All times in EET (CET +1)

Artificial Intelligence in Architecture, Engineering and Construction

AI in AEC CONFERENCE 2021

#AIAEC2021

Virtual Conference

MARCH 24, 2021

Hanna Hagström

Erika Pärn

OPENING SESSION

Stream 1
Chaired by: Dr. Vesa Järvinen - AINS Group / A-Insinöörit

10:00 **OPENING WORDS**
Dr. Vesa Järvinen (Finland) - AINS Group / A-Insinöörit

10:15 **KEYNOTE: HANNA HAGSTRÖM (FINLAND) REAKTOR - SCALING AI**

10:45 **KEYNOTE: DR. ERIKA PÄRN (UNITED KINGDOM) - UNIVERSITY OF CAMBRIDGE, CDBB - BUSINESS MODEL INNOVATION OPPORTUNITIES WITH DIGITAL TWINS**

DATA DRIVEN DESIGN

Stream 1
Chaired by: Eetu Partala, Sweco

11:40 **USING MACHINE LEARNING TO IMPROVE DESIGN PROCESSES AND USER PARTICIPATION**
Prof. Eilif Hjelseth (Norway) - Norwegian University of Science and Technology
Artur Tomczak (Norway) - Norwegian University of Science and Technology

12:00 **MATHEMATICAL OPTIMIZATION AS ENGINE FOR DESIGN AUTOMATION AND EXPLORATION**
Dr. Kristo Mela (Finland) - Tampere University

12:20 **WINDBASE AI - DEVELOPMENT OF A ML-BASED TOOL FOR WIND TURBINE FOUNDATION DESIGN**
Dr. Lex van der Meer (Netherlands) - WindBASE, ABT

12:40 **ALGORITHM-BOOSTED BOILER BUILDING DESIGN**
Ilari Pirhonen (Finland) - Sweco

GENERATIVE DESIGN 1

Stream 2
Chaired by: Janne Liuttu, Ramboll

DESIGN AUTOMATION: MEP ROUTING
Joonas Vierijärvi (Finland) - Granlund Oy, Tero Järvinen (Finland) - Granlund Oy, Pauli Keinonen (Finland) - MagiCAD Group

OBJECT DETECTION IN FLOOR PLANS: LESSONS FROM DESIGNING A HUMAN-IN-THE-LOOP SYSTEM
Patrick Hemmer (Germany) - Karlsruhe Institute of Technology

IMPACTFUL AI 1

Stream 1
Chaired by: Ricardo Farinha, Sweco

13:30 **IS DATA THE KEY TO BRING SUPER POWERS TO THE AEC INDUSTRY?**
Ricardo Farinha (Finland) - Sweco

13:50 **APPLICATION OF MACHINE LEARNING IN CIVIL ENGINEERING: A REVIEW**
Prof. Mohammad Hajmohammadian Baghban (Norway) - Norwegian University of Science and Technology (NTNU), Mohammad Abedi (Norway), Norwegian University of Science and Technology (NTNU)

14:10 **INDUSTRIAL PROPERTY RIGHTS AND THE 4TH INDUSTRIAL REVOLUTION**
Dr. Antti Salmela (Finland) - Finnish Patent Office

14:30 **HOW AI & MACHINE LEARNING ARE TRANSFORMING THE BUILT ENVIRONMENT'S ENTIRE PROJECT LIFECYCLE**
Hank Tran (Netherlands) - BST Global

DEMO SESSION

Stream 1
Chaired by: Henri Pitkänen, Trimble

HANDLING THREE KINDS OF CONSTRUCTION KNOWLEDGE
Nicholas Nisbet (United Kingdom) - AEC3 UK Lt

BOOSTING INFRA LIFECYCLE MANAGEMENT WITH MACHINE VISION & GIS REGISTRY GENERATION
Kaisu Laitinen (Finland) - Tampere University, Saara-Maija Pakarinen (Finland) - Ramboll

PROJECT MANAGEMENT 1

Stream 1
Chaired by: Dr. Vesa Järvinen - AINS Group / A-Insinöörit

15:20 **TAKT - A KEY TO APPLY AI SOLUTIONS IN CONSTRUCTION**
Janosch Dlouhy (Germany) - TAKT.ing, Marco Binninger (Germany) - TAKT.ing

15:40 **AI-POWERED CONSTRUCTION PROJECT PLANNING & CONTROL**
Dr. Houssem Jerbi (Ireland) - Smart PMO

16:00 **ALGORITHM-BASED ESTIMATE: AN ALTERNATE APPROACH OF CONSTRUCTION COST PREDICTION IN EARLY STAGE OF DESIGN**
Shih-Chi Liu (United States) - Hathaway Dinwiddie Construction Company

GENERATIVE DESIGN 2

Stream 2
Chaired by: Henri Pitkänen, Trimble

APPLICATION OF GENERATIVE ML MODELS IN ARCHITECTURAL DESIGN AND ANALYSIS AT GRIMSHAW
Natalia Wojtowicz (United Kingdom) - Grimshaw

RATIONALIZATION OF FREE-FORM ARCHITECTURE USING GENERATIVE AND PARAMETRIC DESIGNS
Dr. Chankyu Lee (United States) - University of Florida

A COMPUTATIONAL DESIGN APPROACH FOR URBAN PLAZAS: HUMAN BEHAVIOR-BASED ALGORITHM
Hamidreza Esmaeillou (United States) - University of Florida

NATURAL LANGUAGE PROCESSING

Stream 1
Chaired by: Janne Liuttu, Ramboll

16:50 **NLP-BASED CONVERSATIONAL AI SYSTEM FOR INFORMATION EXTRACTION FROM BUILDING INFORMATION MODELS**
Ning Wang (United States) - University of Florida

17:10 **NATURAL LANGUAGE PROCESSING AND BIM FOR THE DIGITALIZATION OF PUBLIC CLIENT'S OBJECTIVES AND REQUIREMENTS**
Mirko Locatelli (Italy) - Politecnico di Milano

Aviad Almagor

KEYNOTE SESSION

Stream 2
Chaired by: Henri Pitkänen, Trimble

17:40 **KEYNOTE: AVIAD ALMAGOR - TRIMBLE - FROM HUMAN INTELLIGENCE TO AI - A TRANSFORMATIVE JOURNEY**

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MARCH 25, 2021

PROJECT MANAGEMENT 2

Stream 1
Chaired by: Eetu Partala, Sweco

10:00 **MACHINE LEARNING FOR REAL-TIME DESIGN ASSESSMENT AND PROCESS STEERING IN MECHANISED TUNNELLING WITHIN AN INTEGRATED NUMERICAL AND INFORMATION MODELLING FRAMEWORK**
Prof. Christian Koch (Germany) - Bauhaus-Universität Weimar

10:20 **MACHINE LEARNING FOR IMPROVED SAFETY ON THE CONSTRUCTION SITE**
May Shayboun (Sweden) - Chalmers University of Technology

10:40 **OPTIMIZATION TECHNIQUES AND AI METHODS FOR SOLVING CONSTRUCTION SITE LAYOUT PLANNING TASKS**
Jan-Friedrich Köhle (Germany) - Gießen University of Applied Sciences

SMART BUILDINGS 1

Stream 2
Chaired by: Janne Liuttu, Ramboll

AUTOMATIC AND USER FRIENDLY BUILDING ENERGY CONSUMPTION PATTERN ANALYSIS
Davor Stjelja (Finland) - Granlund Oy

R8 DIGITAL OPERATOR FOR COMMERCIAL BUILDINGS
Siim Täkker (Estonia) - R8 Technologies

POST-OCCUPANCY EVALUATION AND OCCUPANCY-RELATED DIGITAL TWIN DEFINITION FOR POST-PANDEMIC BUILDING MANAGEMENT
Laura Pellegrini (Italy) - Politecnico di Milano

CIRCULAR ECONOMY

Stream 1
Chaired by: Janne Liuttu, Ramboll

11:30 **A MULTI-CRITERIA CONCEPTUAL DESIGN METHOD USING GENETIC ALGORITHMS TO OPTIMIZE STRUCTURES' COST AND ENVIRONMENTAL IMPACTS**
Dr. Alper Kanyilmaz (Italy) - Politecnico di Milano

11:50 **AUTOMATING REUSE OF MATERIALS IN ARCHITECTURE**
Prof. Catherine De Wolf (Netherlands) - Delft University of Technology (TU Delft)

12:10 **AUTOMATIC MONITORING OF WASTE CONTAINERS ON CONSTRUCTION SITES**
Michiel Dhont (Belgium) - BESIX / KU Leuven

DATA ANALYTICS

Stream 2
Chaired by: Ricardo Farinha, Sweco

APPLYING MACHINE LEARNING IN URBAN SCALE TO PREDICT COMFORT QUALITY, CASE STUDY TALLINN, ESTONIA
Nasim Eslamirad (Estonia) - Tallinn University of Technology

USING SEMANTIC WEB TECHNOLOGIES TO DESCRIBE HVAC DATA POINT RELATIONSHIPS
Ville Kukkonen (Finland) - Granlund Oy

QUALITY CONTROL & VERIFICATION

Stream 1
Chaired by: Henri Pitkänen, Trimble

13:00 **AUTOMATED RECOGNITION OF BUILDING COMPONENTS USING DEEP NEURAL NETWORKS AND SYNTHETIC IMAGES**
Dr. Farzaneh Golkhoo (Canada) - Pomerleau

13:20 **CREATING DIGITAL TWINS FROM SIMPLE PHOTOS**
Adrian Merkel (Germany) - FRAMENCE GmbH

13:40

SMART BUILDINGS 2

Stream 2
Chaired by: Dr. Vesa Järvinen - AINS Group / A-Insinöörit

HARVEST THE POWER OF THE BUILDING DIGITAL TWIN WITH ARTIFICIAL INTELLIGENCE
Dr. Sarah Noyé (Spain) - Tecnalia Research & Innovation

REINFORCEMENT LEARNING BASED APPROACH TO AUTOMATE THE EXTERNAL SHADING SYSTEM AND ENHANCE THE OCCUPANT COMFORT
Raghuram Kalyanam (Germany) - TU Kaiserslautern

INTEGRATING A KNOWLEDGE-BASED RECOMMENDATION SYSTEM INTO A BIM WORKFLOW FOR ENERGY EFFICIENT FACILITY MANAGEMENT
Hervé Pruvost (Germany) - Fraunhofer IIS EAS

14:00 **THE IMPACT OF CLIMATE CHANGE ON A UNIVERSITY CAMPUS' ENERGY USE: USE OF MACHINE LEARNING, FUTURE WEATHER DATA, AND BUILDING CHARACTERISTICS**
Haekyung Im (United States) - University of Florida

IMPACTFUL AI 2

Stream 1
Chaired by: Janne Liuttu, Ramboll

14:30 **ARTIFICIAL INTELLIGENCE – TRENDS AND IMPLICATIONS FOR AEC INDUSTRY**
Janne Liuttu (Finland) - Ramboll

14:50 **HOW AI AUTOMATION AND AUTONOMOUS DESIGN WILL IMPACT YOUR TEAM, FIRM, PROFESSION, INDUSTRY AND THE BUILT ENVIRONMENT**
Prof. Randy Deutsch (United States) - University of Illinois Urbana-Champaign

15:10 **"PREPARING FOR AI IN THE AEC: COLLABORATING ACROSS THE AEC"**
Terry Beaubois (United States) - BKS: Building Knowledge Systems

15:30 **CHANGING A GLOBAL PORTFOLIO AROUND THE FULL ASSET LIFECYCLE TO AI EMPOWERED PROPOSITIONS**
Susanne Knorr (United Kingdom) - Arcadis

15:50

AUTONOMOUS CONSTRUCTION

Stream 2
Chaired by: Eetu Partala, Sweco

ARTIFICIAL INTELLIGENCE BASED OPTIMIZATION OF ROAD REHABILITATION PROCESSES
Margarida Amândio (Portugal) - BUILT CoLAB, Dr. Manuel Parente (Portugal) - BUILT CoLAB, Prof. José Neves (Portugal) - CERIS, Instituto Superior Técnico, Universidade de Lisboa

INTELLIGENT JOBSITES- AN INTEGRATED IOT PLATFORM FOR THE CONSTRUCTION ENVIRONMENT
Dr. Aaron Costin (United States) - University of Florida

BLOCKCHAIN FOR THE CONSTRUCTION SUPPLY CHAIN IN SWEDEN: SOCIOMATERIALITY, ACTORS AND PROOF-OF-CONCEPT
Dr. Dimosthenis Kifokeris (Sweden) - Chalmers University of Technology

HUMAN-ROBOT COLLABORATION IN CONSTRUCTION
Cynthia Brosque (United States) - Stanford University School of Engineering, Prof. Martin Fischer (United States) - Stanford University School of Engineering

KEYNOTE SESSION

Stream 1
Chaired by: Dr. Vesa Järvinen - AINS Group / A-Insinöörit

16:20 **KEYNOTE - KEAN WALMSLEY - AUTODESK - BUILDING THE INFRASTRUCTURE FOR PERFORMANCE-BASED GENERATIVE DESIGN**

16:50 **CLOSING OF THE CONFERENCE**Dr. Vesa Järvinen (Finland) - AINS Group / A-Insinöörit

Kean Walmsley

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