ICDM 2022
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# International Conference on Decarbonization and Digitalization in Marine Technology (ICDM 2022)

April 28-29, Online Conference

## Technical Session Program Schedule

**DAY1 - April 28 Thursday**

### Channel 1

**Session1. Decarbonization (Carbon Capture)**
**13:40-14:30**
**Chair: Haifeng LIU (Tianjin University, China)**

| Code | Time | Presentation Title | Presenter |
|---|---|---|---|
| D1-S1-1 | 13:40-13:50 | Decarbonization of the maritime transport sector: a short review on low-carbon technology and the study on pure methanol compression in engines | Haifeng LIU (Tianjin University China(P.R.C)) |
| D1-S1-2 | 13:50-14:00 | Process Design of Onboard Membrane Carbon Capture and Liquefaction Systems for Ships | Juyoung OH (Seoul National University) |
| D1-S1-3 | 14:00-14:10 | Process modeling of on-board carbon capture using monoethanolamine solution | Jong Yeon JUNG (Seoul National University) |
| D1-S1-4 | 14:10-14:20 | A feasibility Study for On-board Carbon Capture and Storage(OCCS) Technology | Jungin CHOI (Samsung Heavy Industries) |
| D1-S1-5 | 14:20-14:30 | Introduction of decarbonICE and Feasibilty Study for Seabed Penetration of Carbon Descent Vehicles (CDVs) | Minjung JUN (Daewoo Shipbuilding & Marine Engineering) |

### Channel 2

**Session2. Digitalization (Digitalized Operation 1)**
**13:40-14:20**
**Chair: Hanseong LEE (Research Institute of Medium & Small Shipbuiling)**

| Code | Time | Presentation Title | Presenter |
|---|---|---|---|
| D1-S2-1 | 13:40-13:50 | A study on the development of a fault diagnosis model for rotating machinery | Jeonghee YANG (Daewoo Shipbuilding & Marine Engineering) |
| D1-S2-2 | 13:50-14:00 | Fatigue Damage Prediction of TTR Subjected to VIV by ANN | Mala Konda Reddy LEKKALA (Universiti Teknologi PETRONAS Malaysia) |
| D1-S2-3 | 14:00-14:10 | The Development of Condition Based Maintenance System on Rotating Machines of Smart ship | BumHyun LIM (Smartship Samsung Heavy Industries Korea) |
| D1-S2-4 | 14:10-14:20 | Hull monitoring system development for hull digital twin | Inho JANG (Daewoo Shipbuilding & Marine Engineering) |

### Channel 3

**Session3. Digitalization (Smart Ship 1)**
**13:40-14:30**
**Chair: Hwa Lyong LEE (DNV)**

| Code | Time | Presentation Title | Presenter |
|---|---|---|---|
| D1-S3-1 | 13:40-13:50 | Autonomous Navigation Experiment in Pohang Canal | Jonghwi KIM (KAIST) |
| D1-S3-2 | 13:50-14:00 | The application of ODD (Operational Design Domain) to MASS | Bomi JEON (Korea Marine Equipment Research Institute) |
| D1-S3-3 | 14:00-14:10 | Detection and Tracking Methods of Maritime Obstacles Using Multiple Cameras | Jeong-Ho PARK (Seoul National University) |
| D1-S3-4 | 14:10-14:20 | A Method for Route Planning of Small Ships in Coastal Areas | Dong-Guen JEONG (Seoul National University) |
| D1-S3-5 | 14:20-14:30 | Autonomous Vessel Voyage Planning Modeling in Northern Sea Route with Liquid Hydrogen Transportation | Se Won KIM (Sejong University) |

### Channel 4

**Session4. Digitalization (Smart Yard 1)**
**13:40-14:20**
**Chair: Jonghun WOO (Seoul National University)**

| Code | Time | Presentation Title | Presenter |
|---|---|---|---|
| D1-S4-1 | 13:40-13:50 | A Block Lifting Method with Wire Ropes Based on Deep Reinforcement Learning | Do-Hyun CHUN (Seoul National University) |
| D1-S4-2 | 13:50-14:00 | Development of Reinforcement Learning based Quay Scehduling Alogorithm | Young-In CHO (Seoul National University) |
| D1-S4-3 | 14:00-14:10 | Development of Innovated Container Ship Production Method using 3D Scanner and Simulation | Doo-Jin CHOI (Samsung Heavy Industries) |
| D1-S4-4 | 14:10-14:20 | Algorithm for establishing optimal plan for steel stock yard with reinforcement learning and meta-heuristics | Heechang YOON (Seoul National University) |

### Channel 5

**Session5. Decarbonization (Hydrogen & GHG Emission)**
**14:40-16:00**
**Chair: Yutaek SEO (Seoul National University)**

| Code | Time | Presentation Title | Presenter |
|---|---|---|---|
| D1-K1 | 14:40-15:20 | **[Keynote] Simulation-Based Evaluation of Decarbonization Pathways** | Georgios PLEVRAKIS (Global Sustainability American Bureau of Shipping) |
| D1-S5-1 | 15:20-15:30 | Collaborative Teamwork Platform for Zero Emission Fuel Transition of Maritime Industry | Kazuo HIEKATA (The University of Tokyo) |
| D1-S5-2 | 15:30-15:40 | Methane emission reduction technologies for medium-speed dual-fuel engines | Hyunchun PARK (Hyundai Heavy Industries) |
| D1-S5-3 | 15:40-15:50 | Development of low-flash point fuel engine technology for reducing GHG emissions on marine engine. | Seungpil LEE (Korea Shipbuilding & Offshore Engineering) |
| D1-S5-4 | 15:50-16:00 | Smart Marine Hydrogen Highway | Zhiming YUAN (University of Strathclyde) |

### Channel 6

**Session6. Decarbonization (LNG & Gas shipping)**
**14:40-16:05**
**Chair: Sung Yong KIM (Bureau Veritas)**

| Code | Time | Presentation Title | Presenter |
|---|---|---|---|
| D1-K2 | 14:40-15:15 | **[Keynote] How to respond to IMO GHG regulation (Shipping and Shipbuilding Industry)** | Kanghyun SONG (Korean Register) |
| D1-S6-1 | 15:15-15:25 | Introduction of Non bonded type Spray Foam Insulation System for IMO Type B Tank | Byunghwa KIM (Daewoo Shipbuilding & Marine Engineering) |
| D1-S6-2 | 15:25-15:35 | Development of no vent bunkering operation | Sungwoo KIM (Samsung Heavy Industries) |
| D1-S6-3 | 15:35-15:45 | Development and Design Verification of Fuel Gas Supply System for LNG Fueled Ship | Hyeonsu JEONG (Samsung Heavy Industries) |
| D1-S6-4 | 15:45-15:55 | A study on sloshing load for various size of LNG fuel tanks of 23,000 TEU containership | Junhyung JUNG (Daewoo Shipbuilding & Marine Engineering) |
| D1-S6-5 | 15:55-16:05 | Developing a sustainable maritime sector along with innovations in Gas shipping | Carlos GUERRERO (Bureau Veritas Marine and Offshore) |

### Channel 7

**Session7. Digitalization plus Decarbonization**
**14:40-16:00**
**Chair: Hyun Joon SHIN (Korea Shipbuilding Offshore Engineering)**

| Code | Time | Presentation Title | Presenter |
|---|---|---|---|
| D1-S7-1 | 14:40-14:50 | A study on the ship data model including the standard classification system of ships | YunHui KIM (Chungnam National University) |
| D1-S7-2 | 14:50-15:00 | A Study on Lightweight Radar Mast Using Composite Materials | Yoon-duck SEO (Structure R&D DSME Korea) |
| D1-S7-3 | 15:00-15:10 | Real-time Control of Wave Energy Converter Based on LSTM RNN based Wave Prediction | Ming ZHANG (University of Strathclyde) |
| D1-S7-4 | 15:10-15:20 | 3D Classification Takes The Maritime Industry To Another Dimension | Olivier DEGRAND (BUREAU VERITAS) |
| D1-K3 | 15:20-16:00 | **[Keynote] Decarbonisation and Digitalisation – it's not all one world!** | Tim KENT (Lloyd's Register) |

### Channel 8

**Session8. Digitalization (Standardization)**
**14:40-16:00**
**Chair: Jang Hyun LEE (Inha University)**

| Code | Time | Presentation Title | Presenter |
|---|---|---|---|
| D1-S8-1 | 14:40-14:50 | Case studies to prepare the workfront in advance using the 4th industrial technology | Jin-Hyung PARK (Samsung Heavy Industries) |
| D1-S8-2 | 14:50-15:00 | How to achieve the Justification of ESG management through Digitalization to Seamless Value Chain in the Shipping and Shipbuilding Industries | Luke (Yang-Ouk) KIM (INHA University) |
| D1-S8-3 | 15:00-15:10 | Standardization of digital technologies for Oil and Gas companies | Kanika SINGH (American Bureau of Shipping, Korea) |
| D1-S8-4 | 15:10-15:20 | Autonomous navigation | Maxim BARKASOV (Russian University of Transport) |
| D1-K4 | 15:20-16:00 | **[Keynote] The Digital Crew Member – Smart Solutions at Sea** | Kalevi TERVO (ABB Marine & Ports) |

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|---|---|---|
| | 16:00-16:10 | Break |
| Opening | 16:10-16:30 | **Opening Address (Channel 1)**<br>Sam-hyun KA (Korea Shipbuilding & Offshore Engineering), Du Seon PARK (Daewoo Shipbuilding & Marine Engineering), Christopher J. Wiernicki (American Bureau of Shipping), Nick Brown (Lloyd's Register) |
| Summit | 16:30-18:00 | **Summit Session (Channel 1)**<br>Moderator: Sung-gu PARK (North East Asia Lloyd's Register)<br>Speaker: Seung Yong PARK (Hyundai Heavy Industries)<br>Discussion: Du Seon PARK (DSME), Andi Case (Clarksons), Yoon Keun JANG (K Shipbuilding), Seung Yong PARK (KSOE) |

## Technical Session Program Schedule

**DAY2 - April 29 Friday**

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|---|---|---|
| Plenary Session | 09:05-09:35 | **Plenary Speech 1 (Channel 5)**<br>**: The Role of Digital Technologies to Achieve a Decarbonized Maritime Industry, Patrick Ryan (American Bureau of Shipping)** |
| | 09:35-10:05 | **Plenary Speech 2 (Channel 5)**<br>**: Decarbonisation and Digitalisation–Navigating the Rapid Transition Together, Neil Kavanagh (Woodside Energy)** |
| | 10:05-10:35 | **Plenary Discussion (Channel 5)**<br>**: Patrick Ryan, Neil Kavanagh, Jing Sun (Moderator: Jin-Ki KIM, SafeTechResearch)** |
| | 10:35-10:40 | Break |

### Channel 1

**Session1. Decarbonization (Electric Propulsion & Wind-Power System)**
**10:40-12:00**
**Chair: Kazuo HIEKATA (Tokyo University)**

| Code | Time | Presentation Title | Presenter |
|---|---|---|---|
| D2-K1 | 10:40-11:20 | **[Keynote] Integrated Power Systems for Electrified Ships: Control and Optimization** | Jing SUN (University of Michigan) |
| D2-S1-1 | 11:20-11:30 | Study of eco-friendly electric propulsion system for ship | Sanghyun KIM (Korea Shipbuilding & Offshore Engineering) |
| D2-S1-2 | 11:30-11:40 | Energy Efficient Control for Electric Ship Propulsion Considering Thrust Fluctuation in Regular Waves | Changyu LEE (KAIST) |
| D2-S1-3 | 11:40-11:50 | A Design of a Fully Electrified Car Ferry Powered by Removable Battery Systems | Young-Shik KIM (Korea Research Institute of Ships & Ocean Engineering) |
| D2-S1-4 | 11:50-12:00 | Some Aspects, and Considerations, for Installation of (Flettner) Rotor Sails on a Bulk Carrier | Robert D TUSTIN (Lloyd's Register) |

### Channel 2

**Session2. Digitalization (Digital Twin 1)**
**10:40-12:00**
**Chair: Masahiko FUJIKUBO (Osaka University)**

| Code | Time | Presentation Title | Presenter |
|---|---|---|---|
| D2-K2 | 10:40-11:20 | **[Keynote] Digital Twin for Ship Structures – R&D Project in Japan** | Masahiko FUJIKUBO (Osaka University) |
| D2-S2-1 | 11:20-11:30 | Preliminary Study on Modeling & Simulation for the Digital Twin of Autonomous Ship | Jinwoo CHOI (Korea Research Institute of Ships and Ocean Engineering) |
| D2-S2-2 | 11:30-11:40 | The Framework for Implementation of Ships' Digital Twin | JinHo SONG (Chungnam National University) |
| D2-S2-3 | 11:40-11:50 | Evolution of Digital Twin from Smart Ship to Autonomous Ship in Object-Oriented Programming | Jung-Hyun KIM (Samsung Heavy Industries) |
| D2-S2-4 | 11:50-12:00 | Prediction of Hydrodynamic Performance for a Real-time Digital Twin of Ship Operation | Jaehak LEE (Seoul National University) |

### Channel 3

**Session3. Digitalization (Smart Ship 2)**
**10:40-12:00**
**Chair: Jinwhan KIM (Korea Advanced Institute of Science and Technology)**

| Code | Time | Presentation Title | Presenter |
|---|---|---|---|
| D2-K3 | 10:40-11:20 | **[Keynote] Application of autonomous navigation system to large ship** | Hyun Joe KIM (Samsung Heavy Industries) |
| D2-S3-1 | 11:20-11:30 | Preliminary validation system for development with reliable intelligent navigation algorithms of autonomous ships | Jeonghong PARK (Korea Research Institute of Ships and Ocean Engineering) |
| D2-S3-2 | 11:30-11:40 | Study on Performance Verification Procedure of Autonomous Navigation System for Autonomous Ship | SangWoong YUN (Korea Research Institute of Ships & Ocean Engineering) |
| D2-S3-3 | 11:40-11:50 | Development of Smart Ship Solution Platform for Intelligent and Lifecycle Managed Vessels | Jong Jin PARK (Samsung Heavy Industries) |
| D2-S3-4 | 11:50-12:00 | Status of technology demonstration and commercialization of autonomous ship technology by Avikus | Daehyuk KIM (HHI Group, Avikus) |

### Channel 4

**Session4. Digitalization (Digital Twin 2)**
**10:40-12:00**
**Chair: Bo Woo NAM (Seoul National University)**

| Code | Time | Presentation Title | Presenter |
|---|---|---|---|
| D2-K4 | 10:40-11:20 | **[Keynote] The research and insight on ship digitalization and intelligence** | Xia Guihua (Harbin Engineering University) |
| D2-S4-1 | 11:20-11:30 | Incorporation of Wave Heading Into A Generalized Neural Network Approach For Ship Motion Forecasting | Kevin SILVA (Naval Surface Warfare Center Carderock Division) |
| D2-S4-2 | 11:30-11:40 | Ocean Wave Prediction Based on Wave Radar Images For a Real-time Digital Twin of Marine Vehicles | Yoon-Seo NAM (Seoul National University) |
| D2-S4-3 | 11:40-11:50 | Prediction of Relative Wave Elevations around a Tension Leg Platform in Irregular Waves using an Artificial Neural Network Model | Jeong-Seok KIM (Seoul National University) |
| D2-S4-4 | 11:50-12:00 | A low-cost real-time ocean wave observing system based on deep learning image algorithm and inverse problem | Je-Eun CHOI (Daewoo Shipbuilding & Marine Engineering) |

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| | 12:00-13:30 | Break |
| | 13:30-15:00 | **Technology Leader`s Forum (Channel 5)**<br>**: YoungBum LEE, Jin KIM, HyunJoe KIM, SungYong KIM (Moderator: Jinwhan KIM, KAIST)** |

### Channel 5

**Session5. Decarbonization (Energy Efficiency Design & Operation)**
**15:00-16:40**
**Chair: Robert D. TUSTIN (Lloyd's Register)**

| Code | Time | Presentation Title | Presenter |
|---|---|---|---|
| D2-K5 | 15:00-15:40 | **[Keynote] The Efforts to Decarbonization in Shipbuiling Industries** | YoungBum LEE (Daewoo Shipbuilding & Marine Engineering) |
| D2-S5-1 | 15:40-15:50 | Comparative study on weather factor of different ship types for EEDI | Jae-Hoon LEE (Seoul National University) |
| D2-S5-2 | 15:50-16:00 | Study of wind resistance reducing methods for commercial vessels | Youngjae KIM (Korea Shipbuilding & Offshore Engineering) |
| D2-S5-3 | 16:00-16:10 | Domestic and international cooperation strategies for the development and commercialization of green ship technology | Hee Jin KANG (Korea Research Institute of Ships & Ocean Engineering) |
| D2-S5-4 | 16:10-16:20 | Development of wing sail system for wind-assisted propulsion of commercial ships | Joonyoung HAN (Korea Shipbuilding & Offshore Engineering) |
| D2-S5-5 | 16:20-16:30 | The technical review of the rotor sail performance from a viewpoint of the optimum velocity ratio | SEONG-OH KIM (Daewoo Shipbuilding & Marine Engineering) |
| D2-S5-6 | 16:30-16:40 | Decarbonization Through Optimization | Henrik GRÖNLUND (NAPA) |

### Channel 6

**Session6. Digitalization (Smart Yard 2)**
**15:00-16:20**
**Chair: Won-Sun RUY (Chungnam National University)**

| Code | Time | Presentation Title | Presenter |
|---|---|---|---|
| D2-K6 | 15:00-15:40 | **[Keynote] Applications of Deep Learning in Ship Design, Production, and Operation Stages** | Myung Il ROH (Seoul National University) |
| D2-S6-1 | 15:40-15:50 | Development of Discrete Event Simulation for Shipyard Outdoor Block Movement | So-Hyun NAM (Seoul National University) |
| D2-S6-2 | 15:50-16:00 | Reinforcement Learning-based High-speed simulation for Three-Roller Cold Forming of Hull Plates | Youngmin KIM (Chungnam National University) |
| D2-S6-3 | 16:00-16:10 | Integration of the master planning and the execution planning for the block assembly process using the constraint satisfaction technique | Kiyoung CHO (Seoul National University) |
| D2-S6-4 | 16:10-16:20 | Development and Application of Pipe Network Analysis System using 3D-CAD models for Maritime industry | Choong Young CHOI (Samsung Heavy Industries) |

### Channel 7

**Session7. Digitalization (Digitalized Operation 2)**
**15:00-16:20**
**Chair: Jin KIM (Korea Research Institute of Ships & Ocean Engineering)**

| Code | Time | Presentation Title | Presenter |
|---|---|---|---|
| D2-K7 | 15:00-15:40 | **[Keynote Speech] Digitalization in the Maritime Value Chain** | Svein Peder BERGE (SINTEF) |
| D2-S7-1 | 15:40-15:50 | Application of artificial neural network for sloshing severity prediction | Yangjun AHN (Sungshin Women's University) |
| D2-S7-2 | 15:50-16:00 | Hybrid Scheme on Prognostics for Onboard LNG Regassification Unit Using Data-Driven Method with Physical Model Based Method with Its Digital Twin | Nayoung LEE (Seoul National University) |
| D2-S7-3 | 16:00-16:10 | Development of a Fire Location and Localization System for Ship Compartment Based On Machine Vision System | Doo Young JEONG (Chungnam National University Korea) |
| D2-S7-4 | 16:10-16:20 | Analysis of Feasible OPEX-reduction Technologies for the Near-Future Digitalized Vessel | Dongsoo KANG (Lloyd's Register) |

### Channel 8

**Session8. Digitalization (Simulation & Design)**
**15:00-16:20**
**Chair: Alexander PINSKY (Russian University of Transport)**

| Code | Time | Presentation Title | Presenter |
|---|---|---|---|
| D2-K8 | 15:00-15:40 | **[Keynote Speech] Digital Hydrodynamics for Better Ships and Blue Oceans** | Bas BUCHNER (MARIN) |
| D2-S8-1 | 15:40-15:50 | Development of Sloshing Monitoring System and On-board Application | Junhyung JUNG (Daewoo Shipbuilding & Marine Engineering) |
| D2-S8-2 | 15:50-16:00 | A time-domain simulation for dynamic position of an unmanned surface vehicle (USV) operated in collaboration with autonomous underwater vehicle (AUV) | Hyung-Do SONG (Korea Research Institute of Ships & Ocean Engineering) |
| D2-S8-3 | 16:00-16:10 | Structural Health Monitoring for Floating Offshore Wind Turbine | Yongman PARK (Hyundai Heavy Industries) |
| D2-S8-4 | 16:10-16:20 | AI Based Process Simulation System Development Using Sensor Data | Nayoung LEE (Seoul National University) |