PROGRAMME GUIDE

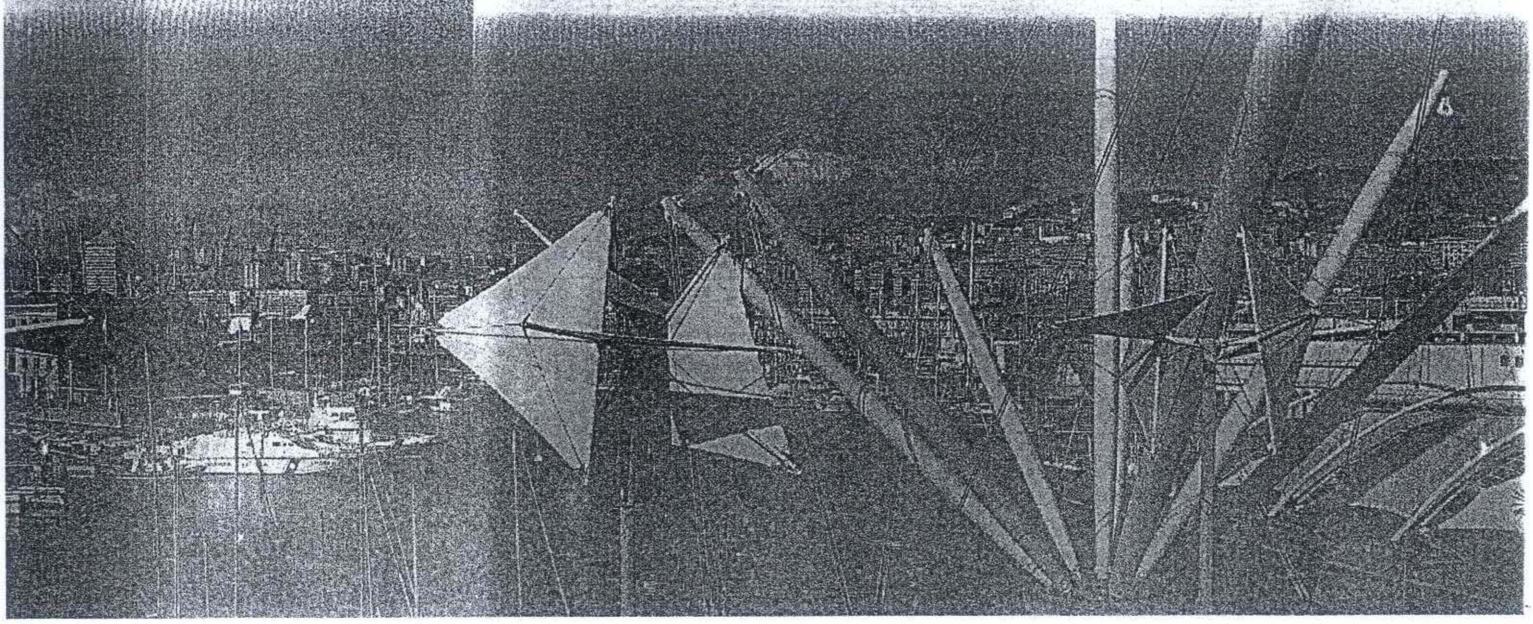
# MNE 2010

36th International Conference on

## Micro & Nano Engineering

GENOA (Italy), 19-22 September 2010

www.MNE2010.org



# Programme at a glance

MNE 2010 Italy

## Sun 19 September

- 09:00 - 10:30 — 2 Short Courses (ZEFIRO/ALISEO)
- 10:30 - 11:00 — Coffee Break
- 11:00 - 12:30 — 2 Short Courses (ZEFIRO/ALISEO)
- 12:30 - 13:30 — Lunch
- 13:30 - 15:00 — 2 Short Courses (ZEFIRO/ALISEO)
- 15:00 - 15:30 — Coffee Break
- 15:30 - 17:00 — 2 Short Courses (ZEFIRO/ALISEO)
- 17:00 - 20:30 — Exhibition
- 18:30 - 20:30 — Welcome Reception

## Mon 20 September

- 08:00 - 08:30 Welcome Coffee
- 08:30 - 09:00 (MAESTRALE) Welcome Address
- 09:00 - 09:40 (MAESTRALE) Plenary I: Robert CHAU, Intel Corporation - USA
- 09:40 - 10:20 (MAESTRALE) Plenary II: Susumu NODA, Kyoto University - Japan
- 10:20 - 10:50 Coffee Break

| LITH | NANO | MEMS |
|---|---|---|
| 10:50 - 12:50 NANOIMPRINT I (MAESTRALE) | 10:50 - 12:50 NANO-PATTERNING & METROLOGY (BORA) | 10:50 - 12:50 DEVICE AND TECHNOLOGY I (SCIROCCO-LIBECCIO) |

- 12:50 - 14:20 Lunch & Networking

| LITH | NANO | MEMS |
|---|---|---|
| 14:20 - 15:50 MASKLESS LITHOGRAPHY I (MAESTRALE) | 14:20 - 15:50 PHOTONICS I (BORA) | 14:20 - 15:50 DEVICE & TECHNOLOGY II (SCIROCCO-LIBECCIO) |

- 15:50 - 18:30 Poster Session & Reception, Odd Numbered Posters (LEVEL II)

## Tue 21 September

- 08:00 - 08:15 Welcome Coffee
- 08:15 - 08:30 (MAESTRALE) Commemoration of Franco Cerrina
- 08:30 - 09:10 (MAESTRALE) Plenary III: Peter FROMHERZ, Max Planck Institute for Biochemistry, Munich - Germany
- 09:10 - 09:50 (MAESTRALE) Plenary IV: Bruno MURARI, STMicroelectronics - Italy
- MNE Fellowship Award
- 09:50 - 10:20 Coffee Break

| LITH | NANO | LIFE |
|---|---|---|
| 10:20 - 12:20 NANOIMPRINT II (MAESTRALE) | 10:20 - 12:20 MICRO & NANO MANUFACTURING I (BORA) | 10:20 - 12:20 MICRO & NANOFLUIDICS (SCIROCCO-LIBECCIO) |

- 12:20 - 13:50 Lunch & Networking

| LITH | NANO | LIFE |
|---|---|---|
| 13:50 - 15:20 MASKLESS LITHOGRAPHY II (MAESTRALE) | 13:50 - 15:20 PHOTONICS II (BORA) | 13:50 - 15:20 MICRODEVICES & SYSTEMS I (SCIROCCO-LIBECCIO) |

- 15:20 - 18:00 Poster Session & Reception, Even Numbered Posters (LEVEL II)
- 20:00 - 23:00 Gala Dinner (Palazzo Ducale)

## Wed 22 September

- 08:00 - 08:30 Welcome Coffee
- 08:30 - 09:10 (MAESTRALE) Plenary V: Kurt RONSE, IMEC, Leuven - Belgium
- 09:10 - 09:50 (MAESTRALE) Plenary VI: Urs STAUFER, TU Delft - The Netherlands
- 09:50 - 10:20 Coffee Break

| MEMS | NANO | LIFE |
|---|---|---|
| 10:20 - 12:20 NANO ELECTRO MECHANICAL SYSTEMS (MAESTRALE) | 10:20 - 12:20 MICRO & NANO MANUFACTURING II (BORA) | 10:20 - 12:20 BIO-NANOSENSORS (SCIROCCO-LIBECCIO) |

- 12:20 - 13:50 Lunch & Networking

| MEMS | NANO | LIFE |
|---|---|---|
| 13:50 - 15:20 BIOMEMS (MAESTRALE) | 13:50 - 15:20 NANODOTS & NANOWIRES (BORA) | 13:50 - 15:20 CELL INTERFACES (SCIROCCO-LIBECCIO) |

- 15:20 - 15:50 Coffee Break

| LITH | NANO | LIFE |
|---|---|---|
| 15:50 - 17:40 MATERIALS & DEVICES (MAESTRALE) | 15:50 - 17:40 CNTS, GRAPHENE AND DIAMOND APPLICATIONS (BORA) | 15:50 - 17:40 MICRODEVICES & SYSTEMS II (SCIROCCO-LIBECCIO) |

consistent with structural design. This structure is expected to have broad applications in micro-imaging, photolithography as well as point-of-care medical surgeries.

## P-NANO-55 - Selective ablation of inkjet-printed Ag thin films on a flexible substrate with a picosecond laser

Dong Jun Lee * [1]; Je Hoon Oh [1]

[1] Department of Mechanical Engineering, Hanyang University, Korea

Ag nanoparticle suspension was printed on polyimide (PI), and sintered at proper temperature to transform nanoparticles to metallic state. After sintering process, 10 ps Nd:YVO4 laser pulses were locally irradiated onto as-printed thin films to generate conductive lines with various widths. Considering the high throughput for future industrial applications, a galvano-scanner was employed to control the laser beam movement because of its higher scanning speed. To fabricate high resolution conductive lines on demand, we investigated the effect of scan speed, incident pulse energy and the number of scans on the ablation characteristics of inkjet-printed thin films.

## P-NANO-56 - Atmospheric-Pressure Plasma Jet from an Array of Micro Holes for PDMS Surface Modification

Kangil Kim * [1]; Geunyoung Kim [1]; Sang Sik Yang [1]

[1] Ajou University, Korea

This paper proposes a simple and inexpensive atmospheric-pressure plasma-jet system for PDMS bonding by surface modification. This paper proposes a simple and inexpensive atmospheric-pressure plasma-jet system for PDMS bonding by surface modification. The anode is fabricated by conventional photolithography and Ni electroplating. The anode has 200 holes of which the diameter and the depth are 100 μm and 60 μm, respectively. In order to generate the plasma jet we used various gases such as argon, helium, nitrogen gas and air. We observed that nitrogen gas made stable plasma jet.

## P-NANO-57 - Ultra-precision Dicing and Wire Sawing of Silicon Carbide

Srecko Cvetkovic * [1]; Caspar Morsbach [2]; Lutz Rissing [1]

[1] Institute for Micro Production Technology, Center for Production Technology, Leibniz Universitaet Hannover, Garbsen, 30823, Germany; [2] Klein & Becker GmbH & Co. KG, Idar-Oberstein, 55743, Germany

The physical and chemical properties of wide bandgap semiconductors like Silicon Carbide (SiC) make these materials an ideal choice for device fabrication and applications in many different areas, e.g. light emitters, high temperature and high power electronics, high power microwave devices, MEMS technology, and substrates. SiC is a hard and brittle material, preventing the ductile mode of machining under normal machining conditions, which makes it difficult to cut and profile. This work presents the application of two standard semiconductor and MEMS machining techniques, ultra-precision dicing and wire sawing for machining of monocrystalline (6H) and ceramic (sintered) SiC.

## P-NANO-58 - Surface Wettability of PDMS Thin Film with Diverse Microstructures

Ahn Jun-hyung * [1]; Oh Jae-weon [1]; Son Joong-gi [1]; Lee Chang-hun [1]; Lee Dong-weon [1]

[1] Chonnam National University, Korea

In this paper, we introduce a novel fabrication method of PDMS thin film with diverse microstructure for superhdrophobic surface. We designed various square shapes to control surface roughness. PDMS thin film with diverse Microstructure arrays are fabricated by using single mask process. On the experimental result, contact angle at square shape arrays was approximately 165°. The transmittance in the visible wavelength range is measured by an UV visible NIR spectrophotometer. The transmittance of a PDMS film with microstructure was more than approximately 90%.

## P-NANO-59 - Accurate assembly process of shape memory alloy tubular micro manipulator with a coaxial bias mechanism

Takashi Mineta * [1]; Kudoh Shinya [1]; Eiji Makino [1]; Takahiro Kawashima [2]; Takayuki Shibata [2]

[1] Graduate School of Science and Technology, Hirosaki University, Japan; [2] Department of Production Systems Engineering, Toyohashi University of Technology, Japan

This paper describes fabrication and assembly of a shape memory alloy (SMA) tubular micro manipulator with a coaxial tubular bias spring. The SMA tubular actuator (O.D: 1000 μm, wall thickness: 30μm) was fabricated with expandable connecting rings for insertion of a tubular bias spring (O.D: 900 μm) in it. After the insertion, the connection rings were contracted by a local heating to cramp the bias spring. By the expansion and shrinking of the SMA ring, the tubular actuator was assembled with the bias spring accurately. Sufficient assembly strength without fracture during the bending motion was successfully obtained.

## P-NANO-60 - Fabrication of subwavelength silicon structures to have anti-reflection and low sliding angle

Chieh-hsiu Chiang [1]; Yung-pin Chen [1]; Lon Wang * [1]

[1] National Taiwan University, Taiwan

To have anti-reflection and low sliding angle simultaneously, subwavelength structures (SWSs) should have sharp peak and high fill factor. Here we introduce a process to fabricate such kind of Si SWSs.The reflectance of our Si SWSs was much lower than that of bare Si. The water contact angle of our Si SWSs was 155° and the sliding angle was 2.4°. we show that a low aspect ratio SWSs on Si can have both anti-reflection and low sliding angle simultaneously.

## P-NANO-61 - Fabrication of curved mirror integrated polymer optical waveguides using UV imprinting technique

Hyun-shik Lee [1]; Keum-soo Jeon [2]; Insu Park [2]; Shinmo An * [1]; El-hang Lee [1]

[1] School of Information and Communication Engineering, Inha University, South Korea; [2] Electro-Materials Business Group, Doosan Corporation, South Korea

A curved mirror integrated polymer optical waveguides was fabricated using UV imprinting technique. The copper surface was wet-etched isotropically and was then coated with photoresist for forming a mater pattern of the waveguide, of which ends are a semispherical shape due to isotropic etching. The master pattern was transferred to a polydimethylsiloxane (PDMS) mold. The replication process was carried out by UV imprinting technique. An under-cladding polymer layer was imprinted by the PDMS mold and a core polymer layer is filled over the cladding layer. The measured propagation loss of the fabricated polymer waveguide was -0.3dB/cm.

## P-NANO-62 - Hot roll embossing in thermoplastic foils using silicon stamp

Khaled Metwally * [1]; Laurent Robert [1]; Samuel Queste [1]; Chantal Khan Malek [1]

[1] FEMTO-ST Institute - UMR CNRS 6174 - France

In the last few years the necessity of having disposable microfluidic devices has lead to usage of polymers in fabrication as they are low cost and offer capability for high volume production. In particular continuous processing carried via roll-to-roll manufacturing allows producing flexible devices using thin films. In this work, we describe a hot-roll-embossing process for manufacturing a flexible polymer-based Y-microreactor in different commercially available thermoplastic foils using a microstructured silicon wafer as a flat stamping tool. We developed a dry etching process to achieve slightly positively tapered sidewalls to allow for easy demoulding.