



Program

ICPT 2024

International Conference on Planarization / CMP Technology

Kurhaus Wiesbaden • October 15–18, 2024
www.icpt2024.org

Welcome to the ICPT 2024 – International Conference on Planarization / CMP Technology

The 19th International Conference on Planarization/CMP Technology 2024 – ICPT2024 – will be held in Wiesbaden, Germany. The European CMP User Groups kindly invite you to this amazing health resort city – one of Germany's hidden champions. Following European venues such as Dresden, Grenoble and Leuven, we are proud to organize the ICPT Conference 2024 again in Europe, and hope that it will be a wonderful event.

Chemical Mechanical Planarization/Polishing (CMP), one of the most important processes in the manufacturing of semiconductor devices, has been developed and improved continuously year after year, it has maintained its position in related industries, and has increased its application areas. From the user's point of view, technical demand is growing more and more, and fields of application beyond the semiconductor sector are increasing equally.

ICPT as an international symposium for Planarization/CMP offers magnificent opportunities for discussions on technologies including FEOL and BEOL CMP, 3D/TSV, Fundamentals of CMP, Polishing Processes, Consumables, Equipment, Green Devices, New Applications, Metrology, Cleaning, Defect Control, Process Control, CMP Alternatives, SiC, GaN, Sapphire and Diamond. The conference provides a place where researchers and engineers alike meet, discuss and share experiences in their field of knowledge. Enthusiastic presentations and discussions are expected to be on an equal footing, flat like the surface of wafer, no matter from which country or organization presenters come, which position they hold or in which technology area they have gained experience or are experts.

The organizing committee would like the ICPT2024 Conference to offer good opportunities for every attendee to learn something new or expand their networks through discussions or information exchange in the field of CMP.

Welcome to ICPT 2024 in Wiesbaden!

*Knut Gottfried, Viorel Balan,
Patrick Ong, Catharina Rudolph,
Eric Jacquinet, Cedric Perrot, Cathérine Euvrard*

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Balan Viorel, CEA-Leti

ICPT 2024 Program Overview

	Tuesday, October 15
09:00–17:15	Tutorials
17:00–18:30	Wine & Cheese

	Wednesday, October 16
07:00–08:00	Registration
08:00–08:10	Opening Remarks
08:10–08:40	Keynote
08:40–10:05	SESSION 1 FEOL CMP
10:05–10:35	<i>Coffee Break & Exhibiton</i>
10:35–12:00	SESSION 2 BEOL & 3D CMP (1)
12:00–13:30	<i>Lunch Break & Exhibiton</i>
13:30–14:55	SESSION 3 CMP fundamentals, modeling and simulation (1)
14:55–15:25	<i>Coffee Break & Exhibiton</i>
15:25–16:50	SESSION 4 Defects, defect control and Post CMP cleaning (1)
16:50–18:20	POSTER SESSION 1
18:20–20:00	Get-Together



The given times in the program schedule are according to the German Local Time (CEST)

ICPT 2024 Program Overview

	Thursday, October 17
07:30–08:00	Registration
08:00–08:10	Presentation ICPT 2025
08:10–08:40	Keynote
08:40–10:05	SESSION 5 Equipment & CMP consumables
10:05–10:35	<i>Coffee Break & Exhibiton</i>
10:35–12:00	SESSION 6 BEOL & 3D CMP (2)
12:00–12:15	Award Ceremony
12:15–13:30	<i>Lunch Break & Exhibitions</i>
13:30–14:55	SESSION 7 Emerging technologies & Substrate polish
14:55–15:25	<i>Coffee Break & Exhibiton</i>
15:25–16:50	SESSION 8 Extra SESSION
16:50–18:20	POSTER SESSION 2
19:30–22:30	Conference Dinner

	Friday, October 18
07:30–08:00	Registration
08:00–08:30	Keynote
08:30–09:55	SESSION 9 Defects, defect control and Post CMP cleaning (2)
09:55–10:25	<i>Coffee Break & Exhibiton</i>
10:25–11:50	SESSION 10 CMP fundamentals, modeling and simulation (2)
11:50–12:10	STUDENT PAPER AWARD
12:10–12:20	Closing Remarks
12:20–13:20	<i>Lunch Break</i>
13:20	End of ICPT 2024
13:30–16:30	Social Event

Tuesday, October 15, 2024

09:00 - 09:10	Opening Remarks
09:10	Navigating the Evolution of CMP from Basics to Breakthroughs <i>Prof. Jihoon Seo, Assistant Professor</i> <i>Department of Chemical and Biomolecular Engineering Clarkson University in NY, USA</i>
10:10 - 10:30	Coffee Break
10:30	CMP challenges in advanced interconnect and 3D packaging <i>Nancy Heylen, R&D team leader</i> <i>IMEC, Belgium</i>
11:30	The CMP Consumables Ecosystem <i>Mario Stella</i> <i>Fab Technology Engineering Director at Entegris</i>
12:30 - 13:30	Lunch Break & Exhibiton
13:30	Metrology Tutorial: Pad Microscopy for CMP <i>Len Borucki</i> <i>Araca Inc. CTO (ret.), USA</i>
14:05	CMP related metrology: Wafer characterization, etc. <i>Dr. Jason J. Keleher</i> <i>Professor and Chair of Chemistry, Lewis University, USA</i>
14:40	Metrology Tutorial: Big Data Analytics for CMP Tools <i>Ara Philipossian</i> <i>Araca Inc. President and CEO, USA</i>
15:15 - 15:35	Coffee Break
15:35	Challenges and Innovations for post-CMP Cleaning of Emerging Materials/Processes at Advanced Technology Nodes Part2: CMP Cleaning <i>Dr. Jason J. Keleher</i> <i>Professor and Chair of Chemistry, Faculty Senate President, Lewis University, USA</i>
16:35	CMP for More-than-Moore <i>Gerfried Zwicker</i> <i>zwickerconsult, Germany</i>
17:10 - 17:15	Closing remarks

Wednesday, October 16, 2024

07:00 - 08:00	Registration
08:00 - 08:10	Opening Remarks
08:10 - 08:40	Keynote Development and Implementation of a Data Ecosystem to enable End-to-End Advanced Predictive Manufacturing using AI <i>Dr. Saifi Usmani, Merck</i>
08:40 - 10:05	SESSION 1: FEOL CMP
08:40	Invited CMP Challenges and Opportunities for FDSOI with 28nm-ePCM advanced technologies and beyond <i>Aurore Durel, STMicroelectronics, France</i>
09:05	Effect of sugar alcohols on removal rate and ceria contamination as a function of carbon number in STI-CMP <i>Muskan Muskan, Jenasree Hazarika, Tae Hwan Kim, Tae Gon Kim, Jin Goo Park</i> <i>Hanyang University, Korea, Republic of (South Korea)</i>
	Student
09:25	Smart Design of A Novel Low Selective W CMP Slurry <i>Hongjun Zhou¹, Joon-Yeon Cho², Gary Lee², Jimmy Chang²</i> <i>¹Merck; ²Merck</i>
09:45	Development of CMP slurry for carbon hard mask <i>Rung-Je Yang¹, Allison Hsu¹, Leo Huang¹, Nita Fan¹, Ping Hsu¹, Kenjiro Ogata², Koichiro Hosokawa²</i> <i>¹DuPont, Taiwan; ²NITTA DuPont Incorporated</i>
10:05 - 10:35	Coffee Break & Exhibiton
10:35 - 12:00	SESSION 2: BEOL & 3D CMP (1)
10:35	Invited Chemical Mechanical Polishing: A Key Enabling Process for Hybrid Bonding <i>Laura Mirkarimi, Adeia, USA</i>
11:00	Study on environmentally sustainable corrosion inhibitor of Cu CMP <i>Jongyeong Jeon, Seungjun Oh, Juyeol Lee, Taesung Kim</i> <i>Sungkyunkwan University, Korea, Republic of (South Korea)</i>
11:20	Cu/SiCN CMP for enabling wafer to wafer hybrid bonding down to 400 nm pitch <i>Sven Dewilde, Steven Deckers, Nancy Heylen, Katia Devriendt</i> <i>imec vzw, Belgium</i>
11:40	The impact of temperature on copper slurry chemistry <i>Pengzhan Liu, Hyeonjeong Lee, Chaerin Park, Taesung Kim</i> <i>Sungkyunkwan University, Korea, Republic of (South Korea)</i>
12:00 - 13:30	Lunch Break & Exhibiton

Wednesday, October 16, 2024

13:30 - 14:55	SESSION 3 – CMP fundamentals, modeling and simulation (1)
13:30	Invited History and Future of CMP Process Monitoring Technology <i>Yoichi Shiokawa, EBARA, Japan</i>
13:55	Secrets of the Stribeck Curve <i>Leonard Borucki</i> <i>Araca Inc., United States of America</i>
14:15	Pad-Abrasive-Wafer Interaction at Micro-Scale in Chemical-Mechanical Polishing <i>Hyun Jun Ryu¹, Seounghee Yun¹, Ji-hun Jeong², Sanha Kim¹</i> <i>¹ KAIST, Korea, Republic of (South Korea); ² MIT, United States</i>
14:35	Accelerating finite element simulations with machine learning to predict interfacial pressures in real-time <i>Tom Rothe^{1,3}, Andre Lauff², Alexey Shaporin^{1,3}, Peter Thieme², Mudassir Ali Sayyed^{1,3}, Knut Gottfried³, Jörg Schuster^{1,3}, Jan Langer³, Martin Stoll¹, Harald Kuhn^{1,3}</i> <i>¹ University of Technology Chemnitz, Chemnitz, Germany; ² Infineon Technologies Dresden GmbH & Co. KG, Dresden, Germany; ³ Fraunhofer Institute for Electronic Nano Systems (ENAS), Chemnitz, Germany</i>
14:55 - 15:25	Coffee Break & Exhibiton
15:25 - 16:50	SESSION 4 – Defects, defect control and Post CMP cleaning (1)
15:25	Invited “Low Stress” Defect Activated p-CMP Cleaning Processes by Tuning the Molecular Structure of Additives <i>Jason Keleher, Lewis University, USA</i>
15:50	Scale Dependence of Particle Removal Efficiency in PVA Brush Scrubbing <i>Somin Shin¹, Ji-hun Jeong², Hyun Jun Ryu¹, Sanha Kim¹</i> <i>¹ KAIST, Korea, Republic of (South Korea); ² MIT, United States</i>
16:10	Challenge for Tiny Defect Issues in Advanced Process <i>Tetsuya Kamimura, Naoko Oouchi, Toru Tuchihashi, Akihiko Ohtsu, Atushi Mizutani</i> <i>FUJIFILM, Japan</i>
16:30	Complete removal of positively-charged ceria particles by using alkaline sodium percarbonate aqueous cleaning solution <i>Boao Ma, Wenlong Tang, Linyi Shen, Qiancheng Sun, Haijun Cheng, Xin-ping Qu</i> <i>School of Microelectronics, Fudan University, China, People's Republic of China</i>
16:50 - 18:20	POSTER SESSION 1

Thursday, October 17, 2024

07:30 - 08:00	Registration
08:00 - 08:10	Presentation ICPT 2025
08:10 - 08:40	Keynote Lithography roadmaps <i>Alberto Pirati, ASML, The Netherlands</i>
08:40 - 10:05	SESSION 5 – Equipment & CMP consumables
08:40	Invited Role of CMP in Enabling Heterogeneous Integration <i>Brian Brown, Applied Materials, USA</i>
09:05	Deep Learning Approaches to Predict Pad Durability in Copper Chemical Mechanical Planarization <i>Seunghwan Lee, Jaewon Lee, Pengzhan Liu, Hosin Hwang, Hyunho Kim, Taesung Kim</i> <i>Sungkyunkwan University, Korea, Republic of (South Korea)</i>
09:25	Effect of increased slurry dwell time on polishing performance <i>Conrad Guhl, Felix Köhler, Benjamin Lilienthal-Uhlig, Fraunhofer IPMS CNT, Germany</i>
09:45	Dishing Control for Nanotwinned Copper TSV Patterned Wafer CMP with Composite Soft Polishing Pad <i>Yueh-Hsun Tsai¹, Kai-Xiang Xiao¹, An-Chieh Cheng¹, Huy Le Nam Quoc¹, Eyob Messele Sefene¹, Chao-Chang A. Chen^{1,2}</i> ¹ Department of Mechanical Engineering, National Taiwan University of Science and Technology, Taiwan; ² CMP Innovation Center, National Taiwan University of Science and Technology, Taiwan
10:05 - 10:35	Coffee Break & Exhibiton
10:35 - 12:00	SESSION 6 – BEOL & 3D CMP (2)
10:35	Invited CMP: a key process for DTW Hybrid bonding integration <i>Emilie Bourjot, CEA-Leti, France</i>
11:00	Impact of CMP Slurry Additives on Copper Pad Corrosion and Surface Topography of Interest to Cu-Cu Hybrid Bonding <i>Seonwoo Go¹, Hazarika Jenasree¹, Arim Woo¹, Jum-Yong Park², Tae-Gon Kim¹, Jin-Goo Park¹</i> ¹ Hanyang University, Republic of Korea; ² Samsung Electronics Co., LTD, Republic of Korea
11:20	Impact of Dissolved Oxygen on Metal Corrosion in Post-CMP Cleaning for Advanced Logic Structures <i>Katrina Mikhaylichenko, Applied Materials, United States of America</i>
11:40	Investigation on the removal mechanism of amorphous carbon chemical mechanical polishing <i>Ziyang Wang, Pengzhan Liu, Seunghwan Lee, Jinhyoung Lee, Taesung Kim</i> <i>Sungkyunkwan University, Korea, Republic of (South Korea)</i>
12:00 - 12:15	Award Ceremony
12:15 - 13:30	Lunch Break & Exhibiton

Thursday, October 17, 2024

13:30 - 14:55	SESSION 7 – Emerging technologies & Substrate polish
13:30	Invited Extreme wafer thinning process, and subsurface damage study for 3D integration <i>Rami Chukka, imec, Belgium</i>
13:55	Novel Catalyst-Referred Etching Technology for Preparing Epi-Ready Silicon Carbide Substrates <i>Ara Philipossian¹, Yasa Sampurno¹, Tatsutoshi Suzuki², Kazuto Yamauchi³</i> <i>¹ Araca, Inc., Tucson AZ, USA; ² Toho Koki Seisakusho Co., Ltd., Yokkaichi, Japan; ³ Osaka University, Osaka, Japan</i>
14:15	High-efficiency GaN polishing by photoelectrochemical etching-assisted catalyst-referred etching <i>Daisetsu Toh¹, Kiyoto Kayao¹, Tatsuya Fukagawa¹, Jumpei Yamada¹, Kazuto Yamauchi², Yasuhisa Sano¹</i> <i>¹ Department of Precision Science and Technology, Graduate School of Engineering, Osaka University, Osaka, Japan; ² OSAKA UNIVERSITY-RIKEN Center for Science and Technology, Osaka University, Osaka, Japan</i>
14:35	CMP steps to enable NbTiN-based Superconducting Digital Logic <i>Bart Kenens¹, Ankit Pokhrel¹, Benjamin Huet¹, Daniel Perez Lozano¹, Jean-Philippe Soulie¹, Diziana Vangoidsenhoven¹, Yann Canvel¹, Vincent Renaud¹, Amey M Walke¹, Jasper Bizindavyi¹, Sara Iraci¹, Blake Hodges², Seifallah Ibrahim², Trent Josephson², Min-Soo Kim², Sabine O'Neal², Kevin Vandersmissen¹, Katia Devriendt¹, Quentin Herr^{1,2}, Zsolt Tokei¹, Anna Herr^{1,2}</i> <i>¹ imec, Belgium; ² imec Florida, USA</i>
14:55 - 15:25	Coffee Break & Exhibiton
15:25 - 16:50	SESSION 8 – Extra SESSION
15:25	Invited Innovative CMP technology for the next generation VNAND devices <i>KiHoon Jang, Samsung R&D Center, Korea</i>
15:50	Surface polishing of polycrystalline silicon carbide using catalyst-referred etching <i>Yusuke Yoshida¹, Kiyoto Kayao¹, Daisetsu Toh¹, Jumpei Yamada¹, Kazuto Yamauchi², Yasuhisa Sano¹</i> <i>¹ Department of Precision Science and Technology, Graduate School of Engineering, Osaka University, Japan; ² OSAKA UNIVERSITY-RIKEN Center for Science and Technology, Osaka University, Osaka, Japan</i>
16:10	Nanoscale Dishing and Selectivity Control in STI Pattern Wafer via Mechano-Structural Heterogeneity of CeO2 Nano Particle <i>Chulwoo Bae, Jinhyoung Lee, Juyong Lee, Jaedo Nam, Taesung Kim</i> <i>Sungkyunkwan Univ., Korea, Republic of (South Korea)</i>
16:30	Application of Neural Network Potential Molecular Dynamics Simulation to Atomic-scale understanding of silicon nitride CMP Process by Nano-sized ceria abrasive <i>Yoshishige Okuno, Ken Takahashi, AKihiro Orita, Satoyuki Nomura</i> <i>Resonac / Japan, Japan</i>
16:50 - 18:20	POSTER SESSION 2
19:30 - 22:30	Conference Dinner

Friday, October 18, 2024

07:30 - 08:00	Registration
08:00 - 08:30	Keynote Challenges for hetero integration process technology, test and reliability <i>Prof. Harald Kuhn, Fraunhofer ENAS, Germany</i>
08:30 - 09:55	SESSION 9 – Defects, defect control and Post CMP cleaning (2)
08:30	Invited Evolution and progress of post CMP cleaning solution for defect reduction <i>Yuchun Wang, Anji Microelectronics Technology Ltd., China</i>
08:55	A Study on Evaluating Supercritical CO2 Cleaning with Pressure Pulse using Computational Fluid Dynamics <i>Joohwan Ha¹, Geumji Back¹, Jongyeong Jeon², Taesung Kim^{1,2,3}</i> ¹ Department of Semiconductor Convergence Engineering, Sungkyunkwan University(SKKU), Suwon 16419, Republic of Korea; ² School of Mechanical Engineering, Sungkyunkwan University(SKKU), Suwon 16419, Republic of Korea; ³ SKKU Advanced Institute of Nanotechnology(SAINT), Sungkyunkwan University(SKKU), Suwon 16419, Republic of Korea
09:15	Separate Distance Measurement of Moving Nano-Particle from Surface in Wet Process using Astigmatism Defocus above Evanescent Field Range <i>Norita Kuroe¹, Panart Khajornrungruang¹, Yu Arima¹, Satomi Hamada², Yutaka Wada², Hirokuni Hiyama², Tomoya Nishi²</i> ¹ Kyushu Institute of Technology, Japan; ² Ebara corporation, Japan
09:35	Investigation of the Cross-Contamination Mechanism by PVA Brush Scrubbing Process and Parameters during Post-CMP Cleaning <i>Kwang-Min Han¹, Sumit Kumar², Mir Jalal Khan², Jae-Hyeong Lee², Tae-Gon Kim³, Jin-Goo Park²</i> ¹ Department of Bio-Nano Technology, Hanyang University ERICA, Republic of Korea; ² Department of Materials Science and Chemical Engineering, Hanyang University ERICA, Republic of Korea; ³ Department of Smart Convergence Engineering, Hanyang University ERICA, Republic of Korea
09:55 - 10:25	Coffee Break & Exhibiton

Friday, October 18, 2024

10:25 - 11:50 SESSION 10 – CMP fundamentals, modeling and simulation (2)

10:25 **Invited**
First ten (of hundreds) ways to kill slurry quality
Rob Rhoades, X-Trinsic, USA

10:50 **Exploring the Potential of Machine Learning in Developing CMP Slurry Composition**
Akihiro Orita, Satoyuki Nomura, Resonac Corporation

11:10 **Wafer Bonding Hotspots Detection by Chip-Scale CMP Simulation**
Ruben Ghulghazaryan¹, Davit Piliposyan¹, Jeff Wilson², Ushasree Katakamsetty³, Yong Chau Ng³, Yudi Setiawan³, Anthony Villalon³, Sam Nakagawa³, Stefan Nikolaev Voykov³
¹Siemens Industry Software, Armenia; ²Siemens EDA, USA; ³GLOBALFOUNDRIES

11:30 **Analysis of lower structures of asperities on pad surface**
Yohei Hashimoto¹, Hozumi Yasuda², Norikazu Suzuki³
¹Kanazawa University, Japan; ²Ebara Company, Japan; ³Chuo University, Japan

11:50 - 12:10 STUDENT PAPER AWARD

12:10- 12:20 Closing Remarks

12:20 - 13:20 *Lunch Break & Exhibiton*

13:20 End of ICPT 2024

Wednesday, October 16, 2024

16:50 - 18:20 POSTER SESSION 1

P1	Cu-CMP Scratch reduction using by Temperature Control Rinse(TCR) <i>Taketo Sekine, Applied Materials, United States of America</i>
P2	A Novel Data-Driven Modeling based on Pad Surface Recognition for Predicting Material Removal Rate in CMP <i>Jongmin Jeong¹, Yeongil Shin¹, Seunghun Jeong¹, Seonho Jeong¹, Masashi Kabasawa², Yoichi Shiokawa², Keita Yagi², Hozumi Yasuda², Jichul Yang², Katsuhide Watanabe², Yutaka Wada², Hirokuni Hiyama², Haedo Jeong¹</i> ¹ Pusan National University, Busan, Republic of Korea; ² EBARA Corporation, Fujisawa, Kanagawa 251-8502, Japan
P3	Observation of liquid movement due to PVA brush nodule deformation and prediction of liquid transfer map <i>Makoto Miwa¹, Shota Suzuki¹, Satomi Hamada², Toshiyuki Sanada¹</i> ¹ Shizuoka University; ² Ebara Corporation
P4	Study on the Effect of High Temperature on Defects in Tungsten Chemical Mechanical Planarization <i>Jeongyeol Yu^{1,2}, Taesung Kim²</i> ¹ Samsung Electronics, Korea, Republic of (South Korea); ² Sungkyunkwan University, Korea, Republic of (South Korea)
P5	Preparation of a highly smoothed Si surface via catalyst-referred etching <i>Yohei Miyaji¹, Kiyoto Kayao¹, Daisetsu Toh¹, Jumpei Yamada¹, Kazuto Yamauchi², Yasuhisa Sano¹</i> ¹ Department of Precision Science and Technology, Graduate School of Engineering, Osaka University, 2-1 Yamadaoka, Suita, Osaka, Japan; ² Osaka University-RIKEN Center for Science and Technology
P6	A Novel Approach to Improve Cleaning Performance of High Oxide Rate CMP by Alkaline Ceria Slurry <i>Yang-Yao Lee, Ming-Che Ho, Vibrantz Technologies, United States of America</i>
P7	Investigation of silica particle and Mo ion contamination on PVA brush during Mo post-CMP cleaning process <i>SUMIT KUMAR¹, PALWASHA JALALZAI¹, NAYOUNG KANG¹, TAE-GON KIM², JIN-GOO PARK¹</i> ¹ Department of Materials Science and Chemical Engineering Hanyang University ERICA, Korea; ² Department of Smart Convergence Engineering, Hanyang University ERICA, Korea
P8	Stagnation Time Effects on Through-Silicon Via (TSV) Mechanical Reliability: A Study on Cu Corrosion Standards <i>JINSOO YOON¹, Taesung KIM²</i> ¹ Samsung Electronics Semiconductor, Hwaseong, Republic of (South Korea); ² Sungkyunkwan University, Korea, Republic of (South Korea)
P9	High-Resolution Size Distribution Characterization of CMP Slurry Particles <i>Andrea Tiwari¹, Daniel Troolin¹, Torsten Tritscher², Atul Patel¹, Justin Koczak¹, Nathan Birkeland¹, Hee-Siew Han¹</i> ¹ TSI Incorporated, Shoreview, MN, United States of America; ² TSI GmbH, Aachen, Germany
P10	Performance of Novel DLC-Coated Conventional Gritted Diamond Discs in ILD CMP <i>Yasa Sampurno¹, Len Borucki¹, Akira Okabe², Ara Philipossian¹</i> ¹ Araca, Inc., Tucson AZ, USA; ² Epicrew Corporation, Omura-city, Japan
P11	Inline Real-Time Process Monitoring of CMP Slurries with Ultrasonic and Conductivity Measurements <i>Raymond Maas, Rhosonics, The Netherlands</i>

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P12	Study on Property Changes Through Slurry Filtration <i>Jongwoo Kwon^{1,2}, Taesung Kim³</i> ¹ Samsung Electronics, Korea, Republic of (South Korea); ² Department of Semiconductor and Display Engineering, Sungkyunkwan University, Suwon, Republic of Korea; ³ School of Mechanical Engineering, Sungkyunkwan University, Suwon, Republic of Korea
P13	Planarization of substrate with metal wiring using catalyst-referred etching – Etching characteristic of wiring metal – <i>Hiroto Yamasaki¹, Kiyoto Kayao¹, Daisetsu Toh¹, Jumpei Yamada¹, Kazuto Yamauchi², Yasuhisa Sano¹</i> ¹ Department of Precision Science and Technology, Graduate School of Engineering, Osaka University, Osaka, Japan; ² OSAKA UNIVERSITY-RIKEN Center for Science and Technology, Osaka University, Osaka, Japan
P14	Investigation of the root cause of the scratch formation during copper post-CMP brush scrubbing <i>MAHEEPAL YADAV¹, SANJAY BISHT¹, SE-HOON PARK¹, TAE-GON KIM², SATOMI HAMADA³, JIN-GOO PARK¹</i> ¹ Department of Materials Science and Chemical Engineering, Hanyang University, Ansan, 15588, Korea; ² Department of Smart Convergence Engineering, Hanyang University, Ansan, 15588, Korea; ³ EBARA Corporation, Fujisawa, Kanagawa, 251-8502, Japan
P15	Influence of a rolling brush on the fluid flow and concentration distribution of cleaning solutions on a rotating disk <i>Yoshinori Jinbo¹, Nao Okuma², Eri Okubo², Yasushi Hongo², Toshimasa Mano², Toshiyuki Sanada¹</i> ¹ Shizuoka University, Japan; ² AION Co., Ltd., Japan
P16	Reduction of Large Particles and Small Particles in Colloidal Silica Manufacturing Process <i>Chiharu Nakano, Shunsuke Tanaka, Haruhiko Eki, Shun Arai, Shuta Ozawa</i> <i>FUSO Chemical CO. LTD., Japan</i>
P17	Influence of Pad-Wafer-Silica based Slurry Interface on BSI Performances <i>Victor Soty¹, Cédric Perrot¹, Aurore Bonnevalle², Cassandre Maljournal², Elodie Bêche², Sébastien Mermoz², Catherine Euvrard¹</i> ¹ Univ. Grenoble Alpes, CEA, LETI, 38000 Grenoble, France; ² ST Microelectronics, France
P18	Silicon Oxide and Tungsten Compatible Formulation for Ceria and Metal Ion Removal for Post-CMP Clean <i>Ping Tzeng¹, Katie M. Gramigna², Yuwan Juan¹, Ling Chang¹, Ian Hung¹, Ping Hsu¹</i> ¹ DuPont, Hsinchu site 1 (TW); ² DuPont, Newark (US)
P19	Investigating Foreign Materials in Post CMP Cleaning Modules with Total Holographic Characterization <i>Laura A Philips¹, Fook Chiong Cheong¹, Tiffany Markus¹, Yongneng Wu², Nai-Chieh Huang², Max Gauge², Jianshe Tang²</i> ¹ Spheryx, Inc., United States of America; ² Applied Material, United States of America
P20	Quantitative measurement of emulsion droplets in silica CMP slurries with Total Holographic Characterization <i>Laura Philips, Fook Chiong Cheong, Tiffany Markus, Spheryx, Inc., United States of America</i>
P21	Development of model-based robot polishing system - Measurement of robot rigidity distribution and its application - <i>Kotaro Totsuka¹, Takamasa Yamamoto², Michio Uneda¹, Norikazu Suzuki³</i> ¹ Kanazawa Institute of Technology; ² Yamamoto Metal Technos Co.,Ltd.; ³ Chuo University
P22	Advanced Copper Post-CMP Cleaning Formulation Providing Superior Copper Compatibility and Ruthenium Residue Removal Capability <i>Peter Sun, Jacky Cheng, Ping Hsu, DuPont, Taiwan</i>

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P23	Functionalized Water Production Methods using Membrane Contactors and its effect on Particle Removal Efficiency post CMP <i>Joel Cardona, Sang-Hyeon Park, Charlotte M Starnes, Solventum, United States of America</i>
P24	Research on Bio-based CMP Pads to Reduce Carbon Dioxide Emissions <i>Mingyeong Ji, Jongwook Yoon, Jangwon Seo, SK enpulse, Korea, Republic of (South Korea)</i>
P25	Effect of Surface Oxidation on post-Chemical Mechanical Planarization Cleaning of Silicon Carbide <i>Piper M. Smith, Jason J. Keleher, Lewis University, United States of America</i>
P26	Oxide CMP Material Removal Rate Performance based on a smart material properties study <i>Aurore Bonneville Durel¹, Max Bastien¹, Floriane Demeyer¹, Valérie Dupuy¹, Camille Sgrillo¹, Jeanny Maurice¹, Cédric Perrot², Victor Soty², Catherine Euvrard², Daniel Benoit¹, Sébastien Petitdidier¹</i> ¹ ST Microelectronics, France; ² Univ. Grenoble Alpes, CEA, LETI, 38000 Grenoble, France
P27	Extending the applicability of a novel cleanliness assessment method for CMP slurries <i>Jochen Ruth, Oliver Baatz, Pall GmbH, Germany</i>
P28	Post-CMP cleaning of silicon-germanium wafer surfaces <i>Andreas Krüger, Awwal Adeniyi Adesunkanmi, Rasuole Lukose, Yuji Yamamoto, Wei-Chen Wen, Marco Lisker, IHP GmbH - Leibniz-Institut für innovative Mikroelektronik, Germany</i>
P29	Enhanced Organic Residue Removal during Cu post-Chemical Mechanical Planarization (p-CMP) Cleaning via surface active non-covalent complexes <i>Katey M. Sheets, Jason J. Keleher, Lewis University, United States of America</i>
P30	Toward an optimized method to remove edge epi defects for GaN on Silicon growths <i>IATOSTI Christophe¹, BENSALÉM Salma², ROY Emmanuel¹, CHABOUREL Alain², KODERA Kenji³, HONG Victor³, NAKANISHI Masayuki³</i> ¹ STMicroelectronics, 153 rue des Douets 37100 Tours, France; ² Ebara Precision Machinery Europe GmbH, 26 Av Jean Kuntzmann, 38330 Montbonnot St Martin, France; ³ Ebara Corporation, 4-2-1, Honfujisawa, Fujisawa-shi, 251-8502, Japan
P31	Regulating molybdenum dissolution through controlled oxide phase formation in CMP with catalytic oxidation <i>Bobae Lee, Memory CMP Technology Team, Samsung Electronics, Pyeongtaek, South Korea</i>
P32	Advanced Filtration Solution for LPC Removal Efficiency Enhancement in CMP Applications <i>Alan {Ling-Hsiang} Chao, Enzo Chen, Henry Wang, Entegris, Taiwan</i>
P33	Optimizing Wafer Polishing: Innovations in CMP Techniques and Filtration <i>Chloe {Ting Chen} Chen, Jason {Yu Chieh} Fu, Nathan Hou, Nate Chang, Elaine Wu, Alex Chuang Entegris, Inc.</i>
P34	Exploring the Potential of Precision Engineering in Next-Generation CMP Consumables <i>Yi He, 3M, United States of America</i>

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P35	Application of Neural Network Potential Molecular Dynamics Simulation to Atomic-scale understanding of poly-Si CMP Process by Nano-sized ceria abrasive <i>Ken Takahashi, Yshishige Okuno, Akihiro Orita, Satoyuki Nomura, Resonac / Japan, Japan</i>
P36	Clarification of Polishing Mechanism Focusing on Polishing Pad in CMP <i>Syuhei Kurokawa¹, Hirokuni Hiyama², Yutaka Wada², Hozumi Yasuda², Shuntaro Hayashi²</i> ¹ Kyushu University, Japan; ² EBARA CORPORATION
P37	Maximizing Material Removal Efficiency of Micro-Structured Pads in Chemical Mechanical Polishing <i>Seounghee Yun, Hyun Jun Ryu, Sanha Kim, Korea Advanced Institute of Science and Technology, Korea, Republic of (South Korea)</i>
P38	Enabling Fast Boron Doped Polysilicon Removal by the Advanced Oxidation and Enhanced Mechanical Approach for DRAM Scaling <i>Yang-Yao Lee, Ming-Che Ho, Vibrantz Technologies, United States of America</i>
P39	A prediction model of material removal rate distribution considering slurry supply position and relative motion <i>Takumi Sato^{1,3}, Yuki Watanabe¹, Yohei Hashimoto², Norikazu Suzuki³</i> ¹ Ebara Corporation, Japan; ² Kanazawa University, 9201192 Ishikawa, Japan; ³ Chuo University, 1128551, Tokyo, Japan
P40	Fundamentals in Polishing Scratch Reduction through Advanced CMP Pad Conditioning Processes <i>Yongsik Moon¹, Kyoung-Kuk Kwack¹, Joohan Lee¹, Jongkuk Park¹, Eunhwa Song¹, Youngtae Jeon¹, Joohee Lee¹, Sungyu Park¹, Yujeong Jin¹, Jongjae Lee¹, Yongik Whang²</i> ¹ EHWA Diamond, 374 Nambu-daero, Osan-si, Gyeonggi-do, Republic of Korea; ² EHWA Europe GmbH, Rudolf-Diesel-Straße 7, 65760 Eschborn, Germany
P41	Influence of Deposition Technique (ALD vs.PVD) on Surface Properties of Mo during Post-CMP Cleaning <i>Nayoung Kang¹, Palwasha Jalalzai¹, Tae-Gon Kim², Jin-Goo Park¹</i> ¹ Department of Materials Science and Chemical Engineering Hanyang University ERICA, Korea; ² Department of Smart Convergence Engineering, Hanyang University ERICA, Korea
P42	Study of chemical reactions for development of a novel CMP process using a supercritical carbon dioxide as a solvent <i>Seokchan Lee¹, Ju Yong Lee², Chulwoo Bae¹, Kihong Park², Jeongyong Bae², Taesung Kim^{1,2}</i> ¹ SKKU Advanced Institute of Nano Technology (SAINT), Sungkyunkwan University (SKKU), Suwon, Republic of Korea; ² School of Mechanical Engineering, Sungkyunkwan University (SKKU), Suwon, Republic of Korea
P43	A data driven approach for real-time estimation of material removal rate toward advanced CMP process control <i>Kodai Hirano^{1,3}, Yuki Watanabe¹, Yohei Hashimoto², Norikazu Suzuki³</i> ¹ Ebara Corporation, 2518502 Kanagawa, Japan; ² Kanazawa University, 9201192 Ishikawa, Japan; ³ Chuo University, 1128551, Tokyo, Japan
P44	Copper Oxidation Mechanism by CMP Slurry Containing Ceria Abrasives <i>Hitomi Takahashi¹, Shogo Arata², Satoyuki Nomura²</i> ¹ Hitachi, Ltd.; ² Resonac Corporation

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P45	Improvement of wafer yield through segmentation of mechanical force during CMP process <i>InJun Heo^{1,2}, Taesung Kim¹</i> ¹ Sungkyunkwan university, Korea, Republic of (South Korea); ² Samsung Electronics, Korea, Republic of (South Korea)
P46	Fast STI-CMP process characterization for diverse layouts by dedicated testchips and high throughput AFM-WLI metrology <i>Conrad Guhl¹, Victor Bergmann², Hongwei Ma³, Benjamin Lilienthal-Uhlig¹</i> ¹ Fraunhofer IPMS CNT, Dresden, Germany; ² Park Systems, Mannheim, Germany; ³ GlobalFoundries, Dresden, Germany
P47	Polymer/Cu CMP using Ultrafine α-alumina Slurry for Chiplet Applications <i>Yutetsu Kamiya¹, Yuzo Nakamura^{1,2}, Kohei Nakayama¹, Kenta Hayama¹, Fumihiro Inoue¹</i> ¹ Yokohama National University, Japan; ² Mitsui Chemicals, Inc., Japan
P48	Development of monitoring function of fine particle unit of chemical mechanical polishing process <i>Chanho Park^{1,2}, Changmin Kim^{1,2}, Kihong Park², Sanghyuck Jeon^{1,2}, Hyunho Seok³, Taesung Kim^{2,3}</i> ¹ Samsung Electronics, Korea, Republic of (South Korea); ² School of Mechanical Engineering, Sungkyunkwan University; ³ SKKU Advanced Institute of Nanotechnology (SAINT), Sungkyunkwan University
P49	CHARACTERIZING THE SURFACE CONTACT OF A CMP CONDITIONER BY ANALYZING A 3D IMAGE OF THE SURFACE <i>David Earl Slutz, DS Technical Consultant LLC, United States of America</i>
P50	Inhibition of Microbial Growth in Copper Chemical Mechanical Polishing Slurry through Organic Antimicrobial Agents <i>Jaewon Lee, Gyuyoung Lee, Seunghwan Lee, Taesung Kim</i> <i>School of Mechanical Engineering, Sungkyunkwan University, Suwon, South Korea</i>
P51	Silica particle contamination and removal mechanism in Molybdenum post-CMP cleaning <i>Hyeonjeong Lee¹, Pengzhan Liu¹, Yunhee Cho², Minha Kim², WonSeob Cho², Andreas Klipp³, Taesung Kim¹</i> ¹ Sungkyunkwan University, Korea, Republic of (South Korea); ² BASF Company Ltd., Korea, Republic of (South Korea); ³ BASF SE, Germany
P52	Emerging Stress-Free Ruthenium Removal Study in Advanced Node Interconnect Structure <i>Yinuo Jin, David Wang, Jian Wang, Minxu Li, ACM Research, Inc., People's Republic of China</i>
P53	Employing Small Molecule/Surface Active Chemistries for Enhanced STI post-CMP Cleaning <i>Elizabeth M. McDonnell, Jason J. Keleher, Lewis University, United States of America</i>
P54	The role of chemical reactions in oxide film polishing <i>Chaerin Park, Pengzhan Liu, Hyeonjeong Lee, Taesung Kim</i> <i>Sungkyunkwan University, Korea, Republic of (South Korea)</i>
P55	Effect of mixed abrasive particle size according to number concentration ratio on W CMP <i>Geumji Back¹, Seungjun Oh², Taesung Kim^{1,2}</i> ¹ Department of Semiconductor Convergence Engineering, Sungkyunkwan University, Suwon-si, Gyeonggi-do, South Korea; ² Department of Mechanical Engineering, Sungkyunkwan University, Suwon-si, Gyeonggi-do, South Korea
P56	Uniformity-improved Chip Thinning by CMP for Failure Analysis <i>Gerfried Zwicker¹, Christian Boit², Awwal A. Adesunkanmi³, Norbert Herfurth³</i> ¹ zwickerconsult, Berlin, Germany; ² TU Berlin, Germany; ³ IHP microelectronics, Frankfurt/Oder, Germany

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P57	High performance acidic slurry for gallium nitride with novel oxidant combination <i>junchao huo^{1,2}, weili liu^{1,2}</i> ¹ Shanghai Institute of Microsystem and Information Technology, People's Republic of China; ² Zhejiang Xinchuangna Electronic Science & Technology Co. Ltd., Zhejiang, 314406, China
P58	Advances of Alkaline Oxide CMP Process: Efficiency, Versatility, and Synergy <i>Yi Guo¹, Leo Hanus², Geary Graham², Matt Van Hanehem¹, Rung Je Yang³, Eric Jacquinet², Changzai Chi¹, Nagella Nukuna¹</i> ¹ Dupont Advanced Cleans and Slurry Technologies, Newark, DE USA; ² Merck Performance Materials, Darmstadt, Germany; ³ Dupont Advanced Cleans and Slurry Technologies, Hsinchu, Taiwan
P59	The Adsorption of Polyacrylic Acid and Polyvinylpyrrolidone on Calcined Ceria Nanoparticles using in Chemical Mechanical Polishing <i>Zhenyang Wang, Tongqing Wang, Xinchun Lu, State Key Laboratory of Tribology, Tsinghua University</i>
P60	Developing a Post-CMP Cleaning Formulation for Advanced Cobalt Interconnects <i>Lifei Zhang, Tongqing Wang, Yuhong Liu, Xinchun Lu, Tsinghua University, China, People's Republic of</i>
P61	Investigation and Formulation of Chemicals of Post CMP Cleaner toward Effective Ceria Particle Removal <i>Hiroaki Iwamoto, Shota Yoshioka, AGC Inc., Japan</i>
P62	Superior Post-CMP Buffing Cleaner for Hump Defect Reduction <i>Eddie I-Chun Chang, Ying-Pei Huang, Ping Tzeng, Ling Chang, Hong-Yi Chiang, Ping Hsu</i> <i>DuPont Taiwan Limited, Taiwan</i>
P63	High-quality planarization of Cu/Ni heterogeneous microstructures using chemical mechanical polishing <i>Liang Jiang, Southwest Jiaotong University, China, People's Republic of</i>
P64	Introduction Of High Performance Ceria Slurry And Its Trend <i>Jaedong Lee, KCTech, Korea, Republic of (South Korea)</i>
P65	Efficient polishing of GaN substrates using direct UV irradiation assist and effects of polisher type <i>Shinsuke Matsui¹, Haruki Kosuge¹, Takahiko Mitsui², Takahiro Shimada², Toshiyasu Yajima³, Daisuke Ninomiya³, Dai Nadahara³</i> ¹ Chiba Institute of Technology /Japan; ² Okamoto Machine Tool Works,Ltd./Japan; ³ Maruishi Industry/Japan
P67	The effect of Membrane surface charge on filtration of Ceria CMP slurry <i>Majid Entezarian, John Morby, Pierre Alexandre Bourgeois, Solventum, United States of America</i>
P68	Designing Low-defect CMP Slurries with Colloidal Ceria in FEOL CMP <i>Kangchun Lee, Kyonggi University, Korea, Republic of (South Korea)</i>

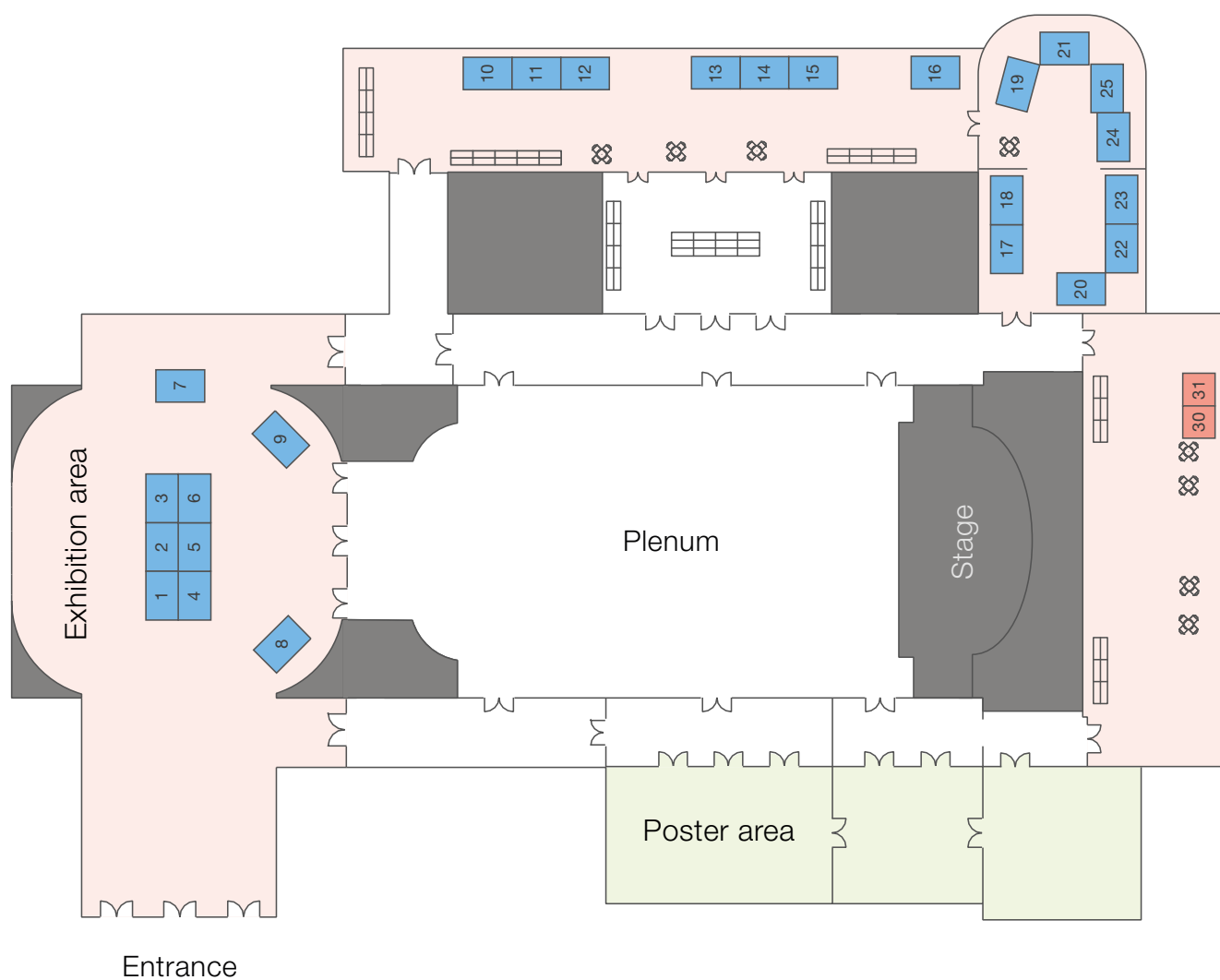
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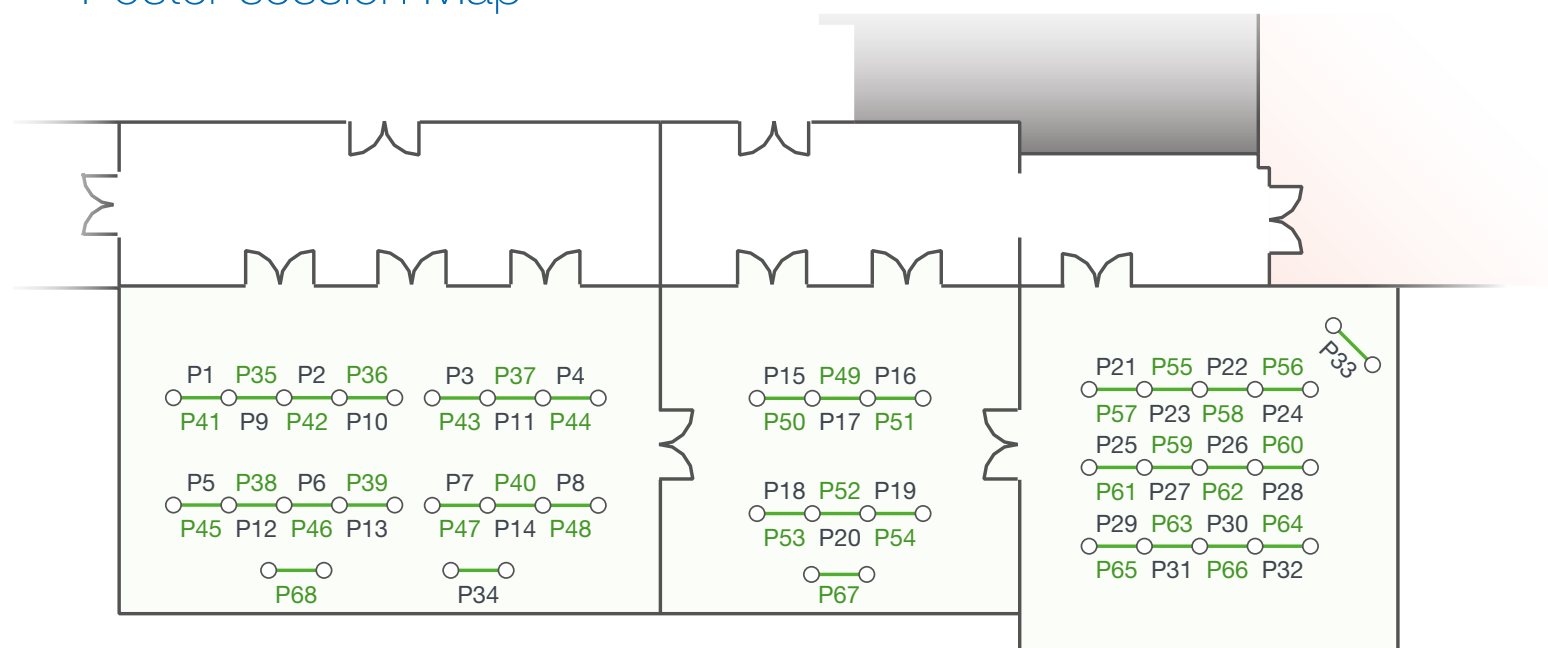
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