ASPE 2020 Spring Topical Meeting: Design and Control of Precision Mechatronic Systems
Wednesday - Friday, May 6-8, 2020 (EDT)
Virtual Meeting: hosted via Zoom

Wednesday, May 6, 2020	
8:00 AM - 8:30 AM	**AM Tutorial Open for Connecting**
8:30 AM - 12:30 PM	**AM Tutorial** *Advanced Feedforward and Iterative Learning Control for Precision Mechatronics* Dr. Tom Oomen (Eindhoven University of Technology)
12:30 PM - 1:30 PM	**Break**
1:00 PM - 1:30 PM	**PM Tutorial Open for Connecting**
1:30 PM - 5:30 PM	**PM Tutorial** *Introduction to Machine Learning and Reinforcement Learning for Precision Engineers* Dr. Amir Barati Farimani (Carnegie Mellon University)
Thursday, May 7, 2020	
9:00 AM - 9:25 AM	**Meeting Open for Connecting**
9:25 AM - 9:30 AM	**Opening Remarks**
9:30 AM - 11:00 AM	**Session I: Industry 4.0 and Learning Control** • *How Learning Control Supports Industry 4.0 in Semiconductor Manufacturing* Gijs van der Veen • *Advanced Feedforward Control as a Service from the Cloud* Chinedum Okwudire • *Procedure Control of Nano Materials Design via Reinforcement Learning* Yuyang Wang • *Long-range Piezo-stepper Actuators: Towards Nanoscale Accuracy Through Commutation-angle Iterative Learning Control* Leontine Aarnoudse
11:00 AM - 11:30 AM	**Keynote** *Perspectives on Precision Mechatronics* Ton Peijnenburg (Eindhoven University of Technology)
11:30 AM - 12:45 PM	**Session II: Advances in Motors** • *Harness the Lag: Precision Positioning with Hysteresis Motors* Lei Zhou • *Design and Measurement of a 6-Phase Combined Winding Bearingless Synchronous Reluctance Slice Motor* Wolfgang Gruber • *Closed-loop Suspension and Rotation of a Spherical Permanent Magnetic Dipole Actuator* Tyler Hamer • *A Novel Position Sensing System for Bearingless Motors* Benjamin Weinreb
12:45 PM - 1:30 PM	**Break (breakout rooms will remain open)**
1:30 PM - 3:00 PM	**Session III: Advances in Autotuning and Feedforward Control** • *Auto-Tuning of Precision Servo Controllers Suffering from Large Mass Ratio Induced Vibrations* Alper Dumanli • *Combined Feedforward Tracking Control and Feedrate Optimization - with Application to a Precision XY Stage* Heejin Kim • *Feedforward Spectral Tuning and Using Iterative Learning Control For Automated Parameter Fitting* Leon Jabben • *Adaptive Feedforward Control of a Flexure Based Hexapod* Sil Spanjer

3:00 PM - 4:00 PM	**Session IV: Advances in Mechatronic Design I** • *Vacuum Compatible Contactless Active Magnetic Linear Bearings for High Cleanliness Robotic Applications* Rick Baade • *Variable Resolution Fused Filament Fabrication (FFF) Printing Using a Variable Orifice Extruder System* Osama Habbal • *Design and Control of a Thermal Actuation System* Chunjie Fan
4:00 PM - 5:00 PM	**Online Socializing**
Friday, May 8, 2020	
9:00 AM - 9:25 AM	**Meeting Open for Connecting**
9:25 AM - 9:30 AM	**Opening Remarks**
9:30 AM - 11:00 AM	**Session V: Advances in Sensing and Feedback Control I** • *Low-cost, High Dynamic Range Position Sensing Enabled by Oversampling and Averaging* Brij Bhushan • *Improved Current Control of Inverter Fed Two-phase Bipolar Stepper Motors Using Repetitive Control* Boaz Kramer • *Dynamics and Control of the PTB Nanometer Comparator* Paul Koechert • *Heuristically Optimized H-Infinity Synthesis for the Real-time Positioning of a Tip-based Measurement Device* Liam G. Connolly
11:00 AM - 11:30 AM	**Keynote** *Nanomanufacturing Enabled by Precision Systems, In-Situ Metrology and Real-Time Control* Prof. S.V. Sreenivasan (NASCENT Center, The University of Texas at Austin)
11:30 AM - 12:45 PM	**Session VI: Advances in Sensing and Feedback Control II** • *Model and Controller Design for High-speed Atomic Force Microscope Imaging and Autotuning* Fangzhou Xia • *Implementation of Length Control of an Optical Cavity Using Second-order Transverse Modes* Alvaro Fernandez-Galiana • *Active Optical Mode Matching for the Quantum Squeezing Cavaties and Upcoming LIGO Upgrades* Fabrice Matichard • *Dynamic Characterization of Lapping Manipulator* Daegweon Koh
12:45 PM - 1:30 PM	**Break (breakout rooms will remain open)**
1:30 PM - 3:00 PM	**Session VII: Modeling and Control of Precision Machines** • *Reduced thermo-mechanical model of a rotary table of a 5-axis precision machine tool* Pablo Hernandez-Becerro • *Loop-shaping Controller Design in the Development of the High-Dynamic Double-Crystal Monochromator at Sirius Light Source* Ricardo Caliari • *Dynamic Error Budgeting in the Development of the High-Dynamic Double-Crystal Monochromator for Sirius Light Source* Renan Geraldes • *The FPGA Control Implementation of the High-Dynamic Double-Crystal Monochromator at Sirius Light Source* Marcelo Moraes

3:00 PM - 3:45 PM	**Session VIII: Advances in Mechatronic Design II** • *Delta Robot Combining Millimetre Travel With Nanometre Performance* Jon Kelly • *Thermally-Stable Precision Motion and Positioning Mechanism* Heebum Chun
3:45 PM - 4:15 PM	**Keynote** *Robots with Physical Intelligence* Prof. Sangbae Kim (Biomimetic Robotics Laboratory, Massachusetts Institute of Technology)
4:15 PM - 5:00 PM	**Online Socializing**