Optical Trapping and Optical Micromanipulation XVI
Sunday - Thursday 11 - 15 August 2019

Conference Sessions At A Glance

1: Shaping the Flow of Information: Energy and Momentum I
2: Shaping the Flow of Information: Energy and Momentum II
3: 3M: Microbiology, Mechanobiology, and Micromechanics
4: Using the Photonic Toolbox to Study Biological Systems
5: Sunday Evening Plenary Session
6: New Fundamental Physics
7: Towards (Or In) the Quantum Limit of Opto-Mechanics
8: Novel Photonic Devices
9: On-Chip, Near-Field, Micromanipulation, Plasmonic, and Nanoparticle Trapping I
10: Levitated Micro-Gyroscopes and Sensors I
11: Levitated Micro-Gyroscopes and Sensors II
12: Special Session Celebrating Art Ashkin's Nobel Prize
13: Single-Molecule Manipulation and Study
14: Statistical Mechanics of Small Systems
15: Enhanced Sensitivity, Accuracy, and Resolution of Optical Force and Torque Actuators
16: Optical Angular Momentum (OAM)
17: Optofluidics and Optically Shaped Structures
18: Optical Manipulation of Matter Through Gaseous Media
19: Optically Bound Matter
20: Optical Momentum and Matter Momentum
21: Optical Boundary Matter
22: Alternative and Hybrid Force Systems

Important Dates

Abstract Due: 30 January 2019
Author Notification: 8 April 2019
Manuscript Due Date: 17 July 2019

Additional Conference Information

SPIE Course Alert

Conference Chairs, Gabriel Spalding and Kishan Dholakia, are teaching a Monday morning course at SPIE Optics + Photonics 2019: "Shaping Light with applications in Advanced Microscopy and Optical Trapping" (SC1043) Pre-registration is required.

Conference Committee

Conference Chairs
Kishan Dholakia, Univ. of St. Andrews (United Kingdom)
Gabriel C. Spalding, Illinois Wesleyan Univ. (United States)

Program Committee
Ashley R. Carter, Amherst College (United States)
Reuven Gordon, Univ. of Victoria (Canada)
Simon Hanna, Univ. of Bristol (United Kingdom)
Masud Mansuripur, College of Optical Sciences, The Univ. of Arizona (United States)
James Millen, King's College London (United Kingdom)
David C. Moore, Yale Univ. (United States)

Program Committee continued...
Lene Broerg Odershede, Niels Bohr Institute (Denmark)
Daniel H. Ou-Yang, Lehigh Univ. (United States)
Daryl Preece, Univ. of California, San Diego (United States)
Ruben Ramos-Garcia, Instituto Nacional de Astrofisica, Optica y Electronica (Mexico)
Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)
Nick Vamivakas, Univ. of Rochester (United States)
Yuebing Zheng, The Univ. of Texas at Austin (United States)
SUNDAY 11 AUGUST

Session 1: Shaping the Flow of Information: Energy and Momentum I

Sunday 11 August 2019
8:10 AM - 10:00 AM
Session Chair: Gabriel Cooper Spalding, Illinois Wesleyan Univ. (United States)

Holographic acoustic tweezers: future applications in medicine and acoustophoretic displays (Invited Paper)
Paper 11083-1
Author(s): Asier Marzo, Univ. Pública de Navarra (Spain); Tatsuki Fushimi, Tom Hill, Bruce W. Drinkwater, Univ. of Bristol (United Kingdom)
Add To My Schedule

From electron vortex beams to spatial electron modulators: the progress of advanced optics in the TEM
Paper 11083-2
Author(s): Giulio Guzzinati, Armand Béché, Johan Verbeeck, Univ. Antwerpen (Belgium)
Add To My Schedule

Making the macro: designing a new SLM for holographic photostimulation
Paper 11083-3
Author(s): Janelle C. Shane, Douglas J. McKnight, Boulder Nonlinear Systems (United States); Adrian Hill, PlusPlus Software LLC (United States); Kevin Taberski, Dynamic Engineering Corp. (United States); Steve Serati, Boulder Nonlinear Systems (United States)
Add To My Schedule

On-demand vector holographic optical tweezers
Paper 11083-4
Author(s): Nkosiphile Hhebhe, Univ. of the Witwatersrand, Johannesburg (South Africa); Peter A. C. Williams, Massachusetts Institute of Technology (United States); Carmelo Rosales-Guzmán, Harbin Univ. of Science and Technology (China); Valeria Rodríguez-Fajardo, Andrew Forbes, Univ. of the Witwatersrand, Johannesburg (South Africa)
Add To My Schedule

Nonlinearity-induced dynamic optical trapping
Paper 11083-5
Author(s): Yuquan Zhang, Changjun Min, Xiao-Cong Yuan, Shenzhen Univ. (China)
Add To My Schedule

Session 2: Shaping the Flow of Information: Energy and Momentum II

Sunday 11 August 2019
10:30 AM - 11:50 AM
Session Chair: Simon Hanna, Univ. of Bristol (United Kingdom)

Customization, application, and identification of non-paraxial 4D light fields structured in amplitude, phase, and 3D polarization
Paper 11083-6
Author(s): Eileen Otte, Kemal Tekce, Cornelia Denz, Westfälische Wilhelms-Univ. Münster (Germany)
Add To My Schedule

Tailoring the optical force landscape with complex optical fields
Paper 11083-7
Author(s): Qiwen Zhan, Univ. of Dayton (United States), Univ. of Shanghai for Science and Technology (China)
Add To My Schedule

Focusing through highly scattering media exceeding memory effect range
Paper 11083-8
Lunch Break 11:50 AM - 1:20 PM

Session 3:
3M: Microhology, Mechanobiology, and Micromechanics

Sunday 11 August 2019
1:20 PM - 3:20 PM

Session Chair: Daniel Ou-Yang, Lehigh Univ. (United States)

Building, bending, and breaking colloidal microstructures with optical tweezers
Paper 11083-10
Author(s): Eric Furst, Univ. of Delaware (United States)

Using light and nanoparticles to unravel the complex fluid dynamics of simple liquids at GHz frequencies and nanometer length scales
Paper 11083-11
Author(s): Brian Utke, Univ. of Maryland, Baltimore County (United States); Debadi Chakraborty, The Univ. of Melbourne (Australia); Edward W. Malachosky, The Univ. of Chicago (United States); Adam Goad, Univ. of Maryland, Baltimore County (United States); Philippe Guyot-Sionnest, The Univ. of Chicago (United States); John Sader, The Univ. of Melbourne (Australia); Matthew Pelton, Univ. of Maryland, Baltimore County (United States)

Optical manipulation of nanoparticles for thermo-rheological studies
Paper 11083-12
Author(s): Pawel Karpinski, Wroclaw Univ. of Science and Technology (Poland)

Using optical tweezers to discover the remarkable heterogeneous stiffness landscape created by cells within engineered tissues
Paper 11083-13
Author(s): Mark Keating, Univ. of California, Irvine (United States); Alexander Levine, Univ. of California, Los Angeles (United States); Elliot L. Botvinick, Univ. of California, Irvine (United States)

Precise calibration of optical tweezers using the interference pattern in the backscattered signal and application to the microrheology of blood clots
Paper 11083-14
Author(s): Nathalie Westbrook, Flavie Gillant, Julien Moreau, Karen Perronet, Lab. Charles Fabry, Institut d'Optique Graduate School, CNRS (France), Univ. Paris-Saclay (France); Maximilian U. Richly, Antigoni Alexandrou, Lab. d'Optique et Biosciences, Ecole Polytechnique, CNRS (France), Institut National de la Santé et de la Recherche Médicale (France); Laura Wolff, Jean-Marc Allain, Lab. de Mécanique des Solides, Ecole Polytechnique, CNRS (France)

Study of mutual interaction of red blood cells influenced by nanoparticles utilizing a combined use of optical tweezers and scanning electron microscopy
Paper 11083-15
Author(s): Tatiana Avsievich, Alexey Popov, Ruixue Zhu, Alexander Bykov, Igor V. Meglinski, Univ. of Oulu (Finland)

https://spie.org/OPN/conferencedetails/optical-trapping-manipulation?print=2
Session 4:
Using the Photonic Toolbox to Study Biological Systems

Sunday 11 August 2019
3:50 PM - 5:50 PM

Session Chair: Ashley R. Carter, Amherst College (United States)

Spatio-temporal control of neuronal systems with holographic optics
Paper 11083-16
Author(s): Wolfgang Losert, Univ. of Maryland, College Park (United States)
Add To My Schedule

Optical manipulation of fish inner ear to study sound localization
Paper 11083-17
Author(s): Michael Taylor, Itia Favre-Bulle, Gilles Vanwalleghem, Ethan Scott, The Univ. of Queensland (Australia)
Add To My Schedule

Expanding the neurophotonic toolbox through in vitro studies of laser-induced shockwaves
Paper 11083-18
Author(s): Christopher Carmona, Univ. of California, San Diego (United States); Daryl C. Preece, Univ. of California, Irvine (United States); Veronica Gomez-Godinez, Linda Z. Shi, Univ. of California, San Diego (United States); Michael W. Berns, Univ. of California, Irvine (United States)
Add To My Schedule

Effect of local thermoplasmonic heating on biological membranes
Paper 11083-19
Author(s): Guillermo S. Moreno-Pescador, Iliriana Qoqaj, Niels Bohr Institute, Univ. of Copenhagen (Denmark); Victoria Thusgaard Ruhoff, Josephine Iversen, Univ. of Copenhagen (Denmark); Poul Martin Bendix, Niels Bohr Institute, Univ. of Copenhagen (Denmark)
Add To My Schedule

Influence of pulsed laser radiation on the adhesion of red blood cells studied by optical tweezers
Paper 11083-20
Author(s): Ruixue Zhu, Tatiana Avsievich, Alexey Popov, Igor V. Meglinski, Univ. of Oulu (Finland)
Add To My Schedule

Stretching and characterization of human red blood cells with tunable “tug-of-war” optical tweezers
Paper 11083-21
Author(s): Yi Liang, San Francisco State Univ. (United States), Guangxi Univ. (China), Nankai Univ. (China); Yinxiao Xiang, San Francisco State Univ. (United States), Nankai Univ. (China); Josh Lamstein, San Francisco State Univ. (United States); Anna Bezryadina, San Francisco State Univ. (United States), California State Univ., Northridge (United States); Zhigang Chen, San Francisco State Univ. (United States), Nankai Univ. (China)
Add To My Schedule

Session Plen:
Sunday Evening Plenary Session

Sunday 11 August 2019
6:00 PM - 7:25 PM

6:00 pm to 6:05 pm: Welcome and Opening Remarks

Accelerating science: how AI and cloud computing can boost scientific progress (Plenary Presentation)
Paper 11139-201
Author(s): Massimo Mascaro, Google Cloud (United States)
Add To My Schedule

LISA: observing gravitational waves from Space (Plenary Presentation)
Paper 11115-20
MONDAY 12 AUGUST

Session Plen: Nanoscience + Engineering Plenary Session

Monday 12 August 2019
8:30 AM - 12:00 PM

Session Chairs: Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia); Mark L. Brongersma, Geballe Lab. for Advanced Materials (GLAM) (United States)

8:30 am to 8:35 am: Welcome and Opening Remarks

From inverse design to implementation of practical (quantum) photonics (Plenary Presentation)
Paper 11091-500
Author(s): Jelena Vuckovic, Stanford Univ. (United States)

Optical forces go smart (Plenary Presentation)
Paper 11083-500
Author(s): Giovanni Volpe, Göteborgs Univ. (Sweden)

Structured light for next-generation optical trapping (Plenary Presentation)
Paper 11083-501
Author(s): Cornelia Denz, Westfälische Wilhelms-Univ. Münster (Germany)

Distributed quantum information processing (Plenary Presentation)
Paper 11091-501
Author(s): Kae Nemoto, National Institute of Informatics (Japan)

Lunch Break 12:00 PM - 1:10 PM

Session 5: New Fundamental Physics

Monday 12 August 2019
1:10 PM - 3:20 PM

Session Chair: Ying Lia Li, Univ. College London (United Kingdom)

Room temperature optomechanical squeezing (Invited Paper)
Paper 11083-24
Author(s): Nancy Aggarwal, Northwestern Univ. (United States)

A phonon laser based on an optical tweezer
Paper 11083-25
Author(s): A. Nick Vamivakas, Robert Petit, Danika Luntz-Martin, Univ. of Rochester (United States); Mishkat Bhattacharya, Wenchao Ge, Pardeep Kumar, Rochester Institute of Technology (United States); Justin Schultz, Univ. of Rochester (United States); Levi Neukirch, Los Alamos National Lab. (United States)
Spinning, scanning, and other fun tricks with optically levitated microspheres  *(Invited Paper)*
Paper 11083-26
Author(s): Giorgio Gratta, Stanford Univ. (United States)

Precision sensing and opto-mechanics with optically levitated nanoparticles
Paper 11083-27
Author(s): Andrew Geraci, Northwestern Univ. (United States)

Resolved sideband cooling of levitated nanoparticles in a high finesse cavity  *(Invited Paper)*
Paper 11083-28
Author(s): Nadine Meyer, Andres de los Rios Sommer, Romain P. Quidant, ICFO - Institut de Ciències Fotòniques (Spain)

**Session 6:**
**Towards (Or In) the Quantum Limit of Opto-Mechanics**

Monday 12 August 2019
3:50 PM - 5:30 PM
Session Chair: David C. Moore, Yale Univ. (United States)

Cavity cooling of a levitated nanosphere by coherent scattering
Paper 11083-29
Author(s): Manuel Reisenbauer, Uros Delic, David Grass, Nikolai Kiesel, Univ. Wien (Austria); Vladan Vuletic, Massachusetts Institute of Technology (United States); Markus Aspelmeyer, Univ. Wien (Austria)

Playing quantum noise on a nanomechanical string  *(Invited Paper)*
Paper 11083-30
Author(s): Dalziel J. Wilson, The Univ. of Arizona (United States); Tobias J. Kippenberg, Vivishek Sudhir, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Amir H. Ghadimi, The Univ. of Arizona (United States); Mohammad J. Bereyhi, Sergey Fedorov, Nils J. Engelsen, Ryan Schilling, Hendrik Shuetz, Ecole Polytechnique Fédérale de Lausanne (Switzerland)

Recent applications of optical tweezers: Casimir force measurements, recurrent and directional light scattering, and negative optical torque
Paper 11083-31
Author(s): Paulo Maia Neto, Univ. Federal do Rio de Janeiro (Brazil)

Measuring the Casimir torque  *(Invited Paper)*
Paper 11083-32
Author(s): Jeremy N. Munday, Univ. of Maryland, College Park (United States)

**TUESDAY 13 AUGUST**

**Session 7:**
**Novel Photonic Devices**

Tuesday 13 August 2019
8:00 AM - 9:10 AM
Session Chair: Reuven Gordon, Univ. of Victoria (Canada)

Commercializing optomechanical sensors: from the classical to quantum regime
Paper 11083-33
Session 8:
On-Chip, Near-Field, Micromanipulation, Plasmonic, and Nanoparticle Trapping I

Tuesday 13 August 2019
9:10 AM - 10:20 AM

Session Chair: Yuebing Zheng, The Univ. of Texas at Austin (United States)

Trapping and enhancing emission from individual upconverter nanocrystals using rectangle nanoapertures in a metal film
Paper 11083-36
Author(s): Reuven Gordon, Univ. of Victoria (Canada)

On-chip trapping and sorting of nanoscale objects with thermoplasmonic nanohole metasurface
Paper 11083-37
Author(s): Justus C. Ndukaife, Chuchuan Hong, Sen Yang, Vanderbilt Univ. (United States)

Rotational manipulation of nanoparticles using plasmonic nano-vortex fields (Invited Paper)
Paper 11083-38
Author(s): Keiji Sasaki, Hokkaido Univ. (Japan)

Session 9:
On-Chip,Near-Field, Micromanipulation, Plasmonic, and Nanoparticle Trapping II

Tuesday 13 August 2019
10:50 AM - 12:20 PM

Session Chair: Keiji Sasaki, Hokkaido Univ. (Japan)

Colloidal lithography for trapping 10 nm enzymes
Paper 11083-39
Author(s): Adarsh Lalitha Ravindranath, Mirali Seyed Shariatdoust, Samuel Mathew, Reuven Gordon, Univ. of Victoria (Canada)

Optical trapping of polymer nanoparticles by quadrupole plasmon resonance
Paper 11083-40
Author(s): Kosei Ueno, Ryota Tatsuimi, Quan Sun, Tomoya Oshikiri, Hokkaido Univ. (Japan); Hiroaki Misawa, Hokkaido Univ. (Japan), National Chiao Tung Univ. (Taiwan)
Strategies for active colloidal manipulation with plasmonic tweezers  
Paper 11083-41  
Author(s): Ambarish Ghosh, Souvik Ghosh, Indian Institute of Science (India)  
Add To My Schedule

Anomalous optical forces from patterned actuators (Invited Paper)  
Paper 11083-42  
Author(s): Simon Hanna, Michael O'Donnell, Univ. of Bristol (United Kingdom)  
Add To My Schedule

Exhibition/Lunch Break 12:20 PM - 1:50 PM

Session 10:  
Levitated Micro-Gyroscopes and Sensors I

Tuesday 13 August 2019  
1:50 PM - 3:10 PM

Session Chair: Brian D'Urso, Montana State Univ. (United States)

Fabrication of large vaterite microspheres for optical trapping and rotation locking in high vacuum  
Paper 11083-43  
Author(s): Sumita Ghosh, Fernando Monteiro, Gad Afek, Andrew Kilby, Wenquiang Li, David C. Moore, Yale Univ. (United States)  
Add To My Schedule

Characterization and control of the external and internal temperature of an optically trapped particle  
Paper 11083-44  
Author(s): Paloma Rodriguez Sevilla, Univ. of St. Andrews (United Kingdom); Yoshihiko Arita, Univ. of St. Andrews (United Kingdom), Chiba Univ. (Japan); Xiaogang Liu, National Univ. of Singapore (Singapore); Daniel Jaque, Univ. Autónoma de Madrid (Spain), Instituto Ramón y Cajal de Investigación Sanitaria (Spain); Kishan Dholakia, Univ. of St. Andrews (United Kingdom), Chiba Univ. (Japan)  
Add To My Schedule

Torsional optomechanics and GHz rotation of an optically levitated nanoparticle in vacuum  
Paper 11083-45  
Author(s): Tongcang Li, Purdue Univ. (United States)  
Add To My Schedule

Electrically driven, optically levitated micro-gyroscopes  
Paper 11083-46  
Author(s): Alexander Rider, Stanford Univ. (United States)  
Add To My Schedule

Session 11:  
Levitated Micro-Gyroscopes and Sensors II

Tuesday 13 August 2019  
3:40 PM - 6:10 PM

Session Chair: David C. Moore, Yale Univ. (United States)

Sensing using rotational optomechanics  
Paper 11083-47  
Author(s): Muddassar Rashid, Yanhui Hu, King's College London (United Kingdom); Marko Toroš, Univ. College London (United Kingdom); Ashley Setter, Hendrik Ulbricht, Univ. of Southampton (United Kingdom); James Millen, King's College London (United Kingdom)  
Add To My Schedule

Optical detection and control of a particle in a magneto-gravitational trap (Invited Paper)
Laser cooling of secular motion of a nanoparticle levitated in a Paul trap for ion-assisted optomechanics
Paper 11083-49
Author(s): Dmitry S. Bykov, Lorenzo Dania, Pau Mestres, Tracy E. Northup, Univ. Innsbruck (Austria)

Advances in precision sensing and measurement based on vacuum optical tweezer from Zhejiang University
Paper 11083-50
Author(s): Huizhu Hu, Zhejiang Univ. (China)

Levitated electromechanics for particle trapping
Paper 11083-51
Author(s): Katie O'Flynn, Muddassar Rashid, King's College London (United Kingdom); Daniel Goldwater, The Univ. of Nottingham (United Kingdom); Tracy E. Northup, Univ. Innsbruck (Austria); Lukas Martinetz, Benjamin Stickler, Klaus Hornberger, Univ. Duisburg-Essen (Germany); James Millen, King's College London (United Kingdom)

Optical manipulation of magnetically trapped superconducting micro particles in superfluid helium
Paper 11083-52
Author(s): Masaaki Ashida, Osaka Univ. (Japan); Jun Naoi, Masato Takamune, Yuta Takahashi, Shota Sasaki, Univ. of Toyama (Japan); Mitsutaka Kumakura, Univ. of Fukui (Japan); Yoshiuki Montwaki, Univ. of Toyama (Japan)

Levitated micro-magnets as quantum transducers
Paper 11083-53
Author(s): Jan Gieseler, Harvard Univ. (United States)

Session 12:
Special Session Celebrating Art Ashkin's Nobel Prize

Tuesday 13 August 2019
6:10 PM - 7:40 PM
Session Chair: Kishan Dholakia, Univ. of St. Andrews (United Kingdom)

Title to be determined
Paper 11083-54
Author(s): Michael W. Berns, Beckman Laser Institute and Medical Clinic (United States); Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)

Title to be determined
Paper 11083-55
Author(s): Kishan Dholakia, Univ. of St. Andrews (United Kingdom); Ashley R. Carter, Amherst College (United States)

Flying on a rainbow with a diffractive solar sail *(Invited Paper)*
Paper 11083-56
Author(s): Grover A. Swartzlander, Rochester Institute of Technology (United States)
Tuesday 13 August 2019
7:40 PM - 8:00 PM

All Optical Trapping and Micromanipulation conference participants are encouraged to gather for a group photo at the end of the day.

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**OTOM Conference Dinner**

Tuesday 13 August 2019
8:00 PM - 11:00 PM

Conference attendees are welcome to enjoy dinner together. A sign-up sheet and details will be made available at the conference.

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**WEDNESDAY 14 AUGUST**

### Session 13:
**Single-Molecule Manipulation and Study**

Wednesday 14 August 2019
8:10 AM - 10:00 AM

Session Chair: Ashley R. Carter, Amherst College (United States)

- **Single-molecule studies of the molecular mechanisms underlying the chaperone activity of HSPB8**
  - Paper 11083-57
  - Author(s): Dhawal Choudhary, Laura Mediani, Univ. degli Studi di Modena e Reggio Emilia (Italy); Mario Avellaneda, AMOLF (Netherlands); Simon Alberti, Edgar Boczek, Max-Planck-Institut für molekulare Zellbiologie und Genetik (Germany); Sander Tans, AMOLF (Netherlands); Serena Carra, Ciro Cecconi, Univ. degli Studi di Modena e Reggio Emilia (Italy)

- **Forced unraveling of condensed DNA translocated through a nanochannel during viral packaging measured with optical tweezers**
  - Paper 11083-58
  - Author(s): Douglas E. Smith, Nick Keller, Univ. of California, San Diego (United States); Paul Jardine, Univ. of Minnesota, Twin Cities (United States)

- **Trapping single molecules in solution without optical forces** *(Invited Paper)*
  - Paper 11083-59
  - Author(s): William E. Moerner, Stanford Univ. (United States)

- **Germanium nanospheres as high precision optical tweezers probes**
  - Paper 11083-60
  - Author(s): Erik Schaeffer, Swathi Sudhakar, Eberhard Karls Univ. Tübingen (Germany)

- **New materials for single molecule manipulation and optical trapping experiments**
  - Paper 11083-61
  - Author(s): Warlley Campos, Tiago Moura, Leandro Oliveira, Jakson Fonseca, Winder Moura-Melo, Joaquim Mendes, Marcio Rocha, Univ. Federal de Viçosa (Brazil)

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### Session 14:
**Statistical Mechanics of Small Systems**

Wednesday 14 August 2019
10:30 AM - 11:50 AM

Session Chair: Giovanni Volpe, Göteborgs Univ. (Sweden)
DNA folds into toroids using a pathway that forms multiple loops
Paper 11083-62
Author(s): Ashley R. Carter, Amherst College (United States)
Add To My Schedule

Boltzmann statistics, equipartition theorem, and fluctuation-dissipation relationship of an active Brownian particle in an optical trap
Paper 11083-63
Author(s): Hsin-Chiao D. Ou-Yang, Chong Shen, Lehigh Univ. (United States)
Add To My Schedule

Cold Brownian motion of optically trapped nanostructures
Paper 11083-64
Author(s): Peter J. Pauzauskie, Xiaojing Xia, Greg Felsted, Univ. of Washington (United States)
Add To My Schedule

Modeling and experimental exploration of the underdamped motion of microbeads in optical tweezers
Paper 11083-65
Author(s): Vatsal Joshi, Alan Bowling, The Univ. of Texas at Arlington (United States)
Add To My Schedule

Exhibition/Lunch Break 11:50 AM - 1:20 PM

Session 15: Enhanced Sensitivity, Accuracy, and Resolution of Optical Force and Torque Actuators

Wednesday 14 August 2019
1:20 PM - 2:20 PM

Session Chair: Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)

Catch, stretch, and pull
Paper 11083-66
Author(s): Alexander B. Stilgoe, Anatolii V. Kashchuk, Declan Armstrong, Timo A. Nieminen, Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)
Add To My Schedule

FORMA: a high-performance algorithm for the calibration of optical tweezers
Paper 11083-67
Author(s): Giovanni Volpe, Laura Pérez-García, Göteborgs Univ. (Sweden); Alejandro V. Arzola, Jaime Donlucas Pérez, Instituto de Fisica, Univ. Nacional Autónoma de México (Mexico); Giorgio Volpe, Univ. College London (United Kingdom)
Add To My Schedule

Metallic nanoparticles: high-speed optical tweezing and more accurate force calculations
Paper 11083-68
Author(s): Euan McLeod, Weilin Liu, Jeffrey Melzer, College of Optical Sciences, The Univ. of Arizona (United States)
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Session 16: Optical Angular Momentum (OAM)

Wednesday 14 August 2019
2:20 PM - 3:20 PM

Session Chair: Síle Nic Chormaic, Okinawa Institute of Science and Technology Graduate Univ. (Japan)

Direct measurement of individual optical force and torque
Paper 11083-69
Session 17:
Optofluidics and Optically Shaped Structures

Wednesday 14 August 2019
3:50 PM - 4:50 PM

Session Chair: Rubén Ramos-García, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico)

- Optical trapping using ultrathin optical fibers
  Paper 11083-72
  Author(s): Síle Nic Chormaic, Okinawa Institute of Science and Technology Graduate Univ. (Japan)

- Photopolymerization with light fields possessing orbital angular momentum
  Paper 11083-73
  Author(s): Yoshihiko Arita, Univ. of St. Andrews (United Kingdom); Junhyung Lee, Katsuhiko Miyamoto, Chiba Univ. (Japan); Paris Panagiotopoulos, Ewan M. Wright, The Univ. of Arizona (United States); Kishan Dholakia, Univ. of St. Andrews (United Kingdom); Takashige Omatsu, Chiba Univ. (Japan)

- Optoelectronic tweezers for the patterning and removal of metallic nanoparticles
  Paper 11083-74
  Author(s): Song Tang, Weizhen Li, Qi Zheng, Lee Cronin, Steven Neale, Univ. of Glasgow (United Kingdom)

Session 18:
Optical Manipulation of Matter Through Gaseous Media

Wednesday 14 August 2019
4:50 PM - 5:30 PM

Session Chair: A. Nick Vamivakas, Univ. of Rochester (United States)

- Characterization and control of optically trapped droplets in air
  Paper 11083-75
  Author(s): Grégory David, Oliver Reich, Matúš E. Divéký, Sandra Roy, Evelyne A. Parmentier, Johannes W. Cremer, Kivanç Esat, Ruth Signorell, ETH Zurich (Switzerland)

- Spectroscopic studies of optically trapped aerosol at elevated temperatures
  Paper 11083-76
  Author(s): Andy Ward, STFC Rutherford Appleton Lab. (United Kingdom); Martin King, Megan McGrory, Royal Holloway, Univ. of London (United Kingdom)
Session PWed:
Posters-Wednesday

Wednesday 14 August 2019
5:30 PM - 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Registration badges are required for entry.

**Poster Setup:** Wednesday 10:00 AM – 4:30 PM
View poster presentation guidelines and set-up instructions at http://spie.org/OPPosterGuidelines

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**Mind-controlled optical tweezers**
Paper 11083-95
Author(s): Ga-Young Lee, Kipom Kim, Korea Brain Research Institute (Korea, Republic of)

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**Levitation of single NV centers and optimal feedback cooling**
Paper 11083-96
Author(s): Gerard P. Conangla, Francesco Ricci, Marc Torrent Cuairan, ICFO - Institut de Ciències Fotòniques (Spain); Raúl Rica, ICFO - Institut de Ciències Fotòniques (Spain), Univ. de Granada (Spain); Andreas Schell, ICFO - Institut de Ciències Fotòniques (Spain), CEITEC- Central European Institute of Technology (Czech Republic); Nadine Meyer, ICFO - Institut de Ciències Fotòniques (Spain); Romain P. Quidant, ICFO - Institut de Ciències Fotòniques (Spain), Institució Catalana de Recerca i Estudis Avançats (Spain)

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**Conformation and mechanical property of three-way junction of mRNA 5' UTR studied by optical tweezers**
Paper 11083-97
Author(s): Haowei Wang, Yinmei Li, Univ. of Science and Technology of China (China)

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**Additive nanomanufacturing based on nanoparticle manipulation in liquid and gaseous media**
Paper 11083-98
Author(s): Chenglong Zhao, Univ. of Dayton (United States)

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**Characterization of bull sperm motility using optical tweezers**
Paper 11083-99
Author(s): Daniel Ricardo Argumedo, Antonio A. R. Neves, Marcella Pecora Milazzotto, Univ. Federal do ABC (Brazil)

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**Interactions between stratified biological cells optically trapped in high-order Bessel beams**
Paper 11083-100
Author(s): Zhensen Wu, Jing Bai, Chengxian Ge, Xidian Univ. (China)

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**Manipulating optical binding force exerted on chiral nanoparticles using a Bessel beam trap**
Paper 11083-101
Author(s): Jing Bai, Zhensen Wu, Chengxian Ge, Xidian Univ. (China)

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**Spin and orbiting motion of a uniaxial anisotropic particle in a high-order Bessel vortex beam**
Paper 11083-102
Author(s): Tan Qu, Zhensen Wu, Jia-Ji Wu, Qing-Chao Shang, Zheng-Jun Li, Xidian Univ. (China)

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**Optical manipulation by photochemistry**
Paper 11083-103
Author(s): Zouheir Sekkat, Moroccan Foundation for Advanced Science, Innovation and Research (Morocco)

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Observation of FRET in collision of droplets  
Paper 11083-104  
Author(s): Soumya Radhakrishnan, Ademir Alemán, Dag Hanstorp, Göteborgs Univ. (Sweden)

Physical manipulation and characterization of living brain cells using optical tweezers  
Paper 11083-106  
Author(s): Ga-Young Lee, You-Na Jang, Kee Joo Lee, Kipom Kim, Korea Brain Research Institute (Korea, Republic of)

Reorientation dynamics of an avian red blood cell in an optical tweezer  
Paper 11083-107  
Author(s): Sharath Ananthamurthy, Univ. of Hyderabad (India)

Compression of an aerosolized jet of virus particles with an optical funnel  
Paper 11083-108  
Author(s): Salah Awel, Ctr. for Free-Electron Laser Science (Germany), The Hamburg Ctr. for Ultrafast Imaging (Germany), Univ. Hamburg (Germany); Daniel Horke, Ctr. for Free-Electron Laser Science (Germany), The Hamburg Ctr. for Ultrafast Imaging (Germany); Richard Kirian, Arizona State Univ. (United States); Nils Roth, Ctr. for Free-Electron Laser Science (Germany), Univ. Hamburg (Germany); Jochen Küpper, Ctr. for Free-Electron Laser Science (Germany), The Hamburg Ctr. for Ultrafast Imaging (Germany), Univ. Hamburg (Germany); Henry N. Chapman, Ctr. for Free-Electron Laser Science (Germany), Univ. Hamburg (Germany), The Hamburg Ctr. for Ultrafast Imaging (Germany); Andrei V. Rode, The Australian National Univ. (Australia)

Thermal gradients-driven 3D manipulation of photothermally generated microbubbles  
Paper 11083-109  
Author(s): Julio Aurelio Sarabia-Alonso, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); José Gabriel Ortega-Mendoza, Univ. Politécnica de Tulancingo (Mexico); Plácido Zaca-Morán, Benemérita Univ. Autónoma de Puebla (Mexico); Julio César Ramírez-San-Juan, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Alfonso Padilla-Vivanco, Univ. Politécnica de Tulancingo (Mexico); Julián Ramírez-Ramírez, Rubén Ramos-García, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico)

Ultimate light trapping in free-form plasmonic waveguide  
Paper 11083-110  
Author(s): Juho Park, KAIST (Korea, Republic of); Sanmun Kim, St. John's College, Univ. of Cambridge (United Kingdom); Sergey Menabde, Min Seok Jang, KAIST (Korea, Republic of)

Mapping complex mode volumes with cavity perturbation theory  
Paper 11083-111  
Author(s): Kévin Cognée, AMOLF (Netherlands), Institut d'Optique Graduate School (France); Wei Yan, Institut d'Optique Graduate School (France); Federico La China, Massimo Gurioli, Dario Balestri, Francesca Intonti, LENS - Lab. Europeo di Spettroscopie Non-Lineari, Univ. degli Studi di Firenze (Italy); Femius Koenderink, AMOLF (Netherlands); Philippe Lalanne, Institut d’Optique Graduate School (France)

OAM beam propagation in hollow core capillary fiber for the study of chiral light matter interactions  
Paper 11083-112  
Author(s): Satyendra Kr Mishra, Manish Sharma, Bora Ung, École de Technologie Supérieure (Canada)

Magneto tropism of mycobaceterium smegatis in an optical tweezer  
Paper 11083-113  
Author(s): Ashok S. Vudayagiri, Rohith Vedaanth, Sharmistha Bannerjee, Univ. of Hyderabad (India)

Opto-thermophoretic manipulation and immobilization of nanoparticles in a photonic crystal trap  
Paper 11083-114  
Author(s): Aravind Krishnan, Shao-Hua Wu, Michelle Povinelli, The Univ. of Southern California (United States)
Surface-plasmon induced transverse optical torque on nanostructures
Paper 11083-115
Author(s): Ryoma Fukuhara, Institute of Industrial Science, The Univ. of Tokyo (Japan); Yoshito Y. Tanaka, Institute of Industrial Science, The Univ. of Tokyo (Japan), PRESTO, Japan Science and Technology Agency (Japan); Tsutomu Shimura, Institute of Industrial Science, The Univ. of Tokyo (Japan)

Interaction optical torque between twisted metal nanorods through surface plasmon coupling
Paper 11083-116
Author(s): An'an Wu, Institute of Industrial Science, The Univ. of Tokyo (Japan); Yoshito Y. Tanaka, Institute of Industrial Science, The Univ. of Tokyo (Japan), PRESTO, Japan Science and Technology Agency (Japan); Ryoma Fukuhara, Tsutomu Shimura, Institute of Industrial Science, The Univ. of Tokyo (Japan)

Mechanical perturbation of tailor-made elastic micro-structures using optical tweezers
Paper 11083-117
Author(s): Jana Kubackova, Veronika Kazikova, Institute of Experimental Physics SAS (Slovakia); Gabriel Zoldak, Pavol Jozef Šafárik Univ. in Košice (Slovakia); Zoltan Tomori, Institute of Experimental Physics SAS (Slovakia); Gregor Bano, Pavol Jozef Šafárik Univ. in Košice (Slovakia)

Manipulating a charged nanoparticle in a Paul trap for ion-assisted levitated optomechanics
Paper 11083-118
Author(s): Lorenzo Dania, Dmitry S. Bykov, Pau Mestres , Tracy E. Northup, Univ. Innsbruck (Austria)

Video analysis of polymerized micro-cantilever deflected by the laser trap
Paper 11083-119
Author(s): Zoltan Tomori, Veronika Kazikova, Jana Kubackova, Institute of Experimental Physics SAS (Slovakia); Gregor Bano, Pavol Jozef Šafárik Univ. in Košice (Slovakia)

Self-converging and multiplex optical traps
Paper 11083-120
Author(s): Peter P. Maksymyak, Oleg V. Angelisky, Igor G. Kurek, Elena I. Kurek, Andrew P. Maksymyak, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine)

Spatial beam profile across spatial light modulator in a HOTs system
Paper 11083-121
Author(s): Deepak Gupta, T. R. Ravindran, Indira Gandhi Ctr. for Atomic Research (India)

Motility assessment of green biflagellated microalgae in an optical trap using back focal plane interferometry
Paper 11083-122
Author(s): Beatriz A. Juarez-Alvarez, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico); Dann De la Torre, Univ. Autónoma de Baja California (Mexico); Veneranda G. Garces, Pacifica Photonics (Mexico); Beatriz Cordero-Esquivel, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico); Juan D. Sanchez-Lopez, Univ. Autónoma de Baja California (Mexico); Gabriel C. Spalding, Illinois Wesleyan Univ. (United States); Kevin A. O'Donnell, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico)

Optofluidic chromatography: label-free sorting of exosomes with plasmonic microlenses
Paper 11083-123
Author(s): Xiangchao Zhu, Univ. of California, Santa Cruz (United States); Ahmet Cicek, Burdur Mehmet Akif Ersoy Üniv. (Turkey); Ahmet Ali Yanik, Univ. of California, Santa Cruz (United States)

Photophoretic forces: a new enabler for robust single fiber-based optical traps in air
Paper 11083-124
Author(s): Souvik Sil, Ayan Banerjee, Indian Institute of Science Education and Research Kolkata (India)
Single particle trapping and manipulation with evanescent focal field via defocused total internal reflection
Paper 11083-125
Author(s): Qiwen Zhan, Univ. of Dayton (United States); Douguo Zhang, Yifeng Xiang, Xi Tang, Yan Kuai, Fengya Lu, Pei Wang, Hai Ming, Univ. of Science and Technology of China (China); Guanghao Rui, Southeast Univ. (China); Changjun Min, Xiao-Cong Yuan, Shenzhen Univ. (China)
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Interplay between optical, viscous, and elastic forces on an optically trapped Brownian particle immersed in a viscoelastic fluid
Paper 11083-126
Author(s): Sylvia Jeney, Ecole Polytechnique Fédérale de Lausanne (Switzerland)
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Internal and external optical torques on calcite particles
Paper 11083-127
Author(s): Catherine M. Herne, Johanna R. Levey, State Univ. of New York at New Paltz (United States)
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Numerical modelling of an optical ‘funnel’ using a first-order quasi-Bessel beam
Paper 11083-128
Author(s): Sebastian Lavin-Varela, The Australian National Univ. (Australia); Martin Ploschner, ARC Ctr. of Excellence for Nanoscale BioPhotonics, Macquarie Univ. (Australia); Andrei V. Rode, The Australian National Univ. (Australia)
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Testing theories and measurement of helical propulsion with optical tweezers
Paper 11083-129
Author(s): Declan Armstrong, Timo A. Nieminen, Itia Favre-Bulle, Shu Zhang, Alexander B. Stilgoe, Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)
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Nano-cones and nano-cylinders fabrication for surface scanning based on optical tweezers
Paper 11083-130
Author(s): Rudy Desgarceaux, Institut d'Électronique et des Systèmes (France)
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A hybrid polarization and Fourier transform approach to shape three dimensional light landscapes
Paper 11083-131
Author(s): Ramon Runde, Eileen Otte, Cornelia Denz, Westfälische Wilhelms-Univ. Münster (Germany)
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Counter-rotating OAM carrying Laguerre-Gaussian beams for optical trapping
Paper 11083-132
Author(s): Cornelia Denz, Jan Stegemann, Valeria Bobkova, Ramon Runde, Westfälische Wilhelms-Univ. Münster (Germany)
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Determination of trap compliances and displacements in single DNA molecule stretching measurements with dual optical tweezers
Paper 11083-133
Author(s): Kristina Koharchik, Douglas E. Smith, Mounir Fizari, Youbin Mo, Univ. of California, San Diego (United States)
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Tailoring the trapping potential for Cesium atoms using nano-antennas of different shapes on a waveguide
Paper 11083-134
Author(s): Angeleene Ang, Ben-Gurion Univ. of the Negev (Israel); Alexander Shalin, ITMO Univ. (Russian Federation); Alina Karabchevsky, Ben-Gurion Univ. of the Negev (Israel)
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Opto-thermophoretic fiber tweezers: design and applications
Paper 11083-135
Author(s): Abhay Kotnala, Yuebing Zheng, The Univ. of Texas at Austin (United States)
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Opto-thermoelectric nanotweezers: quantitative estimation of trap stiffness
Paper 11083-136
Author(s): Pavana Siddhartha Kollipara, Linhan Lin, Yuebing Zheng, The Univ. of Texas at Austin (United States)
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How to design a forceful opto-thermoelectric nanotweezer?
Paper 11083-137
Author(s): Hongru Ding, Linhan Lin, Yuebing Zheng, The Univ. of Texas at Austin (United States)
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Active optical control of thermophoretic microswimmers
Paper 11083-138
Author(s): Xiaolei Peng, Linhan Linh, Zhihan Chen, Jie Fang, Yuebing Zheng, The Univ. of Texas at Austin (United States)
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THURSDAY 15 AUGUST

Session 19:
Optically Bound Matter

Thursday 15 August 2019
8:30 AM - 10:30 AM
Session Chair: Masud Mansuripur, College of Optical Sciences, The Univ. of Arizona (United States)

Optically bound matter: solely bounded by Lorentz force or not?
Paper 11083-77
Author(s): Jack Ng, Hong Kong Baptist Univ. (Hong Kong, China)
Add To My Schedule

Nonequilibrium phase transition in the light-actuated self-assembly of nanoparticles
Paper 11083-78
Author(s): Luat Vuong, Univ. of California, Riverside (United States)
Add To My Schedule

Light-driven selective assembly and healing of optical matter
Paper 11083-79
Author(s): Fan Nan, Zijie Yan, Clarkson Univ. (United States)
Add To My Schedule

Optical juggling
Paper 11083-80
Author(s): Dag Hansdorp, Göteborgs Univ. (Sweden); Albert J. Bae, Max-Planck-Institut für Dynamik und Selbstoprganisation (Germany); Kelken Chang, Göteborgs Univ. (Sweden)
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Dynamics of optically bound clusters
Paper 11083-81
Author(s): Simon Hanna, Chaoyi Zhang, Univ. of Bristol (United Kingdom)
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Transverse optical binding of nanoparticles with the surface localized waves
Paper 11083-82
Author(s): Mihail I. Petrov, Ivan Toftul, Natalia Kostina, Alexander Shalin, ITMO Univ. (Russian Federation)
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Session 20:
Optical Momentum and Matter Momentum

Thursday 15 August 2019
11:00 AM - 12:00 PM
Session Chair: Luat Vuong, Univ. of California, Riverside (United States)

Design of an experimental setup for the measurement of light-driven atomic mass density waves in a silicon crystal
Paper 11083-83
Author(s): Mikko Partanen, Jukka Tulkki, Aalto Univ. (Finland)
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Modeling optical manipulation using the field-kinetic and canonical formulations of electrodynamics
Paper 11083-84
Author(s): Brandon A. Kemp, Cheyenne J. Sheppard, Arkansas State Univ. (United States)
Add To My Schedule

Optical forces from Rayleigh to Mie regime: theory and experiment
Paper 11083-85
Author(s): Antonio Neves, Univ. Federal do ABC (Brazil); Adriana Fontes, Univ. Federal de Pernambuco (Brazil); Wendel L. Moreira, Petroleo Brasileiro SA (Brazil); Carlos L. Cesar, Univ. Estadual de Campinas (Brazil)
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Exhibition/Lunch Break 12:00 PM - 1:30 PM

Session 21:
Optically Bound Matter

Thursday 15 August 2019
1:30 PM - 3:10 PM
Session Chair: Kishan Dholakia, Univ. of St. Andrews (United Kingdom)

Visualizing colloidal aggregation with femtosecond optical tweezers
Paper 11083-86
Author(s): Debabrata Goswami, Indian Institute of Technology Kanpur (India)
Add To My Schedule

The nonlinear optical trap: escape potential, force reversal, and trap splitting
Paper 11083-87
Author(s): Arijit K. De, Anita Devi, Indian Institute of Science Education and Research Mohali (India)
Add To My Schedule

Quasi self-confinement of light in colloidal suspensions of metallic nanoparticles
Paper 11083-88
Author(s): Vladilen Shvedov, The Australian National Univ. (Australia); Konrad Cyprych, Wroclaw Univ. of Science and Technology (Poland); Yana Izdebskaya, The Australian National Univ. (Australia); Yadira Salazar-Romero, Univ. Nacional Autónoma de México (Mexico); Pawel Jung, Warsaw Univ. of Technology (Poland), Univ. of Central Florida (United States); Wieslaw Z. Krolikowski, The Australian National Univ. (Australia), Texas A&M Univ. at Qatar (Qatar)
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Red blood cells form waveguides of light at tunable wavelengths
Paper 11083-89
Author(s): Nicolas R. Perez, Jake Chambers, California State Univ., Northridge (United States); Rekha Gautam, San Francisco State Univ. (United States); Yinxiao Xiang, San Francisco State Univ. (United States), TEDA Applied Physics Institute, Nankai Univ. (China); Josh Lamstein, Yi Liang, San Francisco State Univ. (United States); Zhigang Chen, San Francisco State Univ. (United States), TEDA Applied Physics Institute, Nankai Univ. (China); Anna Bezryadina, California State Univ., Northridge (United States)
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Conference Detail for Optical Trapping and Optical Micromanipulation XVI

Session 22: Alternative and Hybrid Force Systems

Thursday 15 August 2019
3:40 PM - 5:00 PM

Session Chair: Daryl Preece, Univ. of California, San Diego (United States)

Measurement of Van der Waals force using optical tweezers
Paper 11083-90
Author(s): Avijit Kundu, Shuvojit Paul, Soumitro Banerjee, Ayan Banerjee, Indian Institute of Science Education and Research Kolkata (India)

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Colloidal crystal formation using optothermal forces
Paper 11083-91
Author(s): Julián Ramírez-Ramírez, Juan I. Vazquez Lozano, Hayde Peregrina Barreto, Rubén Ramos-García, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico)

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Thermoelectricity-driven nanotweezers for reconfigurable assembly of chiral meta-molecules
Paper 11083-92
Author(s): Linhan Lin, The Univ. of Texas at Austin (United States)

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Nanomanipulation of colloidal particles and nanowires with optothermally gated photon nudging
Paper 11083-93
Author(s): Jingang Li, Yaoran Liu, Yuebing Zheng, The Univ. of Texas at Austin (United States)

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Optical trapping mechanisms based on optothermal Marangoni effect
Paper 11083-94
Author(s): Andrzej Miniewicz, Stanislaw Bartkiewicz, Pawel Karpinski, Wroclaw Univ. of Science and Technology (Poland)

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