

The University of Tokyo
GMSI (Global Center of Excellence for Mechanical Systems Innovation) Open seminar

<http://www.su.t.u-tokyo.ac.jp/~3dwb/event2.html>

May 21. Monday		
13:30-15:30	Low Temperature Direct Wafer Bonding: Mechanisms and Applications	Dr. Hubert Moriceau CEA, LETI, France
15:50-17:50	3D Integrated Circuit Technology—A Historical Perspective on How We Got Here and Where We May Be Heading	Dr. Lisa McIlrath President & CEO, R3Logic, Inc.

Conference

<http://www.su.t.u-tokyo.ac.jp/~3dwb/Program.html>

May 21. Monday		
18:00	RECEPTION - Welcome reception at "Abreuvoir" in The University of Tokyo	

May 22. Tuesday			Chair / Moderator
8:30	REGISTRATION		
9:00-9:20	Opening Remarks	Low Temperature Bonding for 3D Integration: Tadatomo Suga, The University of Tokyo	MC: N. Kawamata
9:20-9:50	Role of Low-temperature Bonding in 3D Integration (1)	[keynote] Permanent & Temporary wafer bonding for 3D ICs: Eric Mounier, Jérôme Baron and Amandine Pizzagalli, Yole Développement	H. Moriceau K. Okamoto
9:50-10:20		[keynote] Design Flow and Methodologies for 3D Systems Architectures Exploiting Heterogeneous Technologies: Lisa G. McIlrath, R3 Logic Inc.	
	COFFEE BRAEK		
10:40-11:10	Bonding Processes: Overview (1)	[keynote] Overview of Wafer Direct BondingTechnology: from Substrate Engineering to Heterogeneous Integration Enabled by 3D Wafer Stacking: Ionut Radu, SOITEC	R. Knechtel E. Higurashi
11:10-11:30		[Invite] Low Temperature Metal and Polymer Bonding for Advanced Infrared Imaging Sensors: Dorota S. Temple, Matthew Lueck, Dean Malta and Erik Vick, RTI International	
11:30-12:00	Photonics Applications of Low-temperature Bonding (1)	[keynote] Towards Heterogeneous Optoelectronics Integration by Low Temperature 3D Wafer Bonding: S. J. Ben Yoo, University of California, Davis	
12:00-13:30	LUNCH		
1330-13:50	Cu-Direct and Cu-Hybrid Bonding (1)	[Invite] Passivation of Cu Surface and Its Application in Cu-Cu Bonding for High Density 3D IC Realization: Chuan Seng Tan, Dau Fatt Lim, Lan Peng, and Hong Yu Li, Nanyang Technological University	D. Temple J. Mizuno
13:50-14:10		[Invite] Copper-Oxide Reduction for Low-Temperature Wafer Bonding: B. Rebhan *, S. Tollabimazraehno **, ***, T. Plach **, ***, G. Hesser **, J. Burggraf *, G. Mittendorfer *, V. Dragoi *, M. Wimplinger *, K. Hingerl *, * EV Group, ** Johannes Kepler University, *** Christian Doppler Laboratory for Microscopic and Spectroscopic Material Characterization	
14:10-14:30		[Invite] Vapor-Assisted Hybrid Bonding of Inorganic/Organic Substrates for 3D Hetero Integration: A. Shigetou* and T. Suga**, * National Institute for Materials Science (NIMS), ** The University of Tokyo	
14:30-14:50		[Invite] Fine Pitch Micro-bump Cu/Sn Solid State Diffusion Bonding With and Without Surface Planarization: W. Zhang, A. L. Manna, P. Soussan, and E. Beyne, IMEC	

	COFFEE BRAEK		
	SHORT PRESENTAION		
15:00-16:25	Cu-Direct and Cu-Hybrid Bonding (2)	Surface Protection of Copper by Self Assembled Monolayer for Low-Temperature Chip Bonding: Lijing Qiu, Kiyooki Nakahara, Akihiro Ikeda, and Tanemasa Asano, Kyushu University	MC: N. Kawamata
		Low Temperature Cu/Cu Direct Bonding Using Formic Gas In-situ Treatment: Wenhua Yang, Masatake Akaike, Tadatomo Suga, The University of Tokyo	
		Hybrid Solder -Adhesive Bonding Using Simple Resin Planarization Technique for 3D LSI: Masatsugu Nimura*, Katsuyuki Sakuma**, Hiroshi Ogino***, Tomoyuki Enomoto***, Akitsu Shigetou****, Shuichi Shoji*, and Jun Mizuno*: *Waseda University, **IBM Corporation, ***Nissan Chemical Industries, ****National Institute for Materials Science (NIMS)	
		Cu to Cu Bonding with Cu@Ag Core-shell Nanoparticles: Jenn-Ming Song*, Chih-Hsun Chang**, Jia-Shin Wu*, Chih-Hang Tsai*** and Shih-Yun Chen***, * National Chung Hsing University, ** National Dong Hwa University, *** National Taiwan University of Science and Technology	
	Photonics Applications of Low-temperature Bonding (2)	The Study on the Micro-voids of InP/Si and InP/SiO2 Wafer Bonding by Infrared Transmission and Scanning Acoustic Microscopy, Xuan Xiong Zhang*, **, Yi Ou*, Fan Yang*, Tian Chun Ye*, and Song Lin Zhuang*, *Institute of Microelectronics, Chinese Academy of Sciences, **University of Shanghai for Science and Technology,	
		SOI Platform and III-V Integrated Active Photonic Device by Direct Bonding for Data Communication: Linghan Li*, Akio Higo**, Eiji Higurashi**, Masakazu Sugiyama**, and Yoshiaki Nakano**, * Ritsumeikan University, ** The University of Tokyo	
		Heterogeneous Integrated Subwavelength Plasmonic Waveguide in Near-infrared Region: Yi Wang*, Jinsong Xia*, and Jinzhong Yu**, * Huazhong University of Science and Technology, ** Institute of Semiconductor, Chinese Academy of Science	
		Adhesive Bonding for Integrating Laser Diode and Optical Isolator: Hideki Yokoi, Isamu Myouenzono, Norihiko Ichishima, Shibaura Institute of Technology	
	Photonic Applications of Surface Activated Bonding (SAB)	AlInAs Selective Oxidation for GaInAsP/Si Hybrid Semiconductor Laser using Surface Activated Bonding: Yusuke Hayashi, Ryo Osabe, Keita Fukuda, Nobuhiko Nishiyama, Shigehisa Arai, Tokyo Institute of Technology	
		Surface Activated Bonding of Si/Ce:YIG for Waveguide Optical Isolators: Yuya Shoji, Masatoshi Ito, Yuya Shirato, and Tetsuya Mizumoto, Tokyo Institute of Technology	
		Fabrication of a New Structured Highly Efficient Wavelength-Conversion Device by Use of the Room-Temperature-Bonding Technique: Tomomi Onda, Kenjiro Hara, Shinnosuke Matsumoto, Wataru Nagashima, and Ichiro Shoji, Chuo University	
		Low-Temperature Bonding of Optical Chips using Coined Au Stud Bumps and Its Application to Micro Laser Doppler Velocimeter: Michitaka Yamamoto*, Takeshi Sato*, Eiji Higurashi*, Tadatomo Suga*, and Renshi Sawada**, * The University of Tokyo, ** Kyushu University	
		InP/Si Heterogeneous Integration by Low-Temperature Bonding Using Metallic Interlayer: Eiji Higurashi*, Michitaka Yamamoto*, Hiromu Kawai*, Yuta Sasaki*, Tadatomo Suga*, Yuta Shiratori**, Minoru Ida**, Tomoyuki Akeyoshi**, * The University of Tokyo, **NTT Photonics Laboratories	
		Atomic Diffusion Bonding of Wafers in Air with Thin Au Films and Its Application to Optical Devices Fabrication: T. Shimatsu*, M. Uomoto*, K. Oba**, and Y. Furukata** , * Tohoku University, ** KYOCERA KINSEKI Corporation	
		Hybrid Integration of LiNbO3 Thin Films on Micromachined Si Substrates Using Room-Temperature Transfer Bonding: R. Takigawa*, E. Higurashi*, T. Suga*, and T. Kawanishi**, * The University of Tokyo, ** National Institute of Information and Communications Technology (NICT)	
	SAB Fundamental	Electrical Properties of Si-based Junctions by SAB: Naoteru Shigekawa*, Noriyuki Watanabe**, and Eiji Higurashi***, * Osaka-City Univ., ** NTT Photonics Labs., *** The University of Tokyo	
		Comparison of SAB Methods for Room Temperature Bonding of Si Wafers: Keigo Oshikawa*, Chenxi Wang*, Masahisa Fujino*, Tadatomo Suga*, Kenichi Iguchi**, Haruo Nakawaza**, Yoshikazu Takahashi**, * The University of Tokyo, ** Fuji Electric Co. Ltd.	
16:25-17:20	Poster Session		
17:30	Leaving to Reception (Bus to Tokyo Bay Cruise) Banquet "Night cruise around Tokyo bay"		

May 23, Wednesday			
9:00-9:20	Role of Low-temperature Bonding in 3D Integration (2)	[Invite] Heterogeneous 3D Stacking Technologies after Memory Cubes: Hiroaki Ikeda, Association of Super-Advanced Electronics Technologies (ASET)	I. Ladu Jenn-Ming Song
9:20-9:40	Plasma Activation (1)	[Invite] Low Temperature Bonding Assisted by CMP and/or Plasma Activation: H. Moriceau *, F. Rieutord **, F. Fournel *, B. Imbert *, L. DiCioccio *, F. Baudin *, C. Rauer *, C. Morales *, * CEA, Leti, ** CEA, INAC	
9:40-10:00		[Invite] 3D Integration Applications for Low Temperature Direct Bond Technology: Paul Enquist, Ziptronix Inc.	
10:00-10:20	Bonding Fundamental	[Invite] In-situ Observation of Formation of Eutectic Structure between Au and Si: Tadashi Ishida, Laurent Jalabert, and Hiroyuki Fujita, The University of Tokyo	
10:20-10:40	SAB in Volume Production	[Invite] Clad Material by SAB Method and its Application in Volume Productions: Hironao Okayama, Kouji Nanbu, Teppei Kurokawa, Takashi Koshiro, Toyo Kohan Co., Ltd.	
COFFEE BREAK			
SHORT PRESENTAION			
11:00-12:40	Plasma Activation (2)	Low Temperature Plasma Activated Direct Wafer Bonding: T. Plach*,*, K. Hingerl*, V. Dragoi*** and M. Wimplinger***, * Johannes Kepler University, ** Christian Doppler Laboratory for Microscopic and Spectroscopic Material Characterization, *** EV Group E. Thallner GmbH	MC: N. Kawamata
		Variable Bond Strength in Low Temperature Directly Bonded Wafers: V. Masteika*, J. Kowal*, N. St. J. Braithwaite*, and T. Rogers*, * The Open University, ** Applied Microengineering Ltd.	
	Temporary Bonding (1)	Temporary-Bonding and LowTemp® Debonding Technology for Various Applications: Masaya Kawano, Takumi Komatsu, Andreas Fehkührer, Maria Schachinger, Harald Wiesbauer, Jürgen Burggraf, Daniel Burgstaller, Thorsten Matthias**, Markus Wimplinger, and Paul Lindner, EV Group E. Thallner GmbH	
	Self-Assembly	Self-Assembly-Based 3D Integration Technologies: T. Fukushima*, J. Beaa, M. Murugesan*, K.-W. Lee*, T. Tanaka*, and M. Koyanagi*, * Tohoku University	
		Assembly of 20µm Pitch Cu/Sn Micro-bumps Using High Speed Capillary Self-alignment, Philippe Soussan, Wenqi Zhang, Marianna Pantouvaki, Tinne Delande, Silvia Armini, IMEC	
	New Bonding Process	Atomic Diffusion Bonding with Thin Nanocrystalline Metal Films in Vacuum and in an Inert Gas: T. Shimatsu, and M. Uomoto, Tohoku University	
		Water Vapor Containing Plasma Activation for Room-temperature Bonding: Chenxi Wang, Jun Umeda, Yan Xub, Kazuma Mawatari, Takehiko Kitamori and Tadatomo Suga, The University of Tokyo	
		Surface Activated Bonding and Transfer of Carbon Nanotube Bumps to Au substrates, Masahisa Fujino*, Hidenori Terasaka*, Tadatomo Suga*, Ikuo Soga**, Daiyu Kondo**, Yoshikatsu Ishizuki**, and Taisuke Iwai**, * The University of Tokyo, ** FUJITSU Laboratories Ltd. and FUJITSU Ltd.,	
		Direct Bonding of Polymer to Glass Wafers using Surface Activated Bonding (SAB) Method at Room Temperature, Tadatomo Suga*, Takashi Matsumae*, Yoshie Matsumoto** and Masashi Nakano**, *The University of Tokyo, **Lantechnical Service Co., Ltd.	
	New Metal Bonding Process	Low Temperature Metal Interdiffusion Bonding for Micro Devices, J. Frömel*, Y.-C. Lin**, M. Wiemer *, T. Gessner **, and M. Esashi**, * Fraunhofer ENAS, ** WPI AIMR, Tohoku University	
		Room-Temperature Microjoining Using Ultrasonic Bonding of Compliant Bump: Keiichiro Iwanabe*, Takanori Shuto*, Kazuhiro Noda**, Seiya Nakai**, and Tanemasa Asano*, * Kyushu University, ** Adwelds Co.,Ltd.,	
		Low Temperature Au-Au Flip Chip Bonding with VUV/O3 Treatment for 3D Integration: Akiko Okada*, Masatsugu Nimura*, Naoko Unami*, Akitsu Shigetou**, Hirokazu Noma***, Katsuyuki Sakuma****, Shuichi Shoji*, and Jun Mizuno*, *Waseda University, ***National Institute for Materials Science (NIMS), ****IBM Research-Tokyo, ****IBM Corporation	
		Low-Temperature Wafer Bonding Using Sub-Micron Gold Particles for Wafer-Level MEMS Packaging: H. Ishida*, T. Ogashiwa**, Y. Kanehira**, S. Ito***, T. Yazaki*, and J. Mizuno***, * SUSS MicroTec K, ** Tanaka Kikinzoku Kogyo K.K.,*** Waseda University	
		Low Temperature Crack-less Solder Bonding Technique Using Self-propagating Exothermic Nanolayers, T. Morikaku*, T. Matsuda*, T. Namazu**, and S. Inoue*, * Mechanical and Systems Engineering, University of Hyogo, ** PRESTO, Japan Science and Technology Agency	

		Low Temperature Bonding Method Using Metal Microcone Arrays:Zhuo Chen, Qin Lu, Tao Hang, Anmin Hu, and Ming Li, Shanghai Jiao Tong University	
	MEMS and Other Applications (1)	Low Temperature Assembly Method of Microfluidic Bio-molecules Detection System, S. van Loo*, S. Stoukatch*, N. Van Overstraeten-Schlöge**, O. Lefèvre***, F. Axisa*, D. Flandre**, P. Mertens *** and J. Destiné*, *Université de Liège, **Université catholique de Louvain, *** Coris BioConcept A Hierarchic Bonding Procedure for the Assembly of Micro Confocal Microscope, C. Jia*, J. Frömel*, ***, S. Bargiel**, N. Passilly**, M. Baranski**, M. Wiemer*, C. Gorecki**, T. Gessner*, * Fraunhofer Institute ENAS, ** Institute FEMTO-ST, *** WPI-AIMR, Tohoku University	
	Testing and Evaluation	A Versatile Optical System for Metrology and Defects Inspection of 3D Integration Processes: S. Perrot**, Y. Randle**, G. Fresquet**, D. Le Bellego**, S. Petitgrand**, P. Coste*, and A. Bosseboeuf*, * Univ Paris-Sud, Institut d'Electronique Fondamentale, ** Fogale nanotech Investigation of Si/SiO2 Bonding Energy Using Recess Test Structure: Aapo Varpula*, James R. Dekker*, and Tommi Suni*, * VTT Technical Research Centre of Finland Mechanical Reliability of Micron-size Solder Joints Fabricated by Explosively Reacting Nanolayers, T. Fujii*, T. Namazu**, K. Ohtani*, M. Fujii*, and S. Inoue*, * University of Hyogo, ** PRESTO, Japan Science and Technology Agency	
12:40-14:30	LUNCH: Poster Session		
14:30-15:10	Bonding Processes: Overview (2)	[Keynote] Wafer-Scale Oxide Fusion Bonding and Wafer Thinning Development for 3D Systems Integration: S. Skordas, D. C. La Tulipe Jr, K. Winstel, T. A. Vo, D. Priyadarshini, A. Upham, D. Song, A. Hubbard, R. Johnson, K. Cauffman, S. Kanakasabapathy, S. Knupp, M. Malley, M. G. Farooq, R. Hannon, D. Berger, S. S. Iyer, IBM Corp	J. Frömel T. Shimatsu
15:10-15:30		[Invite] Heterointegration by Wafer Bonding and Layer Splitting: Helmut Baumgart *, **, and Oussama Moutanabbir ***, * Old Dominion University, ** Jefferson National Accelerator Facility, *** Ecole Polytechnique de Montreal	
15:30-15:50	Polymer and Film Application	[Invite] 3D-TSV Vertical Interconnection Method using Cu/SnAg Double Bumps: Kyung-Wook Paik, Yongwon Choi, and Jiwon Shin, KAIST	
	COFFEE BRAEK		
16:20-16:40	Temporary Bonding (2)	[Invite] Evolution of Temporary Wafer (De)Bonding Technology Towards Low Temperature Processes for Enhanced 3D Integration: A. Phommahaxay, A. Jourdain, P. Bex, A. Van Den Eede, B. Swinnen, G. Beyer, A. Miller and E. Beyne, IMEC	K. W. Paik M. Sasaki
16:40-17:00		[Invite] Low Temperature Process Evaluation for 3DIC Integrated Thin Wafer Handling: Y.H. Chen, W. L. Tsai, H. H. Chang, C. H. Chien, H. C. Fu, C. W. Chiang, and W.C. Lo, ITRI	
17:00-17:20	MEMS and Other Applications (2)	[Invite] Wafer-Level Heterogeneous 3D Integration for MEMS and NEMS: Frank Niklaus*, Martin Lapisa*, Simon J. Bleiker*, Valentin Dubois*, Niclas Roxhed*, Andreas C. Fischer*, Fredrik Forsberg*, Daniel Grogg**, Michel Despont** and Göran Stemme*, *KTH Royal Institute of Technology, ** IBM Research-Zurich	
17:20-1740		[Invite] Low Temperature Wafer Bonding for MEMS-Processes and 3D-Integration: Roy Knechtel, X-FAB Semiconductor Foundries AG	
17:40-18:00	Best Paper and Best Poster Awards		H.Takagi
18:00	Closing Remarks		H. Baumgart