



ICM&P 2017 Plenary



Monday, June 5, 2017

12:30Pm – 13:40Pm

Ronald Tutor Campus Center Ballroom

JSME Awards Luncheon

Title – “The current status and prospects of metal Additive Manufacturing in Japan”

Speaker: Dr. Hideki Kyogoku, Professor, Faculty of Engineering, Kindai University. Technology Research Association for Future Additive Manufacturing (TRAFAM), Project Leader

Abstract: A new research association, Technology Research Association for Future Additive Manufacturing (TRAFAM), was established by the Ministry of Economy, Trade and Industry (METI) of Japan in FY2014 in order to perform “Manufacturing revolution program centering on 3D printing technology” including two projects of (A) Next-generation industrial 3D printers project and (B) Innovative 3D printer using a binder jetting process. By the result of these projects, it is strongly expected that the design and manufacturing technology performs innovation in the manufacturing industry in Japan, and the competitiveness of the Japanese manufacturing industry is reinforced. The membership of TRAFAM includes three academic institutions and 34 companies. The association’s mission is the development of innovative Additive Manufacturing systems that will meet the world's highest standards and the development of manufacturing technologies for high value-added products. TRAFAM is currently developing Powder Bed Fusion and Direct Energy Deposition types of metal AM machines with electron or laser beams. Two test benches and five types of prototype AM machines have been developed at the end of FY2014 and improved since then. In the presentation, the history, the current status and R&D activities of metal AM technology in Japan are introduced.

Biosketch:

Professor Hideki Kyogoku, Faculty of Engineering, Kindai University, is a Councillor of Kindai University and a Fellow of Japan Society of Mechanical Engineers. He obtained a MS degree in Materials Science from Ehime University in 1979 and a Doctor of Engineering degree in Mechanical Systems Engineering from Tokyo Institute of Technology in 1989. He worked at Hiroshima Prefectural Technology Research Institute during 1979-1993. He started his academic career (Associate Professor) at Kindai University, Hiroshima, in 1993 and was promoted to a full professor in 1999. He worked at The University of Texas at Austin as a visiting research associate during 2001-2002. He founded the Advanced Additive Manufacturing research center at Kindai University, Hiroshima, in 2014 as its Director since then. He served as Vice-Dean of Faculty of Engineering during 2004-2008, Director of Research Institute of Fundamental Technology for Next Generation during 2007-2011, and Dean of Faculty of Engineering during 2008-2014 at Kindai University. He serves as the Project Leader of Technology Research Association for Future Additive Manufacturing (TRAFAM) from 2014. He has over 100 publications in peer reviewed journals. Externally, he was Vice-President of The Japan Society of Mechanical Engineers (JSME) during 2011-2012. He was the chairman of 5th JSME/ASME 2014 International Conferences on Materials and Processing (ICM&P2014).





ICM&P2017 Plenary



Wednesday, June 7, 2017 : 9:15Am – 10:00Am SGM 123

Title – “Looking at tradition, creating the future-DENTO MIRAI”

Speaker: Dr. Hiroyuki HAMADA, Professor, Kyoto Institute of Technology

Abstract: DENTO is tradition in Japanese and Mirai is future. In Kyoto Institute of Technology DENTO MIRAI education and research institute was established in 1997. The purpose of this institute is analyzing implicit knowledge in traditional craft industry by using scientific measurement and equipment and converting to scientific knowledge, and creating a new fabrication method by using the scientific knowledge, that make bright future. We started to analyze fabrication method of KyoYumi-Kyoto Bow-, KyoKawara-Kyoto Roof Tile-, Urushi painting, KyoKabe-Kyoto Wall-, and KyoKanaami-Kyoto Metal Wire Knitting-. In the research fabrication method was divided into several steps and name of each step was considered. By using three dimensional motion analysis, eye movement analysis, force measurement the comparison of expert and non-expert was performed.



Biosketch: Professor Hiroyuki HAMADA graduated in Doctoral degree from Doshisha University, Japan in Mechanical Engineering in 1985. The professional career has started in Kyoto Institute of Technology, Japan from 1986 and promoted to Professor in 1998 and now be the professional in Future-Applied Conventional Technology Center.



ICM&P2017 Keynote



Wednesday June 7, 2017

10:00Am – 10: 45Am

SGM 123

Smart Disaster Mitigation Based on Novel Materials and Structures



HIROSHI ASANUMA

Dr. Engineering, Professor

Chiba University

Department of Mechanical Engineering

1-33, Yayoicho, Inage-ku, Chiba-shi, Chiba, 263-8522, Japan

asanuma@faculty.chiba-u.jp

Co-authors

Ji Su, NASA Langley Research Center, USA

Mohsen Shahinpoor, University of Maine, USA

Mehrdad Nejhad, University of Hawaii at Manoa, USA

Lloyd Hihara, University of Hawaii at Manoa, USA

Guirong Yan, Missouri University of Science and Technology, USA

Carolyn Dry, Natural Process Design Inc., USA

Antonio Paolozzi, Sapienza University of Rome, Italy

Ferdinando Felli, Sapienza University of Rome, Italy

Cristian Vendittozzi, University of Brasilia, Brazil

Giancarlo Santilli, University of Brasilia, Brazil

Sontipee Aimmanee, King Mongkutof Brasilia, Brazilchnology Thonburi, Thailand

Chaiwat Ekkawatpanit, King MongkutBrasilia, Brazilchnology Thonburi, Thailandr d

Kyohichi Nakayasu, Hitachi Zosen Corporation, Japan

Gaku Tanaka, Chiba University, Japan

Kazuhiko Adachi, Chubu University, Japan

Tetsuro Yanaseko, Kogakuin University, Japan

Kazuhiro Kudo, Chiba University, Japan

Mitsunori Kubo, Chiba University, Japan

Yoshihisa Maruyama, Chiba University, Japan

Yun Lu, Chiba University, Japan

Satoshi Kishimoto, National Institute for Materials Science, Japan

Yasubumi Furuya, Tohoku University, Japan

Abstract: The authors have been establishing the concept . Ssaster Mitigation and Sustainable Engineeringve been establishing the concept ay not occur for ion and Sustainable Engineenot occur for a long peri It will be successfully

realized by novel structures and materials such as s and materials such as t ay not occur for ion and Sustainable E. Structures and devices for disaster mitigation consume lots oapanese earthquake and tsunami disasters on March 11, 2011, the authors have been exploring a new direction. Serious disasters may occur today, or may not occur for a long period of time. Structures and devices for disaster mitigation consume lots of money. So, they are better to be used daily and/or produce something useful such as energy for their monitoring, maintenance, corrosion suppression, self-repair, and so on. Compact and deployable structures are also very usefull.

Several structures have been considered by the authors based on the above mentioned concept, that is, Smart River Banks, Multifunctional Artificial Forests, Smart Inflatable Tsunami Airbags, in conjunction with “Applications of Electroactive Polymers in Electrical Power Generation Using Ocean Waves presented at the SPIE SS/NDE 2015 in San Diego as an invited presentation, and also, Smart Shelters, Smart Furniture, and so on. Some of them will be introduced in this presentation.

In addition, other related challenges in the world will be introduced such as the flap-gate type products (no energy, no operation Rising Seawall Ocean Wav etc.) developed by Hitachi Zosen Corporation (Hitz) in Japan, the Project MOSES in Italy, the LAYFIELD Aqua Dam in the USA, some deployable structures in Thailand, and so on. Especially, the flap-gate type products have been developed in a smart way and will be introduced in detail. Asanuma, Nakayasu et al. have been discussing how to enhance their smartness.

As for the general basic problems such as selection of materials, bonding of materials, long term durability, maintenance, repeatability, the authors have been trying in various ways. For example, in order to realize the deployable structures, lightweight materials such as aluminum alloys and carbon fiber reinforced plastics are better to be used instead of steels. To do this, relatively thick aluminum oxide layer was found to increase bonding strength and fracture toughness as well as to enhance corrosion resistance and prevent galvanic corrosion.

There exist other difficulties such as mutual understanding among mechanical engineers, civil engineers and many other people. The authors are trying to develop a research team covering variety of fields to work together by taking advantage/disadvantage of the location of Chiba University as a rt Shelters, Smart Furniture, and so on. Some of them will be introdus for Disaster Mitigation and Sustainability-Technical Section as a part of JSME (The Japan Society of Mechanical Engineers) M&P (Materials and Processing) Division to enhance Disaster Mitigation and Sustainable Engineering.

Biosketch:

Asanuma received Dr. Engineering from The University of Tokyo. After being a Research Associate at Institute of Industrial Science, The University of Tokyo and an Associate Professor at Chiba University, he became a Professor in the Department of Mechanical Engineering, Chiba University. He served as a chair of M&P Division of JSME. He started Active Material Systems-Technical Section of the division. He has been organizing sessions on Smart Materials and Structural Systems for MECJ (Mechanical Engineering Congress, Japan) as a chief organizer jointly with M&P (Materials & Processing), M&M (Materials & Mechanics), DMC (Dynamics, Measurement and Control) and Space Engineering Divisions of JSME. He also served as SPIE Conference Chair, Co-Chair, etc., and chairs/organizers of many other symposiums and workshops on Smart Materials and Structures. Recently, he proposed Disaster Mitigation and Sustainable Engineering and started System of Systems for Disaster Mitigation and Sustainability-Technical Section of the division. He has been organizing related sessions, forums and workshops. He has published over 70 journal papers, 90 conference papers, several books and patents, and has been in collaboration/ cooperation with over 30 universities/institutes/companies around the world. He has delivered keynote/invited presentations about 50 times. He is a JSME Fellow and an IOP Fellow.