

NNT2019

Nanoimprint and Nanoprint Technologies

October 14-16, 2019
BOSTON SEAPORT



Monday, October 14

10:30 – 11:30	Registration
11:30 – 2:20	NIL Ecosystem Session 1 <hr/> <p>11:30 Welcome and Introduction</p> <hr/> <p>11:40 Mastering; more than just litho and etch.... T. Nielsen, B. Bilenberg, and N. Hansson (invited)</p> <hr/> <p>12:00 Breaking R2R NIL Mastering Barriers: Speed, Precision & Cost John Berg / Carpe Diem (invited)</p> <hr/> <p>12:20 Large area interference lithography as mastering technique to pattern silicon-based tandem solar cells Benedikt Bläsi, Volker Kübler, Hubert Hauser</p> <hr/> <p>12:40 Process Upscaling – Nanoimprint from small to large areas Thomas Exlager (invited)</p> <hr/> <p>1:00 SCIL technology; from sample to production Marc A. Verschuuren (invited)</p> <hr/> <p>1:20 Wafer Scale Manufacturing Imprinter Using Flexible Mold Hua Tan (invited)</p> <hr/> <p>1:40 Electric-field-driven Jet Deposition Based Micro-and Nano-scale 3D printing and Its Applications Hongbo Lan (invited)</p> <hr/> <p>2:00 UV curing materials for Wafer Level Optics Patrick Heissler</p>
2:20	Break

2:40 – 5:40	<p>NIL Ecosystem Session 2</p> <hr/> <p>2:40 Matching the crosscutting challenges in photopolymers and functional inks for nanoimprint lithography Arne Schleunitz (invited)</p> <hr/> <p>3:00 A Materials-First Approach to Device Fabrication using Imprint Lithography James J. Watkins</p> <hr/> <p>3:20 From lab to fab - Roll to Roll replication of microstructures in to PDMS Olli-Heikki Huttunen (invited)</p> <hr/> <p>3:40 Recent case studies: NIL Industrial Applications in China Ran Ji</p> <hr/> <p>4:00 Excellence in Microlens Imprint Lithography and Wafer-Stacking Reinhard Voelkel (invited)</p> <hr/> <p>4:20 Design for NIL foundry using Wire Grid Polarizer volume production release methodologies on 200mm Full Wafer NIL Bradley R Williams, Kevin Black, Romyana N. Petrova (invited)</p> <hr/> <p>4:40 Roll-to-Plate nanoimprint lithography for large-area applications: equipment, materials and processes Sander Kommeren, Pim Veldhuizen, Jan Matthijs ter Meulen, Rob van Erven, Bram Titulaer</p> <hr/> <p>5:00 Flexpol Ecosystem: Developing a bacterial repelling and killing film. Nikos Kehagias</p> <hr/> <p>5:20 Nanostructures in seven-league boots - the potential of R2R-UV nanoimprinting B. Stadlober, D. Nees, A. Haase, M. Smolka, U. Palfinger, L. Kuna, S. Ruttloff, C. Leiner, C. Sommer, M. Sonnleitner, J. Hesse</p>
5:40	NIL Ecosystem Roundtable
6:05	NIL Ecosystem Roundtable
6:30	Welcome and Networking Reception in Exhibit Hall

Tuesday, October 15

	Continental Breakfast
8:00 – 10:10	<p>Session 1 - Optics 1</p> <hr/> <p>8:00 NIL for advanced AR displays Ismo Vartiainen (invited)</p> <hr/> <p>8:20 R2R-UV-nanoimprinting as a powerful mean for large-area fabrication of freeform micro-optical elements Dieter Nees</p> <hr/> <p>8:35 Diffractive Augmented Reality (AR) Waveguides Fabricated by NIL: Manufacturing Challenges and Improved Approaches Arseny Alexeev</p> <hr/> <p>8:50 High volume manufacturing of advanced diffractive optical elements by injection molding T. Nielsen, B. Bilenberg, A. Johansson, V. Miljkovic, N. Hansson and I. Czolkos</p> <hr/> <p>9:05 R2R Nanoimprint Process for Multilevel OLED substrate with Transparent Metal Mesh Conductor W. Dennis Slafer (with Ruth Shinar, Joe Shinar, Rana Biswas)</p> <hr/> <p>9:20 High Quality Diffractive Optical Elements (DOEs) Using Nanoimprint Lithography Simon Drieschner</p> <hr/> <p>9:35 Full Wafer Double Sided Monolithic Lens Fabrication Using UV-Imprint Lithography Dr.Vijay Ramya Kolli</p> <hr/> <p>9:50 Plasmonic Devices Based on Collapsible Nanofingers Boxiang Song, Pan Hu, Yunxiang Wang, Wei Wu (invited)</p>
10:10	Morning Break in Exhibit Hall
10:30 – 12:15	<p>Session 2 - Optics 2</p> <hr/> <p>10:30 Plenary: Federico Capasso High Performance Flat Optics</p> <hr/> <p>11:15 Multi-Level Nanoimprint Lithography for TFT Display Manufacturing Auke Jisk Kronemeijer, Lukasz Witczak, Tamer Dogan, Joris de Riet, Thijs Bel, Roy Verbeek, Joris Maas , Ilias Katsouras and Gerwin Gelinck</p> <hr/> <p>11:30 Transparent colored signage and display enabled by nanoimprinted multi-layer gratings Zeyang Liu, L. Jay Guo</p> <hr/> <p>11:45 Fabrication of pixelated wiregrid polarizers for real-time laser beam profile analysis Florian Schlachter, Michael Hornung, Stephan Suckow, Max Christian Lemme</p> <hr/> <p>12:00 Curved single crystals from solution at room temperature Harshal Agrawal, Erik Garnett</p>
12:15 – 1:45	Lunch

1:45 – 3:05	<p>Session 3 - Devices 1</p> <hr/> <p>1:45 Keynote: Christopher M. Spadaccini Additive Manufacturing and Architected Materials: New Processes and Materials</p> <hr/> <p>2:15 Direct-written and Low-voltage Polymer Field-Effect Transistors Operating at Radio-Frequencies Mario Caironi (invited)</p> <hr/> <p>2:35 Thermal NIL-based graphene patterning for permeable base heterojunction transistors L.S.D. Antony, C. Strobel, R. Kirchner, C.A. Chavarin, Ch. Wenger, M. Albert, J.W. Bartha</p> <hr/> <p>2:50 Three-terminal memristive RF switch Puming Fang, Sayan Das, Joseph Bardin, Qiangfei Xia</p>
3:05	Afternoon Break in Exhibit Hall
3:30 – 5:05	<p>Session 4 - Devices 2</p> <hr/> <p>3:30 UV-sensor based on capillary filled sub- micrometer interdigitated electrode arrays Helmut Schiff</p> <hr/> <p>3:45 Toward a Self-Aligned, Roll-to-Roll Manufacturing Process for Printed Circuitry C. Daniel Frisbie (invited)</p> <hr/> <p>4:05 Solar Absorber by Nanoimprint Lithography and Sputter Deposition Tina Mitteramskogler</p> <hr/> <p>4:20 Imprint-induced grain growth in perovskite layers Andre Mayer, Neda Pourdavoud, Tobias Haeger, Ralf Heiderhoff, Miriam Leifels, Johannes Rond, Johannes Staabs, Patrik Görrn, Thomas Riedl, Hella-Christin Scheer</p> <hr/> <p>4:35 Direct Imprinting of Microelectrodes for High-Performance Miniature Power Sources Wenhao Li, Vince Einck, Cheng Li, Yiliang Zhou, Troels Christiansen, Bo B. Iversen and James J. Watkins</p> <hr/> <p>4:50 Faithful Replication of Large-Area Nanostructures via Pulsed Direct Current High-Voltage Electrohydrodynamic Phase Instability Dae Joon Kang (invited)</p>
6:00	<p>Dinner Cruise on Boston Harbor</p> <p>To ensure your place on the cruise please register by October 1. After October 1 guests will be accommodated on a space available basis.</p> <p>Sponsored by:</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>

Wednesday, October 16

	Continental Breakfast
8:00 – 10:30	<p>Session 5 - Process 1</p> <hr/> <p>8:00 Approach of fine resist filling technologies for UV-NIL at AIST Sung-Won Youn, Kenta Suzuki, Hiroshi Hiroshima (invited)</p> <hr/> <p>8:20 Impact of molecular size in sub 10nm nanoimprint lithography based on computational study R. Sakata¹, M. Yasuda, K. Tada, Y. Miyashita, M. Shirai, H. Kawata, Y. Hirai</p> <hr/> <p>8:35 Topography and Flatness Induced Overlay Distortion Correction using Resist Drop Pattern Compensation in Nanoimprint Lithography Systems Anshuman Cherala, Se-Hyuk Im, Mario Meissl, Ahmed Hussein, Logan Simpson, Ryan Minter, Ecron Thompson, Jin Choi, Douglas J. Resnick, Mitsuru Hiura, Satoshi Iino</p> <hr/> <p>8:50 Optimizing Filling of Anisotropic Templates in UV Nanoimprint Lithography Yang Ban and Roger T. Bonnezace (invited)</p> <hr/> <p>9:10 Silica Nanoparticles-Containing Replica Resin Molds for Step-and-Repeat UV Nanoimprinting Shunya Ito, Takahiro Nakamura, and Masaru Nakagawa</p> <hr/> <p>9:25 Residual layer etching techniques for NIL in photovoltaics Hubert Hauser, Ralph Müller, Oliver Höhn, Rita M. S. Freitas, Armin Richter, Benedikt Bläsi</p> <hr/> <p>9:40 Multilayer Multimaterial Nanoimprinting combined with Inkjet Printing M. Muehlberger, A. R. Moharana, H. Außerhuber, S. Kopp, T. Mitteramskogler, D. Fechtig</p> <hr/> <p>9:55 Design for nanoimprint lithography: Hot spot modification through total NIL process simulation Sachiko Kobayashi, Kodera Katsuyoshi, Arisawa Yukiyasu, Hirotaka Tsuda, Ryoichi Inanami, Motofumi Komori, Takuya Kono, Tetsuro Nakasugi and Tatsuhiko Higashiki (invited)</p>
10:30	Morning Break in Exhibit Hall
10:40 – 12:00	<p>Session 6 - Process 2</p> <hr/> <p>10:40 Plenary: Professor Stephen Chou New Innovations in NIL</p> <hr/> <p>11:10 Merging Nanoimprint with other Polymer Technologies Prof. Dr. Per Magnus Kristiansen (invited)</p> <hr/> <p>11:30 The Role of Tip-based Measurement in a Hybrid Metrology Framework for Roll-to-Roll Nanofabrication Michael A Cullinan</p> <hr/> <p>11:45 Optical reflectance-based software for automated characterization of nanomaterials: outcomes of the NSF Nanohub's NanoMFG node Vu Nguyen, Wan Li, Hannah Gramling, Yunsu Park, Ke Xu and Hayden Taylor</p>

12:00 – 1:00	Lunch
1:00 – 2:30	<p>Session 7 - Bio</p> <hr/> <p>1:00 Keynote: M. Shane Bowen Nanofabrication and Genomics: How Patterning is Enabling a Revolution in Healthcare</p> <hr/> <p>1:30 Roll-to-roll Fabrication of Through-hole Isoporous Structures and Applications as Cell-culture and Filtration Membranes Him Cheng Wong and Hong Yee Low</p> <hr/> <p>1:45 Surface Charge Density Dependent DNA Capture through Polymer Planar Nanopores Fabricated by NIL Junseo Choi, Zheng Jia, and Sunggook Park*</p> <hr/> <p>2:00 Nano, Micro, or Combination: Design Rules for Self-cleaning Surfaces Achille Francone</p> <hr/> <p>2:15 High performance DLC-based mold technology with high control over micro and nano features for optics and microfluidics M. Daniela Angione</p>
2:30	Afternoon Break in Exhibit Hall
3:00 – 4:35	<p>Session 8 - Nanomanufacturing</p> <hr/> <p>3:00 Nanocoining – Seamless nanopatterned drum molds for roll-to-roll nanoimprint lithography Nichole C Miller, Stephen J Furst</p> <hr/> <p>3:15 A composite imprint lithography technique for the mass production of large-area microstructures Guangming Zhang</p> <hr/> <p>3:30 Challenges for Scaling UV NIL to Production Speeds using Roll-to-Roll Manufacturing Xin Chen, Manogna Jamhapuram, Ron Markum, Stephen Qi, D.A. Lucca and J.K. Good</p> <hr/> <p>3:45 Manufacturing assessment of sub 100 nm features in Si/SiO₂ substrates based on EVG nanoimprint solution for 8 inch substrates Hubert Teyssèdre</p> <hr/> <p>4:00 Size and Shape Control in Nanoimprint Resist Patterning and During Pattern Transfer with Applications in CMOS Memory Scaling S.V. Sreenivasan (invited)</p> <hr/> <p>4:20 A thermomechanical approach to mold filling in roll-to-roll nanoimprinting lithography Juan P. Gomez-Constante, Prabhakar R. Pagilla and Kumbakonam R. Rajagopal</p>
4:35	Farewell
6:00	Committee Dinner

Thursday, October 17

7:45 - 3:30

Optional Tour of Advanced Print and Roll-to-Roll Manufacturing Demonstration Facility at UMass Amherst

Transportation and Lunch Provided (space is limited to first 50 participants)

7:45 Bus Arrives at Seaport Hotel

8:15 Bus Departs for UMass Amherst

10:15 Bus Arrives UMass Amherst

10:30 Convene Life Science Laboratories Conference Center S330
Coffee Break

10:45 Facilities and Capabilities Overview and Discussion

11:45 Catered Lunch - Networking
Sponsored by:

UMassAmherst

Institute for
Applied Life Sciences

12:30 Facility Tours

1:15 Wrap-up

1:30 Bus Departs for Boston Seaport

3:30 Bus Arrives at Seaport Hotel

EXHIBIT HALL



morphotonics



UMassAmherst

Institute for
Applied Life Sciences
Center for Personalized Health Monitoring

Poster Session

- **3D Printed Freeform Lenses with Nanoimprinted Moth-Eye Antireflective Structures**
Amiya R. Moharana, Pavel Kulha, Michael J. Haslinger, Michael Mühlberger, Daniel Fechtig
- **Back injection molding of polymer films with capillary filled sub-micron silver wires**
Helmut Schiff
- **Capillary Filling of Nanoparticle Inks in Open Microchannels**
Tina Mitteramskogler
- **Computational Study on UV Curing Characteristics Based on Stochastic Model**
M. Koyama, M. Shirai, H. Kawata, Y. Hirai, M. Yasuda
- **Control of Sub-50 nm Thickness of UV-Cured Thin Films by Print-and-Imprint Method**
Masaru Nakagawa, Kento Ochiai, Akiko Onuma, Kazue Suto, Takahiro Nakamura, Shunya Ito
- **Deterministic assembly of arrays of lithographically defined WS₂ and MoS₂ monolayer features directly from multilayer sources into van der Waals heterostructures**
Vu Nguyen et. al.
- **Development of a fiber-optic based metrology for nano/microscale mold filling**
Majid Fazeli Jadidi
- **Double replication for characterizing cracks in surface-hardened PDMS**
Miriam Leifels, A. Mayer, P. Görrn, H.-C. Scheer
- **Fabrication of Grating-based Solar Thermal Absorber using Deep Neural Network and Nanoimprint Lithography**
Pil-Hoon Jung, Junyong Seo, Mingeon Kim, Son soomin Son, BongJae Lee, Heon Lee
- **Fabrication of large area (0.5m²) soft mold using roller pressing UV imprint machine**
Woo Young Kim, Su Hyun Choi, Seon Jun Kim, Young Tae Cho, Kwang Young Kim, Sin Kwon, Seung Hyun Lee, Hyun tae Kim
- **Fabrication of micro-lens array with ARS by using high hardness UV curable resin**
Masato Nakamura, Shin Hiwasa, Jun Taniguchi
- **Fabrication of Micro-size Re-entrant Structure by Two Step Imprint Process**
Su Hyun Choi and Young Tae Cho
- **Large area soft mold using precision step & repeat align process and roll-to-roll UV imprint process using it**
Hyuntai Kim, Gaeul Kim, Dongha Song, Seunghyun Lee, Kwangyoung Kim, Youngtae Cho, Sin Kwon
- **Liquid metal electrical conductors in R2R imprinted PDMS microfluidic channels**
Olli-Heikki Huttunen, Johanna Hiitola-Keinänen
- **Low Cost, Durable Masters for Imprint Lithography and Injection Molding by NIL Patterning of Metal Oxides**
Feyza Dundar, Vince Einck, James J. Watkins
- **Multimode Sensing for Roll-to-Roll Flexible Electronics Print Process Control**
Jingyang Yan, Mehdi Riza, Rui Ma, Xian Du
- **Multiple replication of hierarchical structures from polymer masters with anisotropy**
A. Mayer, J. Rond, J. Staabs, M. Leifels, H.-C. Scheer, J. Zajadacz, M. Erhardt, P. Lorenz, K. Zimmer
- **Nanodiamond surface modification and technology development of a high dose non-steroidal anti-inflammatory drug contained in a medical patch**
wwKim, Ckrhee, A.P Puzyr

- [Nanoimprint lithography for large-scale fabrication of micro- and nano-structures](#)
Patrícia C. Sousa*, José Fernandes, Joana Santos, Jordi Llobet, Hélder Fonseca, Carlos Calaza, João Gaspar
- [Observation of Fluorescence Inclination Moiré Fringes for Imprint Alignment](#)
Takuma Yoshida, Shunya Ito, Takahiro Nakamura, Masaru Nakagawa
- [Patterning of Zinc-Tin-Oxide TFTs Using an Electrohydrodynamic Jet Printer](#)
Woon-Seop Choi
- [Selection of UV-Resin Molds Having Nanostructures for Thermal-NIL](#)
Junseo Choi, Zheng Jia, Sunggook Park*
- [Stable transfer technique of anti-reflection structure using high hardness and anti-fouling UV curable resin](#)
Junya Kawauchi, Shin Hiwasa, Jun Taniguchi
- [Ultra-High Refractive Index Polymers in the Visible Wavelength for Nanoimprint Lithography](#)
Carlos Pina-Hernandez, Khai Le, Arian Gashi, Stefano Cabrini, Keiko Munechika