The Japan Society for Precision Engineering

## Introduction of JSPE PRIZES 2013

***1. Masaomi Tsutsumi (Tokyo University of Agriculture and Technology)***

Dr. Masaomi Tsutsumi earned his doctorate from the Graduate School of Science and Technology at the Tokyo Institute of Technology in 1976 and then took the position of Assistant Professor at the Faculty of Engineering of the same university. He was promoted to Associate Professor in 1985. He transferred to Tokyo University of Agriculture and Technology as an Associate Professor in 1986 and was promoted to Professor in 1988.

As an educator, he has produced many doctors and made enormous efforts to foster educators and researchers in the field of machine tools. His students have won many prizes such as the best paper award, encouragement award, and best poster award from international conference organizers, academic societies, and technology foundations.

He has positively and aggressively tackled standardizing the accuracy test methods of machine tools. In particular, he proposed a unique and practical method for evaluating the performance of multi-axis machine tools that was adopted as a test standard by ISO. He received many prizes for this, such as the best paper award from the Japan Society for Precision Engineering, Numata Memorial Paper Award from the Japan Society for Precision Engineering, best paper award from the FA Foundation, and best paper award from the Machine Tool Engineering Foundation. In addition, he received an Industrial Standardization Award from the Minister of Economy, Trade and Industry in 2002 for standardization activities of machine tools.

With regard to society activities, he has made many contributions to the Japan Society for Precision Engineering and Japan Society of Mechanical Engineers as a chairperson and director. He became a Fellow of the Japan Society for Precision Engineering in 2009.

Dr. Masaomi Tsutsumi has made significant contributions to the development of industry and academic societies and achieved excellent results for the standardization and performance test of machine tools.

***2. Yasuto Tatsuta (Toyo Advanced Technologies Co., Ltd. )***

Mr. Yasuto Tatsuta has been contributed greatly in both production automation and product development in the automotive industry since he started his career in Toyo Kogyo Co., Ltd. (currently MAZDA Motor Corporation) in 1972. One of his achievements is the development of HV-FMS (High-Volume Flexible Manufacturing System) which enables the efficient production of multiple types of automotive parts, including parts for engines and transmissions, in a mixed and out of order flow on a single production line. He conducted the first production line of HV-FMS in 2004, it was almost 20 years after his first concept in 1985. Compared to former production systems, this technology has various excellent performances such as less additional costs for installing a new unit or part into the production line (only 5% additional cost is necessary), short down-time, and very short lead-time (only one month) for starting a new production line. HV-FMS is thus recognized as the mother production system of MAZDA's new automotive technology called "Skyactiv".

Mr. Tatsuta also contributed much on the development of the total production system based on the 3D CAD system. In this system, the same CAD model is shared and referred to at every stage from the initial design to the final manufacturing for realizing the digitalization of whole activities in the production process.

After he moved from MAZDA to Toyo Advanced Technologies Co., Ltd., a machining tool manufacture in Japan, he concerned the development of a new wire-saw for efficient cutting of the large SiC ingot with fine surface quality, which leads a new wire-saw product in 2009.

As a member of the Japan Society for Precision Engineering (JSPE), he contributed much for the expansion of the society. He has served the Chugoku-Shikoku region branch of the society as a secretary from 1999 and as the general manager from 2005. He had been a representative delegate of JSPE from 2002 to 2011, and he was named a JSPE fellow in 2008. He was installed as the first president of the corporate members of the JSPE in 2010. As mentioned above, Mr. Tatsuta has made outstanding contributions to the production engineering of the automotive industry and to the expansion of the society.

## Introduction of JSPE Technology Awards 2013

***1. Development and Industrial Application of New Measurement System for Gauge Blocks with Double-Ended Laser Interferometer***

*Yuichiro YOKOYAMA, Yutaka KURIYAMA, Hisayoshi SAKAI, Tatsuya NARUMI and Makoto YAMANAKA (MITUTOYO Corporation)*

ISO requires interferometric measurement with wringing onto an auxiliary platen to measure the central length of grade K gauge blocks. However, the wringing operation requires skill and causes dispersion in the measurement results. In order to solve this problem, a new interferometric measurement system of gauge blocks was developed that does not require the wringing operation. The system has several advantages; it can measure not only the central length but also the fo and fu coefficients of thermal expansion, length difference between two gauge blocks, and long-term temporal stability. The measurement repeatability of the system was found to be less than 3 nm, and the results showed good agreement with those of the conventional system. The system enables better quality control of our gauge block production process.

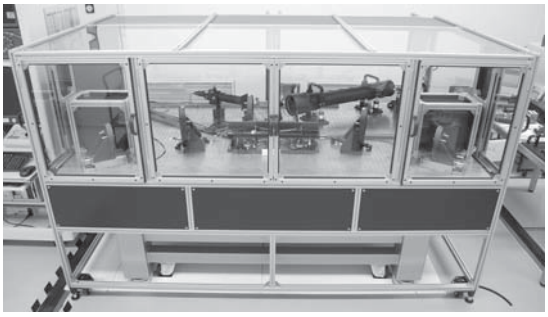

**Fig. 1** Appearance of new interferometer

### *2. 3D MEMS optical switch module*

*Joji YAMAGUCHI, Masato MIZUKAMI, Shingo UCHIYAMA, Naru NEMOTO and Yuko KAWAJIRI (Nippon Telegraph and Telephone Co.)*

Internet traffic is dramatically increasing every year and will soon reach 2 Tbps. To support the huge amount of traffic, optical network systems require more capacity, flexibility, and efficiency. Optical switches are key devices because they can reconfigure networks remotely.

3D MEMS optical switch modules are attractive for high port counts of over one hundred optical switches. The optical fabric comprises fiber, micro-lens, and MEMS tilt-mirror arrays. Each optical beam from the input ports is collimated by a micro-lens and is incident to a MEMS mirror. The MEMS mirror reflects the optical beam to connect it to any output port by controlling the tilt angle. A prototype with 128 input and 128 output ports has the function of MEMS mirror feedback control to improve the stability and repeatability of the optical connections. The prototype achieved an averaged insertion loss of 2.6 dB and switching time of 8 ms.

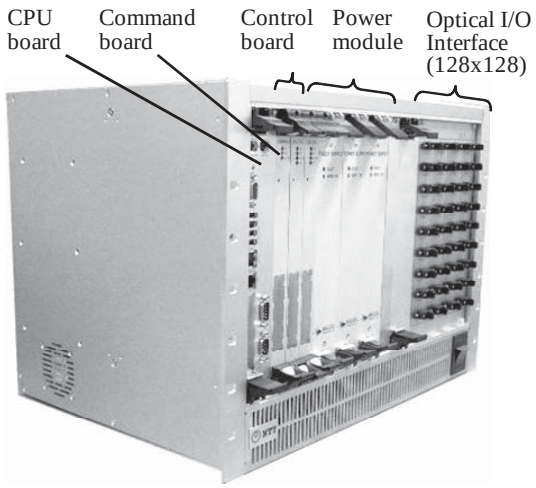


**Fig. 2** 3D MEMS optical switch module

### *3. Development of Ultrasonically Assisted Electrolytic Grinding System*

*Satoshi KOBAYASHI, Masayuki TAKAHASHI, Toru TACHIBANA (MICRON MACHINERY CO., LTD.), Tsunemoto KURIYAGAWA and Keita SHIMADA (Tohoku University)*

Conventional methods of grinding tend to be less efficient and accurate for circumferential surfaces with a smaller inner diameter. To make such grinding highly accurate and efficient, we developed an ultrasonically assisted grinding unit (UAG unit) that uses ultrasound to aid conventional internal grinding. In addition, we developed an ultrasonic and electrolytic grinding system (UEG system) that incorporates the effects of both ultrasonic vibrations and electrolytic actions into the conventional grinding of parts with small internal diameters and high aspect ratios.

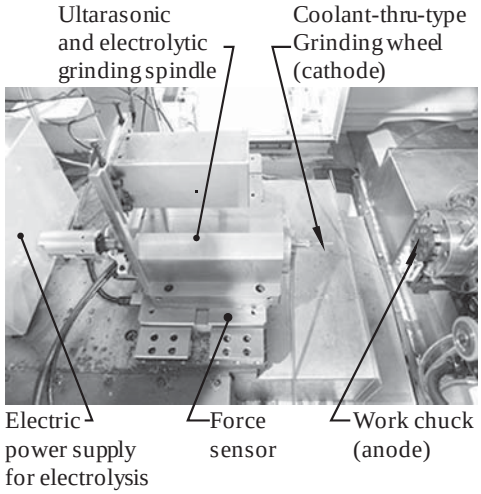


**Fig. 3** UEG-System