WePAMP Cascade Ballroom

Plenary: Data-Enhanced Mechatronic Systems for Smart Manufacturing (Plenary Session)

08:30-09:30 WePAMP.1

*Data-Enhanced Mechatronic Systems for Smart Manufacturing**.

Gao, Robert X. (Case Western Reserve University)

WeCAMC Cascade Foyer

Posters - Wednesday I (Poster Session)

09:30-10:00 WeCAMC.1

*Aerodynamic Effect for Collision-Free Reactive Navigation of a Small Quadcopter**.

Ding, Runze (CITY UNIVERSITY OF HONGKONG); Dong, Kaixu (City University of Hong Kong); Bai, Songnan (City University of Hong Kong); Chirarattananon, Pakpong (City University of Hong Kong)

09:30-10:00 WeCAMC.2

*Exploration of Aerial Torsional Work Using an Add-On Thrust Vectoring Device**.

Rosales Martinez, Ricardo (Ritsumeikan University); Paul, Hannibal (Ritsumeikan University); Shimonomura, Kazuhiro (Ritsumeikan University)

09:30-10:00 WeCAMC.3

Formation Analysis of Dynamic Multi-Agent Systems Controlled by a Generalized Cyclic Pursuit Mechanism, pp. 1-1.

Kwak, Taeheon (Chung-Ang University); Kim, Yeongjae (Chung-Ang University); Kim, Tae-Hyoung (Chung-Ang University)

09:30-10:00 WeCAMC.4

*Improving Human-Led Multi-Robot Platoon Using Decentralized DSR**.

Chang, Henry (University of Washington); Lin, Yudong (University of Washington)

09:30-10:00 WeCAMC.5

*Design and Control of a Solar Panel Cleaning Robot**.

Lee, Beom Jin (Chungnam National University); Kwon, Dong Wook (Chungnam National University); Jung, Seul (Chungnam National University)

09:30-10:00 WeCAMC.6

*Buried Snow Avalanche Victim Search: An Ergodic-Based Approach**.

Lapins, Chantel K. (University of Utah); Leang, Kam K. (University of Utah)

09:30-10:00 WeCAMC.7

Reduced Deformation Transport of Flexible Objects Using Decentralized Robot Networks, pp. 2-2.

Gombo, Yoshua (University of Washington); Tiwari, Anuj (University of Washington); Devasia, Santosh (University of Washington)

09:30-10:00 WeCAMC.8

*Trajectory Planning and Motion Control of Unmanned Forklift for Efficient Operation in Automated Warehouse**.

Vorasawad, Konchanok (Pukyong National University); Kim, Hyungjin (Samsung Heavy Industry); Lee, Juhyun (Samsung Heavy Industry); Kim, Mooseok (Samsung Heavy Industry); Kim, Changwon (Pukyong National University)

09:30-10:00 WeCAMC.9

*Dynamic Inversion for Wheeled Inverted Pendulum with Extra Joint Using Singular Perturbation Technique**.

Kim, Munyu (Korea university); Cheong, Joono (Korea University)

09:30-10:00 WeCAMC.10

*Robust Quadrupedal Locomotion through Asymptotic Stabilization of H-LIP on Dynamic Rigid Surfaces with General Vertical Motion**.

Iqbal, Amir (University of Massachusetts, Lowell, MA)

WeTAMT1 Olympic

Aerial Robotics - Design (Regular Session)

10:00-10:20 WeTAMT1.1

*A Multi-Modal Deformable Land-Air Robot for Complex Environments**.

Zhang, Xinyu (Tsinghua University); Huang, Yuanhao (Inner Mongolia University of Technology); Huang, Kangyao (Tsinghua University); Wang, Xiaoyu (School of Vehicle and Mobility, Tsinghua University); Dafeng, Jin (Suzhou Automobile Research Institute, Tsinghua University, Suzho); Liu, Huaping (Tsinghua University); Li, Jun (The School of Vehicle and Mobility, Tsinghua University, Beijing); Lu, Pingping (University of Michigan)

10:20-10:40 WeTAMT1.2

MorphoGear: An UAV with Multi-Limb Morphogenetic Gear for Rough-Terrain Locomotion, pp. 3-8.

Martynov, Mikhail (Skolkovo Institute of Science and Technology); Darush, Zhanibek (Skolkovo Institute of Science and Technology); Fedoseev, Aleksey (Skolkovo Institute of Science AndTechnology); Tsetserukou, Dzmitry (Skolkovo Institute of Science and Technology)

10:40-11:00 WeTAMT1.3

Multi-Objective Co-Design for Mission-Specific Development of Unmanned Aerial Systems, pp. 9-16.

Wauters, Jolan (Ghent University); Lefebvre, Tom (Ghent University); Crevecoeur, Guillaume (Ghent University)

11:00-11:20 WeTAMT1.4

Design and Control of a Ground-Aerial Dual Actuator Monocopter (G-ADAM), pp. 17-24.

Suhadi, Brian Leonard (Singapore University of Technology and Design); Timothy, Wong (Singapore University of Technology & Design); Win, Shane Kyi Hla (Singapore University of Technology & Design); Win, Luke Soe Thura (Singapore University of Technology & Design); Foong, Shaohui (Singapore University of Technology and Design)

11:20-11:40 WeTAMT1.5

Vertical Take-Off and Landing Fixed Wing Designed for Autonomous Missions, pp. 25-30.

Lewandowski, Krzysztof (Silesian University of Technology); Tomczak, Jakub Łukasz (Silesian University of Technology); Zeifert, Jakub (Silesian University of Technology); Nowacki, Szymon (Silesian University of Technology); Król, Marcel (High Flyers); Grzybowski, Jacek (Silesian Univeristy of Technology, High Flyers); Rudy, Dawid (Silesian University of Technology); Czyba, Roman (Silesian University of Technology); Lemanowicz, Marcin (Silesian University of Technology); Czekalski, Piotr (Silesian University of Technology); Piórkowski, Pawel (Silesian University of Technology)

11:40-12:00 WeTAMT1.6

Investigating the Effects of Polynomial Trajectories on Energy Consumption of Quadrotors, pp. 31-31.

Alkomy, Hassan (York University); Shan, Jinjun (York University)

WeTAMT2 Adams

Continuum and Soft Robots (Regular Session)

10:00-10:20 WeTAMT2.1

Soft Continuum Robot Airbag Integrated with Passive Walker for Fall Mitigation, pp. 32-37.

Thompson, Jacob (Clemson University); Walker, Ian (Clemson University)

10:20-10:40 WeTAMT2.2

Design and Experimental Validation of a Novel Hybrid Continuum Robot with Enhanced Dexterity and Manipulability in Confined Space, pp. 38-38.

Ma, Xin (Chinese Univerisity of HongKong); Wang, Xuchen (The Chinese University of Hong Kong); Zhang, Zihao (Multi-Scale Medical Robotics Center Limited); Zhu, Puchen (Multi-Scale Medical Robotics Center Limited); Cheng, Shing Shin (The Chinese University of Hong Kong); Au, K. W. Samuel (The Chinese University of Hong Kong)

10:40-11:00 WeTAMT2.3

A Survey on the Current Trends and Applications of Design Optimization for Compliant and Soft Robotics, pp. 39-45.

Thorapalli Muralidharan, Seshagopalan (KTH Royal Institute of Technology); Andrikopoulos, Georgios (KTH Royal Institute of Technology); Feng, Lei (KTH Royal Institute of Technology)

11:00-11:20 WeTAMT2.4

Efficient Jacobian-Based Inverse Kinematics with Sim-To-Real Transfer of Soft Robots by Learning, pp. 46-56.

Fang, Guoxin (The University of Manchester); Tian, Yingjun (The University of Manchester); Yang, Zhi-Xin (University of Macau); Geraedts, Jo (Delft University of Technology); Wang, Charlie C.L. (The University of Manchester)

11:20-11:40 WeTAMT2.5

Study on Soft Robotic Pinniped Locomotion, pp. 57-63.

Kodippili Arachchige, Dimuthu Dharshana (DePaul University); Varshney, Tanmay (The Ohio State University); Huzaifa, Muhammad Umer (DePaul University); Kanj, Iyad (DePaul University); Nanayakkara, Thrishantha (Imperial College London); Chen, Yue (Georgia Institute of Technology); Gilbert, Hunter B. (Louisiana State University); Godage, Isuru S. (Texas A&M University)

11:40-12:00 WeTAMT2.6

Independent Tendons Increase Stiffness of Continuum Robots without Actuator Coupling, pp. 64-70.

Molaei, Parsa (Lousiana State University); Pitts, Nekita A. (Louisiana State University Agricrultural and Mechanical College); Gilbert, Hunter B. (Louisiana State University)

WeTAMT3 Whidbey

Micro and Nano Systems (Regular Session)

10:00-10:20 WeTAMT3.1

A High-Bandwidth Closed-Loop MEMS Force Sensor with System Dynamics Adjustment, pp. 71-76.

Dadkhah, Diyako (University of Texas at Dallas); Moheimani, S. O. Reza (The University of Texas at Dallas)

10:20-10:40 WeTAMT3.2

AFM SMILER: A Scale Model Interactive Learning Extended Reality Toolkit for Atomic Force Microscopy Created with Digital Twin Technology, pp. 77-84.

Xia, Fangzhou (Massachusetts Institute of Technology); Lovett, Shane (Massachusetts Institute of Technology); Forsythe, Eyan (Massachusetts Institute of Technology); Ibrahim, Malek (Massachusetts Institute of Technology); Youcef-Toumi, Kamal (Massachusetts Institute of Technology)

10:40-11:00 WeTAMT3.3

Self-Alignment Capillary Gripper for Microfiber Manipulation, pp. 85-85.

Song, Longgang (Shaanxi University of Science & Technology); Chang, Bo (Shaanxi University of Science and Technology); Feng, Yuhang (Shaanxi University of Science & Technology); Jin, Jialong (Shaanxi University of Science & Technology); Zhou, Quan (Aalto University)

11:00-11:20 WeTAMT3.4

AFM Microcantilever with On-Chip Electrothermal and Piezoelectric Transducers: Z-Axis Control and Standalone Operation, pp. 86-90.

Mahmoodi Nasrabadi, Hazhir (The University of Texas at Dallas); Nikooienejad, Nastaran (University of Texas at Dallas); Kumar Singh, Vikrant (The University of Texas at Dallas); Moheimani, S. O. Reza (The University of Texas at Dallas)

11:20-11:40 WeTAMT3.5

Data-Driven Robust Optimal Acoustic Noise Filtering of Atomic Force Microscope Image, pp. 91-96.

Chen, Jiarong (Rutgers, the State University of New Jersey); Zou, Qingze (Rutgers, the State University of New Jersey)

11:40-12:00 WeTAMT3.6

Ensemble Control for Manipulating Multiple Nanowires in Fluid Suspension Using External Electrical Fields, pp. 97-102.

Wu, Juan (Binghamton University); Yu, Kaiyan (Binghamton University)

WeTAMT4 Baker

Control Applications I (Regular Session)

10:00-10:20 WeTAMT4.1

Admittance-Based Non-Singular Terminal Sliding Mode Control of Multiple Cooperative Manipulators, pp. 103-108.

Wan, Lucas (Dalhousie University); Pan, Ya-Jun (Dalhousie University); Chen, Qiguang (Dalhousie University)

10:20-10:40 WeTAMT4.2

Drop-On-Demand Inkjet Drop Control with One-Step Look Ahead Estimation of Model Parameters, pp. 109-109.

Wang, Jie (Purdue University); Chiu, George (Purdue University)

10:40-11:00 WeTAMT4.3

Data-Driven Optimal Tuning of BLDC Motors with Safety Constraints: A Set Membership Approach, pp. 110-110.

Busetto, Riccardo (Politecnico Di Milano); Lucchini, Alberto (Politecnico Di Milano); Formentin, Simone (Politecnico Di Milano); Savaresi, Sergio (Politecnico Di Milano)

11:00-11:20 WeTAMT4.4

A Digital Twin Framework for Virtual Re-Commissioning of Work-Drive Systems Using CAD-Based Motion Co-Simulation, pp. 111-116.

Carlier, Remy (Dynamical Systems & Control Group (DySC), Ghent University and F); Gillis, Joris (KU Leuven); Rademakers, Erwin (Flanders MAke); Borghesan, Gianni (KU Leuven); De Clercq, Pieter (Flanders Make); Ganseman, Chris (Flanders Make); Stockman, Kurt (Universiteit Gent); De Kooning, Jeroen D. M. (Dynamical Systems & Control Group (DySC), Ghent University and F)

11:20-11:40 WeTAMT4.5

Error Diffusion Based Feedforward Height Control for Inkjet 3D Printing, pp. 117-123.

Wu, Yumeng (Cruise LLC); Chiu, George (Purdue University)

11:40-12:00 WeTAMT4.6

Flatness-Based MPC Using B-Splines Transcription with Application to a Pusher-Slider System, pp. 124-129.

Neve, Thomas (Ghent University); Lefebvre, Tom (Ghent University); De Witte, Sander (Ghent University); Crevecoeur, Guillaume (Ghent University)

WeTAMT5 Orcas

Industrial Applications (Regular Session)

10:00-10:20 WeTAMT5.1

Simulation of Particle Motion on Rotating Cone Feeder for a Multihead Weigher Based on Dynamic Friction Modeling, pp. 130-135.

Hartmann, Julia Isabel (Augsburg University); Olbrich, Michael (Augsburg University); Hamann, Marcus (Augsburg University); Ament, Christoph (Augsburg University)

10:20-10:40 WeTAMT5.2

Low-Cost, Accurate Robotic Harvesting System for Existing Mushroom Farms, pp. 136-141.

Mavridis, Panagiotis (TWI-Hellas); Mavrikis, Nikolaos (TWI-Hellas); Mastrogeorgiou, Athanasios (National Technical University of Athens); Chatzakos, Panagiotis (University of Essex AI Innovation Centre)

10:40-11:00 WeTAMT5.3

Robot End-Effector for Fabric Folding, pp. 142-147.

Seino, Akira (Centre for Transformative Garment Production); Terayama, Junya (Tohoku University); Tokuda, Fuyuki (Centre for Transformative Garment Production); Kobayashi, Akinari (Centre for Transformative Garment Production); Kosuge, Kazuhiro (The University of Hong Kong)

11:00-11:20 WeTAMT5.4

Task-Constrained Motion Planning Considering Uncertainty-Informed Human Motion Prediction for Human-Robot Collaborative Disassembly, pp. 148-148.

Liu, Wansong (University at Buffalo); Liang, Xiao (University at Buffalo); Zheng, Minghui (University at Buffalo)

11:20-11:40 WeTAMT5.5

CoboShell Robot for Automatic Scallop Shelling Process: Concepts and Applications, pp. 149-155.

Lakhal, Othman (University Lille, CRIStAL, CNRS-UMR 9189); Belarouci, Abdelkader (University of Lille - CRIStAL Lab); Yang, Xinrui (University of Lille); Chettibi, Taha (Laboratoire Structures, Département Mécanique, Faculté De Techno); Merzouki, Rochdi (CRIStAL, CNRS UMR 9189, University of Lille1)

WeTAMT6 Blakely

Medical Robotics (Regular Session)

10:00-10:20 WeTAMT6.1

Design and Prototyping of a Miniature Gripper with Decoupled Wrist and Rolling Capabilities for Robotic Surgery, pp. 156-163.

Sallam, Mohamed Abdelghany Abdelghany (University of Naples Federico II); Fontanelli, Giuseppe Andrea (University of Naples Federico II); Ficuciello, Fanny (Università Di Napoli Federico II)

10:20-10:40 WeTAMT6.2

Haptic Interface Design for a New Wheelchair Locomotion Simulator Based on a Linear Time-Varying MPC Framework, pp. 164-170.

Ait Ghezala, Amel (Lamih, Umr Cnrs 8201, Uphf); Sentouh, Chouki (LAMIH UMR CNRS 8201, Université Polytechnique Hauts-De-France); Bentaleb, Toufik (Univ. Valenciennes, CNRS. Valenciennes); Pudlo, Philippe (Université Polytechnique Hauts-De-France); Poulain, Thierry (Lamih, Umr Cnrs 8201, Uphf); Conreur, Gerald (Lamih, Umr Cnrs 8201, Uphf)

10:40-11:00 WeTAMT6.3

Point-Based 3D Virtual Fixture Generating for Image-Guided and Robot-Assisted Surgery in Orthopedics, pp. 171-178.

Li, Teng (University of Alberta); Badre, Armin (University of Alberta); Taghirad, Hamid D. (K.N.Toosi University of Technology); Tavakoli, Mahdi (University of Alberta)

11:00-11:20 WeTAMT6.4

Biplane Transrectal Ultrasound Probe Calibration Using Dual-Arm Robotic System with Multi-DOF End-Effectors, pp. 179-185.

Xiong, Jing (Shenzhen Institute of Advanced Technology, Chinese Academy of Sc); Li, Qiangyun (Shenzhen Institutes of Advanced Technology, Chinese Academy of S); Ahmad, Faizan (Shenzhen Institute of Advanced Technology, Chinese Academy of Sc); Xu, Changfu (Chinese Academy of Sciences); Deng, Hao (Shenzhen Institutes of Advanced Technology, CAS); Xia, Zeyang (Chinese Academy of Sciences)

11:20-11:40 WeTAMT6.5

Development of Orthopedic Haptic Drill for Spinal Surgery with Penetration Detection Scheme Based on Viscosity Estimation, pp. 186-192.

Takano, Shunya (Kanagawa Institute of Industrial Science and Technology); Shimono, Tomoyuki (Yokohama National University); Matsunaga, Takuya (Kanagawa Institute of Industrial Science and Technology); Yagi, Mitsuru (Keio University School of Medicine); Ohnishi, Kouhei (Keio Univ); Nakamura, Masaya (Keio University School of Medicine); Mima, Yuichiro (Keio University School of Medicine); Yamanouchi, Kento (Keio University School of Medicine); Ikeda, Go (Japan Medtronic Company Ltd)

11:40-12:00 WeTAMT6.6

Strategy for Haptic-Based Guidance of Soft Magnetic Particles in the Cochlea, pp. 193-199.

Chah, Ahmed (JUNIA / HEI Campus Centre); Elfakir, Hanaâ (Junia); Larbi, Meziane (Automatic Laboratory of Skikda); Belharet, Karim (Hautes Etudes d'Ingénieur - HEI Campus Centre)

WeTAMT7 Vashon I

Robotics (Regular Session)

10:00-10:20 WeTAMT7.1

A Variable-Stiffness Robot for Force-Sensitive Applications, pp. 200-200.

Huang, Chun Hung (National Cheng Kung University); Chiao, Kuan-Wei (National Cheng Kung University); Yu, Chen-Pin (National Cheng Kung University); Guo, Yen-chien (National Cheng Kung University); Lan, Chao-Chieh (National Cheng Kung University)

10:20-10:40 WeTAMT7.2

ExSLeR: Development of a Robotic Arm for Human Skill Learning, pp. 201-206.

Lee, Deokjin (Daegu Gyeongbuk Institute of Science and Technology); Choi, Kiyoung (Deagu Gyeongbuk Institute of Science and Technology); Kim, Junyoung (DGIST); Yun, WonBum (Daegu Gyeongbuk Institute of Science and Technology (DGIST)); Kim, Taehoon (DGIST (Daegu Gyeongbuk Institute of Science & Technology)); Nam, Kanghyun (Yeungnam University); Oh, Sehoon (DGIST)

10:40-11:00 WeTAMT7.3

Mitigate Inertia for Wrist and Forearm towards Safe Interaction in 5-DOF Cable-Driven Robot Arm, pp. 207-212.

Nguyen, Pho (Nanyang Technological University); Sunil Bohra, Dhyan (Nanyang Technological University); Hoang, Chi Cuong (Schaeffler (Singapore) Pte Ltd); Han, Boon Siew (Institute for Infocomm Research (I2R)); Tan, Jingyuan (Schaeffler Singapore Pte Ltd); Chow, Wai Tuck (Nanyang Technological University)

11:00-11:20 WeTAMT7.4

Kinodynamic Motion Planning for Robotic Arms Based on Learned Motion Primitives from Demonstrations, pp. 213-219.

Ashley, Joshua (University of Kentucky); Kennedy, Daniel (University of Kentucky); Xie, Biyun (University of Kentucky)

11:20-11:40 WeTAMT7.5

Encrypted Coordinate Transformation Via Parallelized Somewhat Homomorphic Encryption for Robotic Teleoperation, pp. 220-225.

Kwon, Bin (Georgia Institute of Technology); Kosieradzki, Shane (Georgia Institution of Technology); Blevins, Jacob (Georgia

Institute of Technology); Ueda, Jun (Georgia Institute of Technology)

11:40-12:00 WeTAMT7.6

Design and Development of CAPM to Adaptively Reconfigure Precision/Power Grasps, pp. 226-230.

Chang, Ivy (Georgia Institute of Technology); Lee, Kok-Meng (Georgia Institute of Technology)

WeTAMT8 Vashon II

Mechatronics Pedagogy (Workshop/Tutorial Session)

10:00-10:20 WeTAMT8.1

*Half-Day Workshop: Mechatronics Pedagogy Workshop**.

Vikas, Vishesh (University of Alabama); Mishra, Sandipan (RPI)

WePPMP Cascade Ballroom

Plenary: From R&D to Production: Challenges in Automation for Aerospace (Plenary Session)

13:30-14:30 WePPMP.1

*From R&D to Production: Challenges in Automation for Aerospace**.

Freeman, Philip (Boeing)

WeCPMC Cascade Foyer

Posters - Wednesday II (Poster Session)

14:30-15:00 WeCPMC.1

*Aerodynamic Effect for Collision-Free Reactive Navigation of a Small Quadcopter**.

Ding, Runze (CITY UNIVERSITY OF HONGKONG); Dong, Kaixu (City University of Hong Kong); Bai, Songnan (City University of Hong Kong); Chirarattananon, Pakpong (City University of Hong Kong)

14:30-15:00 WeCPMC.2

*Exploration of Aerial Torsional Work Using an Add-On Thrust Vectoring Device**.

Rosales Martinez, Ricardo (Ritsumeikan University); Paul, Hannibal (Ritsumeikan University); Shimonomura, Kazuhiro (Ritsumeikan University)

14:30-15:00 WeCPMC.3

Formation Analysis of Dynamic Multi-Agent Systems Controlled by a Generalized Cyclic Pursuit Mechanism, pp. 1-1.

Kwak, Taeheon (Chung-Ang University); Kim, Yeongjae (Chung-Ang University); Kim, Tae-Hyoung (Chung-Ang University)

14:30-15:00 WeCPMC.4

*Improving Human-Led Multi-Robot Platoon Using Decentralized DSR**.

Chang, Henry (University of Washington); Lin, Yudong (University of Washington)

14:30-15:00 WeCPMC.5

*Design and Control of a Solar Panel Cleaning Robot**.

Lee, Beom Jin (Chungnam National University); Kwon, Dong Wook (Chungnam National University); Jung, Seul (Chungnam National University)

14:30-15:00 WeCPMC.6

*Buried Snow Avalanche Victim Search: An Ergodic-Based Approach**.

Lapins, Chantel K. (University of Utah); Leang, Kam K. (University of Utah)

14:30-15:00 WeCPMC.7

Reduced Deformation Transport of Flexible Objects Using Decentralized Robot Networks, pp. 2-2.

Gombo, Yoshua (University of Washington); Tiwari, Anuj (University of Washington); Devasia, Santosh (University of Washington)

14:30-15:00 WeCPMC.8

*Trajectory Planning and Motion Control of Unmanned Forklift for Efficient Operation in Automated Warehouse**.

Vorasawad, Konchanok (Pukyong National University); Kim, Hyungjin (Samsung Heavy Industry); Lee, Juhyun (Samsung Heavy Industry); Kim, Mooseok (Samsung Heavy Industry); Kim, Changwon (Pukyong National University)

14:30-15:00 WeCPMC.9

*Dynamic Inversion for Wheeled Inverted Pendulum with Extra Joint Using Singular Perturbation Technique**.

Kim, Munyu (Korea university); Cheong, Joono (Korea University)

14:30-15:00 WeCPMC.10

*Robust Quadrupedal Locomotion through Asymptotic Stabilization of H-LIP on Dynamic Rigid Surfaces with General Vertical Motion**.

Iqbal, Amir (University of Massachusetts, Lowell, MA)

WeTPMT1 Olympic

Aerial Robotics - Control (Regular Session)

15:00-15:20 WeTPMT1.1

Distributed Adaptive Dynamic Event-Triggered Control for Multiple Quadrotors, pp. 231-231.

Shan, Jinjun (York University); Wang, Hao (York University)

15:20-15:40 WeTPMT1.2

Mode Switching Algorithm to Improve Variable-Pitch-Propeller Thrust Generation for Drones under Motor Current Limitation, pp. 232-232.

Naoki, Yuto (The University of Tokyo); Nagai, Sakahisa (The University of Tokyo); Fujimoto, Hiroshi (The University of Tokyo)

15:40-16:00 WeTPMT1.3

Quasi-Static State Feedback Output Tracking for a Slung Load System with Rotor Drag Compensation: PX4 SITL Validation, pp. 233-238.

Jiang, Zifei (University of Alberta); Lynch, Alan (University of Alberta)

16:00-16:20 WeTPMT1.4

Path-Following Control for a Slung Load System, pp. 239-246.

Al Lawati, Mohamed Ali Abdulhussain (Sultan Qaboos University); Lynch, Alan (University of Alberta)

16:20-16:40 WeTPMT1.5

Design and Control of a Stable Invertible Coaxial Actuated ROtorcraft (SICARO), pp. 247-254.

Tang, Emmanuel (Singapore University of Technology & Design); Ang, Wei Jun (Singapore University of Technology & Design); Tan, Kian Wee (Singapore University of Technology & Design); Foong, Shaohui (Singapore University of Technology and Design)

16:40-17:00 WeTPMT1.6

Safe Residual Reinforcement Learning for Helicopter Aerial Refueling, pp. 255-261.

Jayarathne, Damsara (Rensselaer Polytechnic Institute); Paternain, Santiago (Rensselaer Polytechnic Institute); Mishra, Sandipan (RPI)

WeTPMT2 Adams

Legged Robots (Regular Session)

15:00-15:20 WeTPMT2.1

Balance Gait Controller for a Bipedal Robotic Walker with Foot Slip, pp. 262-269.

Mihalec, Marko (Rutgers University); Yi, Jingang (Rutgers

University)

15:20-15:40 WeTPMT2.2

Terrain-Blind Humanoid Walking on Rough Terrain with Trajectory Optimization and Biarticular Springs, pp. 270-277.

Pelit, Mustafa Melih (Tokyo Institute of Technology); Yamakita, Masaki (Tokyo Inst. of Technology)

15:40-16:00 WeTPMT2.3

RHex-T3: A Transformable Hexapod Robot with Ladder Climbing Function, pp. 278-278.

Sun, Chunhu (Tiangong University); Yang, Guiyu (Tiangong University); Yao, Senge (Tiangong University); Liu, Qi (Tiangong University); Wang, Jianmin (Tongji University); Xiao, Xuan (Tiangong University)

16:00-16:20 WeTPMT2.4

Alternative Locomotion Modalities for Lunar Rover, pp. 279-284.

Phornpimonchoke, Naphasthanan (Chulalongkorn University); Koosermmit, Sittiphol (Chulalongkorn University); Tanakijchumroon, Ashira (Chulalongkorn University); Chaichaowarat, Ronnapee (Chulalongkorn University)

16:20-16:40 WeTPMT2.5

A Wheel to Leg Transformation Strategy in a Leg-Wheel Transformable Robot, pp. 285-290.

Wang, Hua-Yu (National Taiwan University); Chen, Liang-Jie (National Taiwan University,); Yu, Wei-Shun (National Taiwan University); Lin, Pei-Chun (National Taiwan University)

16:40-17:00 WeTPMT2.6

A Hybrid Impedance and Admittance Control Strategy for a Shape-Transformable Leg-Wheel, pp. 291-296.

Zhuang, Yuan-Cheng (National Taiwan University); Liu, Yu-Ju (National Taiwan University); Yu, Wei-Shun (National Taiwan University); Lin, Pei-Chun (National Taiwan University)

WeTPMT3 Whidbey

Control Applications II (Regular Session)

15:00-15:20 WeTPMT3.1

Boundary Tracking Control for an Unstable Wave Equation with Boundary Uncertainties: A Backstepping Adaptive NN Approach, pp. 297-302.

Zhang, Jingting (University of Rhode Island); Gu, Yan (Purdue University); Zeng, Wei (Longyan University); Yuan, Chengzhi (University of Rhode Island)

15:20-15:40 WeTPMT3.2

Disturbance-Observer-Based Admittance Control and Its Application to Safe Contact Regulation, pp. 303-308.

Shikata, Kosuke (Keio University); Katsura, Seiichiro (Keio University)

15:40-16:00 WeTPMT3.3

Design, Modeling, and Parametric Analysis of a Syringe Pump for Soft Pneumatic Actuators, pp. 309-314.

Yang, Wu-Te (University of California, Berkeley); Hirao, Motohiro (University of California, Berkeley); Tomizuka, Masayoshi (University of California)

16:00-16:20 WeTPMT3.4

Prediction-Based Control for Uncertain Systems with Input Time Delay and Disturbance, pp. 315-320.

Lee, Seong-Min (Ulsan National Institute of Science and Techonolgy (UNIST)); Son, Hungsun (Ulsan National Institute of Science and Technology)

16:20-16:40 WeTPMT3.5

Adaptive Feedforward Control Using a Gaussian Process and a Recursive Least Squares Algorithm for a Hydraulic Axial Piston Pump, pp. 321-326.

Oberdorfer, Martin (University of Stuttgart); Schroeter, Sebastian (University of Stuttgart); Sawodny, Oliver (University of Stuttgart)

16:40-17:00 WeTPMT3.6

Stability Margins of Heavy-Lifting Machines with a Telescoping Boom and Jib, pp. 327-333.

Adams, Christopher (Georgia Institute of Technology); Singhose, William (Georgia Tech)

WeTPMT5 Orcas

Spotlight: Best Student Papers (Regular Session)

15:00-15:20 WeTPMT5.1

*Design and Parametric Analysis of a Magnetic Leadscrew with an Embedded Displacement Sensor**.

Li, Wenjing (Georgia Institute of Technology); Lee, Kok-Meng (Georgia Institute of Technology)

15:20-15:40 WeTPMT5.2

*Task-Constrained Motion Planning Considering Uncertainty-Informed Human Motion Prediction for Human-Robot Collaborative Disassembly**.

Liu, Wansong (University at Buffalo); Liang, Xiao (University at Buffalo); Zheng, Minghui (University at Buffalo)

15:40-16:00 WeTPMT5.3

*Motion Dynamics Modeling and Fault Detection of a Soft Trunk Robot**.

Jandaghi, Emadodin (University of Rhode Island); Chen, Xiaotian (University of Rhode Island); Yuan, Chengzhi (University of Rhode Island)

16:00-16:20 WeTPMT5.4

*Spectro-Temporal Recurrent Neural Network for Robotic Slip Detection with Piezoelectric Tactile Sensor**.

Ayral, Théo (Université Paris-Saclay, CEA, Leti); Aloui, Saifeddine (Université Grenoble Alpes, CEA, Leti); Grossard, Mathieu (Université Paris-Saclay, CEA, List)

16:20-16:40 WeTPMT5.5

*Design and Control of a Ground-Aerial Dual Actuator Monocopter (G-ADAM)**.

Suhadi, Brian Leonard (Singapore University of Technology and Design); Timothy, Wong (Singapore University of Technology & Design); Win, Shane Kyi Hla (Singapore University of Technology & Design); Win, Luke Soe Thura (Singapore University of Technology & Design); Foong, Shaohui (Singapore University of Technology and Design)

WeTPMT6 Blakely

Exoskeletons (Regular Session)

15:00-15:20 WeTPMT6.1

Development and Evaluation of a Hip Exoskeleton for Lateral Resistance Walk Exercise, pp. 334-334.

Cao, Wujing (Shenzhen Institute of Advanced Technology); Shang, Dongyang (SIAT); Yin, Meng (Chinese Academy of Sciences); Xinwei, Li (University of Shanghai for Science and Technology); Xu, Tiantian (Chinese Academy of Sciences); Zhang, Li (The Chinese University of Hong Kong); Wu, Xinyu (CAS)

15:20-15:40 WeTPMT6.2

Design and Control of the Portable Upper-Limb Elbow-Forearm Exoskeleton for ADL Assistance, pp. 335-341.

Cheng, Hiu Yee Hilary (National University of Singapore); Kwok, Thomas M. (National University of Singapore); Yu, Haoyong (National University of Singapore)

15:40-16:00 WeTPMT6.3

Design and Validation of a Versatile High Torque Quasi-Direct Drive Hip Exoskeleton, pp. 342-349.

Bajpai, Aakash (Georgia Institute of Technology); Carrasquillo, Carlos (Georgia Institute of Technology); Carlson, Jessica (University of Michigan); Park, Julian (Georgia Institute of Technology); Iyengar, Divya (Georgia Institute of Technology); Herrin, Kinsey (Georgia Institute of Technology); Young, Aaron (Georgia Tech); Mazumdar, Anirban (Georgia Institute of Technology)

16:00-16:20 WeTPMT6.4

Origami-Inspired Wearable Robot for Trunk Support, pp. 350-350.

Li, Dongting (Arizona State University); Quiñones Yumbla, Emiliano (Arizona State University); Vanderlinden, Alyssa (Arizona State University); Sugar, Thomas (Arizona State University); Ben Amor, Heni (Arizona State University); Lee, Hyunglae (Arizona State University); Zhang, Wenlong (Arizona State University); Aukes, Daniel (Arizona State University)

16:20-16:40 WeTPMT6.5

Development of Soft Pneumatic Actuator Based Wrist Exoskeleton for Assistive Motion, pp. 351-358.

Singh, Inderjeet (University of Texas at Arlington); Erel, Veysel (The University of Texas at Arlington); Gu, Yixin (University of Texas at Arlington); Lindsay, Alexandra (University of Texas at Arlington); Patterson, Rita (UNT Health Science Center); Swank, Chad (Baylor Scott & White Institute for Rehabilitation); Wijesundara, Muthu B. J. (The University of Texas at Arlington)

16:40-17:00 WeTPMT6.6

Design and Development of a Lightweight, High-Torque, and Cost-Effective Hip Exoskeleton, pp. 359-364.

Esquivel Patricio, Jose (San Jose State University); Sharifi, Mojtaba (San Jose State University); Shrestha, Dhurba (San Jose State University); Thu, Sai Hein Si (San José State University)

WeTPMT7 Vashon I

Flexible Manipulators (Regular Session)

15:00-15:20 WeTPMT7.1

Compliant Control of Flexible Joint by Dual-Disturbance Observer and Predictive Feedforward, pp. 365-365.

Wan, Hongyu (Ningbo Institute of Materials Technology and Engineering, Chines); Chen, Silu (Ningbo Institute of Materials Technology and Engineering, CAS); Zhang, Chi (Ningbo Institute of Material Technology and Engineering, CAS); Chen, Chin-Yin (Ningbo Institute of Material Technology and Engineering, CAS); Yang, Guilin (Ningbo Institute of Material Technology and Engineering, Chines)

15:20-15:40 WeTPMT7.2

Enhancing Torsional Stiffness of Continuum Robots Using 3-D Topology Optimized Flexure Joints, pp. 366-366.

Sun, Yilun (Technical University of Munich); Lueth, Tim C. (Technical University of Munich)

15:40-16:00 WeTPMT7.3

Compliant Finray-Effect Gripper for High-Speed Robotic Assembly of Electrical Components, pp. 367-372.

Hartisch, Richard Matthias (TU Berlin); Haninger, Kevin (Fraunhofer IPK)

16:00-16:20 WeTPMT7.4

Optimal Cosserat-Based Deformation Control for Robotic Manipulation of Linear Objects, pp. 373-380.

Artinian, Azad (ISIR - Sorbonne Université); Huet, Quentin (Sorbonne ISIR); Ben Amar, Faiz (Université Pierre Et Marie Curie, Paris 6); Perdereau, Véronique (Sorbonne University)

16:20-16:40 WeTPMT7.5

Development of a Long Flexible Manipulator Utilizing the Motions of Twining and Tightening to Enhance Holding Ability, pp. 381-386.

Shimegi, Shotaro (Waseda University); Ishibashi, Keitaro (Waseda University); Usami, Toshihiro (Waseda University); Ishii, Hiroyuki (Waseda University)

16:40-17:00 WeTPMT7.6

Six-Bar Pulley-Guided Node Based Prismatic Tensegrity Robot Form-Finding Analysis and Experiment, pp. 387-392.

Yeshmukhametov, Azamat (Nazarbayev University); Tileukulova, Aisulu (Al-Farabi Kazakh National University); Koganezawa, Koichi (Tokai University)

WeTPMT8 Vashon II

Automotive (Regular Session)

15:00-15:20 WeTPMT8.1

A Grey-Box Surrogate Vehicle Energy Consumption Model Capable of Real-Time Updating, pp. 393-400.

Hua, Lingyun (Michigan State University); Tang, Jian (Michigan State University); Dourra, Hussein (Magna International); Zhu, Guoming George (Michigan State University)

15:20-15:40 WeTPMT8.2

Development of an Autonomous, Explainable, Robust Robotic System for Electric Vehicle Battery Disassembly, pp. 401-406.

Zhang, Yisheng (Shanghai Jiao Tong University); Zhang, Hengwei (Shanghai Jiao Tong University); Wang, Zhigang (Intel Labs China); Zhang, Shengmin (Shanghai Jiao Tong University); Li, Huaicheng (Central South University of Forestry and Technology); Chen, Ming (Shanghai Jiao Tong University)

15:40-16:00 WeTPMT8.3

Stability and Intervehicle Distance Analysis of Heterogeneous Platoons in Look-Ahead Topologies, pp. 407-407.

Zakerimanesh, Amir (University of Alberta); Z. Qiu, Tony (University of Alberta); Tavakoli, Mahdi (University of Alberta)

16:00-16:20 WeTPMT8.4

Optimal and Adaptive Engine Switch Control for a Parallel Hybrid Electric Vehicle Using a Computationally Efficient Actor-Critic Method, pp. 408-415.

Liu, Tong (KTH Royal Institute of Technology); Tan, Kaige (KTH Royal Institute of Technology); Zhu, Wenyao (KTH Royal Institute of Technology); Feng, Lei (KTH Royal Institute of Technology)

16:20-16:40 WeTPMT8.5

Proposal of On-Board Camera-Based Driving Force Control Method for Autonomous Electric Vehicles, pp. 416-421.

Ueno, Takumi (The University of Tokyo); Pousseur, Hugo (Université De Technologique De Compiègne, France); Nguyen, Binh Minh (The University of Tokyo); Victorino, Alessandro Correa (Sorbonne Universités - Université De Technologie De Compiègne He); Fujimoto, Hiroshi (The University of Tokyo)

16:40-17:00 WeTPMT8.6

An Efficient Hybrid Deep Learning Approach for Accurate Remaining EV Range Prediction, pp. 422-427.

Eissa, Magdy (Tennessee Technological University); Chen, Pingen (Tennessee Technological University)

Technical Program for Thursday June 29, 2023

ThPAMP Cascade Ballroom

Plenary: The New Age of Learning-Based Robot Motion Planning (Plenary Session)

08:30-09:30 ThPAMP.1

*The New Age of Learning-Based Robot Motion Planning**.

Yip, Michael C. (University of California, San Diego)

ThCAMC Cascade Foyer

Posters - Thursday I (Poster Session)

09:30-10:00 ThCAMC.1

*AcTeR: Actuated Tensegrity Revolute Joint**.

Woods, Cole (The University of Alabama); Vikas, Vishesh (University of Alabama)

09:30-10:00 ThCAMC.2

Design of Knee Joint Support Suit with Fabric-Type Artificial Muscles, pp. 428-428.

Park, Cheol Hoon (Korea Institute of Machinery & Materials); Choi, Kyungjun (Korea Institute of Machinery and Materials); Park, Seong Jun (Korea Institute of Machinery and Materials); Jung, Hyun-Mok (Korea Institute of Machinery and Materials); Bak, Jeongae (Korea Institute of Machinery & Materials)

09:30-10:00 ThCAMC.3

*Designing Comfortable Robotic System with Human Comfort Analysis and Modeling in Human-Robot Collaboration (HRC)**.

Yan, Yuchen (Clemson University); Su, Haotian (Clemson University); Jia, Yunyi (Clemson University)

09:30-10:00 ThCAMC.4

*Quantification of Social Behavior in Robot/Agent-Based Animal-Assisted Activity and Comparison of Its Psychological and Physiological Effects**.

Sato, Shoma (Chuo university); Niitsuma, Mihoko (Chuo University)

09:30-10:00 ThCAMC.5

*Orientation Estimation for Instrumented Helmet Using Neural Networks**.

Zaheer, Muhammad Hamad (University of New Hampshire); Yoon, Se Young (Pablo) (University of New Hampshire)

09:30-10:00 ThCAMC.6

MIMO ILC for Precision SEA Robots Using Input-Weighted Complex-Kernel Regression, pp. 429-429.

Yan, Leon (University of Washington); Banka, Nathan (University of Washington); Owan, Parker (University of Washington); Piaskowy, W. Tony (University of Washington); Garbini, Joseph (U. of Washington); Devasia, Santosh (University of Washington)

09:30-10:00 ThCAMC.7

*Information-Based Mobile Sensor Behavior Classification for Anomaly Detection**.

McKee, Sasha M. (University of Utah); Haddadin, Osama (L3-Harris); Leang, Kam K. (University of Utah)

09:30-10:00 ThCAMC.8

*Concept Design of Multi-Winding Type Gravity Compensation Mechanism for High Torque Compensation**.

Bak, Jeongae (Korea institute of machinery & materials); Yoo, Sungkeun (Seoul National University); Park, Chanhun (KIMM); Park, Cheol Hoon (Korea Institute of Machinery & Materials)

09:30-10:00 ThCAMC.9

*A Compact Lockable Module for a Modular Wearable Robot System**.

Li, Dongting (Arizona State University); Aukes, Daniel (Arizona State University)

ThTAMT1 Olympic

Aerial Robotics - Manipulation (Regular Session)

10:00-10:20 ThTAMT1.1

Aerial Manipulation Via Modular Quadrotors with Passively Foldable Airframes, pp. 430-430.

Jia, Huaiyuan (City University of Hong Kong); Bai, Songnan (City University of Hong Kong); Chirarattananon, Pakpong (City University of Hong Kong)

10:20-10:40 ThTAMT1.2

Contact-Prioritized Planning of Impact-Resilient Aerial Robots with an Integrated Compliant Arm, pp. 431-431.

Liu, Zhichao (University of California, Riverside); Lu, Zhouyu (University of California, Riverside); Agha-mohammadi, Ali-akbar (NASA-JPL, Caltech); Karydis, Konstantinos (University of California, Riverside)

10:40-11:00 ThTAMT1.3

A Linkage-Based Gripper Design with Optimized Data Transmission for Aerial Pick-And-Place Tasks, pp. 432-437.

Smith, Sean (Dalhousie University); Buchanan, Scott (Dalhousie University); Pan, Ya-Jun (Dalhousie University)

11:00-11:20 ThTAMT1.4

Static-Equilibrium Oriented Interaction Force Modeling and Control of Aerial Manipulation with Uni-Directional Thrust Multirotors, pp. 438-445.

Hui, Tong (Technical University of Denmark); Fumagalli, Matteo (Danish Technical University)

11:20-11:40 ThTAMT1.5

A Tiltable Airframe Multirotor UAV Designed for Omnidirectional Aerial Manipulation, pp. 446-451.

Paul, Hannibal (Ritsumeikan University); Rosales Martinez, Ricardo (Ritsumeikan University); Sumetheeprasit, Borwonpob (Ritsumeikan University); Shimonomura, Kazuhiro (Ritsumeikan University)

11:40-12:00 ThTAMT1.6

Null-Space-Based Adaptive Control for Aerial Manipulators on Cooperatively Transporting Cable-Suspended Objects, pp. 452-458.

Hung, Te-Kang (National Cheng Kung University); Liu, Yen-Chen (National Cheng Kung University); Lee, Chen-En (National Cheng Kung University)

ThTAMT2 Adams

Machine Vision in Mobile Robots (Regular Session)

10:00-10:20 ThTAMT2.1

IR-VIO: Illumination-Robust Visual-Inertial Odometry Based on Adaptive Weighting Algorithm with Two-Layer Confidence Maximization, pp. 459-459.

Song, Zhixing (Nankai University); Zhang, Xuebo (Nankai University,); Li, Tianyi (Nankai University); Zhang, Shiyong (Nankai University); Wang, Youwei (Nankai University); Yuan, Jing (College of Computer and Control Engineering, Nankai University)

10:20-10:40 ThTAMT2.2

Kinematic Analysis and Robust Control of a Spherical Motor Based Visual Tracking System, pp. 460-460.

Wen, Shengxiong (Huazhong University of Science and Technology); Ding, Yaowu (Huazhong University of Science and Technology); Wu, Xuan (Huazhong University of Science and Technology); Bai, Kun (Huazhong University of Science and Technology)

10:40-11:00 ThTAMT2.3

Robust Visual Odometry on SE(3): Design and Verification, pp. 461-461.

Zhang, Tong (University of Windsor); Tan, Ying (The University of Melbourne); Lei, Zike (Wuhan University of Science and Technology); Chen, Xiang (University of Windsor)

11:00-11:20 ThTAMT2.4

Multi-Camera Visual Predictive Control Strategy for Mobile Manipulators, pp. 462-468.

Bildstein, Hugo (LAAS-CNRS); Durand-Petiteville, Adrien (Federal University of Pernambuco UFPE); Cadenat, Viviane (University of Toulouse)

11:20-11:40 ThTAMT2.5

Enhancing Indoor Auto-Steering for AMRs through RGB and Depth Fusion, pp. 469-474.

Lee, Chi Hsuan (National Taipei University of Technology); Li, Chih-Hung G. (National Taipei University of Technology)

11:40-12:00 ThTAMT2.6

Real-Time Visual-Servo Navigation for Map-Free Self-Driving in Unstructured Outdoor Environments, pp. 475-480.

Chang, Ho Feng (National Taipei University of Technology); Li, Chih-Hung G. (National Taipei University of Technology)

ThTAMT3 Whidbey

Innovations in MR Devices (Invited Session)

Organizer: Li, Yancheng University of Technology Sydney

Organizer: Du, Haiping University of Wollongong

10:00-10:20 ThTAMT3.1

Experimental Investigation of Semi-Active Vehicle Suspension Equipped with Magnetorheological Dampers (I), pp. 481-486.

Xu, Tiancheng (Shenzhen Upward Tech Co. Ltd); Wang, Huixing (Nanjing University of Science and Technology); Li, Yancheng (University of Technology Sydney); Leng, Dingxin (Ocean University of China); Xu, Hanou (Shenzhen Upward Tech Co. Ltd)

10:20-10:40 ThTAMT3.2

Semi-Active Magnetorheological Suspension of a Full-Vehicle Model Based on Combined Vertical and Attitude Control (I), pp. 487-492.

Lyv, Peng (Ocean University of China); Leng, Dingxin (Ocean University of China); Li, Yancheng (University of Technology Sydney); Xu, Tiancheng (Shenzhen Upward Tech Co. Ltd); Wang, Huixing (Nanjing University of Science and Technology); Xu, Hanou (Shenzhen Upward Tech Co. Ltd)

10:40-11:00 ThTAMT3.3

Development of a Magnetorheological Elastomer Actuator for a Mixed Reality Haptic Glove (I), pp. 493-496.

Christie, Matthew Daniel (University of Wollongong); Fredericksen, Taine (University of Wollongong); Li, Weihua (University of Wollongong)

11:00-11:20 ThTAMT3.4

Semi-Active Vibration Control of a Curved Surface Contacting-Based Nonlinear Stiffness System (I), pp. 497-502.

Cai, Zehua (Ocean University of China); Ning, Donghong (Ocean University of China)

ThTAMT4 Baker

Actuators I (Regular Session)

10:00-10:20 ThTAMT4.1

A Fully 3D Printed, Multi-Material, and High Operating Temperature Electromagnetic Actuator, pp. 503-510.

Mettes, Sebastian (Georgia Institute of Technology); Bates, Justin (Georgia Institute of Technology); Allen, Kenneth (Georgia Tech Research Institute); Mazumdar, Yi (Georgia Institute of Technology)

10:20-10:40 ThTAMT4.2

Design and Control of 3-DOF Reluctance-Force-Type Magnetic Levitator Module for Fine-Positioning Short-Stroke Stage, pp. 511-516.

Yoon, Hyeong Min (Yonsei University); Jung, Jae Woo (Yonsei University); Kim, Eun Kyu (Yonsei University); Park, Jeong Min (Yonsei University); Sung, Jong Min (Yonsei University); Yoon, Jun Young (Yonsei University)

10:40-11:00 ThTAMT4.3

Design, Simulation, and Experiment of a Novel Electromagnetic Launcher with a Permanent Magnet, pp. 517-522.

Cheng, Bingxuan (AIAA); Cheng, Shanbao (CSU Long Beach)

11:00-11:20 ThTAMT4.4

Multiple Magnet Independent Levitation and Motion Control Using a Single Coil Array, pp. 523-528.

Berkelman, Peter (University of Hawaii-Manoa); Kang, Steven (Unversity of Hawaii)

11:20-11:40 ThTAMT4.5

Analytical Design Methodology Based on Distributed Current Source Models for Parametric Study of a Three-DOF Planar Motor, pp. 529-534.

Que, Zixin (Huazhong University of Science and Technology); Lee, Kok-Meng (Georgia Institute of Technology)

11:40-12:00 ThTAMT4.6

Design and Control of PM-Biased Bi-Stable Latching Actuator for Low-Power Micropump, pp. 535-540.

Kim, Eun Kyu (Yonsei University); Kang, Bo Min (Yonsei University); Lee, Hyo Geon (YONSEI UNIVERSITY); Yoon, Hyeong Min (Yonsei University); Kim, Jae Hyun (Yonsei University); Jung, Jae Woo (Yonsei University); Yoon, Jun Young (Yonsei University)

ThTAMT5 Orcas

Sensors I (Regular Session)

10:00-10:20 ThTAMT5.1

A Review of Optomechatronic Ecosystem, pp. 541-544.

Zhang, Sam (Excelitas Technologies Corporation)

10:20-10:40 ThTAMT5.2

Extrinsic Calibration of 2D Millimetre-Wavelength Radar Pairs Using Ego-Velocity Estimates, pp. 545-551.

Cheng, Qilong (University of Toronto); Wise, Emmett (University of Toronto); Kelly, Jonathan (University of Toronto)

10:40-11:00 ThTAMT5.3

Development of a Magnetic/Eddy-Current Sensing System for Simultaneous Estimation of Electrical Conductivity and Thickness in Non-Ferrous Metal Plates, pp. 552-552.

Lin, Chun-Yeon (National Taiwan University); Wu, Yi-Chin (National Taiwan University); Teng, Megan (National Taiwan University)

11:00-11:20 ThTAMT5.4

A Self-Organized Maps Ground Extract Method Based on Principal Component Analysis, pp. 553-558.

Yao, Yu (Beihang University); Li, Yunhua (BeiHang University); Qin, Tao (Beihang University)

11:20-11:40 ThTAMT5.5

Spectro-Temporal Recurrent Neural Network for Robotic Slip Detection with Piezoelectric Tactile Sensor, pp. 559-564.

Ayral, Théo (Université Paris-Saclay, CEA, Leti); Aloui, Saifeddine (Université Grenoble Alpes, CEA, Leti); Grossard, Mathieu

(Université Paris-Saclay, CEA, List)

11:40-12:00 ThTAMT5.6

Design and Implementation of Bending Force Sensor Featuring Printed Circuit Board, pp. 565-569.

Hsieh, I-Wen (National Yang Ming Chiao Tung University); Chen, Yu-Chi (National Chiao Tung University); Hung, Shao-Kang (National Yang Ming Chiao Tung University)

ThTAMT6 Blakely

Rehabilitation Robotics (Regular Session)

10:00-10:20 ThTAMT6.1

A Reliable Kinematic Measurement of Upper Limb Exoskeleton for VR Therapy with Visual-Inertial Sensors, pp. 570-576.

Kwok, Thomas M. (National University of Singapore); Li, Tong (National University of Singapore); Yu, Haoyong (National University of Singapore)

10:20-10:40 ThTAMT6.2

Neural Network Learning of Robot Dynamic Uncertainties and Observer-Based External Disturbance Estimation for Impedance Control, pp. 577-583.

Li, Teng (University of Alberta); Badre, Armin (University of Alberta); Taghirad, Hamid D. (K.N.Toosi University of Technology); Tavakoli, Mahdi (University of Alberta)

10:40-11:00 ThTAMT6.3

Modulation of Joint Stiffness for Controlling the Cartesian Stiffness of a 2-DOF Planar Robotic Arm for Rehabilitation, pp. 584-589.

Tantagunninat, Thanapol (Chulalongkorn University); Wongkaewcharoen, Narakorn (Chulalongkorn University); Pornpipatsakul, Khemwutta (Chulalongkorn University); Chuengpichanwanich, Rada (Chulalongkorn University); Chaichaowarat, Ronnapee (Chulalongkorn University)

11:00-11:20 ThTAMT6.4

Precise Torque Control in High Temperature with Heat Transfer Model Based Torque Constant Compensation Algorithm, pp. 590-594.

Youn, Jimin (KAIST); Kim, Hyeongjun (Korea Advanced Institute of Science and Technology); Kim, Taeyeon (Korea Advanced Institute of Science and Technology); Kong, Kyoungchul (Korea Advanced Institute of Science and Technology)

11:40-12:00 ThTAMT6.6

Prediction Accuracy and Model Robustness of Neural Network-Based Ground Reaction Force Estimators, pp. 595-600.

Abdelhady, Mohamed (NIH); Bulea, Thomas (National Institutes of Health); Abouelwafa, Wael (Minia Unversity); Simon, Dan (Cleveland State University)

ThTAMT7 Vashon I

Robotic Hands and Grippers (Regular Session)

10:00-10:20 ThTAMT7.1

Design and Validation of a Push-Latch Gripper Made in Additive Manufacturing, pp. 601-601.

Ottonello, Emilio (Istituto Italiano Di Tecnologia); Baggetta, Mario (University of Genoa); Berselli, Giovanni (Università Di Genova); Parmiggiani, Alberto (Fondazione Istituto Italiano Di Tecnologia (IIT))

10:20-10:40 ThTAMT7.2

A Methodology for Early Design Specifications of Robotic Grippers, pp. 602-608.

Escorcia Hernandez, Jonatan Martin (Université Paris-Saclay, CEA, List); Grossard, Mathieu (Université Paris-Saclay, CEA, List); Gosselin, Florian (CEA LIST)

10:40-11:00 ThTAMT7.3

An Iterative Method for Solving the Inverse Kinematic Problem of Three-Joints Robotic Fingers with Distal Coupling, pp. 609-614.

Escorcia Hernandez, Jonatan Martin (Université Paris-Saclay, CEA, List); Grossard, Mathieu (Université Paris-Saclay, CEA, List); Gosselin, Florian (CEA LIST); Dubois, Clemence (Université Paris-Saclay, CEA List)

11:00-11:20 ThTAMT7.4

Serial Chain Hinge Support for Soft, Robust and Effective Grasp, pp. 615-621.

Stuhne, Dario (Faculty of Electrical Engineering and Computing, University of Z); Vuletic, Jelena (University of Zagreb, Faculty of Electrical Engineering and Comp); Car, Marsela (University of Zagreb); Orsag, Matko (University of Zagreb, Faculty of Electrical Engineering and Comp)

11:20-11:40 ThTAMT7.5

Dynamic Manipulation Like Normal-Type Pen Spinning by a High-Speed Robot Hand and a High-Speed Vision System, pp. 622-628.

Nakatani, Shoma (The University of Tokyo); Yamakawa, Yuji (The University of Tokyo)

11:40-12:00 ThTAMT7.6

STAR–2: A Soft Twisted-String-Actuated Anthropomorphic Robotic Gripper: Design, Fabrication, and Preliminary Testing, pp. 629-634.

Baker, Aaron (University of Nevada, Reno); Foy, Claire (University of Nevada, Reno); Swanbeck, Steven (University of Nevada, Reno); Konda, Revanth (University of Nevada Reno); Zhang, Jun (University of Nevada Reno)

ThTAMT8 Vashon II

Dynamic Cohesive Tracking in Networks (Workshop/Tutorial Session)

10:00-10:20 ThTAMT8.1

*Dynamic Cohesive Tracking in Networks**.

Tiwari, Anuj (University of Washington)

ThPPMP Cascade Ballroom

Plenary: Working from Home Is Nice, but Flying to Work Is Better (Plenary Session)

13:30-14:30 ThPPMP.1

*Working from Home Is Nice, but Flying to Work Is Better**.

Oakley, Celia (Opener)

ThCPMC Cascade Foyer

Posters - Thursday II (Poster Session)

14:30-15:00 ThCPMC.1

*AcTeR: Actuated Tensegrity Revolute Joint**.

Woods, Cole (The University of Alabama); Vikas, Vishesh (University of Alabama)

14:30-15:00 ThCPMC.2

Design of Knee Joint Support Suit with Fabric-Type Artificial Muscles, pp. 428-428.

Park, Cheol Hoon (Korea Institute of Machinery & Materials); Choi, Kyungjun (Korea Institute of Machinery and Materials); Park, Seong Jun (Korea Institute of Machinery and Materials); Jung, Hyun-Mok (Korea Institute of Machinery and Materials); Bak, Jeongae (Korea Institute of Machinery & Materials)

14:30-15:00 ThCPMC.3

*Designing Comfortable Robotic System with Human Comfort Analysis and Modeling in Human-Robot Collaboration (HRC)**.

Yan, Yuchen (Clemson University); Su, Haotian (Clemson University); Jia, Yunyi (Clemson University)

14:30-15:00 ThCPMC.4

*Quantification of Social Behavior in Robot/Agent-Based Animal-Assisted Activity and Comparison of Its Psychological and Physiological Effects**.

Sato, Shoma (Chuo university); Niitsuma, Mihoko (Chuo University)

14:30-15:00 ThCPMC.5

*Orientation Estimation for Instrumented Helmet Using Neural Networks**.

Zaheer, Muhammad Hamad (University of New Hampshire); Yoon, Se Young (Pablo) (University of New Hampshire)

14:30-15:00 ThCPMC.6

MIMO ILC for Precision SEA Robots Using Input-Weighted Complex-Kernel Regression, pp. 429-429.

Yan, Leon (University of Washington); Banka, Nathan (University of Washington); Owan, Parker (University of Washington); Piaskowy, W. Tony (University of Washington); Garbini, Joseph (U. of Washington); Devasia, Santosh (University of Washington)

14:30-15:00 ThCPMC.7

*Information-Based Mobile Sensor Behavior Classification for Anomaly Detection**.

McKee, Sasha M. (University of Utah); Haddadin, Osama (L3-Harris); Leang, Kam K. (University of Utah)

14:30-15:00 ThCPMC.8

*Concept Design of Multi-Winding Type Gravity Compensation Mechanism for High Torque Compensation**.

Bak, Jeongae (Korea institute of machinery & materials); Yoo, Sungkeun (Seoul National University); Park, Chanhun (KIMM); Park, Cheol Hoon (Korea Institute of Machinery & Materials)

14:30-15:00 ThCPMC.9

*A Compact Lockable Module for a Modular Wearable Robot System**.

Li, Dongting (Arizona State University); Aukes, Daniel (Arizona State University)

ThTPMT1 Olympic

Aerial Robotics - Sensing (Regular Session)

15:00-15:20 ThTPMT1.1

*Perception-Aware Image-Based Visual Servoing of Aggressive Quadrotor UAVs**.

Qin, Chao (University of Toronto); Yu, Qiuyu (Shanghai Jiao Tong Univirsity); Go, H S Helson (University of Toronto); Liu, Hugh H.-T. (University of Toronto)

15:20-15:40 ThTPMT1.2

Application of Support Vector Machine for Near Real Time Health Structural Diagnosis for Drones, pp. 635-640.

Lai, Wei-Hsiang (National Cheng KUNG University); Liang, Yih Rong (Nathion Cheng Kung University); Cristales Cardona, Carlos Rene (National Cheng Kung University); Cheng, DeLi (National Cheng Kung University)

15:40-16:00 ThTPMT1.3

Marker-Based Localisation System Using an Active PTZ Camera and CNN-Based Ellipse Detection, pp. 641-641.

Oh, Xueyan (Singapore University of Technology and Design); Lim, Ryan Jon Hui (Singapore University of Technology & Design); Foong, Shaohui (Singapore University of Technology and Design); Tan, U-Xuan (Singapore University of Techonlogy and Design)

16:00-16:20 ThTPMT1.4

Panoramic Image-Based Aerial Localization Using Synthetic Data Via Photogrammetric Reconstruction, pp. 642-648.

Sufiyan, Danial (Singapore University of Technology & Design); Pheh, Ying Hong (Singapore University of Technology & Design); Win, Luke Soe Thura (Singapore University of Technology & Design); Win, Shane Kyi Hla (Singapore University of Technology & Design); Tan, U-Xuan (Singapore University of Techonlogy and Design); Foong, Shaohui (Singapore University of Technology and Design)

16:20-16:40 ThTPMT1.5

Wind Vector Estimation Considering Difference of Propeller Model Characteristics for Fully Actuated Drone, pp. 649-654.

Kamiya, Manto (The University of Tokyo); Nagai, Sakahisa (The University of Tokyo); Fujimoto, Hiroshi (The University of Tokyo)

16:40-17:00 ThTPMT1.6

Aerial Deployment of Novel Gravity-Assisted Ground Penetrating Sensors Using Nature-Inspired Platform, pp. 655-660.

Win, Shane Kyi Hla (Singapore University of Technology & Design); Lim, Kristabel (Singapore University of Technology & Design); Suhadi, Brian Leonard (Singapore University of Technology and Design); Sufiyan, Danial (Singapore University of Technology & Design); Foong, Shaohui (Singapore University of Technology and Design)

ThTPMT2 Adams

Mobile Robotics I (Regular Session)

15:00-15:20 ThTPMT2.1

A Shape-Changing Wheeling and Jumping Robot Using Tensegrity Wheels and Bistable Mechanism, pp. 661-661.

Spiegel, Sydney (Colorado State University); Sun, Jiefeng (Yale); Zhao, Jianguo (Colorado State University)

15:20-15:40 ThTPMT2.2

A Supervisory Learning Control Framework for Autonomous & Real-Time Task Planning for an Underactuated Cooperative Robotic Task, pp. 662-669.

De Witte, Sander (Ghent University); Lefebvre, Tom (Ghent University); Van Hauwermeiren, Thijs (Ghent University); Crevecoeur, Guillaume (Ghent University)

15:40-16:00 ThTPMT2.3

Dynamics Analysis and Simulation of an Open-Chain Tetrahedral Robot, pp. 670-675.

Wang, Yubin (Shanghai University); Shen, Zhenjun (Shanghai University); Yang, Qian (Shanghai University); Bao, Yichen (Shanghai University); Chen, Dongdong (Shanghai University)

16:00-16:20 ThTPMT2.4

Study on Omnidirectional Cooperative Trasnport System Using Multiple Dual-Wheeled Mobile Robots with Active-Caster Control, pp. 676-681.

Arai, Yu (Tokyo University of Science); Wada, Masayoshi (Tokyo University of Science)

16:20-16:40 ThTPMT2.5

A Feasible Study on the Model Predictive Control for Docking Approach of Small Spacecraft Using Thrusters and a Control Moment Gyro, pp. 682-687.

Tsujita, Katsuyoshi (Tottori University)

16:40-17:00 ThTPMT2.6

Coordinated Pose Control of Mobile Manipulation with an Unstable Bikebot Platform, pp. 688-688.

Han, Feng (Rutgers University); Jelvani, Alborz (Rutgers University); Yi, Jingang (Rutgers University); Liu, Tao (Zhejiang University)

ThTPMT3 Whidbey

Machine Vision (Regular Session)

15:00-15:20 ThTPMT3.1

Pose Estimation Based on Point Pair Features with Optimized Voting and Verification Strategies, pp. 689-694.

Chen, Gaoming (Shanghai Jiao Tong University); Gao, Ao (Shanghai Jiao Tong University); Liu, Wenhang (Shanghai Jiao Tong University); Liu, Chao (Shanghai Jiao Tong University); Xiong, Zhenhua (Shanghai Jiao Tong University)

15:20-15:40 ThTPMT3.2

BiSPD-YOLO: Surface Defect Detection Method for Small Features and Low-Resolution Images, pp. 695-700.

Yan, Sixu (Shanghai Jiao Tong University); Chen, Gaoming (Shanghai Jiao Tong University); Gao, Ao (Shanghai Jiao Tong University); Liu, Chao (Shanghai Jiao Tong University); Xiong, Zhenhua (Shanghai Jiao Tong University)

15:40-16:00 ThTPMT3.3

Image Foreground Segmentation Based on Small Data Set for Visual Servo Applications, pp. 701-706.

Luo, Yan (Shanghai Jiao Tong University); Chen, Gaoming (Shanghai Jiao Tong University); Liu, Chao (Shanghai Jiao Tong University); Xiong, Zhenhua (Shanghai Jiao Tong University)

16:00-16:20 ThTPMT3.4

Copy and Paste Augmentation for Deformable Wiring Harness Bags Segmentation, pp. 707-712.

Žagar, Bare Luka (Technical University Munich); Caporali, Alessio (University of Bologna); Szymko, Amadeusz (Poznan University of Technology); Kicki, Piotr (Poznan University of Technology); Walas, Krzysztof, Tadeusz (Poznan University of Technology); Palli, Gianluca (University of Bologna); Knoll, Alois (Tech. Univ. Muenchen TUM)

16:20-16:40 ThTPMT3.5

Convolutional Neural Network Based Denoising for Digital Image Correlation Reconstructing High-Fidelity Deformation Field, pp. 713-718.

Niu, Bangyan (Huazhong University of Science and Technology); Ji, Jingjing (Huazhong University of Science and Technology)

16:40-17:00 ThTPMT3.6

A Vision-Based Shared Autonomy Framework for Deformable Linear Objects Manipulation, pp. 719-724.

Chiaravalli, Davide (Alma Mater Studiorum, University of Bologna); Caporali, Alessio (University of Bologna); Friz, Anna (Alma Mater Studiorum, University of Bologna); Meattini, Roberto (University of Bologna); Palli, Gianluca (University of Bologna)

ThTPMT4 Baker

Actuators II (Regular Session)

15:00-15:20 ThTPMT4.1

Motion Decoupling for Cable-Driven Serial Robots Based on a Noncircular Pulley, pp. 725-731.

Cheng, Jinsai (Kent State University); Shen, Tao (Kent State University)

15:20-15:40 ThTPMT4.2

Adaptive Extended State Observer-Based Terminal Sliding Mode Control for PMSM System with Uncertainties, pp. 732-737.

Ma, Yuxiang (Beihang University); Li, Yunhua (BeiHang University); Qin, Tao (Beihang University)

15:40-16:00 ThTPMT4.3

Intelligent Servo Control Strategy for Robot Joints with Incremental Bayesian Fuzzy Broad Learning System, pp. 738-745.

Zuo, Guoyu (Beijing University of Technology); Zhou, Jiyong (Beijing University of Technology); Gong, Daoxiong (Beijing University of Technology); Huang, Gao (Beijing University of Technology)

16:00-16:20 ThTPMT4.4

A Novel Series Elastic Actuator with Variable Stiffness, pp. 746-750.

Wang, Chao (University of Leeds); Li, Zhenhong (University of Manchester); Sheng, Bo (Shanghai University); Sivan, Manoj (University of Leeds); Zhang, Zhiqiang (University of Leeds); Li, Guqiang (Binzhou Medical University); Xie, Sheng Quan (University of Leeds)

16:20-16:40 ThTPMT4.5

OpenPneu: Compact Platform for Pneumatic Actuation with Multi-Channels, pp. 751-756.

Tian, Yingjun (The University of Manchester); Su, Renbo (The University of Manchester); Wang, Xilong (University of Manchester); Altin, Nur Banu (The University of Manchester); Fang, Guoxin (The University of Manchester); Wang, Charlie C.L. (The University of Manchester)

16:40-17:00 ThTPMT4.6

Torque Model and Drive Method for Developing Closed-Loop Orientation Control of Spherical Brushless Direct Current Motor, pp. 757-762.

Lee, Sangheon (Ulsan National Institute of Science and Technology); Son, Hungsun (Ulsan National Institute of Science and Technology)

ThTPMT5 Orcas

Sensors II (Regular Session)

15:00-15:20 ThTPMT5.1

A Study of Hand Function in Stroke Patients Using Kinematic Metrics, pp. 763-768.

Sheng, Bo (Shanghai University); Zhao, Jianyu (Shanghai University); Zheng, Junjun (EAW-Volkswagen Automotive Co., LTD. Foshan Branch); Duan, Chaoqun (Shanghai University); Xie, Sheng Quan (University of Leeds); Tao, Jing (Shanghai University)

15:20-15:40 ThTPMT5.2

Understanding and Controlling the Sensitivity of Event Cameras in Responding to Static Objects, pp. 769-772.

Qiyao, Gao (University of Washington); Xiaoyang, Sun (University of Washington); Yu, Zhitao (University of Washington); Chen, Xu (University of Washington)

15:40-16:00 ThTPMT5.3

Design, Fabrication, and Characterisation of a Novel Piezoimpedal Tactile Sensor for Use in Soft-Prosthetic Devices, pp. 773-778.

Searle, Thomas (University of Wollongong); Sencadas, Vitor (School of Mechanical, Materials and Mechatronics and Biomedical); Alici, Gursel (University of Wollongong)

16:00-16:20 ThTPMT5.4

Modeling of Interface Loads for EOD Suit Wearers, pp. 779-785.

Gao, Yuan (Uml); Epstein, Stephanie (UMass Lowell); Inalpolat, Murat (UMass Lowell); Wu, Yi-Ning (University of Massachusetts Lowell); Gu, Yan (Purdue University)

16:20-16:40 ThTPMT5.5

Comparison Analysis of Thermistor and RTD for Energy Transfer Station Application, pp. 786-791.

Mashhood, Zafar (Texas A&M University Kingsville); Wei, Bin (Texas a & M University - Kingsville)

ThTPMT6 Blakely

HMI I (Regular Session)

15:00-15:20 ThTPMT6.1

HAPSEA: Hydraulically Amplified Soft Electromagnetic Actuator for Haptics, pp. 792-800.

Kohls, Noah (Georgia Institute of Technology); Colonnese, Nicholas (Facebook Reality Labs); Mazumdar, Yi (Georgia Institute of Technology); Agarwal, Priyanshu (Facebook Inc)

15:20-15:40 ThTPMT6.2

Model-Based Estimation of Mental Workload in Drivers Using Pupil Size Measurements, pp. 801-807.

Pillai, Prarthana (University of Windsor); Balasingam, Balakumar (University of Windsor); Biondi, Francesco (University of Windsor)

15:40-16:00 ThTPMT6.3

The Pinch Sensor: An Input Device for In-Hand Manipulation with the Index Finger and Thumb, pp. 808-813.

Wang, Cong (New Jersey Institute of Technology); Vungarala, Durga Lakshmi Venkata Deepak (New Jersey Institute of Technology); Navarro, Kevin (New Jersey Institute of Technology); Adwani, Neel (University of Petroleum and Energy Studies); Han, Tao (New Jersey Institute of Technology)

16:00-16:20 ThTPMT6.4

Non-Invasive Feedback for Prosthetic Arms: A Conceptual Design of a Wearable Haptic Armband, pp. 814-819.

Zhuwawu, Sudhir Solomon (Egypt Japan University of Science and Technology); Zaki, Ahmed Baioumy (Egypt Japan University of Science and Technology); Elsamanty, Mahmoud (Egypt Japan University for Science and Technology (EJUS)); Parque, Victor (Waseda University); El-Hussieny, Haitham (Faculty of Engineering(Shoubra), Benha University)

16:40-17:00 ThTPMT6.6

Biometric Signature Authentication with Low Cost Embedded Stylus, pp. 820-825.

Subedi, Divas (Trinity College); Chitrakar, Digesh (Trinity College); Yung, Isabella (Trinity College); Zhu, Yicheng (Trinity College); Su, Yun-Hsuan (Melody) (Mount Holyoke College); Huang, Kevin (Trinity College)

ThTPMT7 Vashon I

AI Damage Detection (Invited Session)

Organizer: Rao, Jing	School of Instrumentation and Opto-Electronic Engineering, Beihang University, Beijing 100191, China
Organizer: Lei, Yaguo	Xi'an Jiaotong University
Organizer: Dorafshan, Sattar	University of North Dakota

15:00-15:20 ThTPMT7.1

STAD-FEBTE, a Shallow and Supervised Framework for Time Series Anomaly Detection by Automatic Feature Engineering, Balancing, and Tree-Based Ensembles: An Industrial Case Study, pp. 826-832.

Zakeriharandi, Mohammadali (Aalborg University); Li, Chen (Aalborg University); Schou, Casper (Aalborg University, Department of Materials and Production); Lazic Villumsen, Sigurd (Aalborg University); Bøgh, Simon (Aalborg University); Madsen, Ole (Aalborg University)

15:20-15:40 ThTPMT7.2

A Robust Wavelet-Integrated Residual Network for Fault Diagnosis of Machines with Adversarial Training (I), pp. 833-837.

Li, Xiwei (Xi'an Jiaotong University); Lei, Yaguo (Xi'an Jiaotong University); Li, Xiang (Xi'an Jiaotong University); Yang, Bin (Xi'an Jiaotong University)

15:40-16:00 ThTPMT7.3

Deep Learning Based Time-Frequency Image Enhancement Method for Machinery Health Monitoring, pp. 838-843.

Choudhury, Madhurjya Dev (Victoria University of Wellington); Blincoe, Kelly (University of Auckland); Dhupia, Jaspreet (The University of Auckland)

16:00-16:20 ThTPMT7.4

A Framework to Support Failure Cause Identification in Manufacturing Systems through Generalization of past FMEAs, pp. 844-851.

Okazaki, Sho (The University of Tokyo); Shirafuji, Shouhei (The University of Tokyo); Yasui, Toshinori (DENSO Corporation); Ota, Jun (The University of Tokyo)

16:20-16:40 ThTPMT7.5

Accelerating Full Waveform Inversion Using Pre-Trained Neural Networks (I), pp. 852-857.

Kollmannsberger, Stefan (Technische Universität München); Singh, Divya (Technische Universität München); Herrmann, Leon (Technische Universität München)

16:40-17:00 ThTPMT7.6

Segmentation of Fatigue Cracks in Ancillary Steel Structures Using Deep Learning Convolutional Neural Networks (I), pp. 858-863.

Jafari, Faezeh (University of North Dakota); Dorafshan, Sattar (University of North Dakota); Kaabouch, Naima (University of North Dakota)

ThTPMT8 Vashon II

Intelligent Human-Machine Collaboration (Invited Session)

Organizer: Lv, Chen	Nanyang Technological University
Organizer: Wang, Yifan	Nanyang Technological University
Organizer: Xing, Yang	Cranfield University
Organizer: Chao, Huang	The Hong Kong Polytechnic University

15:00-15:20 ThTPMT8.1

A Robotic System of Systems for Human-Robot Collaboration in Search and Rescue Operations, pp. 864-871.

Chan, Teng Hooi (Singapore University of Technology and Design); Halim, James (Singapore University of Technology & Design); Tan, Kian Wee (Singapore University of Technology & Design); Tang, Emmanuel (Singapore University of Technology & Design); Ang, Wei Jun (Singapore University of Technology & Design); Tan, Jin Yuan (Singapore University of Technology & Design); Cheong, Samuel (Singapore University of Technology & Design); Ho, Hoan-Nghia (Singapore University of Technology & Design); Kuan, Benson (DSO National Laboratories); Bin Othman, Muhammad Shalihan (Singapore University of Technology and Design); Liu, Ran (Southwest University of Science and Technology); Soh, Gim Song (Singapore University of Technology and Design); Yuen, Chau (Nanyang Technological University); Tan, U-Xuan (Singapore University of Techonlogy and Design); Heng, Lionel (DSO National Laboratories); Foong, Shaohui (Singapore University of Technology and Design)

15:20-15:40 ThTPMT8.2

A Novel Human-Machine Collaboration Approach for Autonomous Driving with Hand Gesture-Based Guidance (I), pp. 872-876.

Zhang, Yiran (Nanyang Technological University); Hu, Zhongxu (Nanyang Technological University); Lv, Chen (Nanyang Technological University)

15:40-16:00 ThTPMT8.3

Human-Robot Interactive Disassembly Planning in Industry 5.0 (I), pp. 877-881.

Lou, Shanhe (Nanyang Technological University); Tan, Runjia (Nanyang Technological University); Zhang, Yiran (Nanyang Technological University); Lv, Chen (Nanyang Technological University)

16:00-16:20 ThTPMT8.4

Musculoskeletal Model Construction of Deep Squat Using Low-Cost

Inertial Measurement Units (I), pp. 882-887.

Wang, Guohui (Nanyang Technological University); Chen, Yu (Nanyang Technological University); Wang, Minda (Nanyang Technological University); Wang, Yifan (Nanyang Technological University)

FrPAMP Cascade Ballroom

Plenary: Sea Lamprey, E-Skin, and Robotic Fish: Mechatronic Solutions to Invasive Species Control (Plenary Session)

08:30-09:30 FrPAMP.1

*Sea Lamprey, E-Skin, and Robotic Fish: Mechatronic Solutions to Invasive Species Control**.

Tan, Xiaobo (Michigan State University)

FrCAMC Cascade Foyer

Posters - Friday I (Poster Session)

09:30-10:00 FrCAMC.1

*Development of Bar-Shape Nonlinear Series Elastic Actuator**.

Hirao, Motohiro (University of California, Berkeley); Ghanbarpour, Alireza (University of California at Berkeley); Tomizuka, Masayoshi (University of California)

09:30-10:00 FrCAMC.2

*Model-Based Impedance Modulation of Antagonistic Pneumatic Artificial Muscles**.

Wang, Xinyao (University of California Riverside); Liu, Tuo (University of California Riverside); Realmuto, Jonathan (Univeristy of California Riverside)

09:30-10:00 FrCAMC.3

*Development of Mobile Welding Robot Motion Software for Large-Scale Environment Welding**.

Choi, Taeyong (KIMM); Park, Jongwoo (Korea Institue of Machinery & Materials); Park, Dongil (Korea Institute of Machinery and Materials (KIMM))

09:30-10:00 FrCAMC.4

Hysteresis Dehunting of a Tendon-Sheath Confined Space Manipulator for Fast and Precise Control, pp. 888-888.

Schultz, Kyle (University of Washington); Marquette, Wade (University of Washington); Devasia, Santosh (University of Washington)

09:30-10:00 FrCAMC.5

*Robot-Based Automation of Charging Process for Electric Vehicle**.

Do, Hyunmin (Korea Institute of Machinery and Materials)

09:30-10:00 FrCAMC.6

*Learning to Detect Slip through Tactile Measures of the Contact Force Field and Its Entropy**.

Hu, Xiaohai (University of Washington); Venkatesh, Aparajit (University of Washington); Zheng, Guiliang (Carnegie Mellon University); Chen, Xu (University of Washington)

09:30-10:00 FrCAMC.7

*Power Assistance System for Steering Characteristics Classified by Deep Neural Network**.

Ryu, Ho Ju (Chungnam National University); Kim, Jeoing Ku (Hyuyndai MOBIS); Jung, Seul (Chungnam National University)

09:30-10:00 FrCAMC.8

Robust Optimal H∞ Control for Active Suspension System Using Input Saturation Function, pp. 889-889.

Kim, Yeongjae (Chung-Ang University); Kim, Mingyu (Chung-Ang University); Kim, Tae-Hyoung (Chung-Ang University)

FrTAMT1 Olympic

Mobile Robotics II (Regular Session)

10:00-10:20 FrTAMT1.1

ARMoR: Amphibious Robot for Mobility in Real-World Applications, pp. 890-895.

Hammond, Matthew (Texas A&M University); Lee, Kiju (Texas A&M University)

10:20-10:40 FrTAMT1.2

Energy Efficient Depth Control for Underwater Devices Using Soft and Hard Actuators, pp. 896-901.

Koc, Denizcan (University of Houston); Zuo, Wenyu (University of Houston); Ghorbel, Fathi (Rice University); Chen, Zheng (University of Houston)

10:40-11:00 FrTAMT1.3

Amphibious Robot with Self-Rotating Paddle-Wheel Mechanism, pp. 902-909.

Kim, Chaewon (Hanyang Unviersity); Lee, Kyungwook (Hanyang University); Ryu, Sijun (Hanyang University); Seo, TaeWon (Hanyang University)

11:00-11:20 FrTAMT1.4

Bio-Mimetic Autonomous Underwater Vehicle Control Using Time Delayed Estimation Technique, pp. 910-915.

Algethami, Abdullah (Taif University); Sarkar, Rajasree (Indian Institute of Technology Delhi); Amrr, Syed Muhammad (Linköping University); Banerjee, Arunava (Indian Institute of Technology Delhi)

11:20-11:40 FrTAMT1.5

Constrained Model Predictive Control of Variable Buoyancy Device, pp. 916-921.

Masood, Muhammad Umar (University of Houston); Kaaya, Theophilus (University of Houston); Chen, Zheng (University of Houston)

11:40-12:00 FrTAMT1.6

Novel Rigid-Wing Bi-Directional Sailboat Design and Method of Sailing, pp. 922-927.

Win, Luke Soe Thura (Singapore University of Technology & Design); Win, Shane Kyi Hla (Singapore University of Technology & Design); Sufiyan, Danial (Singapore University of Technology & Design); Foong, Shaohui (Singapore University of Technology and Design)

FrTAMT2 Adams

Estimation and Identification I (Regular Session)

10:00-10:20 FrTAMT2.1

Optimal Multisine Perturbations for Improved Dynamic System Identification Using a Mechanical Platform: A Preliminary Simulation Study, pp. 928-933.

Qiu, Yingxin (Georgia Institute of Technology); Wu, Mengnan (Emory University); Ting, Lena (Emory University and Georgia Tech); Ueda, Jun (Georgia Institute of Technology)

10:20-10:40 FrTAMT2.2

Multi-Axis Manipulator Kinematic Calibration Using a Novel Linearized Finite Screw Deviation Model, pp. 934-939.

Kim, Jaehyung (Pusan National Univ); Lee, Min Cheol (Pusan National University)

10:40-11:00 FrTAMT2.3

Optimal 2nd Order LTI System Identification, pp. 940-945.

Stocco, Leo (University of British Columbia)

11:00-11:20 FrTAMT2.4

Solving Stochastic Inverse Problems with Stochastic BayesFlow, pp. 946-952.

Zhang, Yi (University of Augsburg); Mikelsons, Lars (University of Augsburg)

11:20-11:40 FrTAMT2.5

A New Torque Estimation Method Based on Equivalent Efficiency Model and BP Neural Network of Mechatronic Integrated Joint, pp. 953-958.

Dai, Junjie (Ningbo Institute of Materials Technology and Engineering, CAS); Yang, Xin (Ningbo Institute of Materials Technology&Engineering, Chinese Aca); Chen, Chin-Yin (Ningbo Institute of Material Technology and Engineering, CAS); Yang, Guilin (Ningbo Institute of Material Technology and Engineering, Chines); Chen, Han (Zhejiang University of Technology)

11:40-12:00 FrTAMT2.6

Data-Driven Identification of Stochastic System Dynamics under Partial Observability Using Physics-Based Model Priors with Application to Acrobot, pp. 959-965.

Vantilborgh, Victor (Ghent University); Lefebvre, Tom (Ghent University); Crevecoeur, Guillaume (Ghent University)

FrTAMT3 Whidbey

Manufacturing (Regular Session)

10:00-10:20 FrTAMT3.1

Force Control of a Grinding Robotic Manipulator with Floating Base Via Model Prediction Optimization Control, pp. 966-974.

Seo, Changkook (Hanyang University); Kim, Hanbom (Hanyang Univercity); Jin, Hongjoo (Hanyang University); Kim, Taegyun (Yeungnam University); Seo, TaeWon (Hanyang University)

10:20-10:40 FrTAMT3.2

Concept and Design of a Bearingless Spinfilter, pp. 975-975.

Beglinger, Lars (ETH Zurich); Steinert, Daniel (Levitronix GmbH); Nussbaumer, Thomas (Levitronix GmbH); Biela, Juergen (ETH Zurich)

10:40-11:00 FrTAMT3.3

Developing a Two-Roll Wire Straightener, pp. 976-981.

Lee, Wei-chen (National Taiwan University of Science and Technology); Huang, Kun-Chung (National Taiwan University of Science and Technology)

11:00-11:20 FrTAMT3.4

Tension Ripple-Free Dancer Control of a Web Processing Machine, pp. 982-987.

De Viaene, Jasper (University of Gent); Thielemans, Yentl (Ghent University); Mathivanan, Arul K. (Ghent University); De Kooning, Jeroen D. M. (Dynamical Systems & Control Group (DySC), Ghent University and F); Stockman, Kurt (Universiteit Gent)

11:20-11:40 FrTAMT3.5

System Identification and Force Estimation of a Grinding Tool, pp. 988-993.

Hsiao, Shang-ya (National Taiwan University); Chu, Yu-Lin (National Taiwan University); Lin, Pei-Chun (National Taiwan University)

11:40-12:00 FrTAMT3.6

Geometry-Agnostic Melt-Pool Homogenization of Laser Powder Bed Fusion through Reinforcement Learning, pp. 994-999.

Park, Bumsoo (RPI); Mishra, Sandipan (RPI)

FrTAMT5 Orcas

Optimization (Regular Session)

10:00-10:20 FrTAMT5.1

An Industrial Applicable Approach towards Design Optimization of a Reciprocating Mechanism: An Emergency Ventilator Case Study, pp. 1000-1006.

Ben yahya, Abdelmajid (University of Antwerp); Van Oosterwyck, Nick (University of Antwerp); Herregodts, Jan (University of Ghent); Herregodts, Stijn (University of Ghent); Houwen, Simon Janos (University of Ghent); Vanwalleghem, Bart (University of Ghent); Derammelaere, Stijn (University of Antwerp, Faculty of Applied Engineering)

10:20-10:40 FrTAMT5.2

Sensitivity Analysis Framework for the Evaluation of Modular Drivetrain Architectures, pp. 1007-1012.

van Os, David (Ghent University); Tuerlinckx, Théo (Flanders Make); Vansompel, Hendrik (Ghent University); Sergeant, Peter (Ghent University); Laurijssen, Koen (Flanders Make); Stockman, Kurt (Universiteit Gent)

10:40-11:00 FrTAMT5.3

Towards Task Tailored Articulated Robot Designs, pp. 1013-1019.

Lefebvre, Tom (Ghent University); Wauters, Jolan (Ghent University); Ostyn, Frederik (Ghent University); Crevecoeur, Guillaume (Ghent University)

11:00-11:20 FrTAMT5.4

Single and Multi-Degree-Of-Freedom Servo Trajectory Generation: An Optimization Framework, Implementation, and Examples, pp. 1020-1027.

Clemen, Layne (Elexity); Rupp, Cory (ATA Engineering, Inc)

11:20-11:40 FrTAMT5.5

Continuous Dynamic Wireless Power Transfer for Circular Roadway with Optimal Load: Design and Analysis, pp. 1028-1034.

Lee, Chen-En (National Cheng Kung University); Lin, Sheng-Feng (National Cheng Kung University); Liu, Yen-Chen (National Cheng Kung University)

11:40-12:00 FrTAMT5.6

Actuator Placement in Adaptive Structures for Static Compensation – Minimizing Displacements versus Minimizing Actuator Forces, pp. 1035-1040.

Friz, Fabian (University of Stuttgart); Zeller, Amelie (University of Stuttgart); Böhm, Michael (University of Stuttgart); Sawodny, Oliver (University of Stuttgart)

FrTAMT6 Blakely

HMI II (Regular Session)

10:00-10:20 FrTAMT6.1

Interactive Task Encoding System for Learning-From-Observation, pp. 1041-1046.

Wake, Naoki (Microsoft); Kanehira, Atsushi (Microsoft); Sasabuchi, Kazuhiro (Microsoft); Takamatsu, Jun (Microsoft); Ikeuchi, Katsushi (Microsoft)

10:20-10:40 FrTAMT6.2

Brain Computer Interfaces for Supervisory Controls of Unmanned Aerial Vehicles, pp. 1047-1052.

Bi, Zhuming (Purdue University Fort Wayne); Liu, Yanfei (Purdue University Fort Wayne); Emmanuel, Quaye (Purdue University Fort Wayne); Luo, Chaomin (Mississippi State University)

10:40-11:00 FrTAMT6.3

Predictive Assistive Motion Generation Based on Human Intent for Human-Collaborative Robots, pp. 1053-1059.

Ichimura, Naoki (Tokyo Denki University); Ishikawa, Jun (Tokyo Denki University)

11:00-11:20 FrTAMT6.4

Improving Human Positioning Control of Oscillatory Systems, pp. 1060-1065.

Lui, Man Wo (Georgia Institute of Technology); Kotten, Daniel (Georgia Institute of Technology); Dushaj, Enea (Georgia Institute of Technology); Singhose, William (Georgia Tech)

11:40-12:00 FrTAMT6.6

Generating Synthetic Data Using a Knowledge-Based Framework for

Autonomous Productions, pp. 1066-1073.

Petrovic, Oliver (Laboratory for Machine Tools and Production Engineering (WZL), R); Dias Duarte, David Leander (Laboratory for Machine Tools WZL, RWTH Aachen University); Herfs, Werner (WZL, RWTH Aachen)

FrTAMT7 Vashon I

Vibration, and Noise Control (Regular Session)

10:00-10:20 FrTAMT7.1

Bridge State and Train Axle Mass Estimation for Adaptive Railway Bridges, pp. 1074-1074.

Zeller, Amelie (University of Stuttgart); Dakova, Spasena (University of Stuttgart); Stein, Charlotte (University of Stuttgart); Böhm, Michael (University of Stuttgart); Senatore, Gennaro (University of Stuttgart); Reksowardojo, Arka P. (University of Stuttgart); Blandini, Lucio (University of Stuttgart); Sawodny, Oliver (University of Stuttgart); Tarín, Cristina (University of Stuttgart)

10:20-10:40 FrTAMT7.2

Reduced-Order Nominal Model Design and Validation for Task Space DOB-Based Motion Control of an Industrial Robot, pp. 1075-1081.

Samuel, Kangwagye (DGIST); Haninger, Kevin (Fraunhofer IPK); Oh, Sehoon (DGIST); Lee, Chan (Yeungnam University)

10:40-11:00 FrTAMT7.3

Identification and Reduction Method of Normal-Direction Force Ripple in Permanent Magnet Linear Synchronous Motor, pp. 1082-1087.

Kwon, Yoon Sik (Yonsei University); Lee, Sangmin (Yonsei University); Yoon, Jun Young (Yonsei University)

11:00-11:20 FrTAMT7.4

Multi-Axis Active Vibration Suppression for Wafer Transfer Systems, pp. 1088-1094.

Qiu, Jiajie (Massachusetts Institute of Technology); Kim, Hongjin (Samsung Electronics); Xia, Fangzhou (Massachusetts Institute of Technology); Youcef-Toumi, Kamal (Massachusetts Institute of Technology)

11:20-11:40 FrTAMT7.5

Validation of Feedforward Disturbance Cancellation for the PSS3 HDD Benchmark Problem for Dual Stage Actuators, pp. 1095-1100.

Tanaka, Yuma (Tokyo Denki University); Ishikawa, Jun (Tokyo Denki University)

11:40-12:00 FrTAMT7.6

Experimental Comparison of Manual and Automated Crane Control through Obstacle Fields, pp. 1101-1106.

Rome, Tyler (Georgia Tech); Adams, Christopher (Georgia Institute of Technology); Singhose, William (Georgia Tech)

FrTAMT8 Vashon II

Machine Learning I (Regular Session)

10:00-10:20 FrTAMT8.1

Early Inner Race Fault Detection on a Ball Bearing Setup Using Histogram of Oriented Gradients and Wavelet Subselection, pp. 1107-1114.

Van Heck, Cedric (UGent - University of Ghent); Wauters, Jolan (Ghent University); Staessens, Tom (Ghent University); Crevecoeur, Guillaume (Ghent University); Ooijevaar, Ted (Flanders Make)

10:20-10:40 FrTAMT8.2

Sensitivity Analysis of Geometric Parameter Errors for Industrial Robots Based on Random Forest, pp. 1115-1120.

Lv, Pin (Shanghai University); Shi, Weihao (Shanghai University); Wang, Yubin (Shanghai University); Li, Ruiyan (Shanghai University); Chen, Dongdong (Shanghai University)

10:40-11:00 FrTAMT8.3

DQDWA: Dynamic Weight Coefficients Based on Q-Learning for Dynamic Window Approach Considering Environmental Situations, pp. 1121-1126.

Kobayashi, Masato (Osaka University); Zushi, Hiroka (Kobe University); Nakamura, Tomoaki (Kobe University); Motoi, Naoki (Kobe University)

11:00-11:20 FrTAMT8.4

Transformer for Automated Feedback System Design, pp. 1127-1132.

Hughes, Isaac (University of Wyoming); O'Brien, John (University of Wyoming)

11:20-11:40 FrTAMT8.5

Encrypted Classification for Prevention of Adversarial Perturbation and Individual Identification in Health-Monitoring, pp. 1133-1138.

Kawase, Hiroaki (The University of Electro-Communications); Meinhold, Waiman (Georgia Tech); Ueda, Jun (Georgia Institute of Technology)

11:40-12:00 FrTAMT8.6

A Fast Score-Based Method for Robotic Task-Free Point-To-Point Path Learning, pp. 1139-1144.

Pasquali, Alex (University of Bologna); Galassi, Kevin (Università Di Bologna); Palli, Gianluca (University of Bologna)

FrPPMP Cascade Ballroom

Plenary: Beyond Conventional Interfaces: Exploring the Intersection of Wearable Technologies, Textiles, and Physical Computing (Plenary Session)

13:30-14:30 FrPPMP.1

*Beyond Conventional Interfaces: Exploring the Intersection of Wearable Technologies, Textiles, and Physical Computing**.

Seyed, Teddy (Microsoft)

FrCPMC Cascade Foyer

Posters - Friday II (Poster Session)

14:30-15:00 FrCPMC.1

*Development of Bar-Shape Nonlinear Series Elastic Actuator**.

Hirao, Motohiro (University of California, Berkeley); Ghanbarpour, Alireza (University of California at Berkeley); Tomizuka, Masayoshi (University of California)

14:30-15:00 FrCPMC.2

*Model-Based Impedance Modulation of Antagonistic Pneumatic Artificial Muscles**.

Wang, Xinyao (University of California Riverside); Liu, Tuo (University of California Riverside); Realmuto, Jonathan (Univeristy of California Riverside)

14:30-15:00 FrCPMC.3

*Development of Mobile Welding Robot Motion Software for Large-Scale Environment Welding**.

Choi, Taeyong (KIMM); Park, Jongwoo (Korea Institue of Machinery & Materials); Park, Dongil (Korea Institute of Machinery and Materials (KIMM))

14:30-15:00 FrCPMC.4

Hysteresis Dehunting of a Tendon-Sheath Confined Space Manipulator for Fast and Precise Control, pp. 888-888.

Schultz, Kyle (University of Washington); Marquette, Wade (University of Washington); Devasia, Santosh (University of Washington)

14:30-15:00 FrCPMC.5

*Robot-Based Automation of Charging Process for Electric Vehicle**.

Do, Hyunmin (Korea Institute of Machinery and Materials)

14:30-15:00 FrCPMC.6

*Learning to Detect Slip through Tactile Measures of the Contact Force Field and Its Entropy**.

Hu, Xiaohai (University of Washington); Venkatesh, Aparajit (University of Washington); Zheng, Guiliang (Carnegie Mellon University); Chen, Xu (University of Washington)

14:30-15:00 FrCPMC.7

*Power Assistance System for Steering Characteristics Classified by Deep Neural Network**.

Ryu, Ho Ju (Chungnam National University); Kim, Jeoing Ku (Hyuyndai MOBIS); Jung, Seul (Chungnam National University)

14:30-15:00 FrCPMC.8

Robust Optimal H∞ Control for Active Suspension System Using Input Saturation Function, pp. 889-889.

Kim, Yeongjae (Chung-Ang University); Kim, Mingyu (Chung-Ang University); Kim, Tae-Hyoung (Chung-Ang University)

FrTPMT1 Olympic

Mobile Robotics III (Regular Session)

15:00-15:20 FrTPMT1.1

Joint Optimization for Transport and Bucket Loading Phases of Automated Wheel Loaders, pp. 1145-1145.

Edson, Connor (University of Minnesota); Yao, Jie (University of Minnesota at Twin Cities); Zhao, Gaonan (University of Minnesota); Sun, Zongxuan (University of Minnesota)

15:20-15:40 FrTPMT1.2

Rhino: An Autonomous Robot for Mapping Underground Mine Environments, pp. 1146-1153.

Arend Tatsch, Christopher Alexander (West Virginia University); Bredu, Jonas Amoama (West Virginia University); Covel, Dylan (West Virginia University); Tulu, Ihsan Berk (West Virginia University); Gu, Yu (West Virginia University)

15:40-16:00 FrTPMT1.3

Increasing Mobile Robot Tethered Payload Transport Capacity through Multipurpose Manipulation, pp. 1154-1161.

Kim, Raymond (Georgia Institute of Technology); Diller, Edward (Stanford University); Harkonen, Eemil (Georgia Institute of Technology); Mazumdar, Anirban (Georgia Institute of Technology)

16:00-16:20 FrTPMT1.4

Modeling Solid-State LiDAR Sensor for Optimization of Area Coverage Deployment, pp. 1162-1167.

Farzadpour, Farsam (University of Windsor); Zhang, Tong (University of Windsor); Chen, Xiang (University of Windsor)

16:20-16:40 FrTPMT1.5

Rollover Prevention by Quadruped Tracked Mobile Robot, pp. 1168-1173.

Fujita, Toyomi (Tohoku Institute of Technology); Sato, Shun (SWS East Japan, Ltd)

FrTPMT2 Adams

Estimation and Identification II (Regular Session)

15:00-15:20 FrTPMT2.1

*Axial Torque Estimation Based on Backlash Detection for Reduction Gear Using Encoder Information**.

Tsuji, Toshiaki (Saitama University); Kiuchi, Masato (Saitama University); Fujimoto, Yasutaka (Yokohama National University)

15:20-15:40 FrTPMT2.2

Dynamics Identification and Amplitude Control of a Wireless Side-Mounted Ultrasonic Tool Holder System under Minimum Impedance Resonance Frequency Tracking, pp. 1174-1174.

Yau, Her-Terng (National Chung Cheng University, Department of Mechanical Engine); Kuo, Ping-Huan (National Chung Cheng University); Ting-Chung Tseng, Ting-Chung Tseng (National Chung Cheng University); Lin, Hao-Yang (National Chung Cheng University)

15:40-16:00 FrTPMT2.3

Estimation of the Electrostatic Effects in the LISA-Pathfinder Critical Test Mass Dynamics Via the Method of Moments, pp. 1175-1175.

Zanoni, Carlo (INFN); Bortoluzzi, Daniele (University of Trento); Vignotto, Davide (University of Trento)

16:00-16:20 FrTPMT2.4

Parameter Identification Related to Vertical Dynamic of a Self-Stabilizing Monorail Vehicle, pp. 1176-1181.

Griese, Martin (OWL University of Applied Sciences and Arts); Mousavi, Seyed Davood (Ostwestfalen-Lippe University of Applied Sciences and Arts); Schulte, Thomas (TH OWL)

16:20-16:40 FrTPMT2.5

Automated Backlash Determination on Rack-And-Pinion Drives, pp. 1182-1187.

Zenn, Wiebke Salome (TRUMPF Machine Tools); Keck, Alexander (TRUMPF Lasersystems for Semiconductor Manufacturing); Beck, Marcus (WITTENSTEIN SE); Herold, Sven (Fraunhofer Institute for Structural Durability and System Reliab); Melz, Tobias (Fraunhofer LBF)

FrTPMT3 Whidbey

Mechatronics in Education (Regular Session)

15:00-15:20 FrTPMT3.1

Towards Mechatronics Approach of System Design, Verification and Validation for Autonomous Vehicles, pp. 1188-1193.

Samak, Chinmay (Clemson University International Center for Automotive Research); Samak, Tanmay (Clemson University International Center for Automotive Research); Krovi, Venkat (Clemson University)

15:20-15:40 FrTPMT3.2

Virtual Reality System Using Explainable AI for Identification of Specific Expert Refinery Inspection Skills, pp. 1194-1199.

Takeuchi, Hiroki (The University of Tokyo); Takamido, Ryota (Research into Artifacts, Center for Engineering (RACE), School O); Kanda, Shinji (University of Tokyo); Umeda, Yasushi (The University of Tokyo); Asama, Hajime (The University of Tokyo); Kasahara, Seiji (ENEOS Corporation); Fukumoto, Seigo (ENEOS Corporation); Tamura, Sunao (ENEOS Corporation); Kato, Toshiya (ENEOS Corporation); Korenaga, Masahiro (ENEOS Corporation); Sasamura, Akinobu (ENEOS Corporation); Hoshi, Misaki (ENEOS Corporation); Ota, Jun (The University of Tokyo)

15:40-16:00 FrTPMT3.3

Prototype of Ball-Like Jumping Robot for Playful Learning, pp. 1200-1205.

Sango, Yuto (Waseda University); Ishii, Hiroyuki (Waseda University)

16:00-16:20 FrTPMT3.4

Development of a Nursing Skill Training System Based on Manipulator Variable Admittance Control, pp. 1206-1211.

Zhou, Yuhao (The University of Tokyo); Takamido, Ryota (Research into Artifacts, Center for Engineering (RACE), School O); Kanai-Pak, Masako (Tokyo Ariake University of Medical and Health Sciences); Maeda, Jukai (Tokyo Ariake University of Medical and Health Sciences); Kitajima, Yasuko (Tokyo Ariake University of Medical and Health Sciences); Nakamura, Mitsuhiro (Tokyo Ariake University of Medical and Health Sciences); Kuwahara, Noriaki (Graduate School of Science and Technology,

Kyoto Institute of Te); Ogata, Taiki (The University of Tokyo); Ota, Jun (The University of Tokyo)

16:20-16:40 FrTPMT3.5

On the Design and Development of a Tabletop Robot for Interaction with Children, pp. 1212-1217.

Christos, Andreanidis (KTH Royal Institute of Technology); Bergsten, Johanna (KTH Royal Institute of Technology); Brümmer, Marcel (KTH Royal Institute of Technology); Fröberg, Joel (KTH Royal Institute of Technology); Lindestam, Algot (Kungliga Tekniska Högskolan); Persson, Annie (KTH Royal Institute of Technology); Pirmohamed, Fahim (KTH Royal Institute of Technology); Sandhal, Maria (KTH Royal Institute of Technology); Thorapalli Muralidharan, Seshagopalan (KTH Royal Institute of Technology); Andrikopoulos, Georgios (KTH Royal Institute of Technology)

FrTPMT5 Orcas

Modeling and Design (Regular Session)

15:00-15:20 FrTPMT5.1

A Novel Sidewinding Snake Robot with Non-Zero Slope in Granular Terrains Modeled by DRFM, pp. 1218-1225.

Huang, Lei (Shanghai Jiao Tong University); Ming, Hengqiang (Shanghai Jiao Tong University); Yin, Yh (Shanghai Jiao Tong Uni)

15:20-15:40 FrTPMT5.2

Design and Parametric Analysis of a Magnetic Leadscrew with an Embedded Displacement Sensor, pp. 1226-1233.

Li, Wenjing (Georgia Institute of Technology); Lee, Kok-Meng (Georgia Institute of Technology)

15:40-16:00 FrTPMT5.3

Design and Analysis of a Compliant Mechanism with Variable Stiffness, pp. 1234-1239.

Zhang, Weipeng (Shandong University); Yan, Peng (Shandong University)

16:00-16:20 FrTPMT5.4

Non-Linear Friction Characterisation of the Unwinding Group in a Web Processing Machine, pp. 1240-1245.

Mathivanan, Arul K. (Ghent University); De Viaene, Jasper (University of Gent); Thielemans, Yentl (Ghent University); De Kooning, Jeroen D. M. (Dynamical Systems & Control Group (DySC), Ghent University and F); Stockman, Kurt (Universiteit Gent)

16:20-16:40 FrTPMT5.5

Design and Backdrivability Modeling of a Portable High Torque Robotic Knee Prosthesis with Intrinsic Compliance for Agile Activities, pp. 1246-1246.

Zhu, Junxi (North Carolina State University); Jiao, Chunhai (City College of New York); Dominguez, Israel (North Carolina State University); Yu, Shuangyue (City University of New York, City College); Su, Hao (North Carolina State University)

FrTPMT6 Blakely

Planning and Navigation (Regular Session)

15:00-15:20 FrTPMT6.1

A Parameterized Cubic B´ezier Spline-Based Informed RRT for Non-Holonomic Path Planning*, pp. 1247-1252.

Fei, Zifan (Dalhousie University); Pan, Ya-Jun (Dalhousie University)

15:20-15:40 FrTPMT6.2

Efficient Trajectory Planning and Control for USV with Vessel Dynamics and Differential Flatness, pp. 1253-1260.

Huang, Tao (Zhejiang University); Xue, Zhenfeng (Zhejiang University); Chen, Zhe (ZheJiang Univercity); Liu, Yong (Zhejiang University)

15:40-16:00 FrTPMT6.3

Template-Free Non-Revisiting Uniform Coverage Path Planning on Curved Surfaces, pp. 1261-1269.

Yang, Tong (Zhejiang University); Valls Miro, Jaime (University of Technology Sydney); Nguyen, Huy Nhat Minh (University of Technology Sydney); Wang, Yue (Zhejiang University); Xiong, Rong (Zhejiang University)

16:00-16:20 FrTPMT6.4

Performance Comparison for Aggregation and Formation of Swarm Robots, pp. 1270-1275.

Yazici, Emre (Istanbul Technical University, NISO); Temeltas, Hakan (Istanbul Technical University)

16:20-16:40 FrTPMT6.5

Cooperative Time-Optimal Trajectory Generation for a Heterogeneous Group of Redundant Mobile Manipulators, pp. 1276-1281.

Hierholz, Alice (University of Stuttgart, Institute for System Dynamics); Gienger, Andreas (University of Stuttgart); Sawodny, Oliver (University of Stuttgart)

16:40-17:00 FrTPMT6.6

Holistic Deep-Reinforcement-Learning-Based Training of Autonomous Navigation Systems, pp. 1282-1288.

Kästner, Linh (T-Mobile, TU Berlin); Meusel, Marvin (Technische Universität Berlin); Buiyan, Teham (Technical University Berlin); Lambrecht, Jens (Technische Universität Berlin)

FrTPMT7 Vashon I

Biologically Inspired Intelligence for Mechatronics and Robotics (Organized Session)

15:00-17:00 FrTPMT7.1

*Biologically Inspired Intelligence for Mechatronics and Robotics**.

Luo, Chaomin (Mississippi State University); Bi, Zhuming (Purdue University Fort Wayne)

FrTPMT8 Vashon II

Machine Learning II (Regular Session)

15:00-15:20 FrTPMT8.1

Motion Profile Optimization in Industrial Robots Using Reinforcement Learning, pp. 1289-1296.

Wen, Yunshi (Rensselaer Polytechnic Institute); He, Honglu (Rensselaer Polytechnic Institute); Julius, Agung (Rensselaer Polytechnic Institute); Wen, John (Rensselaer Polytechnic Institute)

15:20-15:40 FrTPMT8.2

Registration of Deformed Tissue: A GNN-VAE Approach with Data Assimilation for Sim-To-Real Transfer, pp. 1297-1297.

Afshar, Mehrnoosh (University of Alberta); Meyer, Tyler (Baker Cancer Centre); Sloboda, Ronald (Cross Cancer Institute); Husain, Siraj (Tom Baker Cancer Centre); Usmani, Nawaid (Cross Cancer Institute); Tavakoli, Mahdi (University of Alberta)

15:40-16:00 FrTPMT8.3

Deformable Fractional Filters, pp. 1298-1303.

Zamora-Esquivel, Julio (Intel); Rhodes, Anthony (Intel); Macias-Garcia, Edgar (Centro De Investigación Y Estudios Avanzados Del Instituto Polit); Nachman, Lama (Intel Labs)

16:00-16:20 FrTPMT8.4

Motion Dynamics Modeling and Fault Detection of a Soft Trunk Robot, pp. 1304-1309.

Jandaghi, Emadodin (University of Rhode Island); Chen, Xiaotian

(University of Rhode Island); Yuan, Chengzhi (University of Rhode Island)

16:20-16:40 FrTPMT8.5

3-D Precision Positioning Based on Deep Comparison Convolutional Neural Networks, pp. 1310-1315.

Wen, Bo-Xu (National Taipei University of Technology); Li, Chih-Hung G. (National Taipei University of Technology)

16:40-17:00 FrTPMT8.6

Deep Neural Network Design for Improving Stability and Transient Behavior in Impedance Control Applications, pp. 1316-1323.

Slightam, Jonathon E. (Sandia National Laboratories); Griego, Antonio (University of New Mexico)