Artificial Intelligence in Architecture, Engineering and Construction

AI in AEC

March 20–21, 2024   HELSINKI, FINLAND & VIRTUAL

Tuesday
March 19, 2024

all times are EET (CET +1)
Organizer reserves right for changes

19.00 - 21:00   GET TOGETHER AND EXHIBITION

Wednesday
March 20, 2024

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08:45 OPENING SESSION
Venue: Sirkus Chair: **VESA JÄRVINEN**, AINS Group / A-Insinöörit

08:45	**Opening of the AI in AEC 2024 Conference** **VESA JÄRVINEN**, AINS Group / A-Insinöörit
09:00	**Keynote 1** A Quantum future with AI **ROB GREIG**, Arup, United Kingdom
09:30	**Keynote 2** Embracing the Future: AI Integration for Advanced Building Control **TEA ŽAKULA**, University of Zagreb, Croatia
10:00	**Discussion**

ROB GREIG

TEA ŽAKULA

10:15 COFFEE AND EXHIBITION

10:45 ① SMART BUILDINGS
Venue: Sirkus Chair: **DAVOR STJELJA**, Granlund

10:45	**Mind-Controlled Smart Homes: Brain-Computer-Interface and Digital Twin Hybrid Approach** **AHMED ZAKZOUK**, Dresden University of Technology, Germany
11:00	**Towards Generalized Machine Learning Models in Buildings: A Scalable Approach to Energy Consumption Prediction and Anomaly Detection** **DAVOR STJELJA**, Granlund, Finland
11:15	**AI-Driven Lifestyle-based Normative Messaging Feedback for Promoting Energy-efficient Behavior in Households** Prof. **SANGHYUN LEE**, University of Michigan, United States
11:30	**Data Requirements for AI Use in Building Automation Systems: Challenges, Costs and Solutions** **NIKOLA BADUN**, University of Zagreb, Croatia
11:45	**Humanizing Human-Centered Control Systems in Buildings and Occupant Comfort Prediction Using Machine Learning** **ARLINDA BRESA**, University of Zagreb, Croatia & University of Prishtina, Kosovo

② AI IMPLEMENTATION
Venue: Tivoli Chair: **SIMON OSTER**, Arcadis

Privacy Issues when using Artificial Intelligence in Built Environment: A Comprehensive Analysis
ANJA BRELIH, University of Ljubljana, Slovenia

The Road to Operational Artificial Intelligence (AI) Solutions For a Structural Steel Manufacturer
DANIEL BARBEAU, Canam Group inc., Canada

ORGANISATIONAL FACTORS AND BUSINESS MODELS FOR AI ADOPTION IN CONSTRUCTION FIRMS
ADYASHA MISHRA, Heriot-Watt University, United Kingdom

Journey to AI Adoption in AEC: Real-Life Case Studies for Newcomers
TUOMAS LEHTONEN, Ramboll Finland, Finland

12:00 LUNCH AND EXHIBITION

13:00 ③ COMPUTATIONAL DESIGN
Venue: Sirkus Chair: **HEIKKI ARVIO**, Ramboll

13:00	**Leveraging Unsupervised Machine Learning for Precise BIM Model Creation using ICP Registration Algorithm: A Case Study** **RAMIZ MOHAREB** & **DIRK MÜNZER**, BuP. Boll Beraten und Planen, Germany
13:15	**Leveraging BIM Knowledge Using AI: how generative design and AI can help improve architectural workflows** **MARTY ROZMANITH**, Skema, United States
13:30	**Automatic BIM generation from scanned architectural drawings** **LEO SALOMAA**, Make a BIM, Finland
13:45	**Evaluation of Structural Element Safety Using Finite-Element Analysis, Deep Neural Network and Monte Carlo Simulation** **ANTON KRALJ**, TCPS, Croatia
14:00	**Deep learning based crack segmentation in 3d computed tomography images of concrete** **ANNA NOWACKA**, Fraunhofer Institute for Industrial Mathematics, Germany
14:15	**Augmenting Dlubal's Finite Element Analysis Software with AI** Dr. **MICHAEL KRAUS** & **DOGUKAN KARATAS**, Dlubal Software, Germany

④ SUSTAINABLE DEVELOPMENT
Venue: Tivoli Chair: **MIRO RISTIMÄKI**, Skanska

Smarter planning and reporting by AI based CO_2 mapping solution
Dr. **SANNA HÄRKÖNEN**, Sitowise, Finland

Improvement and Enrichment of Building Data in Public Databases for Supporting Engineering Processes
ELISA ILISTE, Tallinn University of Technology, Estonia

Lightning Fast Climate Impact Assessments for Urban Plans
EERO PUURUNEN, Sitowise, Finland

14:30 COFFEE AND EXHIBITION

15:00 ⑤ AI TRANSFORMING THE INDUSTRY
Venue: Sirkus Chair: **MIRO RISTIMÄKI**, Skanska

15:00	**Keynote 3** AI in the Era of Retrofit **KAROLIINA TORTTILA**, Trimble Inc., Finland
15:30	**Location Intelligence + Artificial Intelligence combined** **MARC GOLDMAN**, Esri Inc., United States
15:45	**HOW AI + Big Data Will Transform the AEC Industry** **BRIAN FURR**, BST Global, United States
16:00 - 16:30	**DISCUSSION WITH** session speakers

KAROLIINA TORTTILA

19:00 HELSINKI CITY RECEPTION

Thursday March 21, 2024

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ADAM GAIER

6 LARGE LANGUAGE MODELS

09:00

Venue: Sirkus Chair: **SIMON OSTER**, Arcadis

09:00 — **Keynote 4:** TileGPT: Tile-based Design Exploration with Large Language Models
Dr. **ADAM GAIER**, Autodesk Research, Germany

09:30 — AI-assistant for RT-files knowledge-base and responsible AI data foundation for construction
TOMMI AROLA, Building information foundation RTS sr & **MATTI MÄÄTTÄNEN,** Rakennustieto Ltd., Finland

09:45 — Harnessing OpenAI GPT APIs for User-Friendly Interactions with openBIM IFC Models in AEC
MICHELANGELO CIANCIULLI, ACCA software S.p.A., Italy

10:00 — Predictive Intelligence for Urban Development with Generative AI
ALEKSEI KONDRATENKO, Digital Blue Foam, Italy

10:15 COFFEE AND EXHIBITION

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7 AI-BASED MODELING

10:45

Venue: Sirkus Chair: **JOONAS HELMINEN,** Sweco

10:45 — Beyond Traditional AI: PINNs Supercharged with MOO and Parallel Computing with Focus on Building Performance Simulations
Dr. **RANIA LABIB,** Prairie View A&M University, United States

11:00 — Probabilistic Machine Learning Surrogates With Bayesian Neural Networks
ARCHIE LUXTON, Arup, United Kingdom

11:15 — From Physics to AI: Modelling Buildings' Thermal Dynamics
LINA MORKUNAITE, Kaunas University of Technology, Lithuania

11:30 — PreAct: Pedestrian Level Windflow Prediction through Machine Learning
LINDE VAN BEERS, Arup, Netherlands

11:45 — Enhancing Structural Assessment with Bayesian Deep Learning Surrogates for Cost-effective and Sustainable Maintenance of Existing Reinforced Concrete Frame Bridges
SOPHIA KUHN, ETH Zurich, Switzerland

8 AUTONOMOUS MONITORING & COLLABORATION

Venue: Tivoli Chair: **HENRI PITKÄNEN,** Trimble

Industrial AI for safety on construction site
SAMEER PRABHU, Luleå University of Technology, Sweden

AI in multispectral image analysis: Implementing a deep learning model for the segmentation of common thermal urban features to assist in the automation of infrastructure-related maintenance
ELENA VOLLMER, Karlsruhe Institute of Technology, Germany

Fine grained action classification for rebar work using branch network
YASUYUKI KITAHARA, Kajima Technical Research Institute, Japan

Cloud BIM
Dr. **ZIJIAN WANG,** Technion Israel Institute of Technology, Israel

UrbanistAI - reimagining participatory planning.
SAMPO RUOPPILA, UrbanistAI, Finland

12:00 LUNCH AND EXHIBITION

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9 DESIGN OPTIMIZATION

13:00

Venue: Sirkus Chair: **HENRI PITKÄNEN,** Trimble

13:00 — Machine Learning and Evolutionary Optimization in Immersed Tunnel Design
FELIPE BANDEIRA DE MELO MORAES & **KONSTANTIN KRASNOPJOROV,** Ramboll, Denmark

13:15 — GENERATIVE AI & PARAMETRIC BRIDGE DESIGN BASED ON HISTORICAL DATA
ALEJANDRO PALPAN, GEN+, Peru

13:30 — Advanced impact assessment of road infrastructure designs using AI
RENAUD DE MONTAIGNAC & **ALAIN ANTHONY MARDO,** ORIS, France

13:45 — Data-Driven Predimensioning: Applying Graph Neural Networks to Reinforced Concrete Design
NILS SCHÄFER, Technische Hochschule Mittelhessen, Germany

14:00 — Towards a Holistic AI Design Assistant
DIEGO APELLÁNIZ, kevee, Germany

14:15 — Theory of Design Redundancy and Its Application in AI assisted Structural Design Automation
Prof. **XIN ZHAO,** Tongji University, China

10 CONSTRUCTION

Venue: Tivoli Chair: **JOONAS LEHTOVAARA,** AINS Group / A-Insinöörit

Machine Learning for Risk Management in Construction Projects
Prof. **FULVIO RE CECCONI,** Politecnico di Milano, Italy

Prompted Construction
Prof. **PIERPAOLO RUTTICO,** Politecnico di Milano, Italy

Performance-Driven Construction & AI Use Case
RISTO VAHENURM, Nordecon AS, Estonia & **PATRICK COPE,** Buildots, United Kingdom

Transforming Construction with Digital Twins and AI: The EDIFICTECH Project
ASIER URUEÑA, TECNALIA, Spain

AI-based consistency determination of excavated material using tunnel boring machines
LARA GUTBERLET, STUVA e. V. , Germany

14:30 COFFEE AND EXHIBITION

15:00 CLOSING SESSION

Venue: Sirkus Chair: **VESA JÄRVINEN,** AINS Group / A-Insinöörit

15:00 — **Keynote 5:** How AI Disrupts: Lessons for the Built Environment from Other Industrie
CLAYTON MILLER, National University of Singapore, Singapore

15:30-15:45 — Closing Words
VESA JÄRVINEN, AINS Group / A-Insinöörit

CLAYTON MILLER