

Optical Trapping and Optical Micromanipulation

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

Program Committee: **Paul Bartlett**, Univ. of Bristol (United Kingdom); **Clemens Bechinger**, Univ. Stuttgart (Germany); **Kirstine Berg-Sørensen**, Niels Bohr Institute (Denmark); **Steven M. Block**, Stanford Univ.; **Jesper Glückstad**, Risø National Lab. (Denmark); **Min Gu**, Swinburne Univ. of Technology (Australia); **David W. M. Marr**, Colorado School of Mines; **Alfons van Blaaderen**, Utrecht Univ. (Netherlands); **Pavel Zemánek**, Institute of Scientific Instruments (Czech Republic)

Sunday 1 August

SHORT COURSE: Introduction to Optical Tweezers – and other laser techniques for particle manipulation

Instructors: **Kishan Dholakia**, Univ. of St. Andrews (United Kingdom)

Gabriel C. Spalding, Illinois Wesleyan Univ.

..... Sun. 1:30 to 5:30 pm

Monday 2 August

SESSION 1: Lab-on-a-Chip I: Sorters/Microfluidics

Chair: **David W. Marr**, Colorado School of Mines

..... Mon. 1:30 to 3:20 pm

1:30 pm: **Microfluidic optical sorting** (*Invited Paper*), M. P. MacDonald, Univ. of St. Andrews (United Kingdom); G. C. Spalding, Illinois Wesleyan Univ.; K. Dholakia, Univ. of St. Andrews (United Kingdom) [AM226-136]

2:00 pm: **Behavior of colloidal microparticles in a planar 3-beam interference field**, P. Zemánek, M. Sery, V. Karasek, Institute of Scientific Instruments (Czech Republic) [AM226-51]

2:20 pm: **Optical trapping for complex fluid microfluidics**, T. Vestad, Colorado School of Mines; J. S. Oakey, Metafluidics, Inc.; D. W. Marr, Colorado School of Mines [AM226-173]

2:40 pm: **Optical chromatography for biological separations**, S. J. Hart, Naval Research Lab.; A. V. Terray, Geo-Centers, Inc.; K. L. Kuhn, J. Arnold, Naval Research Lab. [AM226-56]

3:00 pm: **The study of cell-sorting by using microchannels and optical tweezers**, H. Lin, D. Yu, P. Shih, National Chiao Tung Univ. (Taiwan); C. Ho, C. Liu, H. Chang, National Tsing Hua Univ. (Taiwan); L. Hsu, National Chiao Tung Univ. (Taiwan) [AM226-111]

Coffee Break 3:20 to 3:50 pm

SESSION 2: Lab-on-a-Chip II: Integrated Lab-on-a-Chip Systems

Chair: **David W. Marr**, Colorado School of Mines

..... Mon. 3:50 to 5:30 pm

3:50 pm: **Integrated miniaturized laboratories using dynamic multiple-beam optical manipulators**, V. R. Daria, P. J. L. Rodrigo, J. Glückstad, Risø National Lab. (Denmark) [AM226-72]

4:10 pm: **Miniaturized optical tweezers**, S. J. McGreehin, L. O'Faolin, Univ. of St. Andrews (United Kingdom);

J. Roberts, Univ. of Sheffield (United Kingdom); T. Krauss, K. Dholakia, Univ. of St. Andrews (United Kingdom) [AM226-132]

4:30 pm: **Microscope-integrated micromanipulator based on multiple VCSEL traps**, B. Shao, S. Zlatanovic, S. C. Esener, Univ. of California/San Diego [AM226-73]

4:50 pm: **Toward all optical lab-on-a-chip system: optical manipulation of both microfluids and microscopic particles**, P. Y. Chiou, A. Ohta, M. C. Wu, Univ. of California/Los Angeles [AM226-183]

5:10 pm: **Optical trapping and micromanipulation in microchannels with various configurations**, D. Cojoc, ELETTRA Sincrotrone Trieste S.C.p.A (Italy) and PUB-RCO (Romania); I. I. Mokhun, Chernivtsi National Univ. (Ukraine); E. Ferrari, E. Di Fabrizio, ELETTRA Sincrotrone Trieste S.C.p.A (Italy); O. V. Angelsky, Chernivtsi National Univ. (Ukraine) [AM226-144]

Posters-Monday

..... Mon. 5:30 to 7:00 pm
Posters will be on display after 10:00 am Monday morning. A poster reception, with authors present at their posters, will be held Monday evening from 5:30 to 7:00 pm. Light refreshments will be served. Poster authors, see p. x for setup instructions.

How the size of a particle approaching dielectric interface influences its behavior, P. Jákl, M. Sery, J. Jezek, P. Zemánek, Institute of Scientific Instruments (Czech Republic) [AM226-53]

Optical trapping in counter-propagating Bessel beams, T. Cizmar, Institute of Scientific Instruments (Czech Republic); V. Garcéz-Chávez, K. Dholakia, Univ. of St. Andrews (United Kingdom); P. Zemánek, Institute of Scientific Instruments (Czech Republic) [AM226-52]

Orbital angular momentum of inhomogeneous electromagnetic field produced by polarized optical beams, I. I. Mokhun, A. Mokhun, J. Viktorovskaya, National Univ. of Chernovtsy (Ukraine); D. Cojoc, ELETTRA Sincrotrone Trieste S.C.p.A (Italy) and PUB-RCO (Romania); O. Angelsky, National Univ. of Chernovtsy (Ukraine); E. Di Fabrizio, ELETTRA Sincrotrone Trieste S.C.p.A (Italy) [AM226-148]

Dynamically reconfigurable optical trap created with a combination of axicons, K. P. Volke-Sepulveda, Univ. Nacional Autónoma de México (Mexico); C. G. Treviño-Palacios, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [AM226-161]

Axial control in optical tweezers, E. J. Galvez, A. Weiss, G. Newbury, Colgate Univ. [AM226-164]

Light-torqued nanomotors free of a surface, K. D. Bonin, W. A. Shelton, Wake Forest Univ.; T. Walker, Univ. of Wisconsin/Madison [AM226-141]

Particle-sorting by optical patterns of line shapes, S. Tseng, L. Hsu, S. Chi, National Chiao Tung Univ. (Taiwan) [AM226-172]

Optical chromatography in a PDMS microfluidic environment, S. J. Hart, Naval Research Lab.; A. V. Terray, Geo-Centers, Inc; K. L. Kuhn, J. Arnold, Naval Research Lab. [AM226-66]

Experimental and theoretical analyses of 3D microflows generated by an optical mixer, H. Ukita, K. Takada, Ritsumeikan Univ. (Japan) [AM226-39]

Study of DNA deformation under flow using optical tweezers, E. Theofanidou, J. Arlt, T. Su, D. T. Dryden, J. Crain, W. C. Poon, Univ. of Edinburgh (United Kingdom) [AM226-82]

Laser tweezers micromanipulation of filamentous fungi, G. Wright, G. Roca, J. Arlt, W. C. Poon, N. Read, Univ. of Edinburgh (United Kingdom) [AM226-90]

The study of adhesive forces between the type 3 fimbriae of klebsiella pneumoniae and collagen-coated surfaces by using optical tweezers, C. Chan, H. Peng, H. Long, Y. Huang, National Chiao Tung Univ. (Taiwan) [AM226-138]

Superposed oscillation in force calibrations driven by triangular-wave in optical tweezers system, H. Guo, Institute of Physics/CAS (China) [AM226-190]

Advantages and disadvantages in using oil immersed microscope objectives for optical trapping, M. I. Radu, E. Di Fabrizio, Lecce Univ. (Italy); E. Ferrari, ELETTRA Sincrotrone Trieste S.C.p.A (Italy) [AM226-123]

Defect-free optically-assisted assembly of polystyrene spheres, G. Wang, Indiana Univ.-Purdue Univ. Fort Wayne; J. B. Ketterson, Northwestern Univ.; G. C. Spalding, Illinois Wesleyan Univ. [AM226-54]

Crystallization and melting of concentrated colloidal dispersions using optical light beams, D. L. Vossen, Univ. Utrecht (Netherlands) and FOM Institute for Atomic and Molecular Physics (Netherlands); M. Plaisier, Univ. Utrecht (Netherlands); A. van der Horst, FOM Institute for Atomic and Molecular Physics (Netherlands) and Utrecht Univ. (Netherlands); A. van Blaaderen, Univ. Utrecht (Netherlands) and FOM Institute for Atomic and Molecular Physics (Netherlands) [AM226-84]

Three-dimensional manipulation and imaging on single particle level in concentrated colloidal dispersions, A. van der Horst, D. L. Vossen, Univ. Utrecht (Netherlands) and FOM-Institute for Atomic and Molecular Physics (Netherlands); K. Visscher, Univ. of Arizona; M. Dogterom, FOM Institute for Atomic and Molecular Physics (Netherlands); A. van Blaaderen, Univ. Utrecht (Netherlands) and FOM-Institute for Atomic and Molecular Physics (Netherlands) [AM226-92]

Tuesday 3 August

SESSION 3: Lab-on-a-Chip III: Mixers/Actuation

Chair: Jesper Glückstad, Risø National Lab. (Denmark)

..... Tues. 8:30 am to 12:00 pm

8:30 am: **Optical manipulation of nanocontainers for biotechnology**, K. Helmerson, J. Reiner, E. Edgu-Fry, J. Wells, R. Kishore, L. Locascio, National Institute of Standards and Technology; M. Gilson, Univ. of Maryland [AM226-167]

8:50 am: **Manipulation of microdisks in laser tweezers**, Z. C. Cheng, Harvard Univ.; T. G. Mason, Univ. of California/Los Angeles; P. M. Chaikin, Princeton Univ. [AM226-34]

9:10 am: **Normal-light streak effect in optically trapped hollow microspheres**, I. Ricardez-Vargas, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); K. P. Volke-Sepulveda, Univ. Nacional Autónoma de México (Mexico); D. Iturbe-Castillo, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); V. Ruiz-Cortez, Ctr. de Investigación Científica y de Educación Superior de Ensenada (Mexico); R. Ramos-García, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) and Univ. of California/Santa Barbara [AM226-47]

9:30 am: **State-of-the-art in generalized phase contrast driven optical micromanipulation**, J. Glückstad, V. R. Daria, P. J. L. Rodrigo, Risø National Lab. (Denmark) [AM226-78]

9:50 am: **Dynamic multiple beads manipulation on x-y-z directions**, D. Cojoc, Technologie Avanzate e nanoSCienze (Italy) and PUB-RCO (Romania); V. Emiliani, Institut Jacques Monod (France); E. Ferrari, E. Di Fabrizio, Technologie Avanzate e nanoSCienze (Italy) [AM226-63]

Coffee Break 10:10 to 10:40 am

10:40 am: **High-speed holographic optical tweezers**, E. Theofanidou, Univ. of Edinburgh (United Kingdom); K. Heggarty, Ecole Nationale Supérieure des Telecommunications de Bretagne (France); M. Birch, CRL Opto Ltd. (United Kingdom); J. Arlt, W. J. Hossack, J. Crain, Univ. of Edinburgh (United Kingdom) [AM226-149]

11:00 am: **Comparison between direct binary search and Gerchberg-Saxton algorithms applied to holographic optical tweezers**, G. S. Sinclair, Jonathan Leach, Matthew Parsons, Kevin O'Holleran, Johannes Courtial, Miles Padgett, Univ. of Glasgow (United Kingdom) [AM226-31]

11:20 am: **Arbitrary multibeam laser scanning and trapping by use of SLM and manual scripting interface**, R. W. Cohn, X. Xun, X. Chang, Univ. of Louisville [AM226-55]

11:40 am: **Neural network for image-to-image control of optical tweezers**, A. J. Decker, NASA Glenn Research Ctr. [AM226-140]

Lunch/Exhibition Break..... 12:00 to 2:00 pm

SESSION 4: Bio I: Interactions

Chair: Steven M. Block, Stanford Univ.

..... Tues. 2:00 to 5:50 pm

2:00 pm: **A double trap for single molecule manipulation at opaque and microstructured surfaces**, O.

Legrand, D. Cote, U. Bockelmann, Ecole Normale Supérieure (France) [AM226-160]

2:20 pm: **Feeling for cells with light** (*Invited Paper*), J. Guck, B. Lincoln, S. Schinkinger, F. Wottawah, F.

Sauer, S. Ebert, K. Travis, Univ. Leipzig (Germany) [AM226-45]

2:50 pm: **Simulation of heart infarction and arrhythmias by laser microbeams and optical tweezers**, K. O.

Greulich, S. Monajembashi, B. Perner, Institut für Molekulare Biotechnologie (Germany) [AM226-184]

Coffee Break 3:10 to 3:30 pm

3:30 pm: **Effect of surface tension on voltage-induced membrane movement: an optical-tweezers study**, F.

Qian, Rice Univ.; W. Brownell, Baylor College of Medicine; B. Anvari, Rice Univ. [AM226-168]

3:50 pm: **Cytoskeletal adhesion and viscoelasticity of the outer hair cell plasma membrane: studies using optically trapped fluorescent microspheres**, S. Ermilov, Rice Univ.; W. Brownell, Baylor College of Medicine; B. Anvari, Rice Univ. [AM226-154]

4:10 pm: **Shape deformation of giant unilamellar vesicles with a laser tweezer array**, W. Losert, D. English, P.

Bradford, K. Okamoto, Univ. of Maryland/College Park [AM226-60]

4:30 pm: **Twisting biopolymers by optical tweezers**, P. Ormos, S. Bottka, P. Galajda, H. Kirei, Biological

Research Ctr. (Hungary) [AM226-76]

4:50 pm: **Identification of stepped changes of binding affinity during interactions between the disintegrin rhodostomin and integrin α (IIb) β (3) in living cells using optical tweezers**, C. Hsieh, National Yang-Ming Univ. (Taiwan); B. Chang, L. Hsu, S. Chi, National Chiao Tung Univ. (Taiwan); C. Lin, National Yang-Ming Univ. (Taiwan) [AM226-74]

5:10 pm: **Condensation of hydrodynamically stretched DNA using single molecule fluorescence imaging and optical tweezers**, E. Theofanidou, T. Su, J. Arlt, W. C. Poon, D. T. Dryden, J. Crain, Univ. of Edinburgh (United Kingdom) [AM226-81]

5:30 pm: **Formation of an artificial blood vessel: adhesion force measurements with optical tweezers**, G.

Knoener, N. R. Heckenberg, J. Campbell, H. Rubinsztein-Dunlop, Univ. of Queensland (Australia) [AM226-110]

Wednesday 4 August

SESSION 5: Optical Angular Momentum and Novel Modes

Chair: Kishan Dholakia, Univ. of St. Andrews (United Kingdom)

..... Wed. 8:00 to 10:10 am

8:00 am: **Optical torque and symmetry** (*Invited Paper*), T. A. Nieminen, S. Parkin, N. R. Heckenberg, H.

Rubinsztein-Dunlop, Univ. of Queensland (Australia) [AM226-48]

8:30 am: **Measurement of orbital angular momentum in optical tweezers**, S. J. W. Parkin, T. A. Nieminen, N.

R. Heckenberg, H. Rubinsztein-Dunlop, Univ. of Queensland (Australia) [AM226-42]

8:50 am: **Selective optical trapping using optical beams with fractional helical phase**, X. Yuan, S. Tao, W. M.

Lee, B. S. Ahluwalia, Nanyang Technological Univ. (Singapore) [AM226-02]

9:10 am: **Trapping nanoparticles with cylindrical polarization**, Q. Zhan, Univ. of Dayton [AM226-79]

9:30 am: **Optical tweezers with cylindrical vector beams produced by optical fibers**, D. Petrov, G. Volpe, G. Singh, Institut de Ciències Fotoniques (Spain) [AM226-65]

9:50 am: **Dynamic holographic optical tweezers**, A. Jesacher, S. Bernet, M. Ritsch-Marte, S. Fürhapter, W. Singer, Institute of Medical Physics (Austria) [AM226-43]

Coffee Break 10:10 to 10:30 am

SESSION 6: Brownian Systems

Chair: **Clemens Bechinger**, Univ. Stuttgart (Germany)

..... Wed. 10:30 am to 12:00 pm

10:30 am: **Stochastic resonance in coupled systems** (*Invited Paper*), D. Babic, Univ. Stuttgart (Germany) and Univ. of Ljubljana (Slovenia); C. Schmitt, C. Bechinger, Univ. Stuttgart (Germany) [AM226-28]

11:00 am: **The fluctuation theorem as a generalized second-law for nanomachines: demonstrations using optical tweezers**, E. M. Sevick, G. Wang, D. C. Carberry, J. C. Reid, The Australian National Univ. (Australia); D. J. Searles, Griffith Univ. (Australia); D. J. Evans, The Australian National Univ. (Australia) [AM226-95]

11:20 am: **Imaging the spectral interactions of optically trapped nanospheres**, A. Rohrbach, E. H. K. Stelzer, European Molecular Biology Lab. (Germany) [AM226-75]

11:40 am: **Activated escape and directed diffusion in a modulated optical trap**, B. Golding, R. Kruse, D. Ryvkine, M. I. Dykman, Michigan State Univ. [AM226-170]

Lunch/Exhibition Break 12:00 to 2:00 pm

SESSION 7: Many-body

Chairs: **Clemens Bechinger**, Univ. Stuttgart (Germany); **Alfons van Blaaderen**, Univ. Utrecht (Netherlands)

..... Wed. 2:00 to 5:40 pm

2:00 pm: **Building optical matter with binding and trapping forces** (*Invited Paper*), J. R. Fournier, Swiss Federal Institute of Technology (Switzerland) [AM226-185]

2:30 pm: **Optically bound arrays of microscopic particles in one dimension**, D. McGloin, A. E. Carruthers, K. Dholakia, Univ. of St. Andrews (United Kingdom); E. M. Wright, Univ. of Arizona and Univ. of St. Andrews (United Kingdom) [AM226-15]

2:50 pm: **Trapping of high-index particles using counter-propagating optical tweezers**, A. van der Horst, FOM Institute for Atomic and Molecular Physics (Netherlands) and Utrecht Univ. (Netherlands); D. L. Vossen, A. van Blaaderen, Univ. Utrecht (Netherlands) and FOM-Institute for Atomic and Molecular Physics (Netherlands); M. Dogterom, FOM Institute for Atomic and Molecular Physics (Netherlands) [AM226-91]

Coffee Break 3:10 to 3:30 pm

3:30 pm: **Multiple dual-beam traps for three-dimensional position control of particles** (*Invited Paper*), P. J. L. Rodrigo, Risø National Lab. (Denmark); V. R. Daria, J. Glückstad, Risø National Lab (Denmark) [AM226-143]

4:00 pm: **Micromanipulation with Bessel beams: studies of angular momentum and reconstruction**, D. McGloin, V. Garcés-Chávez, K. Dholakia, Univ. of St. Andrews (United Kingdom) [AM226-37]

4:20 pm: **Three-body interactions in colloidal systems** (*Invited Paper*), J. Dobnikar, M. Brunner, H. H. von Gruenberg, Univ. of Konstanz (Germany); C. Bechinger, Univ. Stuttgart (Germany) [AM226-10]

4:50 pm: **Statics and dynamics of colloidal particles in periodic traps** (*Invited Paper*), C. M. Reichhardt, Los Alamos National Lab. [AM226-86]

5:20 pm: **Optical force-induced assembling of gold-nanoparticles probed by extinction microspectroscopy**, H. Yoshikawa, T. Matsui, H. Masuhara, Osaka Univ. (Japan) [AM226-117]

Thursday 5 August

SESSION 8: 2D and 3D Assembly and Studies

Chair: **Alfons van Blaaderen**, Univ. Utrecht (Netherlands)

Thurs. 8:00 to 10:20 am

8:00 am: **Laser-trapped mirrors in space: steps towards laboratory testing**, A. Labeyrie, College de France (France); J. R. Fournier, Swiss Federal Institute of Technology (Switzerland); R. V. Stachnik, Christina River Institute [AM226-181]

8:20 am: **Three-dimensional structures in optical tweezers** (*Invited Paper*), M. J. Padgett, Univ. of Glasgow (United Kingdom) [AM226-119]

8:50 am: **Crystal nucleation in concentrated dispersions using optical tweezers: single particle control and simultaneous 3D-imaging** (*Invited Paper*), D. L. Vossen, Univ. Utrecht (Netherlands) and FOM Institute for Atomic and Molecular Physics (Netherlands); A. van der Horst, FOM Institute for Atomic and Molecular Physics (Netherlands) and Utrecht Univ. (Netherlands); A. van Blaaderen, Univ. Utrecht (Netherlands) and FOM Institute for Atomic and Molecular Physics (Netherlands) [AM226-83]

9:20 am: **Optical assembling dynamics of colloidal nanoparticles depending on size and trapping-force**, C. Eta, H. Yoshikawa, H. Masuhara, Osaka Univ. (Japan) [AM226-125]

9:40 am: **Fabrication of three-dimensional microscopic structure by VCSEL array trapping**, F. Sumiyama, Y. Ogura, J. Tanida, Osaka Univ. (Japan) [AM226-57]

10:00 am: **Construction of three-dimensional microstructure using optical beam of designed vortex-shape**, W. M. Lee, X. Yuan, J. K. Moh, Nanyang Technological Univ. (Singapore) [AM226-01]

Coffee Break 10:20 to 10:40 am

SESSION 9: Sensitivity and Resolution

Chair: **Pavel Zemánek**, Institute of Scientific Instruments (Czech Republic)

Thurs. 10:40 am to Noon

10:40 am: **Influence of the condenser on sample tracking via forward scattering pattern detection**, C. Tsai, B. Chang, L. Hsu, National Chiao Tung Univ. (Taiwan) [AM226-137]

11:00 am: **Using improved optical tweezers and single particle tracking axial position detection to measure interaction potentials with nanometer resolution**, L. B. Oddershede, J. K. Dreyer, P. M. Hansen, Univ. of Copenhagen (Denmark) [AM226-146]

11:20 am: **Spherical aberration correction for optical tweezers**, J. Arlt, L. Wilson, E. Theofanidou, W. J. Hossack, Univ. of Edinburgh (United Kingdom) [AM226-23]

11:40 am: **Unintended filtering in optical tweezers systems**, H. Flyvbjerg, Risø National Lab. (Denmark); K. Berg-Sørensen, Niels Bohr Institute (Denmark); E. J. G. Peterman, M. van Dijk, C. F. Schmidt, Vrije Univ. Amsterdam (Netherlands) [AM226-142]

Lunch/Exhibition Break 12:00 to 2:00 pm

SESSION 10: Bio II: Growth and Rheology

Chair: **Kirstine Berg-Sørensen**, Univ. of Copenhagen (Denmark)

Thurs. 2:00 to 5:40 pm

2:00 pm: **Optical control of neuronal growth**, D. Koch, T. Betz, A. Ehrlicher, B. Stuhmann, M. Gögler, J. Käs, Univ. Leipzig (Germany) [AM226-152]

2:20 pm: **Multiple beam laser cell micropatterning system**, S. V. Narasimhan, D. M. Dawson, B. Z. Gao, Clemson Univ. [AM226-162]

2:40 pm: **Constructing and probing biomimetic models of the actin cortex with holographic optical tweezers**,

C. Schmitz, J. E. Curtis, J. P. Spatz, Ruprecht-Karls-Univ. Heidelberg (Germany) [AM226-165]

Coffee Break 3:00 to 3:30 pm

3:30 pm: **Studying cell adhesion with holographic optical tweezers**, J. E. Curtis, J. P. Spatz, Ruprecht-Karls-Univ. Heidelberg (Germany) [AM226-169]

3:50 pm: **Optical tweezers studies of intracellular dynamics of vascular endothelial cells**, H. D. Ou-Yang, E. Rickter, L. Lowe-Krentz, Lehigh Univ. [AM226-187]

4:10 pm: **Coupled rotational and translational two-particle microrheology**, J. N. Wilking, T. G. Mason, Univ. of California/Los Angeles [AM226-171]

4:30 pm: **Use of tethering for axial confinement in optical tweezers** (*Invited Paper*), M. Cronin-Golomb, Tufts Univ. [AM226-67]

5:00 pm: **Microrheology of colloidal structures at interfaces using optical and magnetic tweezers**, T. M. Fischer, L. E. Helseth, Florida State Univ. [AM226-12]

5:20 pm: **Optical tweezers as a tool for microrheology of simplex and complex fluids**, G. Pesce, A. Sasso, Univ. di Napoli Federico II (Italy) and Istituto Nazionale per la Fisica della Materia (Italy); S. Fusco, P. Netti, Univ. di Napoli Federico II (Italy); A. Borzacchiello, Consiglio Nazionale delle Ricerche (Italy) [AM226-64]

Friday 6 August

SESSION 11: Interaction Strengths

Chair: Gabriel C. Spalding, Illinois Wesleyan Univ.

..... Fri. 8:00 to 10:00 am

8:00 am: **Examination of microscopic gas-liquid surfaces**, S. Fürhapter, M. Ritsch-Marte, S. Bernet, W. Singer, A. Jesacher, Institute of Medical Physics (Austria) [AM226-44]

8:20 am: **Anomalous gradient force on colloidal particles suspended in an optically anisotropic liquid crystal**, I. Poberaj, Univ. of Ljubljana (Slovenia); M. Skarabot, J. Stefan Institute (Slovenia); D. Babic, Univ. of Ljubljana (Slovenia); I. Musevic, Univ. of Ljubljana (Slovenia) and J. Stefan Institute (Slovenia) [AM226-139]

8:40 am: **Optical manipulation of metal-silica hybrid nanoparticles**, R. R. Agayan, R. Kopelman, Univ. of Michigan [AM226-156]

9:00 am: **Computational modeling of optical tweezers**, T. A. Nieminen, N. R. Heckenberg, H. Rubinsztein-Dunlop, Univ. of Queensland (Australia) [AM226-49]

9:20 am: **Optical guiding with cw and femtosecond lasers**, H. Little, V. Garcés-Chávez, T. Brown, K. Dholakia, W. Sibbett, Univ. of St. Andrews (United Kingdom) [AM226-182]

9:40 am: **Size effect of waveguide coupled whispering gallery mode disk resonators**, M. Rosenblit, R. Folman, Ben Gurion Univ. of the Negev (Israel) [AM226-71]

Coffee Break 10:00 to 10:30 am

SESSION 12: Bio III

Chair: Kirstine Berg-Sørensen, Univ. of Copenhagen (Denmark)

..... Fri. 10:30 to 11:50 am

10:30 am: **All-optical constant-force laser tweezers**, J. D. Meiners, R. Nambiar, A. Gajraj, Univ. of Michigan [AM226-88]

10:50 am: **Measuring phagocytic binding and uptake by photonic force microscopy**, H. Kress, E. H. K. Stelzer, A. Rohrbach, European Molecular Biology Lab. (Germany) [AM226-145]

11:10 am: **Observing the dynamic variation of the binding force between rhodostomin ligand and integrin alpha(IIb)beta(3) receptor using photonic force microscope**, B. Chang, National Chiao Tung Univ. (Taiwan); C. Hsieh, National Yang-Ming Univ. (Taiwan); S. Chi, National Chiao Tung Univ. (Taiwan); C. Lin, National Yang-Ming Univ. (Taiwan); L. Hsu, National Chiao Tung Univ. (Taiwan) [AM226-135]

11:30 am: **Resonance Raman study of the oxygenation cycle of optically trapped single red blood cells in a microfluidic system**, K. Ramser, K. Logg, M. Goksör, J. Enger, M. Käll, D. Hanstorp, Chalmers Univ. of Technology (Sweden) [AM226-109]

Lunch/Exhibition Break..... 11:50 to 2:00 pm

SESSION 13: Localization/Trap Volume/Near Field

Chair: Min Gu, Swinburne Univ. of Technology (Australia)

Room:Fri. 2:00 to 5:50 pm

2:00 pm: **Guiding of polystyrene and glass microspheres along Cs⁺ ion-exchanged waveguides**, K. Grujic, O. G. Hellesø, Univ. of Tromsø (Norway) [AM226-22]

2:20 pm: **Guiding and trapping microparticles in an extended surface field**, V. Garcés-Chávez, Univ. of St. Andrews (United Kingdom); G. C. Spalding, Illinois Wesleyan Univ.; K. Dholakia, Univ. of St. Andrews (United Kingdom) [AM226-128]

2:40 pm: **Subwavelength patterning of the optical near-field**, R. Quidant, G. Badenes, Institut de Ciències Fotòniques (Spain); J. Weeber, Univ. de Bourgogne (France) [AM226-21]

Coffee Break 3:00 to 3:30 pm

3:30 pm: **On-chip characterization of fluids using microsurface plasmon resonance sensors**, A. L. Pyajt, K. Sundara-Rajan, G. I. Rowe, M. A. L. Enlund, Univ. of Washington [AM226-176]

3:50 pm: **Near-field optical trapping with nanochannels in thin metal films**, B. Dragnea, W. L. Schaich, E. Kwak, T. Onuta, D. Amarie, Indiana Univ. [AM226-85]

4:10 pm: **Physical model for near-field scattering and manipulation**, D. Ganic, X. Gan, M. Gu, Swinburne Univ. of Technology (Australia) [AM226-17]

4:30 pm: **Two-photon single-beam particle trapping of active microspheres**, D. Morrish, X. Gan, M. Gu, Swinburne Univ. of Technology (Australia) [AM226-14]

4:50 pm: **Scanning trapped-probe optical reflective microscope: a new tool of 3D morphological scans at nanoscale**, Y. Chang, A. Chang, S. Chi, National Chiao Tung Univ. (Taiwan); H. Chang, National Tsing Hua Univ. (Taiwan); L. Hsu, National Chiao Tung Univ. (Taiwan) [AM226-103]

5:10 pm: **Laser manipulation and ablation of individual gold nanoparticles in solution for deposition of nm-sized gold fragments onto substrates**, S. Ito, Osaka Univ. (Japan); T. Mizuno, H. Yoshikawa, Osaka Univ.; H. Masuhara, Osaka Univ. (Japan) [AM226-122]

5:30 pm: **Design of DOE to control the optical 'bubble' with high NA focusing of cylindrical vector beam**, Y. Zhao, Univ. of Science and Technology of China (China); Q. Zhan, Univ. of Dayton; Y. Li, Univ. of Science and Technology of China (China) [AM226-108]