ASME® 2019 ISPS

Information Storage and Processing Systems Conference

CONFERENCE
June 27–28, 2019

CMRR
University of California
San Diego, CA

Program

The American Society of Mechanical Engineers®
ASME®

ASME
SETTING THE STANDARD

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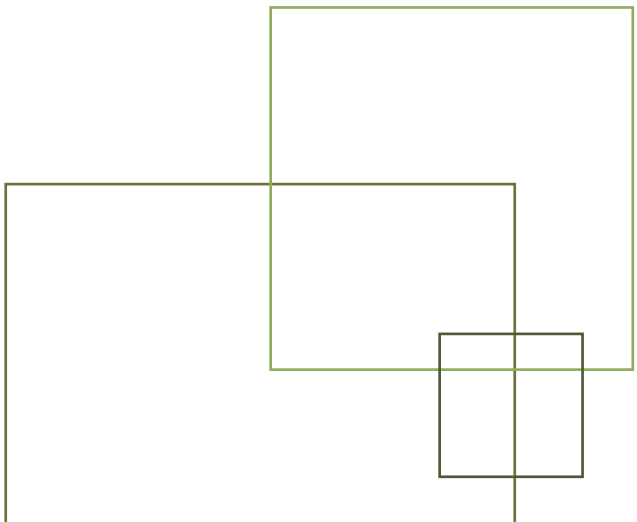

Welcome Letter

FROM THE CONFERENCE CHAIRS

On behalf of the American Society of Mechanical Engineers (ASME) Information Storage and Processing Systems (ISPS) Executive Committee, it is our pleasure to welcome you to the 2019 ASME ISPS Conference.

This year marks the 28th ISPS conference held since 1981. The conference focuses on information storage and processing systems as well as intelligent and precision equipment. Topics ranging from magnetic and solid state data storage and memory to intelligent data processing in medical and precision systems will be presented at this year's conference. This year, we added several new tracks to our conference, covering the areas of smart systems, machine learning, and artificial intelligence in mechanical engineering. In those applications, data storage, memory, and processing are crucial. Attracting more than 60 high quality technical presentations and papers from both industry and academia, ISPS provides a forum for international researchers from all over the world to share their findings, to network, and to foster new opportunities for collaboration. A key objective is also to attract and support graduate students and researchers in ISPS technical areas and related industries.

As is customary, the ISPS 2019 annual conference will be held in the state of California known for its world-renowned universities and trailblazing industrial innovations in science and technology. This year's ISPS conference is cohosted by the ASME ISPS Division and the Center for Memory and Recording Research (CMRR) at the University of California in San Diego (UCSD). For more than 35 years, CMRR has been one of the leading research centers in the area of data storage, and we are excited to partner with them for ISPS 2019. We gratefully acknowledge the support of Prof. Frank Talke and the CMRR students, faculty, and staff for their efforts to make this year's conference a success.

The ISPS conference features keynote speeches during both lunch events and the dinner banquet. At the ISPS banquet, Prof. Frank Talke, Endowed Chair of CMRR from UCSD, will deliver a distinguished talk on the illustrious history and future of the CMRR. The banquet will also include the ISPS award ceremony to recognize the student fellowships and scholarships. In the first day's lunch event, Dr. Jen-Yuan (James) Chang, distinguished Professor from National Tsing Hua University, Taiwan, will discuss smart manufacturing in Taiwan and the transformation of recording technologies into smart machines. On the second day, lunch will feature a talk by Dr. Antanas (Tony) Daugela, founder of Nanometronix, LLC, who will discuss how nanomechanical test instruments enable researchers to impact the world at the nanoscale.

On behalf of the ISPS organizing committee, we acknowledge all volunteers who have taken time to invite speakers, organize tracks, and review papers and awards. We would also like to acknowledge the invaluable assistance provided by the ASME staff during the coordination of the ISPS conference year after year.

Finally, we would like to thank all conference participants and hope that everyone will have a wonderful and rewarding experience at ISPS 2019.

Sincerely,

Dr. Shaomin Xiong
Conference Chair (ISPS)
Western Digital Technologies, USA

Dr. Abhishek Srivastava
Conference Program Co-Chair
Western Digital Technologies, USA

Prof. Wanchin Kim
Conference Co-Chair
Hanbat National University, Korea

Dr. Yuan Ma
Conference Program Co-Chair
TAMU, USA

Dr. Shaomin Xiong
Conference Chair (ISPS)
Western Digital Technologies, USA

Prof. Wanchin Kim
Conference Co-Chair
Hanbat National University, Korea

Dr. Abhishek Srivastava
Conference Program Co-Chair
Western Digital Technologies, USA

Dr. Yuan Ma
Conference Program Co-Chair
TAMU, USA

At-A-Glance

THURSDAY, JUNE 27

Room Name	8:45AM—9:15AM	9:15AM—10:45AM Session No.	11:00AM—12:00PM Session No.	12:00PM—1:30PM Session No.	2:00PM—3:45PM Session No.	Evening Event 6:30PM—9:00PM
Auditorium	**Breakfast**	**3-1:** Heat Assisted Magnetic Recording 1	**3-2:** Heat Assisted Magnetic Recording 2	**Lunch** 12:00PM—12:45PM **14-3:** Keynote 12:45PM—1:30PM Prof. Jen-Yuan (James) Chang, Opportunities of Magnetic Recording and Data Storage in Smart Machines and Manufacturing	**1-1:** Tribology, Dynamics and Servo Control of Nano-Micro Systems 1	
Conference Room - 1st Floor		**13-1:** Application of Data and Artificial Intelligence in Mechanical Engineering 1	**7-1:** Smart Materials 1		**8-1:** Smart Sensors and Actuators 1	
The Ida & Cecil Green Faculty Club, Atkinson Pavilion and Patio						**Awards Banquet Dinner** Distinguished Speaker **14-2:** Dr. Frank Talke, UCSD, 35 Years of CMRR—Present, Past, and Future

FRIDAY, JUNE 28

Room Name	8:45AM—9:15AM	9:15AM—10:45AM Session No.	11:00AM—12:00PM Session No.	12:00PM—1:30PM Session No.	2:00PM—3:45PM Session No.	Evening Event 6:30PM—9:00PM
Auditorium	**Breakfast**	**6-1:** Dynamics and Control for Future Technologies 1	**10-1:** Optical Imaging Devices and Opto-mechatronic Systems 1	**Lunch** 12:00PM—12:45PM **14-1:** Keynote 12:45PM—1:30PM Dr. Antanas Daugela, Nanomechanical Test Instruments: Touching the World at Nanoscale	**9-1:** Micro/Nano and Biomedical Mechatronic Systems 1	
Conference Room - 1st Floor		**12-1:** Advanced Simulation in Science and Engineering 1	**8-2:** Smart Sensors and Actuators 2			

AUDIOVISUAL EQUIPMENT IN SESSION ROOMS

The Auditorium and Conference Room at USCD, where all the technical sessions will be held, are equipped with an LCD projector and screen. Laptops will NOT be provided in the sessions. Presenters should either bring their own or make arrangements in advance with the session chairs to bring their laptops. If you are not bringing you own laptop, please bring your presentations on a thumb drive before the technical sessions begin each day to upload it onto the laptop provided by the session chair.

BADGE REQUIRED FOR ADMISSION

All conference attendees must wear the official ASME 2019 ISPS badge at all times in order to gain admission to technical sessions and other conference events. Without a badge, you will NOT be allowed to attend any conference activities. Your badge also provides a helpful introduction to other attendees.

CONFERENCE BREAKFASTS

Thursday, June 27 and Friday, June 28
8:45AM—9:15AM
UCSD/CMRR Lobby/Patio

COFFEE NETWORKING BREAKS

Thursday, June 27 and Friday, June 28
10:45 AM – 11:00 AM
1:45 PM – 2:00PM
UCSD/CMRR Lobby/Patio

ISPS KEYNOTE LUNCHEON SPEAKER

Dr. Jen-Yuan (James) Chang
"Opportunities of Magnetic Recording and Data Storage in Smart Machines and Manufacturing"

Thursday, June 27
12:45PM–1:30PM (Lunch will be from 12:00 PM to 12:45PM in the Lobby & Patio, followed by the Keynote at 12:45PM)

CMRR, First Floor, Auditorium

ISPS KEYNOTE LUNCHEON SPEAKER

Dr. Antanas Daugela
Friday, June 28

12:45PM–1:30PM (Lunch will be from 12:00PM to 12:45PM in the Lobby & Patio followed by the Keynote at 12:45 PM)

CMRR, First Floor, Auditorium

AWARDS BANQUET DINNER, DISTINGUISHED SPEAKER *

Dr. Frank Talke
35 Years of CMRR—Present, Past, and Future

Thursday, June 27
6:30PM—9:00PM
The Ida & Cecil Green Faculty Club, Atkinson Pavilion and Patio (Directional maps can be found at the registration desk.)

***Following Prof. Talke's presentation, the ISPS Awards will be presented.**

EXECUTIVE COMMITTEE MEETING

Thursday, June 27
4:00 PM–6:00 PM
Jacobs Hall, First Floor Conference Room
Directional maps can be found at the registration desk.

CONFERENCE PROCEEDINGS

Each attendee will be provided with an individual link to the online papers via email. In the event you do not receive the email, send a request to toolboxhelp@asme.org. Access to all of the papers accepted for presentation at the conference will be found online with this link. The official conference archival proceedings will be published after the conference and will not include accepted papers that were not presented at the conference. The official conference proceedings will be registered with the Library of Congress and submitted for abstracting and indexing. The proceedings will be published in the ASME Digital Library.

REGISTRATION

Registration will be located in the Lobby at the CMMR Building of the University of California, San Diego. The hours are as follows:

Wednesday, June 26	4:00PM–6:00PM
Thursday, June 27	7:00AM–5:00PM
Friday, June 28	8:00AM–4:00PM

QUESTIONS ABOUT THE MEETING

If you have any questions or need assistance, an ASME representative will be located at the conference registration area.

REGISTRANTS WITH DISABILITIES

Whenever possible, we are pleased to make arrangements for registrants with disabilities. Advance notice may be required for certain requests. For on-site assistance, please visit the conference registration area and ask to speak with a conference representative.

ABOUT THE UNIVERSITY OF CALIFORNIA, SAN DIEGO

As a billion-dollar research enterprise situated in the heart of one of the most densely concentrated innovation hubs in the nation, UC San Diego is a unique place where fresh ideas are translated into solutions to benefit society—from climate science and the human microbiome to nanotechnology and social mobility.

The Center for Memory and Recording Research (CMRR) was established at UC San Diego in 1983 to advance the state of the art in information storage technology and to produce highly trained graduate students and postdoctoral professionals for the data storage industry. Pursuing a dynamic, interdisciplinary program of cutting-edge research defined in cooperation with government agencies and industry partners, the Center's faculty, researchers, and students continue to push the frontiers of scientific knowledge and engineering technology to meet society's ever-increasing need for high-performance, reliable, and secure information storage systems.

HOTEL

Set in picturesque La Jolla, California, the Sheraton La Jolla welcomes you to enjoy nearby beaches, La Jolla Cove, Torrey Pines Golf Course, and popular San Diego attractions such as the San Diego Zoo, Balboa Park, LEGOLAND, and USS Midway. The hotel is conveniently located near the University of California San Diego, as well as some of the most renowned hospitals and research facilities in the world. The hotel is also located within 5 miles of some of the best independent craft breweries and distilleries in the nation. Within steps of the hotel, visit Whole Foods, restaurants, movie theaters, coffee shops, and more. Stroll through their 7.5 acres of lush, tropical gardens and manicured grounds with cascading waterfalls and Koi ponds. Take a dip in the heated outdoor pool. Maintain your workout routine in their state-of-the-art Sheraton Fitness Center. Treat yourself to on-site dining in the award-winning Humphreys La Jolla Grill or Shooter's Bar & Grill, which features nightly entertainment.

Sheraton La Jolla Hotel

3299 Holiday Court
La Jolla, California 92037
Phone Number: +1 858-453-5500

Keynote Luncheon Speaker

Thursday, June 27
12:45PM—1:30PM

CMRR, First Floor, Auditorium

"Opportunities of Magnetic Recording and Data Storage in Smart Machines and Manufacturing"

Abstract: Topic of smart manufacturing has drawn significant attention in recent years due to its importance in Industry 4.0, its influence to industry sectors, and its alignment with nation's strategic investment to leverage a nation's competitive strengths. The basic tenents for smart manufacturing are the smart machines, which offer digital solutions including hardware and software components for corporates and enterprises to possess key technologies of smart sensors, smart actuators and smart controllers to be able to compete in the world arena. Starting from introduction of key elements and principles for smart machines, smart manufacturing will be discussed in the context of 5Cs, cyber-physical systems, artificial intelligence and digital twins in its ecosystem comprising machines, platforms, and services. The focus of this talk will then be placed on discussing opportunities of magnetic recording and data storage technologies that can be implemented and applied in smart machines to improve manufacturing precision and accuracy and to transform traditional factory into digital manufacturing. An example of the speaker's recent R&D efforts will be given to illustrate how magnetic recording technologies can be of greater used in the precision smart machines.

Biography: Jen-Yuan (James) Chang received his Ph.D. degree from Carnegie Mellon University in 2001. His research interests are vibrations and control, precision magnetic recording and data storage devices, robotics, smart machines, and manufacturing. His work in the aforementioned areas has been the subject of numerous publications in international journals and conferences. Dr. Chang received several awards including the Outstanding Contribution Award and Distinguished Institution Award from ASME ISPS; the Outstanding Teaching, Research and University-Industry Collaboration Awards from NTHU; and most recently the Outstanding Research Award from Ministry of Science and Technology, Taiwan. He is a Fellow of the ASME.

Prof. Jen-Yuan (James) Chang

Distinguished Professor
Department of Power Mechanical Engineering, National Tsing Hua University, Taiwan

Deputy Director
Artificial Intelligence for Intelligent Manufacturing Systems Research Center, Ministry of Science and Technology, Taiwan

CTO
Mechanical and Mechatronics Systems Research Laboratories, Industrial Technology Research Institute (ITRI), Taiwan

Keynote Luncheon Speaker

Friday, June 28
12:45PM—1:30PM

CMRR, First Floor, Auditorium

"Nanomechanical Test Instruments: Touching the World at Nanoscale"

Dr. Antanas Daugela

Naonmetronix, LLC, Fayetteville, AR

Abstract: Advances in nanotechnology and all derived products would be impossible without nanoscale metrology instruments, specifically, Atomic Force Microscopes (AFM) and Nanomechanical Test instruments. While AFMs are providing surface shape measurements with sub-nanometer resolution, nanoindentors measure critical mechanical properties such as nanohardness and elastic modulus derived at the few nanometer depth levels. Material scientists/engineers use the surface topography and material properties data in designing and optimizing most of the products today. For example, coatings on contact lenses, glasses, the cover of an iPhone, nanofiber-based modern clothes were designed with the help of those instruments. Modern automotive, pharmaceutical, biomedical R&D, and manufacturing control strongly depend on nanomechanical test results.

The main difference between an AFM and a nanoindenter is that the nanoindenter can be modelled by a single DOF mechanical system eliminating uncertainties of the probing stylus geometry. A retrospective view on instrument design brings us to the classical nanoindenter configuration that consist of a voice coil actuator and a precision three plate capacitive sensor where the center plate hangs on a precision low stiffness suspension. A capacitive sensing and actuation is another popular design alternative which minimizes temperature drift. A piezo actuator and multiple capacitive sensors configuration is a popular design for instruments that can be operated at higher (up to 1N) loads and still have 1nm resolution. Other configurations consisting of laser/photodiode, LVDT sensing did not withstand a trial of time. In-situ scanning nanomechanical test instruments combined both worlds, i.e., AFM-type imaging with materials properties measurements. The last decade was an indeed in-situ instrumentation era where integration of nanomechanical test instruments with SEM, Raman, multi-wavelength microscopy and spectroscopy, tribometers and high temperature/vacuum chambers took place.

The ISO/ASTM standards for quasi-static instrumented nanoindentation targeting elasto-plastic metallic materials behavior were developed and adopted at the beginning of 2000s. The other testing modes such as dynamic, viscoelastic, and nanoscratch were standardized very recently in order to accommodate polymers and biomaterials research needs where quasi-static measurements fell short. Passive and active acoustic methods have been explored in conjunction with nanomechanical tests for nanoscale fracture and materials phase transition investigation.

Data storage and particularly the hard disk drive industry has a special relationship with nanomechanical test instrumentation and therefore contributed a lot to their development. More than a decade ago HDD DLC overcoats became ~2nm thick. Since then the state-of-the-art capacitive sensing technology of nanoindentors was not able to provide sufficient resolution for reliable material properties measurements. Nevertheless, the current recipes for HDD DLC overcoats quantitative characterization still rely on the combination of sclerometric measurements and AFM resolution imaging.

Biography: Antanas (Tony) Daugela received his IE doctorate from the Kaunas University of Technology, Lithuania (1996) and PhD in ME from the Gifu University, Japan (1997). He was a posdoc at the CMRR/UCSD in 1997–1998. In the following 18 years, Tony held senior staff scientist/lead engineer positions at Hysitron, CETR, and Seagate. His interest is nanoscale metrology. He developed four commercialized nanomechanical test instruments one receiving the US R&D-50 award. Tony holds seven US patents and has 20+ journal publications. He presented work worldwide and participated in development of the ISO nanoindentation/nanoscratch standards. Tony founded Nanometronix LLC and is a president since 2017.

ISPS Banquet Dinner and Distinguished Speaker*

**Included with full registration. Tickets for guests can be purchased at the registration desk for $50*

The ISPS conference banquet will recognize the exceptional achievements and dedication of the numerous leaders within the Information Storage & Processing Systems community. The evening will begin with a Distinguished Lecture by Professor Frank Talke, University of California, San Diego, Center for Memory and Recording Research (CMMR), San Diego, CA. The Award Ceremony will include award presentations to winners of the ISPS Student Fellowships and Conference Scholarships.

THURSDAY, JUNE 27
6:30PM—9:00PM

The Ida & Cecil Green Faculty Club, Atkinson Pavilion & Patio

Professor Frank Talke

University of California, San Diego
San Diego, CA

Center for Memory and Recording Research (CMMR)
San Diego, CA

"35 Years of CMRR—Present, Past, and Future"

Abstract: CMRR was established in 1983 as a center of expertise for the advancement of magnetic recording storage technology. The time in the early 1980s was a time of unprecedented growth of the computer industry, with the demand for digital storage devices exceeding the supply. Fourteen-inch disk drives, floppy disks, and flexible tape drives were the main products on the market. More than 50 different companies were competing in this rapidly developing branch of computer technology. Many companies from Asia started to enter the field of data storage at that time, and it was becoming apparent that the technology would soon find very strong competition from Asian companies.

Two of the industrial leaders of the technology at that time, Jim Lemke from Spin Physics and Art Anderson from IBM, saw this change coming and proposed the establishment of the Center for Magnetic Recording Research (CMRR), to educate highly trained students, postdocs and visitors, to work in the data storage industry in the United States. At the time of the founding of CMRR, four endowed chairs areas were provided, namely, in recording physics (Professor Bertram), in physics of magnetic materials (Professor Berkowitz), in signal processing (Professor Wolf), and in tribology and mechanics (Professor Talke).

CMRR has seen large growth over the last 35 years, changing its name recently to the Center for Memory and Recording Research, to indicate the increased scope of research being conducted. The Center is pursuing leading-edge research with support from government and industry and is a focal point for research in the computer and storage industry. In addition to data storage related activities, Nano-engineering projects are pursued actively by faculty associated with CMRR, and new research areas such as biomedical devices are part of the present research activities.

Further details about the presence, past and future of CMRR will be presented.

ISPS Banquet Distinguished Speaker

Biography: Dr. Frank Talke began his career at the IBM Research and Development Laboratories in San Jose, California, in 1969. He joined the department of Applied Mechanics and Engineering Science at UC San Diego in 1986.

Dr. Talke made important contributions in tribology of magnetic recording systems and in the development of a prototype drop-on-demand color ink jet printer. He performed pioneering studies in applying laser Doppler Vibrometry to hard disk drives, and in studying novel lubricants and additives for the head/disk interface.

More recently, Dr. Talke has become interested in medical device technology, studying 3-D printed disposable endoscopes and miniaturized intraocular pressure sensors for implantation in the human eye.

Dr. Talke has authored/co-authored more than 350 archived journal articles. He holds 11 patents with two pending.

An ASME Fellow, Dr. Talke most recently served as member of the Committee on Honors (2011—2017). He received the ASME Medal in 2008, the Mayo D. Hersey Award in 2010, and the Tribology Gold Medal in 2010. Dr. Talke is a Fellow of the STLE and the IEEE. He became an honorary member of ASME in 2018, and was elected to the National Academy of Engineering in 1999.

Dr. Talke received his Diplom-Ingenieur degree from the University of Stuttgart, Germany, in 1965. He earned his master's and Ph.D. degrees in mechanical engineering from the University of California, Berkeley, in 1966 and 1968, respectively. He holds an honorary doctorate from the Technical University of Munich (TUM), Germany.

The following awards are being presented during the banquet and distinguished speaker dinner.

Distinguished Speaker

THURSDAY, JUNE 27
6:30PM—9:00PM
The Ida & Cecil Green Faculty Club, Atkinson Pavilion & Patio

Professor Frank Talke
University of California, San Diego, San Diego, CA
Center for Memory and Recording Research (CMMR), San Diego, CA

"35 Years of CMRR—Present, Past, and Future"

ISPS Division Graduate Student Fellowships

Ying-Chuan Kao
National Taiwan University
"Precision Measurement and Comprehensive Analysis of Dielectrophoretic Crossover Behavior of Micro-Particles"

Ping-Hsun Lee
National Tsing Hua University
"Platform Design for Characterizing Shear Force Produced by Magnetized Magnetorheological Fluid"

Qilong Cheng
University of California, Berkley
"Effect of Humidity on the Nanoscale Heat Transfer at the Head-Media Interface"

Karcher Morris
University of California, San Diego
"A Wearable Neck Measurement Device and Monitoring System to Improve Ergonomic Performance of Surgeons"

Rajeev Kumar Pandey
National Chiao Tung University
"A New On-Chip Real-Time Algorithm for Non-Invasive Cuffless Blood Pressure Estimation Using PPG Sensor"

ISPS Division Graduate Student Travel Stipend

Phuong Truong
University of California, San Diego
"Development of a Portable Reader for an Optical Intraocular Pressure Sensor"

Tan Trinh
University of California, San Diego
"Laser Current Studies in Heat-Assisted Magnetic Recording"

Makio Tamada
Tokai University
"Establishment of Mass Production Method of Mesoporous Silica Thin Film and Development of Porous Carbon Thin Film Using 1,4-Dihydroxyanthraquinone as Carbon Source"

Junsun Yoo
Yonsei University
"Bandgap Analysis of Elastic Metamaterial Tunable Vibration Absorber with Electromagnetic Stiffness: Bandgap Change Due to Electromagnetic Stiffness Variation"

Hyeon Gi Ryu
Gachon University
"Experimental and Numerical Analysis of Change of Wettability Induced by Deflection on a Specific Surface"

Yu-Chen Chen
National Taiwan University
"Deposition of Highly Transparent and Conductive Films on Tilted Substrates by Atmospheric Pressure Plasma Jet"

Po-Lin Huang
National Tsing Hua University
"Development of Novel Tooth-Matching Linear Piezoelectric Actuator"

Shih-Wei Liu
National Tsing Hua University
"Eye-In-Hand Robotic Gripper Vision Fusion for Object Recognition and Tracking"

ASME ISPS Distinguished Institution Award

Prof. Paul C.P. Chao
National Chiao Tung University

Prof. Bharat Bhushan
Ohio State University

Technical Sessions

TRACK 3 HEAT ASSISTED MAGNETIC RECORDING & MICROWAVE ASSISTED MAGNETIC RECORDING

Track Organizer: Youfeng Zhang, *Western Digital, San Jose, CA, United States*

Track Co-Organizer: Abhishek Srivastava, *Western Digital Corporation, San Jose, CA, United States*

THURSDAY, JUNE 27

3-1 HEAT ASSISTED MAGNETIC RECORDING 1

1st Floor, CMMR, Auditorium **9:15AM—10:45AM**

HAMR Emulation using Plasmonic Sensor Arrays
Technical Presentation. ISPS2019-7456
Masahiro Yanagisawa, Mikiko Saito, Masahiro Kunimoto, Takayuki Homma, *Waseda University, Tokyo, Japan*

HDI Tribology Challenges and Strategies of Heat Assisted Magnetic Recording Drives
Technical Paper Publication. ISPS2019-7443
Youfeng Zhang, *WDC Spacing Control & Integration, San Jose, CA, United States,* **Yeoungchin Yoon,** *Western Digital Corporation, San Jose, CA, United States,* **Shaomin Xiong,** *HGST, Fremont, CA, United States*

Smear Behavior of PFPE Lubricant Films of Magnetic Disk by Laser Heating in Air and Helium
Technical Presentation. ISPS2019-7470
Norio Tagawa, Kenji Yakata, Renguo Lu, Shinji Koganezawa, Hiroshi Tani, *Kansai University, Suita, Osaka, Japan*

Air Bearing Pushback in Heat Assisted Magnetic Recording
Technical Paper Publication. *ISPS2019-7503*
Shaomin Xiong, *HGST, Fremont, CA, United States,* **Robert Smith, Chanh Nguyen,** *Western Digital Corporation, San Jose, CA, United States,* **Youfeng Zhang,** *WDC Spacing Control & Integration, San Jose, CA, United States,* **Yeoungchin Yoon,** *Western Digital Corporation, San Jose, CA, United States*

Evolution of Transferred Lubricant Distributions on the Slider Surface Under Ambient and Laser-Heating Conditions
Technical Paper Publication. ISPS2019-7458
Ryan Hetzel, Shao Wang, Jonathon Lawry, Ahmed Alsafwani, *The University of Akron, Akron, OH, United States*

Hybrid Lubricant Film With High Bonding Ratio and High Coverage
Technical Paper Publication. ISPS2019-7428
Hiroshi Tani, Yuki Uesaraie, Renguo Lu, Shinji Koganezawa, Norio Tagawa, *Kansai University, Suita, Osaka, Japan*

TRACK 13 APPLICATION OF DATA AND ARTIFICIAL INTELLIGENCE IN MECHANICAL ENGINEERING

Track Organizer: Haoyu Wu, *Western Digital, Milpitas, CA, United States*

Track Co-Organizer: Minghui Zheng, *University of California, Berkeley, Albany, CA, United States,* **Qian Zhong,** *Western Digital, Milpitas, CA, United States*

13-1 APPLICATION OF DATA AND ARTIFICIAL INTELLIGENCE IN MECHANICAL ENGINEERING 1

1st Floor, CMMR, Conference Room **9:15AM—10:45AM**

Cost Effective On-Site Fault Diagnosis Home Appliance Using a Smart Phone and Support Vector Machine
Technical Paper Publication. ISPS2019-7445
Ji Min Baek, Kyeong Ha Lee, Seung Ho Lee, Ja Choon Koo, *Sungkyunkwan University, Suwon, Gyeonggi-do, Korea (Republic)*

A Real-Time Human Recognition and Tracking System With a Dual-Camera Setup
Technical Paper Publication. ISPS2019-7469
Haoyu Wu, *Western Digital, Milpitas, CA, United States,* **Shaomin Xiong,** *HGST, Fremont, CA, United States,* **Toshiki Hirano,** *Western Digital, Milpitas, CA, United States*

A New Human Intruder Detection Scheme for Video Surveillance
Technical Paper Publication. ISPS2019-7490
Shaomin Xiong, *HGST, Fremont, CA, United States,* **Haoyu Wu, Toshiki Hirano,** *Western Digital, Milpitas, CA, United States*

Realization of Natural User Interface for Computer Control With KNN Classifier Enhanced Smart Glove
Technical Paper Publication. ISPS2019-7493
Chieh-Ju Wu, Kai-Hsiang Lin, Meng-Lin Hsieh, Jen-Yuan (James) Chang, *National Tsing Hua University, Hsinchu, Taiwan*

Failure Detection for Multiple Micro-Punches Outfitted in Progressive Piercing Processes With Artificial Intelligent Model
Technical Paper Publication. ISPS2019-7494
Tsung-Liang Wu, Yu-Chun Hwang, *National Kaohsiung University of Science & Technology, Kaohsiung, Taiwan*

TRACK 3 HEAT ASSISTED MAGNETIC RECORDING & MICROWAVE ASSISTED MAGNETIC RECORDING

Track Organizer: Youfeng Zhang, *Western Digital, San Jose, CA, United States*

Track Co-Organizer: Abhishek Srivastava, *Western Digital Corporation, San Jose, CA, United States*

3-2 HEAT ASSISTED MAGNETIC RECORDING 2

1st Floor, CMMR, Auditorium **11:00AM—12:00PM**

Addressing the Achilles' Heels of Amorphous Carbon Overcoats With Doping: Mechanisms of Thermal and Oxidative Degradation
Technical Presentation. ISPS2019-7442
Filippo Mangolini, *The University of Texas at Austin, Austin, TX, United States,* **J. Brandon McClimon, James Hilbert, Jennifer Lukes, Robert Carpick,** *University of Pennsylvania, Philadelphia, PA, United States*

Effect of Humidity on the Nanoscale Heat Transfer at the Head-Media Interface
Technical Paper Publication. ISPS2019-7449
Qilong Cheng, *University of California Berkeley, Berkeley, CA, United States,* **Yuan Ma,** *Texas A&M, College Station, TX, United States,* **David Bogy,** *UC Berkeley, El Cerrito, CA, United States*

Numerical and Experimental Investigation of Nanoscale Heat Transfer in the Head-Media Interface During Static Touchdown
Technical Paper Publication. ISPS2019-7448
Siddhesh Sakhalkar, Qilong Cheng, Amin Ghafari, *University of California Berkeley, Berkeley, CA, United States,* **Yuan Ma,** *Texas A&M, College Station, TX, United States,* **David Bogy,** *University of California Berkeley, El Cerrito, CA, United States*

Establishment of Mass Production Method of Mesoporous Silica Thin Film and Development of Porous Carbon Thin Film Using 1,4-Dihydroxyanthraquinone As Carbon Source
Technical Paper Publication. ISPS2019-7468
Makio Tamada, Yuta Sunami, *Tokai University, Hiratsuka-shi, Japan*
Filippo Mangolini, *The University of Texas at Austin. Austin, TX, United States,* **J. Brandon McClimon, James Hilber, Jennifer Lukes, Jennifer Lukes,** *University of Pennsylvania, Philadelphia, PA, United States*

TRACK 7 SMART MATERIALS

Track Organizer: Kyoung-Su Park, *Gachon University, Seoul, Korea (Republic)*
Track Co-Organizer: Shintaro Itoh, *Nagoya University, Nagoya, Japan*

7-1 SMART MATERIALS 1
1st Floor, CMMR, Conference Room **11:00AM—12:00PM**

Bandgap Analysis of Elastic Metamaterial Tunable Vibration Absorber with Electromagnetic Stiffness
Technical Presentation. ISPS2019-7404
Junsun Yoo, Dongwook Kim, Seonbin Lim, No-Cheol Park, *Yonsei University, Seoul, Korea (Republic)*

Deposition of Highly Transparent and Conductive Films on Tilted Substrates by Atmospheric Pressure Plasma Jet
Technical Paper Publication. ISPS2019-7423
Yu-Chen Chen, Wen-Kai Chen, Jing-Chi Huang, *National Taiwan University, Taipei, Taiwan,* **Jia-yang Juang,** *National Taiwan University-Dept. of Mechanical Engineering, Taipei, Taiwan*

Platform Design for Characterizing Shear Force Produced by Magnetized Magnetorheological Fluid
Technical Paper Publication. ISPS2019-7450
Ping-Hsun Lee, Jen-Yuan (James) Chang, *National Tsing Hua University, Hsinchu, Taiwan*

Design of a Magnetorheological Finishing Tool Manipulated by a Mechanical Magnetic Switch for Magnetic Field Assisted Finishing
Technical Paper Publication. ISPS2019-7492
Ping-Hsun Lee, Jen-Yuan (James) Chang, *National Tsing Hua University, Hsinchu, Taiwan*

Investigation of Zinc-Silver Oxide-Thermoplastic Composite for Application in a Biofilm Retardant Urinary Catheter
Technical Paper Publication. ISPS2019-7517
Oren Gotlib, Karcher Morris, Frederick E. Spada, Madhu Alagiri, Frank Talke, Katy Patras, *University of California, San Diego, La Jolla, CA, United States*

Investigation of Zinc - Silver Oxide Thermoplastic Composite for Application in a Biofilm Retardant Catheter
Technical Presentation. ISPS2019-7518
Oren Gotlib, Karcher Morris, Frederick E. Spada, Madhu Alagiri, Frank Talke, *University of California, San Diego, La Jolla, CA, United States,* **Katy Patras,** *University of California, La Jolla, CA, United States*

TRACK 14 KEYNOTES

14-1 KEYNOTE: NANOMECHANICAL TEST INSTRUMENTS: TOUCHING THE WORLD AT NANOSCALE
1st Floor, CMMR, Auditorium **12:45PM—1:30PM**

TRACK 1 TRIBOLOGY, DYNAMICS AND SERVO CONTROL OF NANO-MICRO SYSTEMS

Track Organizer: Frank Talke, *University of California San Diego, La Jolla, CA, United States*
Track Co-Organizer: Jia-yang Juang, *National Taiwan University-Dept. of Mechanical Engineering, Taipei, Taiwan,* **Junguo Xu,** *Western Digital, Fujisawa, Kanagawa, Japan,* **Andrey Ovcharenko,** *Western Digital, San Jose, CA, United States*

1-1 TRIBOLOGY, DYNAMICS AND SERVO CONTROL OF NANO-MICRO SYSTEMS 1
1st Floor, CMMR, Auditorium **2:00PM—3:45PM**

A Method to Detect Head Media Spacing Change in a Hard Disk Drive Using an Embedded Contact Sensor
Technical Paper Publication. ISPS2019-7457
Rahul Rai, Puneet Bhargava, Bernhard Knigge, Aravind Murthy, *Western Digital Corporation, San Jose, CA, United States*

Investigation of Disk Runout in Air, Helium, and Vacuum
Technical Presentation. ISPS2019-7472
Qin Zhao, Zijian Zeng, Tan Trinh, *University of California San Diego, La Jolla, CA, United States,* **Christoph Schade,** *TU Dresden, Dresden, Germany*

Voltage Biasing and Nano-Corrosion of the Head-Disk Interface
Technical Presentation. ISPS2019-7508
Tan Trinh, Frederick E. Spada, Frank Talke, *University of California San Diego, La Jolla, CA, United States,* **Christoph Schade,** *TU Dresden, Dresden, Germany,* **Michael Johnson,** *Seagate Technology, Bloomington, MN, United States*

Laser Current Studies in Heat-Assisted Magnetic Recording
Technical Paper Publication. ISPS2019-7511
Tan Trinh, *University of California San Diego, La Jolla, CA, United States,* **Sukumar Rajauria, Robert Smith, Erhard Schreck, Qing Dai,** *Western Digital Corporation, San Jose, CA, United States,* **Frank Talke,** *University of California San Diego, La Jolla, CA, United States*

Detachable Endoscope for Endotracheal Intubation
Technical Presentation. ISPS2019-7515
Matthew Kohanfars, Yu Li, Karcher Morris, Jaspreet Somal, Farshad Ahadian, Frank Talke, *University of California San Diego, La Jolla, CA, United States*

Sound-Induced Vibration to Hard Disk Drive in a Data Storage Enclosure
Technical Paper Publication. ISPS2019-7489
Shaomin Xiong, *HGST, Fremont, CA, United States,* **Toshiki Hirano,** *Western Digital, Milpitas, CA, United States*

TRACK 8 SMART SENSORS AND ACTUATORS

Track Organizer: Shinji Koganezawa, *Kansai University, Suita, Japan*
Track Co-Organizer: Kwangseok Oh, *Hankyong National University, Anseong-Si, Korea (Republic)*

8-1 SMART SENSORS AND ACTUATORS 1

1st Floor, CMMR, Conference Room **2:00PM—3:45PM**

Design of a Novel Variable Stiffness Series Elastic Actuator for Extended Linearity
Technical Paper Publication. ISPS2019-7499
Seung Ho Lee, hyeok Jin Lee, Kyeong Ha Lee, Ji Min Baek, Ja Choon Koo, *SungKyunKwan University, SuWon, Gyeonggi, Korea (Republic)*

Error Modeling and Compensation for Improving the Position Accuracy of Dual Absolute Encoder System
Technical Presentation. ISPS2019-7467
Kyung-min Lee, *Chungnam National University, Daejeon, Korea (Republic),* **Taehyeong Gu,** *University of Texas Health Science Center at Houston, Houston, TX, United States,* **Young-bong Bang,** *Advanced Institutes of Convergence Technology, Gyenggi-do, Korea (Republic)*

Design and Implementation of a High Accuracy Interpolation Encoder IC for Magnetic Sensor
Technical Paper Publication. ISPS2019-7476
Wen-Yu Chen, Yi-Feng Zhang, Paul C.P. Chao, Eka Fitrah Pribadi, *National Chiao Tung University, Hsinchu, Taiwan*

Development of Novel Tooth-Matching Linear Piezoelectric Actuator
Technical Paper Publication. ISPS2019-7497
Po-Lin Huang, Jen-Yuan (James) Chang, *National Tsing Hua University, Hsinchu, Taiwan*

TRACK 14 KEYNOTES

14-2 KEYNOTE: 35 YEARS OF CMRR—PRESENT, PAST, AND FUTURE

The Ida & Cecil Green Faculty Club **6:30PM—9:00PM**

TRACK 6 DYNAMICS AND CONTROL FOR FUTURE TECHNOLOGIES

FRIDAY, JUNE 28

Track Organizer: Guoxiao Guo, *Western Digital, Irvine, CA, United States*
Track Co-Organizer: Gunhee Jang, *Hanyang Univ, Seoul 133 791, Korea (Republic),* **Ong Eng Hong,** *Singapore University of Technology and Design, Singapore, Singapore,* **Ja Choon Koo,** *Sungkyunkwan University, Suwon, Korea (Republic)*

6-1 DYNAMICS AND CONTROL FOR FUTURE TECHNOLOGIES 1

1st Floor, CMMR, Auditorium **9:15AM—10:45AM**

A Predictive Driver Model Based Decision Algorithm for Takeover Control of Longitudinal Autonomous Driving
Technical Presentation. ISPS2019-7454
Kwangseok Oh, *Hankyong National University, Anseong-Si, Korea (Republic),* **Kyongsu Yi,** *Seoul National University, Seoul, Korea (Republic)*

Investigation on the Vibration of High Speed Cable Robot Manipulation due to Tension Around Drum
Technical Paper Publication. ISPS2019-7455
Jinwoo Jung, *Daegu Catholic University, Geongsan-si, Korea (Republic),* **Jinlong Piao, Eunpyo Choi, Jong-Oh Park, Chang-Sei Kim,** *Chonnam National University, Gwangju, Korea (Republic)*

Design of Controller for Reducing Cable Driven Parallel Robot's Position Error Using Hybrid RNN
Technical Presentation. ISPS2019-7464
Jung-Min Kang, Song Hyeon Jeon, Kyoung-Su Park, *Gachon University, Seongnam-si, Korea (Republic),* **Hyeon Gi Ryu,** *Gachon University, Gyeonggi-do, Korea (Republic)*

Inverse Kinematics of a Humanoid Robotic Arm With Fixed Joint Method
Technical Paper Publication. ISPS2019-7495
Yu-Heng Deng, Jen-Yuan (James) Chang, *National Tsing Hua University, Hsinchu, Taiwan*

Eye-in-Hand Robotic Gripper Vision Fusion for Object Recognition and Tracking
Technical Paper Publication. ISPS2019-7496
Shih-Wei Liu, Jen-Yuan (James) Chang, *National Tsing Hua University, Hsinchu, Taiwan*

Optimization of Phase-Locked-Loop Based Correction Method for Linear Magnetic Encoding Signals
Technical Paper Publication. ISPS2019-7498
Yi-Ting Shih, Jen-Yuan (James) Chang, *National Tsing Hua University, Hsinchu, Taiwan*

TRACK 12 ADVANCED SIMULATION IN SCIENCE AND ENGINEERING

Track Organizer: Kyoung-Su Park, *Gachon University, Seoul, Korea (Republic)*
Track Co-Organizer: Sangwook Lee, *Honam University, Gwangju, Korea (Republic)*

12-1 ADVANCED SIMULATION IN SCIENCE AND ENGINEERING 1

1st Floor, CMMR, Conference Room **9:15AM—10:45AM**

Aerodynamic Characteristics of Co-Axial Rotor in Duct
Technical Presentation. ISPS2019-7402
Sangwook Lee, Jong Kwon Kim, *Honam University, Gwangju, Korea (Republic)*

Optimal Design of Electric Compressor Motor for Commercial Electric Vehicle Integrated Air Conditioning System
Technical Presentation. ISPS2019-7427
Sangwook Lee, Soo-Whang Baek, *Honam University, Gwangju, Korea (Republic)*

Construction of Dynamic Simulation Framework of an Ultra-High Speed Maglev Train With Curved Motion
Technical Presentation. ISPS2019-7471
Hue Ha, Jung-Min Kang, Kyoung-Su Park, *Gachon University, Seongnam-si, Korea (Republic),* **Hyeon Gi Ryu,** *Gachon University, Gyeonggi-do, Korea (Republic)*

A Study on the High Insulation Interior Material for Electric Vehicle to Reduce Heating and Cooling Heat Load
Technical Presentation. ISPS2019-7491
Sangwook Lee, Soo-Whang Baek, *Honam University, Gwangju, Korea (Republic)*

Optimal Design of a Traction Motor for Eco-Friendly Car Based on Deep Learning
Technical Presentation. ISPS2019-7509
Yongmin You, *Honam University, Gwangju, Korea (Republic)*

TRACK 8 SMART SENSORS AND ACTUATORS

Track Organizer: Shinji Koganezawa, *Kansai University, Suita, Japan*
Track Co-Organizer: Kwangseok Oh, *Hankyong National University, Anseong-Si, Korea (Republic)*

8-2 SMART SENSORS AND ACTUATORS 2

1st Floor, CMMR, Conference Room **11:00AM—12:00PM**

Development of Novel Rotary Magnetic Encoder
Technical Paper Publication. ISPS2019-7502
Kai-Yang Peng, Jen-Yuan (James) Chang, *National Tsing Hua University, Hsinchu, Taiwan*

Application of Code Division Multiple Access Technology in Readout Circuit and System Design for an Ultra-Thin On-Cell Flexible Capacitive Touch Panel
Technical Paper Publication. ISPS2019-7522
Ying-Jia Lin, Ying-Cheng Su, Jia-Yu Zhang, Eka Fitrah Pribadi, Paul C.P. Chao, *National Chiao Tung University, Hsinchu, Taiwan*

A V2V Communication Based Fault-Tolerant Control Strategy for Functional Safety of Longitudinal Autonomous Driving
Technical Presentation. ISPS2019-7485
Taejun Song, Kwangseok Oh, *Hankyong National University, Anseong-Si, Korea (Republic),* **Hyewon Lee,** *Hankyong National University, Gyeonggi-do, Korea (Republic),* **Jongmin Lee, Kyongsu Yi,** *Seoul National University, Seoul, Korea (Republic)*

An Investigation on Time to Takeover Control for Functional Safety of Autonomous Vehicles using Geometrical Analysis
Technical Presentation. ISPS2019-7488
Hyewon LEE, *Hankyong National University, Gyeonggi-do, Korea (Republic),* **Taejun Song, Kwangseok Oh,** *Hankyong National University, Anseong-Si, Korea (Republic),* **Youngmin Yoon, Kyongsu Yi,** *Seoul National University, Seoul, Korea (Republic)*

Preview Control of Web Position in Roll-to-Roll Printing
Technical Presentation. ISPS2019-7505
Byeongcheol Lee, Youngjin Kim, Jihyeon Kim, Taehyeong Kim, Jimin Park, Dongho Oh, *Chungnam National University, Daejeon, Korea (Republic)*

Technical Sessions

TRACK 10 OPTICAL IMAGING DEVICES AND OPTO-MECHATRONIC SYSTEMS

Track Organizer: No-Cheol Park, *Yonsei University, Seoul, Korea (Republic)*

Track Co-Organizer: Paul C.P. Chao, *National Chiao Tung University, Hsinchu 300, Taiwan,* **Wanchin Kim,** *Hanbat National University, Seoul, Korea (Republic)*

10-1 OPTICAL IMAGING DEVICES AND OPTO-MECHATRONIC SYSTEMS 1

1st Floor, CMMR, Auditorium **11:00AM—12:00PM**

Optical System Design for UV Direct Patterning of Ultra-Wide Width by the Resolution of 20um
Technical Presentation. ISPS2019-7417
Jongbok Park, Dong-Kil Lee, *Korea Photonics Technology Institute, Gwangju, Korea (Republic),* **Wanchin Kim,** *Hanbat National University, Seoul, Korea (Republic)*

Optical System Design for LiDAR With Ultra-Wide FOV
Technical Presentation. ISPS2019-7421
Hyun Choi, *Konyang University, Chungcheongnam-do, Korea (Republic),* **Wanchin Kim,** *Hanbat National University, Seoul, Korea (Republic)*

Achieving Sensing Precision of 0.5nA in Pixel with 7-¼s Settling Time by a New External Current Sensing Circuit for AMOLED Displays
Technical Paper Publication. ISPS2019-7474
Rajeev Kumar Pandey, Tzu Hao Huang, Wei-hsuan Ho, Paul C.P. Chao, Eka Fitrah Pribadi, *National Chiao Tung University, Hsinchu, Taiwan*

A New On-Chip Real-Time Algorithm for Non-Invasive Cuffless Blood Pressure Estimation Using PPG Sensor
Technical Paper Publication. ISPS2019-7475
Ming Hua Yeh, Paul C.P. Chao, Rajeev Kumar Pandey, *National Chiao Tung University, Hsinchu, Hsinchu, Taiwan*

Optical Simulation for Designing a PPG Signal Patch
Technical Paper Publication. ISPS2019-7480
Eka Fitrah Pribadi, Paul C.P. Chao, *National Chiao Tung University, Hsinchu, Taiwan*

TRACK 14 KEYNOTES

14-3 KEYNOTE: OPPORTUNITIES OF MAGNETIC RECORDING AND DATA STORAGE IN SMART MACHINES AND MANUFACTURING

1st Floor, CMMR, Auditorium **12:45PM—1:30PM**

TRACK 9 MICRO/NANO & BIOMEDICAL MECHATRONIC SYSTEMS

Track Organizer: Tien-Kan Chung, *National Chiao Tung University, Hsinchu, Taiwan*

Track Co-Organizer: Hiroshige Matsuoka, *Tottori University, Tottori, Japan,* **Norio Tagawa,** *Kansai University, Suita, Osaka, Japan,* **Jia-Ying Tu,** *National Tsing Hua University, Hsinchu, Taiwan*

9-1 MICRO/NANO AND BIOMEDICAL MECHATRONIC SYSTEMS 1

1st Floor, CMMR, Auditorium **2:00PM—3:45PM**

Precision Measurement and Comprehensive Analysis of Dielectrophoretic Crossover Behavior of Micro-Particles
Technical Paper Publication. ISPS2019-7426
Ying-Chuan Kao, Yun-Wei Lu, Chieh Sun, Chia-Ling Hung, Jia-yang Juang, *National Taiwan University, Taipei, Taiwan*

Experimental and Numerical Analysis of Change of Wettability Induced by Deflection on a Specific Surface
Technical Presentation. ISPS2019-7466
Hyeon Gi Ryu, *Gachon University, Gyeonggi-do, Korea (Republic),* **Jung-Min Kang,** *Gachon University, Seongnam-si, Korea (Republic),* **Kyoung-Su Park,** *Gachon University, Seoul, Korea (Republic)*

A Wearable Neck Measurement Device and Monitoring System to Improve Ergonomic Performance of Surgeons: Part 1
Technical Paper Publication. ISPS2019-7513
Karcher Morris, Minghui Zhao, Jenny Lam, Garth Jacobsen, Santiago Horgan, Frank Talke, *University of California San Diego, La Jolla, CA, United States*

A Wearable Neck Measurement Device and Monitoring System to Improve Ergonomic Performance of Surgeons: Part 2
Technical Presentation. ISPS2019-7514
Karcher Morris, Minghui Zhao, Jenny Lam, Garth Jacobsen, Santiago Horgan, Frank Talke, *University of California San Diego, La Jolla, CA, United States*

An Electromagnetic Targeting System With Semi-Circular Configuration for Navigating Endo-Bronchoscope
Technical Paper Publication. ISPS2019-7520
Shao-Wei Hsu, Ching-Kai Lin, Yun-Chien Cheng, Chen-Wei Chang, Tien-Kan Chung, *National Taiwan University Hospital, Hsinchu, Taiwan,* **Chin-Chung Chen,** *University of California, Los Angeles, Los Angeles, CA, United States*

Development of a Portable Reader for an Optical Intraocular Pressure Sensor
Technical Paper Publication. ISPS2019-7521
Phuong Truong, Alex Phan, Nicolas Williams, Frank Talke, *University of California San Diego, La Jolla, CA, United States*

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Johnson	Michael	1-1	Voltage Biasing and Nano-Corrosion of the Head-Disk Interface	ISPS2019-7508
Juang	Jia-yang	7-1	Deposition of Highly Transparent and Conductive Films on Tilted Substrates by Atmospheric Pressure Plasma Jet	ISPS2019-7423
		9-1	Precision Measurement and Comprehensive Analysis of Dielectrophoretic Crossover Behavior of Micro-Particles	ISPS2019-7426
Jung	Jinwoo	6-1	Investigation on the Vibration of High Speed Cable Robot Manipulation due to Tension Around Drum	ISPS2019-7455
Kang	Jung-Min	6-1	Design of Controller for Reducing Cable Driven Parallel Robot's Position Error Using Hybrid RNN	ISPS2019-7464
		9-1	Experimental and Numerical Analysis of Change Of Wettability Induced by Deflection on a Specific Surface	ISPS2019-7466
		12-1	Construction of Dynamic Simulation Framework of an Ultra-High Speed Maglev Train with Curved Motion	ISPS2019-7471
Kao	Ying-Chuan	9-1	Precision Measurement and Comprehensive Analysis of Dielectrophoretic Crossover Behavior of Micro-Particles	ISPS2019-7426
Kim	Chang-Sei	6-1	Investigation on the Vibration of High Speed Cable Robot Manipulation due to Tension Around Drum	ISPS2019-7455
Kim	Dongwook	7-1	Bandgap Analysis of Elastic Metamaterial Tunable Vibration Absorber with Electromagnetic Stiffness	ISPS2019-7404
Kim	Jihyeon	8-2	Preview Control of Web Position in Roll-To-Roll Printing	ISPS2019-7505
Kim	Jong Kwon	12-1	Aerodynamic Characteristics of Co-Axial Rotor in Duct	ISPS2019-7402
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Kim	Wanchin	10-1	Optical System Design for UV Direct Patterning of Ultra Wide Width by the Resolution of 20um	ISPS2019-7417
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Kim	Youngjin	8-2	Preview Control of Web Position in Roll-To-Roll Printing	ISPS2019-7505
Knigge	Bernhard	1-1	A Method to Detect Head Media Spacing Change in a Hard Disk Drive Using an Embedded Contact Sensor	ISPS2019-7457
Koganeza-wa	Shinji	3-1	Smear Behavior of PFPE Lubricant Films of Magnetic Disk by Laser Heating in Air and Helium	ISPS2019-7470
		3-1	Hybrid Lubricant Film With High Bonding Ratio and High Coverage	ISPS2019-7428
Kohanfars	Matthew	1-1	Detachable Endoscope for Endotracheal Intubation	ISPS2019-7515
Koo	Ja Choon	8-1	Design of a Novel Variable Stiffness Series Elastic Actuator for Extended Linearity	ISPS2019-7499
		13-1	Cost Effective On-Site Fault Diagnosis Home Appliance Using a Smart Phone and Support Vector Machine	ISPS2019-7445
Kunimoto	Masahiro	3-1	HAMR Emulation using Plasmonic Sensor Arrays	ISPS2019-7456
Lam	Jenny	9-1	A Wearable Neck Measurement Device and Monitoring System to Improve Ergonomic Performance of Surgeons Part 1	ISPS2019-7513
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Lee	Hyewon	8-2	A V2V Communication Based Fault-Tolerant Control Strategy for Functional Safety of Longitudinal Autonomous Driving	ISPS2019-7485

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Oh	Kwangseok	6-1	A Predictive Driver Model Based Decision Algorithm for Takeover Control of Longitudinal Autonomous Driving	ISPS2019-7454
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Park	Jimin	8-2	Preview Control of Web Position in Roll-To-Roll Printing	ISPS2019-7505
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Park	No-Cheol	7-1	Bandgap Analysis of Elastic Metamaterial Tunable Vibration Absorber with Electromagnetic Stiffness	ISPS2019-7404
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		7-1	Investigation of Zinc - Silver Oxide Thermoplastic Composite for Application in a Biofilm Retardent Catheter	ISPS2019-7518
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Piao	Jinlong	6-1	Investigation on the Vibration of High Speed Cable Robot Manipulation due to Tension Around Drum	ISPS2019-7455
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		9-1	Experimental and Numerical Analysis of Change Of Wettability Induced by Deflection on a Specific Surface	ISPS2019-7466
		12-1	Construction of Dynamic Simulation Framework of an Ultra-High Speed Maglev Train with Curved Motion	ISPS2019-7471
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Sakhalkar	Siddhesh	3-2	Numerical and Experimental Investigation of Nanoscale Heat Transfer in the Head-Media Interface During Static Touchdown	ISPS2019-7448
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Track 6	Hong	Ong Eng	*Dynamics and Control for Future Technologies*
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Track 7	Park	Kyoung-Su	*Smart Materials*
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Track 8	Koganezawa	Shinji	*Smart Sensors and Actuators*
Track 8	Oh	Kwangseok	*Smart Sensors and Actuators*
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Track 9	Tagawa	Norio	*Micro/Nano & Biomedical Mechatronic Systems*
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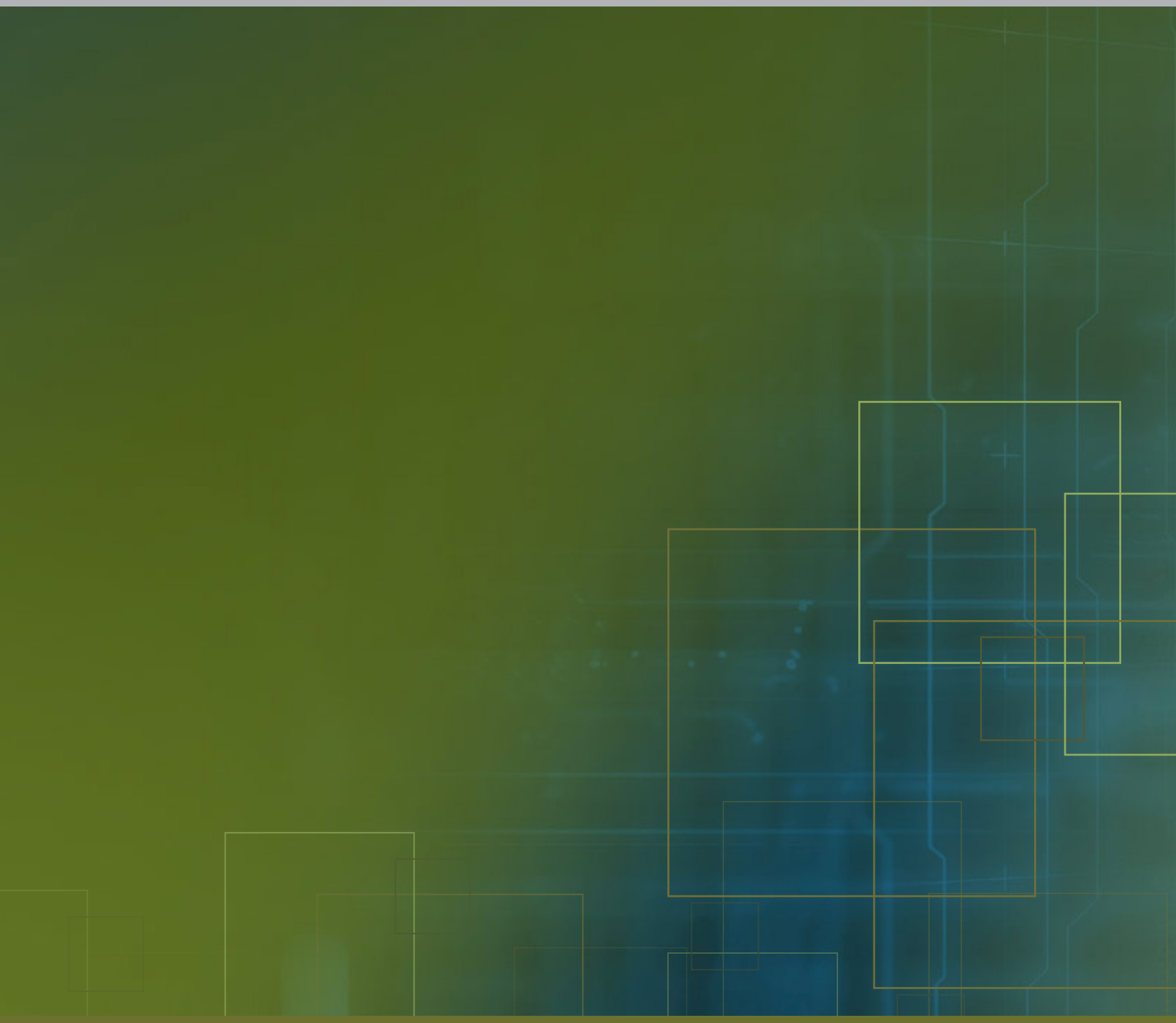

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