

## Curriculum Vitae

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### **Orlin D. Velev**

#### **INVISTA Professor**

*Department of Chemical and Biomolecular Engineering  
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### **EDUCATIONAL BACKGROUND**

Ph.D., Physical Chemistry, 1996, Univ. of Sofia and Bulgarian Academy of Sciences, Bulgaria  
M.Sc., Chemical Physics and Theoretical Chemistry, 1989, Department of Chemistry, University of Sofia, Bulgaria

### **PROFESSIONAL EXPERIENCE**

Professor in Chemical Engineering 2008 – present, Department of Chemical and Biomolecular Engineering, North Carolina State University  
Associate Professor in Chemical Engineering, 2006 - 2008, North Carolina State University  
Assistant Professor in Chemical Engineering, 2001 - 2006, Department of Chemical and Biomolecular Engineering, North Carolina State University  
Research Assistant Professor in Chemical Engineering, 1998 - 2001, Department of Chemical Engineering, University of Delaware  
Postdoctoral Fellow, 1996 - 1998, Dept. of Chemical Engineering, University of Delaware  
Research Scientist, 1994 - 1995, Japanese Exploratory Research for Advanced Technology Program, Tsukuba, Japan  
Research and Teaching Fellow, 1993 - 1994, University of Sofia, Laboratory of Thermodynamics and Physico-Chemical Hydrodynamics (LTPH), University of Sofia, Bulgaria  
Short-term visiting researcher, 1991 - 1994, University of Bristol, England, and University of Patras, Greece  
Research and teaching assistant and graduate student, 1990 - 1993, Department of Chemistry, University of Sofia, Bulgaria

### **MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS**

American Chemical Society (ACS)  
Materials Research Society (MRS)  
American Institute of Chemical Engineers (AIChE)

American Physical Society (APS)  
Sigma Xi

## SCHOLARLY AND PROFESSIONAL HONORS

Fellow of the American Chemical Society (ACS)	2011
Innovator of the Year Award (NC State University)	2011
Alumni Association Outstanding Research Award (NC State University)	2011
Alcoa Foundation Distinguished Engineering Research Award (NCSU)	2010
INVISTA named professorship (NC State University)	2009
Camille Dreyfus Teacher-Scholar Award (Camille and Henry Dreyfus Foundation)	2006
NC State University Academy of Outstanding Teachers (NCSU)	2006
3M Nontenured Faculty Award (3M Company)	2006
Sigma Xi Faculty Research Award (Sigma Xi NCSU Chapter)	2004
CAREER award (The National Science Foundation)	2003
Ralph E. Powe Junior Faculty Award (Oak Ridge Associated Universities)	2002
Camille and Henry Dreyfus New Faculty Award (Camille and Henry Dreyfus Foundation)	2001
Governmental award (gold medal) for academic excellence (The Bulgarian Ministry of Science and Education)	1989
Governmental diploma for academic excellence (The Bulgarian Ministry of Chemical and Biochemical Industry)	1989
First Award at the National Student Science and Creativity Competition (Bulgaria)	1989
Named governmental stipend for outstanding students (Sofia Univ., Bulgaria)	1987-1989
Bronze Medal from the International Chemistry Olympiad (Stockholm, Sweden)	1982
First Award at the Bulgarian National Chemistry Olympiad (Bulgaria)	1982

## SCHOLARLY ACHIEVEMENTS METRICS

**123** peer-reviewed publications, including ones in *Nature*, *Science*, *Nature Materials*, *JACS*, etc.

**143 invited, plenary and keynote** presentations at international meetings, universities, companies and federal laboratories.

More than **7600** citations reported by Web of Science Database.

Average citations/publication = **54.6**. Papers cited more than 100 times = **20**.

**H-index = 44.**

Graduate students advised or advising = **22** (of which **6** co-advised). PhD students graduated = **12**.

Undergraduate researchers advised or advising = **34** (of which **10** from minority groups).

## SCHOLARLY ACHIEVEMENTS

### Research articles and research review articles

#### *Book chapters and invited reviews (refereed)*

1. N. Carroll, S. T. Chang, D. N. Petsev and O. D. Velev, "Droplet Microreactors for Materials Synthesis", chapter in "Microdroplet Technology: Principles and Applications in Biology and Chemistry", P. Day, A. Manz and Y. Zhang, Eds., in press, Elsevier, 2012.
2. B. G. Prevo and O. D. Velev, "Materials Deposition in Evaporating Menisci — Fundamentals and Engineering Applications of the Convective Assembly Process", chapter in "Evaporative Self-Assembly of Ordered Complex Structures", Zhiqun Lin, Ed., World Scientific Publ., in press, 2011.
3. D. N. Petsev and O. D. Velev, "Transport Control of Fluid and Solutes in Microchannels Using AC Field and Semiconductor Diodes", chapter in "Continuum Mechanics", Andrus Koppel and Jaak Oja, Eds., Nova Science Publ., 2010, pp. 85-103.
4. O. D. Velev and S. Gupta, *Adv. Mater.* **21**, 1897–1905 (2009). Materials fabricated by micro and nanoparticle assembly - The challenging path from science to engineering.
5. O. D. Velev, S. Gangwal and D. N. Petsev, *Annu. Rep. Prog. Chem., Sect. C*, **105**, 213-246 (2009). Particle-localized AC and DC manipulation and electrokinetics.
6. K. P. Velikov and O. D. Velev, "Stabilization of Thin Films, Foams, Emulsions and Bifluid Gels with Surface-active Solid Particles", chapter in "Colloid Stability and Application in Pharmacy", T. F. Tadros, Ed., Wiley-VCH Publ. Weinheim, 2007, pp. 277-306.
7. B. G. Prevo, D. M. Kuncicky and O. D. Velev, *Colloids Surf. A: Physicochem. Eng. Asp.*, **311**, 2-10 (2007). Engineered deposition of coatings from nano- and micro-particles: A brief review of convective assembly at high volume fraction.
8. O. D. Velev and K. H. Bhatt, *Soft Mater*, **2**, 738-750 (2006). On-chip micromanipulation and assembly of colloidal particles by electric fields.
9. K. P. Velikov and O. D. Velev, "Novel Materials Derived from Particles Assembled on Liquid Surfaces", chapter in "Colloidal Particles at Liquid Interfaces", B. P. Binks and T. S. Horozov, Eds., Cambridge University Press, 2006, pp. 225-297.
10. O. D. Velev, *Science*, **312**, 367-368 (2006). Self-assembly of unusual nanoparticle crystals (invited Perspectives paper).
11. D. M. Kuncicky, B. G. Prevo and O. D. Velev, *J. Mater. Chem.*, **16**, 1207-1211 (2006). Controlled assembly of SERS substrates templated by colloidal crystal films.
12. O. D. Velev and S. O. Lumsdon, "Electrically Functional Nanostructures", chapter in "Encyclopedia of Nanoscience and Nanotechnology", J. A. Schwartz, C. Contescu, K. Putyera, Eds., Marcel Dekker, New York, 2004, pp. 1025-1042.
13. O. D. Velev, "Assembly of Electrically Functional Microstructures from Colloidal Particles", chapter in "Colloids and Colloid Assemblies", F. Caruso, Ed., Wiley-VCH Publ. Weinheim, 2003, pp. 437-464.

14. O. D. Velev, "Assembly of Colloidal Particles into Nanostructured Materials and Microscopic Devices", chapter in: "Handbook of Surfaces and Interfaces of Materials", H. S. Nalwa, Ed., Vol. 3, pp. 125-163, Academic Press, San Diego, 2001.
15. O. D. Velev and E. W. Kaler, *Adv. Mater.* **12**, 531-534 (2000). Structured porous materials via colloidal crystal templating: From inorganic oxides to metals.
16. O. D. Velev and A. M. Lenhoff, *Curr. Opinion Colloid Interface Sci.* **5**, 56-63 (2000). Colloidal crystals as templates for porous materials.

***Research papers (refereed)***

17. J. Kleinert, S. Kim and O. D. Velev, *Langmuir*, **28**, 3037–3044 (2012). Electric-field-controlled flow in nanoscale-thin wetting films.
18. H. Schmidle, C. K. Hall, O. D. Velev and S. H. L. Klapp, *Soft Matter*, **8**, 1521-1531 (2012). Phase diagram of two-dimensional systems of dipole-like colloids.
19. H.-J. Koo, J.-H. So, M. D. Dickey, O. D. Velev, *Adv. Funct. Mater.* **22**, 625–631 (2012). Towards All-Soft Matter Circuits: Prototypes of Quasi-Liquid Devices with Memristor Characteristics.
20. S. Lam, E. Blanco, S. Smoukov, K. P. Velikov, O. D. Velev, *J. Am. Chem. Soc.*, **133**, 13856–13859 (2011). Magnetically Responsive Pickering Foams.
21. E. M. Melvin, B. R. Moore, K. H. Gilchrist, S. Grego and O. D. Velev, *Biomicrofluidics*, **5**, 034113 (2011). On-chip collection of particles and cells by AC electroosmotic pumping and dielectrophoresis using asymmetric microelectrodes.
22. H.-J. Koo, J.-H. So, M. D. Dickey, O. D. Velev, *Adv. Mater.*, **23**, 3559-3564 (2011). Towards All-Soft Matter Circuits: Prototypes of Quasi-Liquid Devices with Memristor Characteristics.
23. H.-J. Koo, S. T. Chang, J. M. Slocik, R. R. Naik and O. D. Velev *J. Mater. Chem.*, **21**, 72-79 (2011). Aqueous soft matter based photovoltaic devices.
24. C. E. Ashley, D. R. Dunphy, Z. Jiang, E. C. Carnes, Z. Yuan, D. N. Petsev, P. B. Atanassov, O. D. Velev, M. Sprung, J. Wang, D. S. Peabody and C. J. Brinker, *Small*, **8**, 1043–1050 (2011). Convective assembly of 2D lattices of virus-like particles visualized by in-situ grazing-incidence small-angle X-ray scattering.
25. I. Hoeger, O. J. Rojas, K. Efimenko, O. D. Velev and S. S. Kelley, *Soft Matter*, **7**, 1957 - 1967 (2011). Ultrathin film coatings of aligned cellulose nanocrystals from a convective-shear assembly system and their surface mechanical properties.
26. V. Rastogi, K. P. Velikov and O. D. Velev, *PCCP*, **12**, 11975 - 11983 (2010). Microfluidic characterization of sustained solute release from porous supraparticles.
27. R. F. Fakhrullin, O. J. Cayre, O. D. Velev, and V. N. Paunov, *PCCP*, **12**, 11912–11922 (2010). Live celloidosome structures based on the assembly of individual cells by colloid interactions.
28. A. Goyal, C. K. Hall and O. D. Velev, *J. Chem. Phys.*, **133**, 064511/1-10 (2010). Self-assembly in binary mixtures of dipolar colloids: Molecular dynamics simulations.

29. J. Kleinert, S. Kim, and O. D. Velev, *Langmuir*, **26**, 10380–10385 (2010). Electric-field-assisted convective assembly of colloidal crystal coatings.
30. H.-J. Koo, S.-T. Chang and O. D. Velev, *Small*, **6**, 1393-1397 (2010). Ion-current diode with aqueous Gel/SiO<sub>2</sub> nanofilm interfaces.
31. M.-L. Brandy, O. J. Cayre, R. F. Fakhrullin, O. D. Velev, and V. N. Paunov, *Soft Matter*, **6**, 3494–3498 (2010). Directed assembly of yeast cells into living celloidosomes by bubble templating.
32. S. Gangwal, A. Pawar, I. Kretzschmar and O. D. Velev, *Soft Mater*, **6**, 1413 - 1418 (2010). Programmed assembly of metallodielectric patchy particles in external AC electric fields.
33. S. Gupta, R. G. Alargova, P. K. Kilpatrick and O. D. Velev, *Langmuir*, **26**, 3441-3452 (2010). On-chip dielectrophoretic co-assembly of live cells and particles into responsive biomaterials.
34. A. Goyal, C. K. Hall and O. D. Velev, *Soft Matter*, **6**, 480–484 (2010). Responsive bicontinuous gels formed by self-assembly of dipolar colloid particles.
35. V. Rastogi, A. A. García, M. Marquez and O. D. Velev, *Macromol. Rapid Commun.*, **31**, 190-195 (2010). Anisotropic particle synthesis inside droplet templates on superhydrophobic surfaces.
36. S. Kim, H. Barraza and O. D. Velev, *J. Mater. Chem.*, **19**, 7043–7049 (2009). Intense and selective coloration of foams stabilized with functionalized particles.
37. S. T. Chang, A. B. Ucar, G. R. Swindlehurst, R. O. Bradley, F. J. Renk and O. D. Velev, *Adv. Mater.* **21**, 2803–2807 (2009). Materials of controlled shape and stiffness with photocurable microfluidic endoskeleton.
38. L. B. Jerrim and O. D. Velev, *Langmuir*, **25**, 5692–5702 (2009). Deposition of live cells and large particles by “Convective-Sedimentation” assembly.
39. S. K. Smoukov, S. Gangwal, M. Marquez and O. D. Velev, *Soft Matter*, **5**, 1285-1292 (2009). Reconfigurable responsive structures assembled from magnetic Janus particles.
40. S. Gangwal, O. J. Cayre and O. D. Velev, *Langmuir*, **24**, 13312-13320 (2008). Dielectrophoretic assembly of metallodielectric Janus particles in AC electric fields.
41. V. Rastogi, S. Melle, O. G. Calderón, A. A. García, M. Marquez and O. D. Velev, *Adv. Mater.*, **20**, 4263-4268 (2008). Synthesis of light-diffracting assemblies from microspheres and nanoparticles in droplets on a superhydrophobic surface.
42. B. M. Budhlall, M. Marquez and O. D. Velev, *Langmuir*, **24**, 11959–11966 (2008). Microwave, photo- & thermally responsive PNIPAm - gold nanoparticle microgels.
43. H. A. Wege, S. Kim, V. N. Paunov, Q. Zhong and O. D. Velev, *Langmuir*, **24**, 9245-9253 (2008). Long-term stabilization of foams and emulsions with in-situ formed microparticles from hydrophobic cellulose.
44. S. Gupta, R. G. Alargova, P. K. Kilpatrick and O. D. Velev, *Soft Matter*, **4**, 726 - 730 (2008). On-chip electric field driven assembly of biocomposites from live cells and functionalized particles.
45. S. Gangwal, O. J. Cayre, M. Z. Bazant, O. D. Velev, *Phys. Rev. Lett.*, **100**, 058302, 1-4 (2008). Induced-charge electrophoresis of metallo-dielectric particles.

46. A. Goyal, C. K. Hall and O. D. Velev, *Phys. Rev. E*, **77**, 031401, 1-6 (2008). Phase diagram for stimulus-responsive materials containing dipolar colloidal particles.
47. D. M. Kuncicky and O. D. Velev, *Langmuir*, **24**, 1371-1380 (2008). Characterization and engineering of the process of colloidal crystal formation from drying sessile droplets.
48. S. T. Chang, E. Beaumont, D. N. Petsev and O. D. Velev, *Lab Chip*, **7**, 117 - 124 (2008). Remotely powered distributed microfluidic pumps and mixers based on miniature diodes.
49. S.-T. Chang, V. N. Paunov, D. N. Petsev and O. D. Velev, *Nature Mater.*, **6**, 235-240 (2007). Remotely powered self-propelling particles and micropumps based on miniature diodes.
50. O. J. Cayre, S.-T. Chang and O. D. Velev, *J. Am. Chem. Soc.* **129**, 10801-10806 (2007). Polyelectrolyte diode - nonlinear current response of a junction between aqueous ionic gels.
51. H. A. Wege, A. Dyab, O. D. Velev and V. N. Paunov, *PCCP*, **9**, 6300-6303 (2007). Fabrication of magnetically functionalized lens- and donut- shaped microparticles by a surface formation technique.
52. V. Rastogi and O. D. Velev, *Biomicrofluidics*, **1**, 014107, 1-17 (2007). Development and evaluation of realistic microbioassays in freely suspended droplets on a chip.
53. S. Gupta, S. Huda, P. K. Kilpatrick and O. D. Velev, *Anal. Chem.*, **23**, 5498-5504 (2007). Characterization and optimization of gold nanoparticle-based silver-enhanced immunoassays.
54. Z. Yuan, D. N. Petsev, B. G. Prevo, O. D. Velev and P. Atanassov, *Langmuir*, **23**, 5498-5504 (2007). Two-dimensional nanoparticle arrays derived from ferritin monolayers.
55. B. G. Prevo, E. W. Hon and O. D. Velev, *J. Mater. Chem.*, **17**, 791-799 (2007). Assembly and characterization of colloid-based antireflective coatings on multicrystalline silicon solar cells.
56. D. M. Kuncicky, K. Bose, K. D. Costa and O. D. Velev, *Chem. Mater.*, **19**, 141-143 (2007). Sessile droplet templating of miniature porous hemispheres from colloid crystals.
57. Q. Zhong, C. R. Daubert, and O. D. Velev, *J. Agric. Food Chem.*, **55**, 2688-2697 (2007). Physicochemical variables affecting the rheology and microstructure of rennet casein gels.
58. D. M. Kuncicky, R. R. Naik and O. D. Velev, *Small*, **2**, 1462 - 1466 (2006). Rapid deposition and long range alignment of nanocoatings and arrays of electrically conductive wires from tobacco mosaic virus.
59. H.-Y. Koo, S.-T. Chang, W.-S. Choi, J.-H. Park, D.-Y. Kim and O. D. Velev, *Chem. Mater.*, **18**, 3308-3313 (2006). Emulsion-based synthesis of reversibly swellable, magnetic nanoparticle-embedded polymer microcapsules.
60. S.-T. Chang and O. D. Velev, *Langmuir*, **22**, 1459-1468 (2006). Evaporation-induced microseparation inside freely floating droplets.
61. R. G. Alargova, V. N. Paunov and O. D. Velev, *Langmuir*, **22**, 765-774 (2006). Formation of polymer microrods in shear flow by emulsification - solvent attrition mechanism.
62. J. R. Millman, K. H. Bhatt, B. G. Prevo and O. D. Velev, *Nature Mater.*, **4**, 98-102 (2005). Anisotropic particle synthesis in dielectrophoretically controlled microdroplet reactors.
63. K. H. Bhatt, S Grego and O. D. Velev, *Langmuir*, **21**, 6603-6612 (2005). An AC electrokinetic technique for collection and concentration of particles and cells on patterned electrodes.

64. B. G. Prevo, Y. Hwang and O. D. Velev, *Chem. Mater.*, **17**, 3642-3651 (2005). Convective assembly of antireflective silica coatings with controlled thickness and refractive index.
65. D. M. Kuncicky, S. D. Christesen and O. D. Velev, *Appl. Spectr.*, **59**, 401-409 (2005). Role of the micro- and nanostructure in the performance of SERS substrates assembled from gold nanoparticles.
66. B. G. Prevo, J. C. Fuller, III and O. D. Velev, *Chem. Mater.*, **17**, 28-35 (2005). Rapid deposition of gold nanoparticle films with controlled thickness and structure by convective assembly.
67. N. H. Finkel, B. G. Prevo, O. D. Velev and L. He, *Anal. Chem.*, **77**, 1088-1095 (2005). Ordered silicon nanocavity arrays in surface-assisted desorption/ionization mass spectrometry.
68. O. D. Velev, Y. H. Pan, E. W. Kaler and A. M. Lenhoff, *Cryst. Growth Design*, **5**, 351-359 (2005). Molecular effects of anionic surfactants on lysozyme precipitation and crystallization.
69. R. G. Alargova, D. S. Warhadpande, V. N. Paunov and O. D. Velev, *Langmuir*, **20**, 10371-10374 (2004). Foam superstabilization by polymer microrods.
70. R. G. Alargova, K. H. Bhatt, V. N. Paunov and O. D. Velev, *Adv. Mater.*, **16**, 1653-1657 (2004). Scalable synthesis of new class of polymer microrods by a liquid-liquid dispersion technique.
71. P. Noble, O. J. Cayre, R. G. Alargova, O. D. Velev and V. N. Paunov, *J. Am. Chem. Soc.*, **126**, 8092-8093 (2004). Fabrication of 'Hairy' colloidosomes with shells of polymeric microrods.
72. B. G. Prevo and O. D. Velev, *Langmuir*, **20**, 2099-2107 (2004). Controlled rapid deposition of structured coatings from micro-and nanoparticle suspensions.
73. K. H. Bhatt and O. D. Velev, *Langmuir*, **20**, 467-476 (2004). Control and modeling of the dielectrophoretic assembly of on-chip nanoparticle wires.
74. S. O. Lumsdon, E. W. Kaler and O. D. Velev, *Langmuir*, **20**, 2108-2116 (2004). Two-dimensional crystallization of microspheres by coplanar AC electric field.
75. Q. Zhong, C. R. Daubert and O. D. Velev, *Langmuir*, **20**, 7399-7405 (2004). Cooling effects on a model rennet casein gel system: Part I. Rheological characterization.
76. Q. Zhong, C. R. Daubert and O. D. Velev, *Langmuir*, **20**, 7406-7411 (2004). Cooling effects on a model rennet casein gel system: Part II. Permeability and Microscopy.
77. O. D. Velev, B. G. Prevo and K. H. Bhatt, *Nature*, **426**, 515-516 (2003). On-chip manipulation of freely suspended droplets.
78. O. Cayre, V. N. Paunov and O. D. Velev, *Chem. Comm.*, 2296-2297 (2003). Fabrication of dipolar colloid particles by microcontact printing.
79. O. Cayre, V. N. Paunov and O. D. Velev, *J. Mater. Chem.*, **13**, 2445-2450 (2003). Fabrication of asymmetrically coated colloid particles by microcontact printing techniques.
80. J. Tang, B. Gao, H. Geng, O. D. Velev, L.C. Qin, and O. Zhou, *Adv. Mater.*, **15**, 1352-1355 (2003). Assembly of 1D nanostructures into sub-micron diameter fibrils with controlled and variable length.

81. S. O. Lumsdon, J. P. Williams, E. W. Kaler and O. D. Velev, *Appl. Phys. Lett.*, **82**, 949-951 (2003). Dielectrophoretic assembly of oriented and switchable two-dimensional photonic crystals.
82. C. Guo, B. E. Campbell, K. Chen, A. M. Lenhoff and O. D. Velev, *Colloids Surf. B: Biointerfaces*, **29**, 297-307 (2003). Casein precipitation equilibria in the presence of calcium ions and phosphates.
83. Y. Yuan, O. D. Velev, and A. M. Lenhoff, *Langmuir*, **19**, 3705-3711 (2003). Mobility of adsorbed proteins studied by fluorescence recovery after photobleaching.
84. P. M. Tessier, S. D. Christesen, K. K. Ong, E. M. Clemente, A. M. Lenhoff, E. W. Kaler and O. D. Velev, *Appl. Spectr.*, **56**, 1524-1530 (2002). On-line spectroscopic characterization of sodium cyanide with nanostructured gold SERS substrates.
85. Y. J. Yuan, O. D. Velev, K. Chen, B. E. Campbell, E. W. Kaler and A. M. Lenhoff, *J. Agric. Food Chem.*, **50**, 4953-4958 (2002). Effect of pH and  $\text{Ca}^{2+}$ -induced associations of soybean proteins.
86. K. D. Hermanson, S. O. Lumsdon, J. P. Williams, E. W. Kaler and O. D. Velev, *Science*, **294**, 1082-1086 (2001). Dielectrophoretic assembly of electrically functional microwires from nanoparticle suspensions.
87. P. M. Tessier, O. D. Velev, A. T. Kalambur, J. F. Rabolt, A. M. Lenhoff and E. W. Kaler, *Adv. Mater.*, **13**, 396-400 (2001). Structured metallic films for optical and spectroscopic applications via colloidal crystal templating.
88. O. D. Velev, A. M. Lenhoff and E. W. Kaler, *Science*, **287**, 2240-2243 (2000). A class of microstructured particles through colloidal crystallization.
89. P. M. Tessier, O. D. Velev, A. T. Kalambur, J. F. Rabolt, A. M. Lenhoff and E. W. Kaler, *J. Am. Chem. Soc.*, **122**, 9554-9555 (2000). Assembly of gold nanostructured films templated by colloidal crystals and use in surface-enhanced Raman spectroscopy.
90. O. D. Velev, E. W. Kaler and A. M. Lenhoff, *J. Phys. Chem. B*, **104**, 9267-9275 (2000). Surfactant diffusion into lysozyme crystal matrices investigated by quantitative fluorescence microscopy.
91. K. P. Velikov and O. D. Velev, "Formation of 2D structures of micrometer sized latex particles inside thinning foam films", in "Emulsions, Foams and Thin Films", K. L. Mittal, P. Kumar, Eds., Marcel Dekker, New York, 2000, pp. 279-281.
92. O. D. Velev, P. M. Tessier, A. M. Lenhoff and E. W. Kaler, *Nature*, **401**, 548-548 (1999). A class of porous metallic nanostructures.
93. O. D. Velev and E. W. Kaler, *Langmuir* **15**, 3693-3696 (1999). In situ assembly of colloidal particles into miniaturized biosensors.
94. O. D. Velev, E. W. Kaler and A. M. Lenhoff, *Adv. Mater.*, **11**, 1345-1349 (1999). Photochemical micromachining of lysozyme crystals.
95. K. Furusawa and O. D. Velev, *Colloids Surfaces A*, **159**, 359-371 (1999). Electrokinetic behavior in synthetic process of composite particles.



96. B. L. Neal, D. Asthagiri, O. D. Velev, A. M. Lenhoff, and E. W. Kaler, *J. Cryst. Growth*, **196**, 377-387 (1999). Why is the osmotic second virial coefficient related to protein crystallization?
97. O. D. Velev, E. W. Kaler and A. M. Lenhoff, *Biophys. J.*, **75**, 2682-2697 (1998). Protein interactions in solution characterized by light and neutron scattering: Comparison of lysozyme and chymotrypsinogen.
98. O. D. Velev, B. E. Campbell and R. P. Borwankar, *Langmuir*, **14**, 4122-4130 (1998). Effect of calcium ions and environmental conditions on the properties of  $\beta$ -Casein stabilized films and emulsions.
99. O. D. Velev, T. A. Jede, R. F. Lobo and A. M. Lenhoff, *Chem. Mater.*, **10**, 3597-3602 (1998). Microstructured porous silica obtained via colloidal crystal templates.
100. K. P. Velikov, F. Durst and O. D. Velev, *Langmuir*, **14**, 1148-1155 (1998). Direct observation of the dynamics of latex particles confined inside thinning water-air films.
101. O. D. Velev, T. A. Jede, R. F. Lobo and A. M. Lenhoff, *Nature*, **389**, 447-448 (1997). Microstructured porous silica via colloidal crystallization.
102. O. D. Velev, *Adv. Biophys.*, **34**, 139-157 (1997). Assembly of protein structures onto liposomes by using non-specific and specific interactions.
103. K. P. Velikov, O. D. Velev, K. G. Marinova and G. N. Constantinides, *J. Chem. Soc. Faraday Trans.*, **93**, 2069-2075 (1997). Effect of the surfactant concentration on the kinetic stability of thin foam and emulsion films.
104. O. D. Velev and K. Nagayama, *Langmuir*, **13**, 1856-1859 (1997). Assembly of latex particles by using emulsion droplets 3. Reverse (Water in Oil) systems.
105. O. D. Velev, K. D. Danov and I. B. Ivanov, *J. Dispersion Sci. Technol.*, **18**, 625-645 (1997). Stability of emulsions under static and dynamic conditions.
106. K. G. Marinova, T. G. Gurkov, O. D. Velev, I. B. Ivanov and R. P. Borwankar, *Colloids Surfaces A*, **123-124**, 155-167 (1997). The role of additives for the behaviour of thin emulsion films stabilised by proteins.
107. T. S. Horozov, C. D. Dushkin, K. D. Danov, L. N. Arnaudov, O. D. Velev, A. Mehreteab and G. Broze, *Colloids Surfaces A*, **113**, 117-126 (1996). Effect of the surface expansion and wettability of the capillary on the dynamic surface tension measured by the maximum bubble pressure method.
108. K. G. Marinova, R. G. Alargova, N. D. Denkov, O. D. Velev, D. N. Petsev, I. B. Ivanov and R. P. Borwankar, *Langmuir*, **12**, 2045-2051 (1996). Charging of Oil/Water interfaces due to spontaneous adsorption of hydroxyl ions.
109. O. D. Velev, K. Furusawa and K. Nagayama, *Langmuir*, **12**, 2385-2391 (1996). Assembly of latex particles by using emulsion droplets as templates 2. Ball-like and composite aggregates.
110. O. D. Velev, K. Furusawa and K. Nagayama, *Langmuir*, **12**, 2374-2384 (1996). Assembly of latex particles by using emulsion droplets as templates 1. Microstructured hollow spheres.
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***Publications in proceedings volumes and marginally refereed journals***

1. K. P. Velikov and O. D. Velev, *Curr. Opinion Colloid Interface Sci.*, **16**, 81-83 (2011). Colloidal dispersions by engineering and design (Editorial overview).
2. B. G. Prevo and O. D. Velev, "Engineered Assembly of Coatings from Nano- and Micro-particles: A brief review of convective assembly at high volume fraction", in "Interactions of Colloidal Dispersions in Coating Process and Related Matters", *Proc. of NEPTIS-XIV Intl. Sem.*, Y. Mori, Ed., Nisshin Eng., 2005. pp. 117-126.

3. G. Tsutsumanova, M. Bivolarska, T. Velinov, B. Prevo, O. Velev, S. Russev, *Annals Sofia Univ. St. Kliment Ohridski*, **98**, 83-90 (2005). A set-up for measuring local optical spectra.
4. V. N. Paunov, P. F. Noble, O. J. Cayre, R. G. Alargova and O. D. Velev, *MRS Symp. Proc.* **845**, AA5.18.1-3 (2005). Fabrication of novel types of colloidosome microcapsules for drug delivery applications.
5. R. J. Hill, J. Millman and O. D. Velev, *Pharmaceutical Eng.* **24**, 98-110 (2004). Fabrication and study of simple and robust microfluidic devices.
6. D. M. Kuncicky, S. D. Christesen and O. D. Velev, *Proc. SPIE Int. Soc. Opt. Eng.*, **5585**, 33-45, (2004). Engineering of SERS substrate structure: Role of micro- and nanoporosity.
7. J. Tang, G. Yang, J. Zhang, H.Z. Geng, B. Gao, O. Velev, L.-C. Qin, O. Zhou, *MRS Symp. Proc.* **788**, L8.27.1-4 (2004). Controlled assembly of carbon nanotube fibrils by dielectrophoresis.
8. P. M. Tessier, K. Ong, S. D. Christesen, A. M. Lenhoff, E. W. Kaler, O. D. Velev, *Proc. SPIE Int. Soc. Opt. Eng.*, **4577**, 53-64, (2004). Assembly of gold nanostructured films templated by colloidal crystals and use in surface-enhanced Raman spectroscopy.
9. S. O. Lumsdon, E. W. Kaler and O. D. Velev, *MRS Symp. Proc.* **776**, 81-87 (2003). Dielectrophoretic assembly of switchable two-dimensional photonic crystals with specific orientation.
10. O. J. Cayre, V. N. Paunov and O. D. Velev, *MRS Symp. Proc.* **EXS-2**, M3.6.1-3 (2003). Preparation of unsymmetrically coated colloid particles by microcontact printing techniques.
11. T. D. Gurkov, K. D. Danov, O. D. Velev, I. B. Ivanov, R. P. Borwankar, *Proc. of III World Congress on Emulsions*, Paris, **2-3**, 155-161 (1997). Stability of liquid films in non-preequilibrated emulsions.
12. O. Velev, T. Gurkov, R. Alargova, K. Marinova, I. Ivanov and R. Borwankar, *Proc. of I World Congress on Emulsions*, Paris, **1-22**, 130-136 (1993). Stability of films and emulsions in the presence of nonionic surfactant blends.

### ***Books edited***

- "Unconventional Approaches to Nanostructures with Applications in Electronics, Photonics, Information Storage and Sensing", O. D. Velev, T. J. Bunning, Y. Xia and P. Yang, Editors, MRS Proc. Vol. 776, MRS, Warrendale, PA, 2003.

### **Invited, keynote and plenary research presentations and seminars**

1. Environmental Protection Agency (EPA), Durham, NC, January 2012. (Invited Talk: Designing of Biomimetic Artificial Leaves for Sustainable Electricity and Hydrogen Generation).
2. Institut des Sciences Moléculaires, University of Bordeaux, Bordeaux, France, December 2011. (Invited talk: Programmed Assembly and Manipulation of Complex Particles by Electric Fields).

3. AIChE Annual Conference, Minneapolis, MN, October 2011 (**Plenary talk**: Directed Co-Assembly of Live Cells and Colloidal Particles into Biocomposites with Engineered Structure and Functionality).
4. Department of Chemical Engineering, Colorado School of Mines, September 2011 (Electrically Functional Soft Matter: From Precise Colloidal Assembly to Hydrogel Photovoltaics).
5. Department of Chemical Engineering, Johns Hopkins University, September 2011 (Programmed Assembly and Manipulation of Complex Particles by Electric Fields).
6. Debye Institute, Utrecht University, Utrecht, Netherlands, July 2011 (Programmed Assembly and Manipulation of Complex Particles by Electric Fields).
7. Particles 2011 conference, Berlin, July 2011 (Keynote talk: Functional Magnetically Responsive Foams Stabilized with Particles of Engineered Structure and Properties).
8. Department of Chemical Engineering, Virginia Tech University, Blacksburg, VA, April, 2011 (**Plenary talk** – 3<sup>rd</sup> Annual Graduate Symposium: Electrically Functional Soft Matter: From Precise Colloidal Assembly to Hydrogel Photovoltaics).
9. Department of Chemical Engineering, Penn State University, State College, PA, April, 2011 (Electrically Functional Soft Matter: From Precise Colloidal Assembly to Hydrogel Photovoltaics).
10. APS Annual Meeting, Dallas, TX, April, 2011 (Invited Tutorial: Liquid and Particle Manipulation by Electrical Fields).
11. Department of Chemical and Biomolecular Engineering, University of Pennsylvania, Philadelphia, PA, March, 2011 (Electrically Functional Soft Matter: From Precise Colloidal Assembly to Hydrogel Photovoltaics).
12. Department of Chemical and Biomolecular Engineering, Georgia Institute of Technology, Atlanta, GA, February, 2011 (Electrically Functional Soft Matter: From Precise Colloidal Assembly to Hydrogel Photovoltaics).
13. Faculty of Science, Technology and Media, Mid Sweden University, Sundsvall, Sweden, January 2011 (Precise Directed Assembly of Colloidal Particles into Materials with Engineered Structure and Properties).
14. ISMC-2011, 3rd International Symposium on Materials Chemistry, Bhabha Atomic Research Centre, Mumbai, India, December 2011 (Precise Directed Assembly of Colloidal Particles into Materials with Engineered Structure and Properties).
15. Department of Materials Science, ETH-Swiss Federal Institute of Technology, Zurich, Switzerland, November 2010 (Foam Superstabilization and Functionalization by Particles with Engineered Structure and Properties).
16. 24th conference of the European Colloid and Interface Society, September, 2010, Prague, the Czech Republic (**Plenary Talk**: Precise Directed Assembly of Colloidal Particles into Materials with Engineered Structure and Properties).

17. COST D43 Thematic Symposium on Colloidal Dispersions in Nanoscience, Borovets, Bulgaria, July 2010 (Programmed Assembly and Manipulation of Complex Particles by Electric Fields).
18. Eufoam 2010 Conference July 2010, Borovets, Bulgaria (**Plenary Talk:** Strategies for Directing and Controlling the Processes of Particle Assembly in Liquid Media).
19. Smart Polymer Systems 2010 - iSmithers Conference, Atlanta, GA, May 2010 (New Microfluidic Elastomer Composites with Switchable Shape, Stiffness and Color).
20. Second Triangle Soft Matter Workshop, Durham, NC, May 2010 (Emerging Trends - Microfluidic Soft Matter).
21. MRS National Spring Meeting; San Francisco, CA, April 2010 (A new class of programmable microfluidic materials with switchable shape, stiffness and color).
22. Department of Chemical Engineering, University of New Mexico, NM, February 2010 (Colloidal electronics: Electrically active structures from water-based particles and gels).
23. CFDR research corporation, Huntsville, AL, November 2009 (On-chip Liquid and Particle Manipulation by AC Electric Fields: Applications in Colloidal Assembly and Microfluidics).
24. Department of Chemical Engineering, Texas A & M University, October 2009 (On-chip Liquid and Particle Manipulation by AC Electric Fields: Applications in Colloidal Assembly and Microfluidics).
25. 14th UK Polymer Colloids Forum, University of Hull, September 2009 (**Keynote talk:** Programmed Assembly of Janus, Patchy and Dipolar Particles by Electric and Magnetic Fields).
26. 238th ACS National Meeting, Washington, DC, August 2008 (Programmed assembly of Janus, patchy and dipolar particles by electric and magnetic fields).
27. Association in Solution II Engineering Research Conference, July 2009, Tomar, Portugal (Colloidal Electronics: Electrically Active Structures from Water-Based Particles and Gels).
28. 13th IACIS International Conference on Surface and Colloid Science and the 83rd ACS Colloid & Surface Science Symposium, New York, NY, June 2009 (Meniscus-Directed Assembly of Structured Films, Lines and Self-Contained Clusters From Microparticles, Nanoparticles and Biomolecules).
29. 13th IACIS International Conference on Surface and Colloid Science and the 83rd ACS Colloid & Surface Science Symposium, New York, NY, June 2009 (Field-Driven Assembly And Gelation of Janus And Dipolar Particles).
30. Proctor and Gamble Research Center, Cincinnati, OH, June 2009 (Classical colloids meet nanoscience: A new generation of particulate stabilizers for foams, emulsions and microcapsules).
31. Cabot Co., Boston, MA, May 2009 (Meniscus-Directed Assembly of Highly Structured Films, Lines and Self-Contained Clusters from Synthetic or Biological Particles).
32. First Triangle Soft Matter Workshop, Raleigh, NC, May 2009 (Colloidal Electronics: Electrically Active Structures from Water-Based Particles and Gels).

33. MRS National Spring Meeting; San Francisco, CA, April 2009 (Fabrication of Anisotropic Assemblies from Microspheres and Nanoparticles inside Suspended or Sessile Droplets).
34. Department of Chemical Engineering, The City College of New York, March 28, 2009 (On-chip Liquid and Particle Manipulation by AC Electric Fields: Applications in Colloidal Assembly and Microfluidics).
35. Colloid and Surfactant Science Basic Research Workshop, organized by the Army Research Office, Napa, CA, March 28, 2009 (Particle Structuring at Liquid Interfaces Used in Novel Materials and Functionalized Dispersions).
36. "Self-Assembled Soft-matter Nanostructures at Interfaces" Symposium, Technical University, Berlin, Germany, February 2009 (Meniscus-Directed Assembly of Highly Structured Films, Lines and Self-Contained Clusters from Synthetic or Biological Particles).
37. Department of Chemical Engineering, University of Delaware, February 2009 (On-chip Liquid and Particle Manipulation by AC Electric Fields: Applications in Colloidal Assembly and Microfluidics).
38. Department of Chemistry and Department of Mechanical Engineering and, University of Toronto, Toronto, Canada, December 2008 (On-chip Liquid and Particle Manipulation by AC Electric Fields: Applications in Colloidal Assembly and Microfluidics).
39. High-Tech Research Center Project Symposium, Meiji University, Tokyo, Japan, November 2008. (Electrical Chips in the Biological Domain: On-chip Collection of Cells, Assembly of Bionanomaterials and Bioassay Readout).
40. AFRL/RX Bio Review Meeting Arlington, VA November 2008 (Novel Types of Flexible Photovoltaic Cells Based on Aqueous Gels).
41. Department of Chemical Engineering, Northwestern University, Chicago, IL, October 2008 (On-chip Liquid and Particle Manipulation by AC Electric Fields: Applications in Colloidal Assembly and Microfluidics).
42. Cabot Directed Self-Assembly Conference, Stage Neck, Maine, September 2008 (Strategies for Directing and Controlling the Processes of Particle Assembly in Liquid Media).
43. 236th ACS National Meeting, Philadelphia, PA, August 2008 (Engineered colloidal assembly of biocomposite structures including nanoparticles, viruses and live cells).
44. Particles 2008 conference, Orlando, FL, May 2008 (**Plenary talk:** Janus Particles - Unusual Properties and Use as Components of Complex Anisotropic Materials).
45. Cabot Co., Boston, MA, March 2008 (Meniscus-Directed Assembly of Highly Structured Films, Lines and Self-Contained Clusters from Synthetic or Biological Particles).
46. Unilever Co., Port Sunlight, UK, March 2008 (Colloidal Engineering on a Chip: Fabrication and Manipulation of Complex Assemblies, Capsules and Self-propelling Particles).
47. Department of Mechanical Engineering, Arizona State University, February 2008 (On-chip Liquid and Particle Manipulation by AC Electric Fields: Applications in Microfluidics and Colloidal Assembly).

48. Department of Electrical Engineering, North Carolina State University, January 2008 (On-chip Liquid and Particle Manipulation by AC Electric Fields: Applications in Microfluidics, Bioassays and Colloidal Assembly).
49. Carolina Center of Cancer Nanotechnology Excellence, University of North Carolina – Chapel Hill, January 2008 (Electrical Chips in the Biological Domain: On-chip Collection of Cells, Assembly of Bionanomaterials and Bioassay Readout).
50. MRS National Fall Meeting, Boston, November 2008 (Meniscus-Directed Assembly of Highly Structured Films, Lines and Self-Contained Clusters from Particles or Biomolecules).
51. AIChE Annual Conference, Salt Lake City, UT, November 2008 (Classical Colloids Meet Nanoscience: New Classes of Particulate Stabilizers for Foams, Emulsions and Microcapsules).
52. Departments of Mathematics and Chemistry, Penn State University, State College, PA, October 2007 (On-chip droplet and particle manipulation by electric fields: Applications in microfluidics and colloidal assembly).
53. Department of Chemical Engineering, Auburn University, Auburn, AL, September 2007 (On-chip droplet and particle manipulation by electric fields: Application in microbioassays and microfluidic devices).
54. DOW Chemicals, Midland, MI, September 2007 (Droplet-based colloidal engineering: Scalable and controllable processes for fabrication and manipulation of complex particles and capsules).
55. Cabot Co., Boston, MA, September 2007 (Classical colloids meet nanoscience: New classes of particulate stabilizers for foams, emulsions and microcapsules).
56. Syngenta Co., Greensboro, NC, August 2007 (Classical colloids meet nanoscience: New classes of particulate stabilizers for foams, emulsions and microcapsules).
57. Associations in Solution, Engineering Conferences International, Il Chiocco, Italy, July 2007 (Electric field driven assembly of colloidal particles into one-, two- and three-dimensional functional structures).
58. 81<sup>st</sup> ACS Colloid and Surface Science Symposium, Newark, DE, June 2007 (*keynote*, Electrical microchips in the biocolloidal domain: On-chip assembly and detection of live cells and biological molecules).
59. Gordon Research Conference on Chemistry of Supramolecules & Assemblies, Il Ciocco, Italy, May 2007 (Convergence of electronics and colloids: Electronic devices as "smart" particles and particles as electronic devices).
60. MeadWestvaco Research Center, Raleigh, NC, May 2007 (Principles of operation and applications of microfluidic devices).
61. MRS National Spring Meeting; San Francisco, CA, April 2007 (Electric field driven assembly of anisotropic colloidal particles into two-dimensional and three-dimensional crystals of unusual symmetry).

62. Department of Chemical Engineering, University of Michigan, Ann Arbor, MI, March 2007 (On-chip droplet and particle manipulation by electric fields: Application in microbioassays and microfluidic devices).
63. Department of Mechanical Engineering, Massachusetts Institute of Technology, Boston, MA, March 2007 (On-chip droplet and particle manipulation by electric fields: Applications in microfluidics and colloidal assembly).
64. Department of Chemical and Biomolecular Engineering, Tulane University, New Orleans, LA, March 2007 (On-chip droplet and particle manipulation by electric fields: Application in microbioassays and microfluidic devices).
65. Department of Materials Science and Engineering, Cornell University, Ithaca, NY, March 2007 (Materials engineering on a Chip: Particle assembly and manipulation by electric fields).
66. Department of Physics, Indiana University, Bloomington, IN, February 2007 (On-chip micromanipulation and assembly of particles by electric fields).
67. DSRC-DARPA Programmable Matter Workshop, Washington DC, January 2007 (Electric field directed particle manipulation and assembly: Principles and applications).
68. MRS National Fall Meeting, Boston, December 2006 (Remotely powered "smart" particles, MEMS actuators and microfluidic pumps based on miniature semiconductor diodes).
69. Advanced Liquid Logic Inc., RTP, NC, November 2006 (On-chip droplet and particle manipulation by electric fields: Application in microbioassays and cell collection and assembly).
70. Department of Chemical Engineering, Rensselaer Polytechnic Institute, Albany, NY, October 2006 (On-chip droplet and particle manipulation by electric fields: Application in microbioassays and microfluidic devices).
71. Department of Chemical Engineering, University of Oklahoma, Norman, OK, September 2006 (On-chip droplet and particle manipulation by electric fields: Application in microbioassays and microfluidic devices).
72. Environmental Protection Agency (EPA), August 2006 (What makes the nanoparticles an unusual form of matter?).
73. Proctor and Gamble Research Center, Cincinnati, OH, August 2006 (Classical colloids meet nanoscience: A new generation of particulate stabilizers for foams, emulsions and microcapsules).
74. Pan American Advanced Study Institute Summer School, San Jose, Costa Rica, June 2006. (Lectures on dielectrophoresis, microfluidics, DEP assembly of nanoparticles and manipulation of droplets).
75. Particles 2006 Conference, Orlando, FL, May 2006. (Colloidal assembly extended into the biomaterials domain: Composite coatings and membranes from live cells)
76. 3M Company, St. Paul, MN, May 2006. (Droplet-based colloidal engineering: Examples of scalable and controllable particle fabrication processes)



77. Sandia National Laboratory, Livermore, CA, April 2006 (On-chip droplet and particle manipulation by electric fields: Application in microbioassays and cell collection and assembly).
78. MRS National Spring Meeting; San Francisco, CA, April 2006. (On-chip manipulation by electric fields: From self-assembling particles to self-propelling devices)
79. ACS National Spring Meeting, Atlanta, GA, April 2006 (2 invited talks - Evaporation-driven mixing and microseparations in droplets on a chip: Fundamentals and applications in materials synthesis and bioassays & Dielectrophoretic assembly of bionanocomposite materials from live cells and functionalized particles).
80. Department of Materials Science, Massachusetts Institute of Technology, Boston, MA, March 2006. (On-chip droplet and particle manipulation by electric fields: Application in microbioassays and self-propelling devices)
81. Department of Chemical Engineering, Virginia Tech., Blacksburg, VA, March 2006. (On-chip droplet and particle manipulation by electric fields: Application in microbioassays and self-propelling devices)
82. Gordon Research Conference on Colloidal, Macromolecular & Polyelectrolyte Solutions, Ventura, CA, February 2006. (On-chip manipulation and assembly of nanoparticles, microparticles and live cells by electric fields)
83. Nanobiotechnology in North Carolina meeting, RTP, NC, January 2006. (Assembly of bionanocomposite materials from live cells and functionalized particles)
84. Nisshin Engineering Particle Technology International Seminar (NEPTIS 14), Hakone, Japan, December 2005 (Controlled deposition of functional nano- and microparticle coatings for photonics, electronics and biotechnology applications).
85. Association of Powder Process Industry and Engineering Seminar, Kyoto, Japan, December 2005 (Droplet-based colloidal engineering: Examples of scalable and controllable particle fabrication processes).
86. Department of Chemical Engineering, University of Notre Dame, IN, November 2005 (On-chip electric field manipulation and assembly of nanoparticles, live cells and droplets).
87. China/USA/Japan Joint Chemical Engineering Conference, Beijing, China, October 2005 (**keynote**, Electrically controlled microchips for manipulation and assembly of nanostructures and biomaterials).
88. Department of Chemistry, University of Sofia, Sofia, Bulgaria, July 2005 (Colloidal engineering on a chip: Examples of nanoscience research and education directions in USA).
89. 79<sup>th</sup> ACS Colloid and Surface Science Symposium, Potsdam, NY, June 2005 (**keynote**, Strategies for on-chip assembly of sensors and biomaterials from live cells).
90. 1<sup>st</sup> International Network of Emerging Science and Technologies Meeting on Droplet NanoEngineering, Philip Morris USA, Williamsburg, VA, May 2005 (Droplet-based colloidal engineering: examples of scalable and controllable particle fabrication processes).
91. MRS National Spring Meeting, San Francisco, CA, March 2005 (Strategies for assembly of live cells into biocomposite coatings and membranes).

92. ACS National Spring Meeting, San Diego, CA, March 2005 (Scalable synthesis, alignment and applications of a new class of polymer microrods).
93. Department of Chemistry and Center for Nanotechnology, University of Washington, WA, May 2005 (On-chip dielectrophoretic manipulation and assembly of nanoparticles, live cells and droplets).
94. Sandia National Laboratory, Albuquerque, NM, May 2005 (Controlled assembly of materials and devices from nanoparticles, microparticles and live cells).
95. Department of Chemistry & Chemical Biology, Stevens Institute of Technology, NJ, April 2005 (On-chip manipulation and assembly of nanoparticles, microparticles and live cells).
96. General Electric Inc., Albany, NY, January 2005 (Assembly of materials and devices from nanoparticles, microparticles and live cells).
97. MRS National Fall Meeting, Boston, MA, December 2004 (On-chip electric field driven assembly of microparticles, nanoparticles and live cells).
98. ACS National Spring Meeting, Anaheim, CA, April 2004 (2 talks: Colloidal assembly as a toolbox for biomolecular organization and electric interfacing & On-chip manipulation of droplets for assembly of microparticle and nanoparticle structures).
99. Workshop on Field-Assisted Nanocolloid Self-Assembly, University of Twente, Enschede, The Netherlands, November 2004 (On-chip manipulation and assembly of nanoparticles, microparticles and live cells).
100. ACS PRF Summer School on Nanoparticle Materials, Ypsilanti, MI, June 2004 (2 talks: Controlled deposition of functional nanocoatings & On-chip electric field driven assembly of micro- and nanoparticles).
101. NIEHS Nanotechnologies workshop, RTP, April 2004 (Nanostructure based on-chip devices for chemical and biological detection).
102. Meeting of the North Carolina IEEE Chapter, RTP, January 2004 (On-chip assembly of nanoparticle structures with electric, photonic and biosensing functionality).
103. Department of Chemical Engineering, University of Florida, FL, December 2004 (On-chip manipulation and assembly of nanoparticles, microparticles and droplets).
104. Department of Polymer Science & Engineering, University of Massachusetts, Amherst, MA, October 2004 (On-chip dielectrophoretic manipulation and assembly of nanoparticles, microparticles and droplets).
105. Department of Chemistry, Rice University, TX, October 2004 (On-chip dielectrophoretic manipulation and assembly of nanoparticles, microparticles and droplets).
106. School of Engineering, Duke University, September 2004 (On-chip manipulation and assembly of nanoparticles, droplets and live cells).
107. Department of Chemistry, University of Hull, Hull, UK, June 2004 (2 seminars: Formation of anisotropic particles in droplets & On-chip droplet microfluidics).
108. Department of Chemical Engineering, Ohio State University, OH, June 2004 (On-chip dielectrophoretic manipulation and assembly of nanoparticles, droplets and live cells).

109. Department of Chemical Engineering, Princeton University, NJ, April 2004 (On-chip manipulation and assembly of nanoparticles, microparticles and droplets).
110. KODAK Inc., Rochester, NY, December 2004 (3 seminars on the fundamentals and application of electric fields in microfluidics).
111. Unilever Research and Development Center, Vlaardingen, Netherlands, November 2004 (Development of new tools for making and studying foams, emulsions and coatings).
112. MRS National Fall Meeting, Boston, MA, December 2003 (2 invited talks: Tools for fast and controllable fabrication of photonic structures via particle self-assembly & On-chip electric field driven assembly of microparticles, nanoparticles and live cells).
113. AIChE Annual Conference, San Francisco, CA, October 2003 (On-chip manipulation and assembly of nano- and microparticles).
114. 2003 Composites at Lake Louise Meeting, Lake Louise, Canada (*keynote*, Templated assembly of composite materials with photonic and electronic functionality).
115. ACS National Annual Meeting, New York, NY, September 2003 (On-chip dielectrophoretic manipulation and assembly of nanoparticles, microparticles and droplets).
116. ACCGE Conference, Keystone, CO, July 2003 (Tools for fast and controllable crystallization of microparticles).
117. NSF Workshop on Fundamental Research Needs in Photonic Materials Synthesis and Processing at the Interface, Rochester, NY, April 2003 (Fast and controllable fabrication of photonic structures via particle self-assembly).
118. Department of Chemical Engineering, University of California at Santa Barbara, CA, October 2003 (On-chip manipulation and assembly of nanoparticles, microparticles and droplets).
119. Army Research Laboratory (ARL), Maryland, December 2003 (Rapid and controllable fabrication of photonic and electronic structures via particle self-assembly).
120. Air Force Research Laboratory (AFRL), Dayton, OH, July 2003 (Novel tools for rapid controlled assembly of nanoparticles, microparticles and droplets).
121. MCNC – Research and Development institute, RTP, North Carolina, April 2003 (Fabrication of photonic and electronic structures via particle self-assembly)
122. 77<sup>th</sup> ACS Colloid and Surface Science Symposium, Atlanta, GA, June 2002 (Electrostatic manipulation of freely suspended droplets in a novel lab-on-a-chip system).
123. AIChE Annual Conference, Indianapolis, IN, November 2002 (On-chip electric field driven particle manipulation and assembly).
124. 18<sup>th</sup> Conference on Crystal Growth and Epitaxy West, Stanford Sierra Camp, CA, June 2002 (Controlled assembly of colloidal crystals in two and three dimensions).
125. 76<sup>th</sup> ACS Colloid and Surface Science Symposium, Ann Arbor, MI, June 2002 (*keynote*, On-chip assembly of structures from metallic and dielectric particles).
126. MRS National Spring meeting, San Francisco, April 2002 (On-chip colloidal assembly of electrically functional structures via dielectrophoresis).

127. Department of Chemical Engineering, Yale University, NH, October 2002 (Functional materials and devices via electrically driven assembly of colloidal particles).
  128. Department of Chemical Engineering, University of Houston, TX, October 2002 (Functional materials and devices via electrically driven assembly of colloidal particles).
  129. Department of Chemistry, University of Chapel Hill, NC, September 2002 (Functional microstructures and devices via controlled nanoparticle assembly).
  130. Department of Chemical Engineering, University of New Mexico, NM, April 2002 (Functional microstructures and devices via controlled nanoparticle assembly).
  131. Department of Chemistry, Georgetown University, Washington DC, March 2002 (Functional materials and devices via electrically driven assembly of colloidal particles).
  132. KODAK Inc., Rochester, NY, December 2002 (Functional microstructures and devices via controlled nanoparticle assembly).
  133. Proctor and Gamble Research Center, Cincinnati, OH, May 2002 (Functional microstructures and devices via controlled nanoparticle assembly).
  134. Particles 2001 Conference, Orlando, FL, April 2001 (Colloidal engineering: Functional materials and devices via templated assembly).
  135. ACS National Spring Meeting, San Diego, CA, April 2001 (Synthesis and application of nanostructured metallic films templated by colloidal crystals).
  136. CIGS Meeting on Controlled Assembly of the Royal Society of Chemistry, London, UK, December 2001 (Functional materials and devices via templated assembly of colloidal particles).
  137. Westvaco R&D Center, Maryland, July 2001 (Templated assembly of nano- and microstructured materials and devices).
  138. Rohm and Haas Research Center, PA, June 2001 (Templated assembly of nano- and microstructured materials and devices).
  139. Honeywell Research, New Jersey, September 2001 (Templated assembly of photonic crystal materials and devices).
  140. MRS National Fall Meeting, Boston, MA, December 2000 (Novel materials and devices via templated assembly of colloidal particles).
  141. ARO workshop on Novel Methods for Materials Synthesis on the Nanoscale, Aberdeen, MD, September 2000 (Functional materials and devices via templated assembly of colloidal particles).
  142. DuPont Research Center, Wilmington, DE, April 2000 (Templated assembly of nano- and microstructured materials and devices).
  143. KRAFT Foods Research Center, Glenview, IL, September 1999 (Protein crystallization and interactions in solution).
- ***Earlier invited seminars: more than 20 presentations at national and international universities, 1994-2000.***

## **Regular contributed research presentations**

- AIChE Annual Conference, Nashville, TN, November 2009 (2 talks: Superstabilization and Functionalization of Foams and Emulsions by Particles with Engineered Structure and Properties *and* Programmable Microfluidic Materials with Controlled Shape, Stiffness and Color).
- AIChE Annual Conference, Philadelphia, PA, November 2008 (2 talks: Scalable Meniscus-Directed Fabrication of Assemblies from Microspheres and Nanoparticles on Hydrophobic and Superhydrophobic Surfaces *and* Dielectrophoretic Assembly of New Colloidal Structures from Janus and Patchy Metallodielectric Particles).
- 236th ACS National Meeting, Philadelphia, PA, August 2008 (Remotely powered distributed microfluidic pumps and mixers based on miniature diodes).
- AIChE Annual Conference, Salt Lake City, UT, November 2007 (2 talks: AC Electrohydrodynamic Mobility and Dielectrophoretic Assembly of "Janus" Particles *and* Co-Assembly Of Biocomposite Materials From Live Cells And Inorganic Particles Using Dielectrophoresis On A Chip).
- MRS National Spring Meeting; San Francisco, CA, April 2007 (Engineering of nanocoatings and wires from aligned viruses and structured particles).
- 80<sup>th</sup> ACS Colloid and Surface Science Symposium, Boulder, CO, June 2006 (Electroosmotic self-propelling particles and distributed microfluidic pumps based on miniature semiconductor diodes).
- Pacifichem 2005 conference, Hawaii, December 2005 (2 talks: Engineered deposition of functional micro- and nanoparticle coatings from water and alternative solvents & Assembly of complex nanoparticle structures and microbioassays in dielectrophoretically controlled droplet reactors).
- AIChE Annual Conference, Cincinnati, OH, November 2005 (2 talks: Self-propelling semiconductor devices demonstrate new electroosmotic motility principles & Graduate and undergraduate teaching of colloid science and nanoscale engineering - combining fundamentals with emerging technologies).
- 79<sup>th</sup> ACS Colloid and Surface Science Symposium, Potsdam, NY, June 2005 (Controlled deposition and modification of conductive and antireflective nanoparticle coatings).
- MRS National Spring meeting, San Francisco, CA, April 2005 (Assembly of complex microparticle and nanoparticle structures in on-chip microdroplet reactors).
- ACS National Spring Meeting, San Diego, CA, March 2005 (Engineering of SERS substrate structure for chemical sensors: Role of micro- and nanoporosity).
- AIChE Annual Conference, Austin, TX, November 2004 (2 talks: Engineered colloidal assembly of live cells into biocomposite coatings, membranes and "wires" & New class of polymer microrods: Synthesis, properties and applications).
- AIChE Annual Conference, San Francisco, CA, October 2003 (2 talks: Dielectrophoretic manipulation of freely suspended droplets for microfluidic applications & New nanoscience concentration at NCSU department of chemical engineering).

- MRS National Spring meeting, San Francisco, CA, April 2003 (On-chip electrical circuits via nanoparticle assembly).
- AIChE Annual Conference, Indianapolis, IN, November 2002 (Oriented and switchable two-dimensional photonic crystals via dielectrophoresis).
- AIChE Annual Conference, Reno, November 2001 (Dielectrophoretic assembly of electrically functional microwires from nanoparticle suspensions).
- *28 presentations at earlier scientific meetings: 1993-2000.*

### **Contributed research presentations by students, post-docs and collaborators**

- American Institute of Chemical Engineers, Minneapolis, MN, October 2011 (Talks by Elena Blanco and Rachita Sharma).
- 85th ACS Colloid and Surface Science Symposium, Toronto, Canada, June 2011 (Talks by Elena Blanco and Stephanie Lam).
- 2011 Korean-American Science, Engineering, and Medicine South-Atlantic Regional Conference, October 2011 (Poster by Hyung Jun Koo).
- ICEIN 2011 - EPA Nano Grantees Conference, Duke University, May 2011 (poster by Alexander Richter).
- MRS National Spring Meeting; San Francisco, CA, April 2011 (Talk & poster by Hyung-Jun Koo).
- APS Annual Meeting, Dallas, TX, April, 2011 (Talk by Rachita Sharma).
- MRS National Fall Meeting; Boston, MA, November 2011 (Talk by Ju-Hee So).
- AIChE Annual Conference, Salt Lake City, UT, November 2010 (2 talks by Stoyan Smoukov, talk by Vinayak Rastogi).
- 1<sup>st</sup> Annual IGRTG meeting on Self-Assembled Soft Matter at Interfaces, Dollnsee, Germany, July 2010 (Poster by Stephanie Lam).
- 84<sup>th</sup> ACS Colloid and Surface Science Symposium, Akron, OH, June 2010 (Talk & poster by Hyung-Jun Koo, talk by Burak Ucar)
- MRS National Spring Meeting; San Francisco, CA, April 2010 (2 talks by Jairus Kleinert, talk by Jessica Jenkins).
- AIChE Annual Conference, Nashville, TN, November 2009 (talks by Sumit Gangwal and Amit Goyal, poster by Sumit Gangwal).
- 238th ACS National Meeting, Washington, DC, August 2008 (talk by Jessica Jenkins).
- 14th UK Polymer Colloids Forum, University of Hull, September 2009 (talks by Elizabeth Melvin and Jairus Kleinert).

- 13th IACIS International Conference on Surface and Colloid Science and the 83rd ACS Colloid & Surface Science Symposium, New York, NY, June 2009 (talks by Sumit Gangwal, Jairus Kleinert and Dimiter Petsev, posters by Sumit Gangwal and Jairus Kleinert).
- MRS National Spring Meeting; San Francisco, CA, April 2009 (2 talks by Stoyan Smoukov, 2 talks by Suk Tai Chang, 1 talk and 1 poster by Vinayak Rastogi).
- AIChE Annual Conference, Salt Lake City, UT, November 2007 (2 talks by Stoyan Smoukov, talks by Amit Goyal and Dimiter Petsev, 2 posters by Jairus Kleinert, poster by Robert Bradley).
- 82<sup>nd</sup> ACS Colloid and Surface Science Symposium, Raleigh, NC, June 2008 (10 talks by Lindsey Jerrim, Vinayak Rastogi, Sumit Gangwal, Stoyan Smoukov, Suk Tai Chang, Sejong Kim-2, Bridgette Budhlall, Carol Hall, Vesselin Paunov, 7 posters by Elizabeth Lynch, Suk Tai Chang-2, Sumit Gangwal, Jairus Kleinert, Amar B. Pawar).
- ELKIN 2008 conference, Santa Fe, NM, May 2008 (talk by Martin Bazant).
- Unilever Co., Port Sunlight, UK, March 2008 (talk by Sejong Kim).
- Zing Conference in Microfluidics & Nanofluidics 2008, Cancun, Mexico, February 2008 (talk by Antonio Garcia).
- AIChE Annual Conference, Salt Lake City, UT, November 2007 (2 talks by Carol Hall *and* Dimiter Petsev).
- Surfactant and Colloid Group Workshop, Department of Chemistry, University of Hull, Hull, United Kingdom, September 2007 (2 talks by Sumit Gangwal and Vinayak Rasogi).
- 81<sup>st</sup> ACS Colloid and Surface Science Symposium, Newark, DE, June 2007 (4 talks by Lindsey Jerrim, Vinayak Rastogi, Sumit Gangwal and Suk Tai Chang, poster by Suk Tai Chang).
- MRS National Spring Meeting; San Francisco, CA, April 2007 (3 talks by Suk Tai Chang, Sonia Grego and Shalini Gupta, 2 Posters by Suk Tai Chang and Vesselin Paunov).
- AIChE Annual Meeting, San Francisco, CA, USA (November 2006, talk and poster by Daniel Kuncicky, talk by Amit Goyal).
- 80<sup>th</sup> ACS Colloid and Surface Science Symposium, Boulder, CO, June 2006 (6 talks presented by Daniel Kuncicky-2, Brian Prevo, Hartmut Wege, Brian Prevo and Bridgette Budhlall).
- Gordon Research Conference on Colloidal, Macromolecular & Polyelectrolyte Solutions, Ventura, CA, February 2006 (poster presented by Suk Tai Chang)
- AIChE Annual Conference, Cincinnati, OH, November 2005 (2 talks presented by Brian Prevo and Shalini Gupta, poster presented by Shalini Gupta - *wins 2<sup>nd</sup> poster award*).
- MRS National Fall Meeting, Boston, MA, December 2005 (poster presented by Daniel Kuncicky).
- 79<sup>th</sup> ACS Colloid and Surface Science Symposium, Potsdam, NY, June 2005 (3 talks presented by Ketan Bhatt, Suk Tai Chang and Vesselin Paunov).
- Gordon Research Conference on Chemistry of Supramolecules and Assemblies, Waterville, ME June 2005 (poster presented by Lindsey Jerrim).

- MRS National Spring Meeting, San Francisco, CA, April 2005 (2 talks presented by Brian Prevo and Vesselin Paunov).
- MRS National Fall Meeting, Boston, MA, December 2004 (2 talks presented by Rossitza Alargova and Vesselin Paunov).
- AIChE Annual Conference, Austin, TX, November 2004 (2 talks presented by Ketan Bhatt).
- ACS National Annual Meeting, Philadelphia, PA, September 2004 (talk presented by Daniel Kuncicky).
- 78<sup>th</sup> ACS Colloid and Surface Science Symposium, Yale, NH, June, 2004 (4 talks presented by Brian Prevo, Shalini Gupta, Rossitza Alargova and Vesselin Paunov, 2 posters presented by Brian Prevo and Shalini Gupta).
- Particles 2004 conference, Miami, Florida, April 2004 (talk presented by Shalini Gupta).
- MRS National Fall Meeting, Boston, MA, December 2003 (talk presented by Rossitza, 2 posters from Brian Prevo and Jie Tang).
- AIChE Annual Conference, San Francisco, CA, October 2003 (2 talks presented by Brian Prevo and Plamen Atanassov).
- Joint Service Scientific Conference on Chemical and Biological Defense Research, Towson, MD, November 2003 (talk presented by Daniel Kuncicky).
- Gordon Research Conference on Chemistry of Supramolecules and Assemblies, Andover, NH, June 2001 (2 posters presented by Ketan Bhatt).
- 77<sup>th</sup> ACS Colloid and Surface Science Symposium, Atlanta, GA, June 2002. (talk and poster presented by Ketan Bhatt).
- MRS National Spring Meeting, San Francisco, CA, April 2003 (2 talks presented by Brian Prevo and Simon Lumsdon, poster presented by Simon Lumsdon).
- AIChE Annual Conference, Indianapolis, IN, November 2002 (talk presented by Peter Tessier, poster presented by Brian Prevo).
- Trends in Nanotechnology Conference, Santiago de Compostela, Spain, September 2002 (poster presented by Ketan Bhatt).
- ACS National Spring 2002 Meeting, Orlando, April 2002 (talk and poster presented by Simon Lumsdon).
- Gordon Research Conference, Ventura, CA December 2001 (2 posters presented by Simon Lumsdon)
- AIChE Annual Conference, Reno, November 2001 (2 talks presented by Peter Tessier).
- *Tens of earlier presentations 1992-2000.*

**Awards to graduate and undergraduate researchers advised by Velev**



- Andrew Tibbits, 2<sup>nd</sup> Place Poster Presentation winner, Environmental Section, American Institute of Chemical Engineers, Minneapolis, MN, October 2011.
- Hyung Jun Koo, 3<sup>rd</sup> Place Poster Presentation winner, 2011 Korean-American Science, Engineering, and Medicine South-Atlantic Regional Conference, October 2011.
- Rachita Sharma, 1<sup>st</sup> Place Poster Presentation winner, Schoenborn Competition within CBE Department, NC State University, Raleigh, NC, January 2011.
- Vinayak Rastogi nominated for best paper award, AIChE 2010 annual meeting, Salt Lake City, November 2010.
- Hyung Jun Koo, 1<sup>st</sup> Place Poster Presentation winner, Schoenborn Competition within CBE Department, NC State University, Raleigh, NC, January 2010.
- A. Burak Ucar, 3<sup>rd</sup> Place Poster Presentation winner, Schoenborn Competition within CBE Department, NC State University, Raleigh, NC, January 2010.
- Hyung Jun Koo, 2<sup>nd</sup> place best poster award, 6th KSEA Young Generation Technical and Leadership Conference, Washington, DC, January 2010.
- Sumit Gangwal, 1<sup>st</sup> Place Poster Presentation winner in Electrophoresis Society Section, AIChE Annual Conference, Nashville, TN, November 2009.
- Garrett R. Swindlehurst, Best Poster on Materials Research, 18th Annual NC State University Undergraduate Research Symposium, Raleigh, NC, April 2009.
- Sumit Gangwal, 1st Place Poster Presentation winner, 4<sup>th</sup> Annual Graduate Student Research Symposium, NC State University, Raleigh, NC, March 2009.
- Vinayak Rastogi, 1<sup>st</sup> Place Oral Presentation winner, Schoenborn Competition within CBE Department, NC State University, Raleigh, NC, January 2009.
- Amit Goyal, 3<sup>rd</sup> Place Oral Presentation winner, Schoenborn Competition within CBE Department, NC State University, Raleigh, NC, January 2009.
- Sumit Gangwal, 2<sup>nd</sup> Place Poster Presentation winner, Schoenborn Competition within CBE Department, NC State University, Raleigh, NC, January 2009.
- Suk Tai Chang, 3<sup>rd</sup> Place Poster Presentation winner, Schoenborn Competition within CBE Department, NC State University, Raleigh, NC, January 2009.
- Jairus Kleinert, 3<sup>rd</sup> Place Poster Competition winner, American Institute of Chemical Engineering, Nanoscale Science and Engineering Forum, Philadelphia, PA, Nov. 2008.
- Robert Bradley, 2<sup>nd</sup> Place Poster Competition winner, American Institute of Chemical Engineering, Materials Division, Philadelphia, PA, Nov. 2008.
- Sumit Gangwal, 3<sup>rd</sup> Place Oral Presentation winner, invited talk, SofMatt 2008 Student Research Symposium, Raleigh, NC, June 2008.
- Sumit Gangwal, 2<sup>nd</sup> Place Poster Presentation winner, Schoenborn Competition within CBE Department, NC State University, Raleigh, NC, January 2008.

- Vinayak Rastogi, 3rd Place Poster Presentation winner, Schoenborn Competition within CBE Department, NC State University, Raleigh, NC, January 2007.
- Suk Tai Chang, 1st Place Poster Presentation winner, Schoenborn Competition within CBE Department, NC State University, Raleigh, NC, January 2006.
- Brian Prevo, 3<sup>rd</sup> Place Oral Presentation winner, Schoenborn Competition within CBE Department, NC State University, Raleigh, NC, January 2005.
- Shalini Gupta, 2<sup>nd</sup> Place Poster Presentation winner, NSEF, American Institute of Chemical Engineers, Cincinnati, OH, Fall 2005.

### **Publicity generated – coverage in the national and international mass media**

- *NCSU Press release and NCSU 2010 Chancellor's report*: “Thinking Big,” a story highlighting the formation of Xanofi, a NC State spinoff company based of Velev’ technology, April 2011.
- *MSNBC News*: “Microbots made to turn as they swim”, on Sharma & Velev upcoming APS Spring 2011 presentation, February 2011.
- *New Scientist*: “Microbots made to twist and turn as they swim”, on Sharma & Velev upcoming APS Spring 2011 presentation, February 2011.
- *IEEE Spectrum*: “Chemists Construct Squishy Memristors and Diodes”, covering Ju-Hee So’s presentation at the MRS Fall meeting 2010 with Koo, Dickey and Velev, December 2010.
- *NCSU press release on the J. Mater. Chem. paper*: “Mimicking Nature, Water-Based ‘Artificial Leaf’ Produces Electricity” September, 2010. Also listed as first selection on the 2010 NC State research highlights”, December 2010.
- *DISCOVER Magazine*: “Mimicking Nature, Water-Based ‘Artificial Leaf’ Produces Electricity” December, 2010.
- *Photonic spectra*: “Mimicking nature to build a better solar cell” December, 2010.
- *News and Observer, Raleigh, NC*: “Artificial 'leaf' from the lab makes energy” November, 2010.
- *Dong-a ilbo*, a major Korean newspaper highlights the gel photovoltaic paper in JMC, November 2010.
- *Chem. Eng. Progress*: “Water-Based “Artificial Leaf” Produces Electricity” November, 2010.
- *e! Science News*: “Mimicking Nature, Water-Based ‘Artificial Leaf’ Produces Electricity” *C&E News*: “Artificial Leaf’ Produces Electricity” October, 2010.
- *Highlight in Chemical Science (Royal Society of Chemistry)*: “Mimicking nature’s solar cells” October, 2010.
- *Science Daily*: “Mimicking Nature, Water-Based ‘Artificial Leaf’ Produces Electricity” September, 2010.
- *Physorg*: “Leaf-like solar cells: Water-Based ‘Artificial Leaf’ Produces Electricity” September, 2010.

- *The Epoch Times*: “Water-Based Artificial Leaf Produces Electricity” September, 2010.
- *nanowerk*: “Mimicking Nature, Water-Based ‘Artificial Leaf’ Produces Electricity” September, 2010.
- *Technology Daily*: “Mimicking Nature, Water-Based ‘Artificial Leaf’ Produces Electricity” September, 2010.
- *R&D Magazine*: “Mimicking Nature, Water-Based ‘Artificial Leaf’ Produces Electricity” September, 2010.
- *Physics News*: “Mimicking Nature, Water-Based ‘Artificial Leaf’ Produces Electricity” September, 2010.
- *Science magazine*: “Mimicking Nature, Water-Based ‘Artificial Leaf’ Produces Electricity” September, 2010.
- *Russian Chemical News*: “Yeastosomes – Artificial Multicellular Organisms” July 2010.
- *Advances in Advance (Wiley Interscience)*, features the paper "Materials of Controlled Shape and Stiffness ..." May 2009.
- *Nature Chemistry*: "Colloidal assemblies: Diffracting droplets" September 2008.
- *Science Daily*: "Nanoparticles made easy" September 2008.
- *PhysOrg.com*: "Nanoparticles made easy" September 2008.
- *Photonics.com*: "Nanoparticles made easy" September 2008.
- *EurekAlert! and e! Science News*: "Nanoparticles made easy" September 2008.
- *Discovery News*: "Stacking Nanoparticles with Jewel-like Results" July 2008.
- *Bio-Medicine*: "Nanoparticles made easy" July 2008.
- *Nanotechnology Now*: "Nanoparticles made easy" July 2008.
- *Nanowerk*: "Nanoparticles made easy" July 2008.
- *RDMag*: "Nanoparticles made easy" July 2008.
- *Technology News Daily*: "Nanoparticles, Arranging Nanoparticles" October 2008.
- *NCSU and COE press release on PRL paper*, "'Two-Faced' Particles Act Like Tiny Submarines in NC State Study," February 2008.
- *Science Daily*: 'Two-Faced' Particles Act Like Tiny Submarines, February 2008.
- *PhysOrg.com*: 'Two-Faced' Particles Act Like Tiny Submarines, February 2008.
- *Innovations Report*: 'Two-Faced' Particles Act Like Tiny Submarines in NC State Study, March 2008.
- *Medical News Today*: '2-Faced' Particles Act Like Tiny Submarines, March 2008.
- *Lab on a Chip*: Research Highlights - "Miniature semiconductor diodes act as self-propelling particles", April 2007.

- *DocuCinema/Reelz Channel* record an interview and short movies for the diode propelling work to be used in a TV show about scientific discovery, April 2007.
- *New Scientist*: "Diode Propulsion Could Power Microbots", story on self-propelling diode research, March 2007.
- *Vanguardia magazine, Ecuador* – a story on the microbots and microrobotics (in Spanish), March 2007.
- *Science Daily*: "Researchers Create Tiny Devices That Can Propel Themselves In Liquid, Perform Other Functions," March 2007.
- *DailyTech*: "Self-Propelled Diodes Could Traverse the Human Body," March 2007.
- *PhysOrg.com*: "Researchers Create Tiny, Self-Propelled Devices," March 2007.
- *NCSU press release on Nature materials* paper, "Researchers Create Tiny Devices That Can Propel Themselves in Liquid, Perform Other Functions," February 2007.
- *PRISM journal, American Society for Engineering Education*: "21<sup>st</sup> Century Professor," pp. 26-31, January 2007. Cover story by T. K. Grose features Velev among few other professors.
- *COE press release* on Velev and Genzer having cover illustrations and feature publications in RSC journals, May 2006.
- *Analytical Chemistry*, "Diving into Droplets" p. 1401, March 2006. Research perspective review including Velev research and opinions.
- *Science News*, vol. 167, p. 78, "Congealing useful oddballs", January 2005.
- *Homeland Protection Professional* magazine, Vol 4, No 4, p. 40 "The chip of things to come", highlight of the Velev droplet microassay technique, May 2005.
- *Micro/Nano R&D Magazine*, vol. 10, p. 1, "Micro billiards, anyone?" February 2005.
- *NC State alumni* magazine, p. 9, "Particle by Particle", Summer 2005.
- *Triangle Tech Journal*: "Researchers construct tiny, floating 'Eyeballs,' on microchips", February 2005.
- *PhysOrg.com*: "Researchers Construct Tiny, Floating 'Eyeballs,' 'Billiard Balls' on Microchip", January 2005.
- *Live Science: Image of the Day*, "Microscopic Eyes Are Shining", January 2005.
- *Science Daily*, "Researchers Construct Tiny, Floating 'Eyeballs,' 'Billiard Balls' on Microchip", January 2005.
- *Science Blog*: "Researchers Construct Tiny, Floating 'Eyeballs' on Microchip", January 2005.
- *Chemical Online*: "Researchers Construct Tiny, Floating 'Eyeballs,' 'Billiard Balls' On Microchip", January 2005.
- *AZoNano.com*: "Researchers Construct Tiny, Floating 'Eyeballs,' 'Billiard Balls' on Microchip", January 2005.

- *NCSU press release* on *Nature materials* paper, "Engineers Create Tiny, Floating Particles on Microchip", January 2005.
- *Science, Editor's Choice: Highlights of Recent Literature*, "Keeping One's Head" - *Langmuir* paper on microrod stabilization selected as a one of that week's highlighted papers, *Science*, vol. 306, 1104 (2004).
- *Materials Research News* highlights the *Langmuir* paper on microrod stabilization, MRS, November 2004.
- *NCSU Achieve Journal*, "Biomedical Research Tools: Microscopic Factory to Yield Lab Safety and Savings", August 2004.
- *Analytical Chemistry*, an ACS journal, highlights the *Nature* droplet microfluidics paper, February 2004.
- *COE press release* on Velev winning the DURIP award, 2004.
- *Science Daily*, "Researchers Manipulate Tiny, Floating Droplets on A Chip", news on the droplet microfluidics work, December 2003.
- *Nanobiotech News*, a national weekly newspaper, "Researchers Create Virtual Multiwell Plate that Could Analyze Live Cells and Molecules", December 2003.
- *Technology Research News* and *Technology Review* (MIT), "Chip Uses Oil to Move Droplets", December 2003.
- *Newswise*, "Researchers Manipulate Tiny, Floating Droplets on a Chip" press release on the *Nature* droplet microfluidics paper, December 2003.
- *Small Times*, a weekly nanotechnology report, "Researchers Devise Slick Lab-on-a-Chip", December 2003.
- *Science Blog*: "Researchers manipulate tiny, floating droplets on a chip", December 2003.
- *Innovations Report*, a German technology alert highlights the *Nature* droplet microfluidics paper, December 2003.
- *Sensor Technology Alert*, published by the Technical Insights division of Frost & Sullivan highlights the *Nature* droplet microfluidics paper, December 2003.
- *NCSU press release* on *Nature* droplet microfluidics paper, December 2003.
- *Nature News Service* "Chemists shrink beakers into drops", highlights of the 2003 Annual ACS Meeting in New York (out of nearly 7000 papers presented) September 2003.
- *NC State Achieve* press service "Microscopic Factory to yield lab safety and savings", highlights of NCSU biomedical research, July 2003.
- *Photonics Spectra*: "Dielectrophoresis builds photonic crystals", news feature on the *Appl. Physics Lett.* paper, April 2003.
- *NCSU and COE press releases* on Velev winning the CAREER award and the Ralph E. Powe new faculty award, May 2002 and April 2003.

- *Chemical and Engineering News: Chemical Highlights 2001*. Microwire work selected as one of the major scientific achievements of year 2001. December 2001.
- *Christian Science Monitor*: Story on microwires, November 2001.
- *BIZZ: Perspektiven*. Popular German journal runs a large two-page color photo and small story on microwire assembly. January 2002.
- *Popular Mechanics*: Photography and description of microwire assembly. February 2002.
- *Small Times*: Story on microwire assembly, February 2002.
- *Chemical and Engineering News: Science Highlights*. Microwire work described in the weekly science roundup. December 2001.
- *Scientific American*, "Gold Nanowires Grow on Their Own", November 2001.
- *Technology Research News*: Story on microwire assembly, November 2001.
- *NCSU press releases* on the Dreyfus New Faculty Award and *Science* microwire work, September and November 2001.
- *University of Delaware press release* on microwires, November 2001.
- ***More than 20 press releases and stories on the earlier research at the University of Delaware, 1998-2001.***

## INTELLECTUAL PROPERTY GENERATED

### *Patents*

- O. D. Velev, "Droplet Transportation Devices and Methods Having a Fluid Surface", *US Patent* 7,647,380, 2009.
- O. D. Velev and R. A. Alargova, "Process for Preparing Microrods Using Liquid-Liquid Dispersion", *US Patent* 7,323,540, January 2008.
- E. W. Kaler and O. D. Velev, "Miniaturized Biosensor Assembled from Colloidal Particles between Micropatterned Electrodes", *US Patent* 6,333,200, 2001.
- K. Nagayama and O. D. Velev, "Ordered Colloidal Clusters and Method for Their Fabrication", *Japanese patent*, H09-913, 1996.
- "Method for Measuring the Wetting Angles of Fine Particles", *Japanese patent*, H08-68742, 1995.
- "Set-up for Determining the Coating Quality of Textile Additives for Staple Fibers", *Bulgarian patent*, 91198, 1992.

### ***Provisional patents and patent applications***

- H. J. Barraza, S. Kim and O. Velev, "Modification of particulate-stabilized fluid-fluid interfaces", *Patent application*, Unilever/NCSU, 2009.

- O. D. Velev, S. Smoukov, M. Marquez, "Nanospinning of Polymer Fibers from Sheared Solutions," *Patent application*, NCSU, 2009.
- O. D. Velev, F. J. Renk, S.-T. Chang, G. Swindlehurst, R. O. Bradley, IV, "Photocurable Materials with Microfluidic Endoskeleton", *Provisional patent application*, NCSU, 2009.

***Invention disclosures - active***

- O. D. Velev, S. Smoukov, P. Geisen, M. Wright, S. Gangwal, "A continuous process for nanofiber fabrication based on shear and antisolvent-based polymer precipitation" *Invention disclosure*, NCSU, 2011.
- O. D. Velev, S. D. Stoyanov, V. N. Paunov, "New environmentally benign bactericidal nanoparticles from Ag+ infused biopolymers" *Invention disclosure*, NCSU, 2010.
- O. D. Velev, H.-J. Koo, S.-T. Chang, "Aqueous Soft Matter Based Photovoltaic Devices" *Invention disclosure*, NCSU, 2010.
- O. D. Velev, S. Smoukov, "Shear Nanospinning Process for the Fabrication of Inorganic Fibers and Nonwovens" *Provisional patent application*, NCSU, 2010.
- B. Branch, D. N. Petsev, O. D. Velev, S. Cramer "Analytes Focusing and Separation Based on Miniature Diodes Using a Combination of AC and DC Electric Fields" *Provisional patent application*, University of New Mexico, 2009.
- O. D. Velev, S. Gangwal, A. B. Ucar, F. J. Renk, "Color changing, heat-exchanging and infrared radiation controlling microfluidic materials for light and energy management", *Provisional patent application*, NCSU, 2009.
- H. J. Barraza, S. Kim and O. Velev, "Modification of particulate-stabilized fluid-fluid interfaces", *Invention disclosure, approved for patent filing*, NCSU, 2008.
- O. D. Velev, S.-T. Chang, G. Swindlehurst, R. O. Bradley, IV, "Materials of Controlled Shape and Stiffness with Photocurable Microfluidic Endoskeleton", *Invention disclosure, approved for patent filing*, NCSU, 2008.
- O. D. Velev, S. Smoukov, M. Marquez, "Efficient and Scalable Nanospinning Process for Shear-driven Spontaneous Formation of Micron-Diameter Fibers", *Invention disclosure, approved for patent filing*, NCSU, 2008.
- O. D. Velev et al., "Thermally Actuated Microfluidic Valves" *Invention disclosure*, NCSU, 2008.
- Q. Zhong, S. Kim, O. D. Velev, H. A. Wege, "Method for Formation of Superstable Foams and Emulsions Stabilized by Hydrophobic Cellulose", *Invention disclosure, approved for patent filing*, NCSU, 2007.
- O. D. Velev, O. J. Cayre and S.-T. Chang, "Polyelectrolyte Diode: Nonlinear Current Response of a Junction between Aqueous Ionic Gels," *Invention disclosure, approved for patent filing*, NCSU, 2007.
- O. D. Velev, D. N. Petsev and S.-T. Chang, "Microfluidic Pumps Based on Remotely Powered Miniature Diodes," *Invention disclosure, approved for patent filing*, NCSU, 2007.

## NATIONAL AND INTERNATIONAL SCIENTIFIC SERVICE

- Member of the Editorial Advisory Board, *Langmuir* (ACS), from January 2008 – present.
- Member of the Editorial Advisory Board, *Chemistry of Materials* (ACS), 2008 – present.
- Member of the Editorial Board, *Biomicrofluidics* (American Institute of Physics), 2006 – present.
- Section Editor “Colloidal Dispersions”, *Current Opinion in Colloid and Interface Science*, 2009 – present.

### *Served as Reviewer of manuscripts for the following scientific journals*

<i>Langmuir</i> *	<i>Nature</i>	<i>Science</i>	<i>Nature Mater.</i>
<i>J. Am. Chem. Soc.</i>	<i>Nano Lett.</i>	<i>Nature Nanotechnol.</i>	<i>Nature Photonics</i>
<i>Adv. Mater.</i>	<i>Soft Matter</i>	<i>Adv. Funct. Mater</i>	<i>Chem. Mater.</i>
<i>Proc. Nat. Acad. Sci.</i>	<i>Angew. Chem. Int. Ed.</i>	<i>Small</i>	<i>J. Mater. Chem.</i>
<i>Appl. Phys. Lett.</i>	<i>J. Appl. Phys.</i>	<i>Lab. Chip</i>	<i>J. Phys. Chem.</i>
<i>Phys. Rev. Lett.</i>	<i>Phys. Rev. E</i>	<i>Chem. Comm.</i>	<i>J. Fluid Mech.</i>
<i>CHEMPHYSCHEM</i>	<i>Chem. Phys. Lett.</i>	<i>Appl. Spectr.</i>	<i>Biotechnol. &amp; Bioeng.</i>
<i>Colloids Surf. A</i>	<i>J. Coll. Interface Sci.</i>	<i>Thin Solid Films</i>	<i>J. Membrane Sci.</i>
<i>J. Chem. Education</i>	<i>Macromol. R. Comm.</i>	<i>AIChE J.</i>	<i>Chem. Soc. Rev.</i>
<i>Biomicrofluidics</i>	<i>Austral. J. Chem.</i>	<i>Nanoscale</i>	<i>Materials Today</i>
<i>ACS Nano</i>	<i>Anal. Chem.</i>	<i>Inorganic Chem.</i>	

- Ranked as one of the top 20% of *Langmuir* reviewers in number and quality of reviews, 2009-2010.

### *Served as Reviewer of proposals for the following national and international funding agencies*

<i>National Science Foundation (NSF)</i>	<i>EPSRC - UK</i>
<i>Petroleum Research Fund (PRF)</i>	<i>IWT - Belgium</i>
<i>Army Research Office (ARO)</i>	<i>US - Israel Binational Science Foundation</i>
<i>Department of Energy (DOE)</i>	<i>FOM - Netherlands</i>



<i>National Research Council (NRC)</i>	<i>CRDF</i>
<i>National Aeronautics Space Admin. (NASA)</i>	<i>DEPSCoR - South Carolina</i>
<i>COBASE/National Academy of Sciences</i>	<i>US Department of Agriculture (USDA)</i>
<i>Research Corporation, US</i>	<i>Foundation for Polish Science</i>
<i>Israel Science Foundation</i>	<i>Swiss National Science Foundation</i>

## SERVICE TO PROFESSIONAL SOCIETIES AND ORGANIZATIONS

- Organizer (together with D. Gracias) of the session "Self-Assembly in Nano- and Micro-Systems" at the 86th ACS Colloid and Surface Science Symposium, Baltimore, MD, June 2012.
- Co-organizer of the Symposium MM: "Evaporative Self-Assembly of Polymers, Nanoparticles, and DNA" at the 2010 Spring MRS Meeting, San Francisco, CA, 2010.
- Organizer (together with D. Velegol) of the session "Fabrication of Colloidal Assemblies and Devices" at the 83<sup>rd</sup> ACS Colloid & Surface Science Symposium and 13<sup>th</sup> International Conference on Surface & Colloid Science, Columbia University, New York, NY, June 2009.
- Chair and Host (together with Peter K. Kilpatrick) the 82<sup>nd</sup> ACS (International) Colloid and Surface Science Symposium at North Carolina State University, June 2008. **A major national and international scientific event with more than 600 participants (<http://www.colloids2008.org/>).**
- Co-organizer of the Symposium P: "Materials and Strategies for Lab-on-a-Chip: Biological Analysis, Microfactories, and Fluidic Assembly of Nanostructures" at the 2007 Spring MRS Meeting, San Francisco, CA, 2007.
- Organizer of the session "Colloidal Nanoscience: From Fundamentals to Technology" at the 80<sup>th</sup> ACS Colloid and Surface Science Symposium, Boulder, CO, June 2006.
- Organizer of sessions 01C01 - "Self-Assembly in Solution I" and 01C02 - "Self-Assembly in Solution II" at the 2005 AIChE Annual Meeting, Cincinnati, OH, November 2004.
- Organizer of Symposium AA: "Dynamic, Self-Organizing Systems in Multifunctional Nanomaterials and Nanostructures" at the 2005 Spring MRS meeting, San Francisco, 2005.
- Member of the International Program Committee, 8<sup>th</sup> International Conference on Computer Science and Informatics (CSI 2005), Salt Lake City, July 2005.
- Organizer of sessions "Self-Assembly in Solution I", "Self-Assembly in Solution II" and "Self-Assembly in Solution III" at the 2004 AIChE Annual Meeting, Austin, TX, November 2004.
- Organizer of the session "Synthesis and Applications of Nanoparticles and Nanostructures" at the 78<sup>th</sup> ACS Colloid and Surface Science Symposium, New Haven, CT, June 2004.
- Organized a Research Triangle Area Workshop on "Anisotropic Colloidal Particles and Nanostructures," Raleigh, NC, December 2003.

- Organizer of Symposium Q: "Unconventional Approaches to Nanostructures with Applications in Electronics, Photonics, Information Storage, and Sensing" at the 2003 Spring MRS meeting, San Francisco, CA, 2003.
- Session chair at 20 scientific meetings, 2001-2010.