced Hollow Cathode Discharge Plasma Treatment of Novel Bi-Layered Fibrous Guidance Conduits for Enhanced Peripheral Nerve Regeneration

Sheida Aliakbarshirazi, Tim Egghe, Rouba Ghobeira, Nathalie De Geyter, Heidi Declercq, Rino Morent

Predictive Maintenance in Fusion Devices With an Application to the Ohmic Heating Circuit at JET
Leonardo Caputo, Geert Verdoolaege

Preventing Catastrophic Forgetting Using Prior Transfer in Physics Informed Bayesian Neural Networks
Cedric Van Heck, Guillaume Crevecoeur

Radio Frequency Absorption of a Western Honey Bee in the Near Field of Antennas
David Toribio, Wout Joseph, Günter Vermeeren, David Plets, Arno Thielens

Reliable Calculation of Lubricant Properties From Equilibrium Molecular Dynamics Simulations
Gözdenur Toraman, Toon Verstraelen, Dieter Fauconnier

Renovate in One Step, Stepwise, or Reconstruct?
Yanaika Decorte, Marijke Steeman, Nathan Van Den Bossche

Retrieving Landscape: A Biography of Nanhai in the Pearl River Delta, China
Hong Wan Chan

Reuse Potential of Building Materials Derived From Existing Dwellings
Katrien Devos, Marijke Steeman, Lionel Devlieger

Optimizing Production Costs via Hybrid Assembly
Andrea Mencaroni, Dieter Claeys, Stijn De Vuyst

Smart Decision Support for Maintenance Logistics
Naim Al Khoury, Dieter Claeys, El-Houssaine Aghezzaf, Dieter Fiems

Soft Switching Multiple Model Predictive Control in Wind Energy Conversion Systems: Practical Evaluations
Babak Mehdizadeh Gavgani, Arash Farnam, Jeroen De Kooning, Guillaume Crevecoeur

Solid Data Vaults vs Cookies: The Effects on Users' Perceived Transparency, Control, Security and Trust
Tim Theys

Sparse Array (Nonlinear) Guided Wave Imaging for Fast Non-Destructive Testing of Composites
Yusheng Ma, Saeid Hedayatrasa, Koen Van Den Abeele, Mathias Kersemans

Structural Integrity of the Deposit-Substrate Interface of Wire + Arc Additively Manufactured Steel Components
Robin Motte, Wim De Waele

Sustainable Corrosion Inhibition of Carbon Steel With Sodium Silicate

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Dennis Maes, Emilien Peytavit, Bart Kuyken, Sam Lemey

Test Methods for Corrosion-Fatigue of Offshore Structures

Hasan Saeed, Somsubhro Chaudhuri, Wim De Waele

The Co-Design Facilitator's Game Through the Lens of Sustainability

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The Shear Strength of the Interface Between Rock and Printable Concrete At Super-Young Ages

Xiaoyun Wang, Yong Yuan, Jiao-Long Zhang, Kim Van Tittelboom, Geert De Schutter

Thermal Conductivity of Plastic Composites

Tom Wieme, Hannelore Ohnmacht, Ellen Fernandez, Ludwig Cardon

Topology Optimization of Building Structures in Fire

Ticho Ooms, Ruben Van Coile, Wouter De Corte

Towards Bayesin Co-Design for Mission Specific Design of Dynamical Systems

Jolan Wauters, Tom Lefebvre, Guillaume Crevecoeur

Towards Real-Time Dense 3D Mapping With Lightweight Portable Sensors

Charles Hamesse, Rob Haelterman, Hiep Luong

Update Logic Synthesis Objectives for Better Placement and Routing

Marieke Louage, Dirk Stroobandt

What Is the Effect of Currents, Superimposed on Waves?

Ivandito Herdayanditya, Evert Lataire, Pieter Rauwoens

Yarn Level FEM Simulation for Bending Over Sheaves of Braided Ropes

Ziyuan Li, Edoardo Zappa, Lieva Van Langenhove, Benny Malengier

Awards

Award for Excellent Science Communication (Poster)

Awarded by Jeroen Ongenae and Roger Van Hecke (FEA Communications Officers)

Does Interior Insulation Damage Our Heritage?

Kaat Janssens, Valentina Marincioni, Nathan Van Den Bossche

Award for Excellent Science Communication (Pitch)

Awarded by Gerlinde Van Hauwermeiren (DO! - Durf Ondernemen)

The Future of Preoperative Planning for Liver Cancer: From CT-Scan in the 20th Century to Computational Model in the 21st Century

Tim Bomberna, Charlotte Debbaut

Award for Interdisciplinary Research

Awarded by Ilse Boeren (EOS)

Radio Frequency Absorption of a Western Honey Bee in the Near Field of Antennas

David Toribio, Wout Joseph, Günter Vermeeren, David Plets, Arno Thielens

Award for Link to Sustainable Development Goals

Awarded by Jan Mertens (Chief Science Officer Engie)

Reuse Potential of Building Materials Derived From Existing Dwellings

Katrien Devos, Marijke Steeman, Lionel Devlieger

Award for Research Impact

Awarded by Ronny Verhoeven (AIG - Alumni Ingenieurs Gent)

Hybrid Machine Learning for Leak Localization in the Drinking Water Grid

Ganjour Mazaev, Michael Weyns, Femke Ongenae, Sofie Van Hoecke

Award for Courage

Nathan Van Den Bossche (FEARS Organizing Committee)

Solid Data Vaults vs Cookies: The Effects on Users' Perceived Transparency, Control, Security and Trust

Tim Theys

Audience's Choice Award

Dennis Maes (FEARS Organizing Committee)

Sustainable Corrosion Inhibition of Carbon Steel With Sodium Silicate

Elias De Ketelaere, David Moed, Marjolein Vanoppen, Arne Verliefde, Tom Depover, Kim Verbeken

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