



# Shinno-Yoshioka Group

## Production engineering based on innovative precision mechanical devices

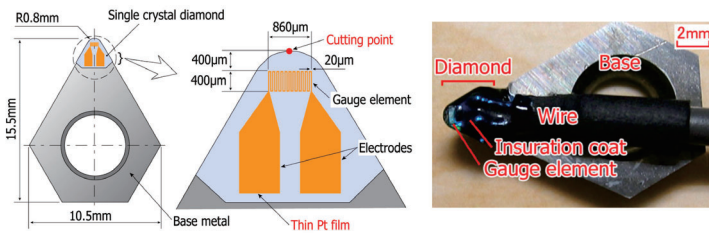
Innovative Mechano-Device Research Core  
Laboratory for Future Interdisciplinary Research of Science and Technology

<http://www.upm.pi.titech.ac.jp>

Research field of our research group is future production system which is higher precision, higher productivity, and flexible. In order to achieve that goal, we have developed an ultraprecision machining and measuring systems based on innovative design concept, functional components such as positioning system, monitoring systems

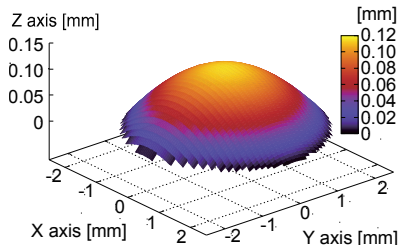
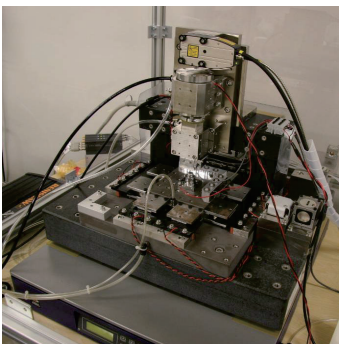
### Sensor-integrated cutting tool

- Micro thermometry sensor on rake face of cutting tool
- Inprocess monitoring of thermal behavior near cutting point
- Adaptive control of ultraprecision cutting using monitoring information



### Nano measuring system by integrating innovative mechanical devices

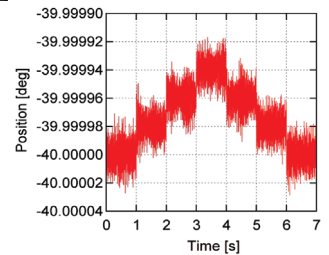
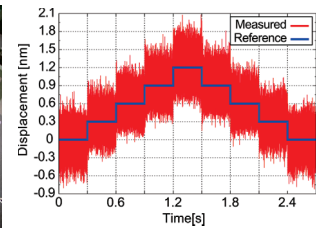
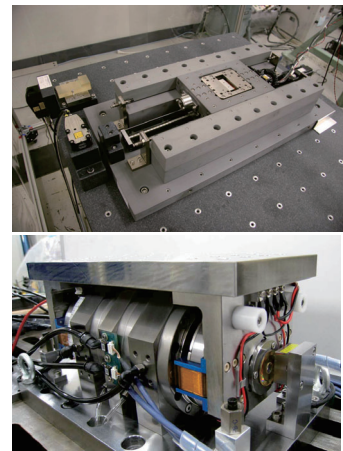
- Ultraprecision motion based on non-contact structure
- Abbe-error minimized layout of mechanical components
- Wide measuring range from nanometer to millimeter



- Production engineering
- Ultraprecision machinery system
- Precision mechanical device

### Ultraprecision positioning system

- Sub-nanometer positioning table system by minimizing structural error factors
- Tiling positioning platform driven by a hybrid actuator combined electromagnetic and pneumatic actuators



### Nano machining system by integrating innovative mechanical devices

- Ultraprecision motion based on non-contact structure
- Stable structure with rigid and low thermal expansion material
- Inprocess monitoring function and nano machining based on feedback of the monitoring result

