

## **Prof. Nikolai D. Denkov**

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Faculty of Chemistry and Pharmacy  
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### **Academic degrees:**

2007 – DSc in Physical Chemistry, Sofia University, Sofia, Bulgaria.  
1993 – PhD in Physical Chemistry, Sofia University, Sofia, Bulgaria.  
1987 – MSc in Chemical Physics and Theoretical Chemistry, Sofia University, Sofia, Bulgaria.

### **Academic career:**

2008 – present: Professor, Faculty of Chemistry, Sofia University  
2003-2004: Lead scientist, Unilever R&D, Edgewater NJ, USA (sabbatical leave)  
1998-2008: Associate Professor, Faculty of Chemistry, Sofia University  
1997-1998: Senior Research Associate, R&D Center, Rhone-Poulenc, France (sabbatical leave)  
1996-1997: Assistant Professor, Faculty of Chemistry, Sofia University.  
1994-1995: Research Associate, ERATO, JRDC, Tsukuba, Japan.  
1991-1994: Researcher, Faculty of Chemistry, Sofia University.

### **Research Interests:**

Physical chemistry and applications of disperse systems and surfactants:

- Surfactants, micellar solutions, adsorption, solubilization, detergency
- Formation, stability and rheology of emulsions
- Foam generation, rheology, and stability
- Antifoam effect of oils and oil-solid mixtures
- Surface forces, capillary phenomena and stability of thin liquid films
- Biophysics of food digestion and oral drug delivery

### **Publications:**

- 156 research papers, incl. *Nature* (2), *Nature Comm.* (1), *Phys. Rev. Lett.* (5), *Langmuir* (47), *Adv. Colloid Interface Sci.* (5), *Soft Matter* (4), 20 invited reviews in books and journals, cited > 6500 times, *h*-index = 43 (WoS)
- 10 patents - 6 international (WIPO, US, Europe), 1 German, 1 Japanese, 2 Bulgarian
- 74 lectures presented at International conferences and symposia (31 plenary or keynote)
- 66 invited seminars in foreign Universities and Research institutes
- 15 completed PhD Theses and 2 others under preparation

### **Teaching Courses:**

- Chemical Kinetics and Catalysis
- Intermolecular and Surface Forces
- Interfacial Phenomena and Stability of Dispersions
- Disperse Systems
- Separation Processes in Disperse Systems

**Professional and administrative service:**

2017-present: Head of Laboratory for active formulations and materials  
2017: Minister of science and education of Bulgaria  
2014-2016: Deputy minister of science and education of Bulgaria  
2014-present: Member, Editorial Board, Colloid & Interface Science Communications (Eslevier)  
2009-2015: Head, Department of Chemical Engineering, Faculty of Chemistry, Sofia University  
2009-2010: Member, National Scientific Commission for granting degrees in Chemical Sciences  
2008-2010: Member, National Scientific Council for granting degrees in Theoretical Chemistry  
2008-2009: Head, Laboratory of Chemical Physics and Engineering, Faculty of Chemistry  
2004-2008: Vice dean of the Faculty of Chemistry, Sofia University  
2011-2017: Member, ERC panel PE5 for evaluation of Consolidator Grants  
1998-present: Reviewer for numerous international journals and research funds

**Awards and fellowships:**

2018: Elected member of the Council of IACIS  
2016: Granted big award for high scientific achievements of Sofia University.  
2013: Granted Medal of Honor with blue ribbon by Sofia University for academic achievements.  
2010: Granted by the Bulgarian Ministry of Education and Science with the highest National award "Pythagoras" for scientific achievements.  
1995: Diploma by Japanese Research and Development Corporation (JRDC)

**Organizer of scientific events:**

2013: International school Structure and Dynamics of Liquid Foams, Orsay, France  
2010: 8th International conference Eufoam; Bugaria  
2010: Summer training school Physics of Droplets; Bulgaria  
2004: International conference Physics and Design of Foams; NJ, USA  
Member of the scientific committee of 7 international conferences

**Professional Societies:**

American Chemical Society (ACS)  
European Colloid and Interface Society (ECIS)  
International Association of Colloid and Interface Scientists (IACIS)

**Projects:**

2012-2015: Leader of the Bulgarian team, ERC project (EMATTER No 280078, in collaboration with the University of Cambridge)  
2009-2018: Member of the MC of 3 COST actions: MP1305 "Flowing Matter"; MP1106 "Smart and green interfaces" and P21 "Physics of Droplets"  
2011-2015: Member of the MC and WP leader in FP7-REGPOT project (BeyondEverest, No 286205, in collaboration with Univ. Cambridge, Univ. Barcelona, MPI Golm)  
2004-present: PI of 43 projects funded by international companies, incl. Unilever, BASF, Saint Gobain, Wacker, Dow Corning, Rhodia, Heineken.  
2014-2016: Negotiated with EC and started the implementation of the national Operational Program "Science and Education for Smart Growth", funded by ERDF (567 mln. Euro)

## List of Publications

### **A. Two-dimensional colloid crystals and capillary forces** (experimental and theoretical studies on the mechanism of colloid crystal formation in thin liquid films)

1. N. D. Denkov, O. D. Velev, P. A. Kralchevsky, I. B. Ivanov, H. Yoshimura and K. Nagayama, "Mechanism of Formation of Two-Dimensional Crystals from Latex Particles on Substrata", *Langmuir* **8** (1992) 3183.
2. V. N. Paunov, P. A. Kralchevsky, N. D. Denkov, I. B. Ivanov and K. Nagayama, "Capillary Meniscus Interaction between a Microparticle and a Wall", *Colloids Surfaces* **67** (1992) 119.
3. N. D. Denkov, O. D. Velev, P. A. Kralchevsky, I. B. Ivanov, H. Yoshimura and K. Nagayama, "Two-Dimensional Crystallization", *Nature* (London) **361** (1993) 26.
4. O. D. Velev, N. D. Denkov, V. N. Paunov, P. A. Kralchevsky and K. Nagayama, "Direct Measurement of Lateral Capillary Forces", *Langmuir* **9** (1993) 3702.
5. P. A. Kralchevsky, V. N. Paunov, N. D. Denkov, I. B. Ivanov and K. Nagayama, "Energetical and Force Approaches to the Capillary Interactions between Particles Attached to a Liquid-Fluid Interface", *J. Colloid Interface Sci.*, **155** (1993) 420.
6. V. N. Paunov, P. A. Kralchevsky, N. D. Denkov, K. Nagayama, "Lateral Capillary Forces between Floating Submillimeter Particles", *J. Colloid Interface Sci.* **157** (1993) 100.
7. G. S. Lazarov, N. D. Denkov, O. D. Velev, P. A. Kralchevsky, K. Nagayama, "Formation of Two-Dimensional Structures from Colloidal Particles on Fluorinated Oil Substrate", *J. Chem. Soc. Faraday Trans.* **90** (1994) 2077.
8. P. A. Kralchevsky, V. N. Paunov, N. D. Denkov, K. Nagayama, "Capillary Image Forces. I. Theory", *J. Colloid Interface Sci.* **166** (1994) 47.
9. O. D. Velev, N. D. Denkov, V. N. Paunov, P. A. Kralchevsky, K. Nagayama, "Capillary Image Forces. II. Experiment", *J. Colloid Interface Sci.* **166** (1994) 66.
10. P. A. Kralchevsky, V. N. Paunov, N. D. Denkov, K. Nagayama, "Stresses in Lipid Membranes and Interactions between Inclusions", *J. Chem. Soc.: Faraday Trans.* **91** (1995) 3415.
11. P. A. Kralchevsky, N. D. Denkov, "Analytical Expression for the Oscillatory Structural Surface Forces", *Chem. Phys. Lett.* **240** (1995) 385; N. D. Denkov, and P. A. Kralchevsky, "Colloid Structural Forces in Thin Liquid Films", *Progress Colloid Polymer Sci.* **98** (1995) 18.
12. N. D. Denkov, H. Yoshimura, K. Nagayama, T. Kouyama, "Nanoparticle Arrays in Freely Suspended Vitrified Films", *Phys. Rev. Lett.* **76** (1996) 2354.
13. N. D. Denkov, H. Yoshimura, K. Nagayama, "Method for Controlled Formation of Vitrified Films for Cryo-electron Microscopy", *Ultramicroscopy* **65** (1996) 147.
14. A. Hadjiiski, R. Dimova, N. D. Denkov, I. B. Ivanov and R. Borwankar, "Film Trapping Technique: Precise Method for Three-phase Contact Angle Determination of Solid and Fluid Particles of Micrometer Size", *Langmuir* **12** (1996) 6665.
15. N. D. Denkov, H. Yoshimura, T. Kouyama, J. Walz, K. Nagayama, "Electron Cryomicroscopy of Bacteriorhodopsin Vesicles: Mechanism of Vesicle Formation", *Biophys. J.* **74** (1998) 1409.

16. P. A. Kralchevsky, N. D. Denkov, K. D. Danov, "Particles with an Undulated Contact Line at a Fluid Interface: Interaction between Capillary Quadrupoles and Rheology of Particulate Monolayers", *Langmuir* **17** (2002) 7694.

**B. Emulsification** (mechanisms of drop breakup and drop-drop coalescence in different flow regimes).

17. N. C. Christov, D. N. Ganchev, N. D. Vassileva, N. D. Denkov, K. D. Danov, P. A. Kralchevsky, "Capillary Mechanisms in Membrane Emulsification: Oil-in-Water Emulsions Stabilized by Tween 20 and Milk Proteins", *Colloids & Surfaces A: Physicochem. Eng. Aspects* **209** (2002) 83-104.
18. S. Tcholakova, N. D. Denkov, D. Sidzhakova, I. B. Ivanov, B. Campbell, "Interrelation between drop size and protein adsorption at various emulsification conditions", *Langmuir* **19** (2003) 5640-5649.
19. S. Tcholakova, N. D. Denkov, T. Danner, "Role of surfactant type and concentration for the mean drop size during emulsification in turbulent flow", *Langmuir* **20** (2004) 7444-7458.
20. H. Steiner, R. Teppner, G. Brenn, N. Vankova, S. Tcholakova, N. Denkov, "Numerical simulation and experimental study of emulsification in a narrow-gap homogenizer", *Chem. Eng. Sci.* **61** (2006) 5841-5855.
21. S. Tcholakova, N. Vankova, N. D. Denkov, I. B. Ivanov, T. Danner, "Kinetics of drop breakup during emulsification in turbulent flow", Proc. 4<sup>th</sup> World Congress on Emulsions, Lyon, France, 3-6 October, 2006.
22. N. Vankova, S. Tcholakova, N. D. Denkov, I. B. Ivanov, V. D. Vulchev, T. Danner, "Emulsification in turbulent flow: 1. Mean and maximum drop diameters in inertial and viscous regimes", *J. Colloid Interface Sci.* **312** (2007) 363-380.
23. N. Vankova, S. Tcholakova, N. D. Denkov, V. D. Vulchev, T. Danner, "Emulsification in turbulent flow: 2. Breakage rate constants", *J. Colloid Interface Sci.* **313** (2007) 612-629.
24. S. Tcholakova, N. Vankova, N. D. Denkov, T. Danner, "Emulsification in turbulent flow: 3. Daughter drop-size distribution", *J. Colloid Interface Sci.* **310** (2007) 570-589.
25. S. Tcholakova, I. Lesov, K. Golemanov, N. D. Denkov, S. Judat, "Drop size in concentrated emulsions, obtained by rotor-stator homogenization", In *Proceedings of the 5th World Congress on Emulsions*, Lyon, France, 2010; Paper No. 1.1-53.
26. S. Tcholakova, N. D. Denkov, D. Hristova, M. Deruelle, "Emulsification and emulsion stability of silica-charged silicone oils", In *Proceedings of the 5th World Congress on Emulsions*, Lyon, France, 2010; Paper No. 4.1-50.
27. S. Tcholakova, I. Lesov, K. Golemanov, N. D. Denkov, S. Judat, R. Engel, T. Danner, "Efficient emulsification of viscous oils at high drop volume fraction", *Langmuir* **27** (2011) 14783-14796.
28. S. Tcholakova, N. Politova, N. Denkov. Kinetics of Drop Breakage and Drop-Drop Coalescence in Turbulent Flow. *Biomath Communications* **3** (2016) 1-163.
29. S. Tcholakova, Z. Valkova, D. Cholakova, Z. Vinarov, I. Lesov, N. D. Denkov, K. Smoukov. "Efficient Self-Emulsification via Cooling-Heating Cycles", *Nature Comm.*, **8** (2017) 15012.

30. Zh. Valkova, D. Cholakova, S. Tcholakova, N. Denkov, S. K. Smoukov. "Mechanisms and Control of Self-Emulsification upon Freezing and Melting of Dispersed Alkane Drops". *Langmuir* **33** (2017) 12155–12170.

### C. Coalescence and Flocculation Stability of Emulsions.

31. N. D. Denkov, P. A. Kralchevsky, I. B. Ivanov, C. S. Vassilieff, "Effect of Droplet Deformation on the Interactions in Microemulsions", *J. Colloid Interface Sci.* **143** (1991) 157.
32. N. D. Denkov, P. A. Kralchevsky, I. B. Ivanov, D. T. Wasan, "A Possible Mechanism of Stabilization of Emulsions by Solid Particles", *J. Colloid Interface Sci.* **150** (1992) 589.
33. M. Morita, M. Matsumoto, S. Usui, T. Abe, N. Denkov, O. D. Velev, I. B. Ivanov, "Interfacial Properties and Emulsion Stability in Fluorinated Oil - Nonfluorinated Oil - Surfactant(s) Systems", *Colloids Surfaces* **67** (1992) 81.
34. N. D. Denkov, D. N. Petsev, K. D. Danov, "Interaction between Deformable Brownian Droplets", *Phys. Rev. Lett.* **71** (1993) 3226.
35. K. D. Danov, D. N. Petsev, N. D. Denkov, R. Borwankar, "Pair Interaction Energy between Deformable Drops and Bubbles", *J. Chem. Phys.* **99** (1993) 7179.
36. K. D. Danov, N. D. Denkov, D. N. Petsev, I. B. Ivanov, R. Borwankar, "Coalescence Dynamics of Deformable Brownian Emulsion Drops", *Langmuir* **9** (1993) 1731.
37. O. D. Velev, A. D. Nikolov, N. D. Denkov, G. Doxastakis, V. Kiosseoglu, G. Stalidis "Investigation on the Mechanisms of Stabilization of Food Emulsions by Vegetable Proteins", *Food Hydrocolloids* **7** (1993) 55.
38. N. D. Denkov, D. N. Petsev, K. D. Danov, "Flocculation in Emulsions of Deformable Droplets. I. Droplet Shape and Line Tension Effects", *J. Colloid Interface Sci.* **176** (1995) 189.
39. D. N. Petsev, N. D. Denkov, P. A. Kralchevsky, "Flocculation in Emulsions of Deformable Droplets. II. Pair Interaction Energy", *J. Colloid Interface Sci.* **176** (1995) 201.
40. K. G. Marinova, R. G. Alargova, N. D. Denkov, O. D. Velev, D. N. Petsev, I. B. Ivanov, R. Borwankar, "Charging of Oil-Water Interfaces Due to Spontaneous Adsorption of Hydroxyl Ions", *Langmuir* **12** (1996) 2045.
41. I. B. Ivanov, K. G. Marinova, R. G. Alargova, N. D. Denkov, R. P. Borwankar, "Charge of Emulsion Droplets Covered with Nonionic Surfactants", *Proc. 2nd World Congress on Emulsion*, 23-26 September, 1997, Bordeaux, France; EDS: Paris, 1997; paper 2-2-149.
42. P. A. Kralchevsky, N. D. Denkov, K. D. Danov, D. N. Petsev, "Effect of Droplet Deformability and Surface Forces on Flocculation", *Proc. 2nd World Congress on Emulsion*, 23-26 September, 1997, Bordeaux, France; EDS: Paris, 1997; paper 2-2-150.
43. S. Tcholakova, N. D. Denkov, R. Borwankar, B. Campbell, "Van der Waals Interaction between Two Truncated Spheres Covered by a Uniform Layer (Drops, Vesicles, Bubbles)", *Langmuir* **17** (2001) 2357-2362.
44. S. Tcholakova, N. Denkov, I. Ivanov, B. Campbell, "Coalescence in Protein Stabilized Emulsions", *Proc. 3<sup>rd</sup> World Congress on Emulsions*, 24-27 September, 2002, Lyon, France.
45. N. Denkov, S. Tcholakova, I. Ivanov, B. Campbell, "Methods for Evaluation of Emulsion Stability at a Single Drop Level", *Proc. 3<sup>rd</sup> World Congress on Emulsions*, 24-27 September, 2002, Lyon, France.

46. S. Tcholakova, N. D. Denkov, I. B. Ivanov, B. Campbell, "Coalescence in  $\beta$ -Lactoglobulin Stabilized Emulsions: Effects of Protein Adsorption and Drop Size", *Langmuir* **18** (2002) 8960-8971.
47. P. S. Denkova, S. Tcholakova, N. D. Denkov, K. D. Danov, B. Campbell, C. Shawl, D. Kim, "Evaluation of the Precision of Drop-Size Determination in Oil/Water Emulsions by Low Resolution NMR Spectroscopy", *Langmuir* **20** (2004) 11402-11413.
48. S. Tcholakova, N. D. Denkov, I. B. Ivanov, R. Marinov, "Evaluation of short-term and long-term stability of emulsions by centrifugation and NMR", *Bulgarian J. Phys.* **31** (2004) 96-110.
49. S. Tcholakova, N. D. Denkov, D. Sidzhakova, I. B. Ivanov, B. Campbell, "Effects of electrolyte concentration and pH on the coalescence stability of  $\beta$ -lactoglobulin emulsions: Experiment and interpretation", *Langmuir* **21** (2005) 4842-4855.
50. K. Golemanov, S. Tcholakova, N. D. Denkov, T. Gurkov, "Selection of surfactants for stable paraffin-in-water dispersions, undergoing solid-liquid transition of the dispersed particles" *Langmuir* **22** (2006) 3560-3569.
51. S. Tcholakova, N. D. Denkov, D. Sidzhakova, B. Campbell, "Effect of thermal treatment, ionic strength, and pH on the short-term and long-term coalescence stability of  $\beta$ -lactoglobulin emulsions", *Langmuir* **22** (2006) 6042-6052.
52. N. Denkov, S. Tcholakova, I. Lesov, D. Cholakova, S. K. Smoukov. Self-Shaping of Oil Droplets via the Formation of Intermediate Rotator Phases upon Cooling. *Nature* **528** (2015) 392–395.
53. N. Denkov, D. Cholakova, S. Tcholakova, S. Smoukov. „On the Mechanism of Drop Self-Shaping in Cooled Emulsions“, *Langmuir* **32** (2016) 7985–7991.
54. D. Cholakova, N. Denkov, S. Tcholakova, I. Lesov, S. K. Smoukov, „Control of Drop Shape Transformations in Cooled Emulsions“, *Adv. Colloid Interface Sci.* **2016**, 235, 90–107.
55. N. Politova, S. Tcholakova, N. D. Denkov. "Factors Affecting the Stability of Water-oil-water Emulsion Films", *Colloids Surf. A* **522** (2017) 608–620.
56. D. Cholakova, Zh. Valkova, S. Tcholakova, N. Denkov, S. K. Smoukov. "'Self-Shaping" of Multicomponent Drops", *Langmuir* **33** (2017) 5696–5706.
57. P. A. Haas, R. E. Goldstein, S. K. Smoukov, D. Cholakova, N. Denkov, "Theory of Shape-Shifting Droplets", *Phys. Rev. Lett.*, **118** (2017) 088001.
58. R. Gordon, M. M. Hanczyc, N. D. Denkov, M. A. Tiffany, S. K. Smoukov, "Emergence of polygonal shapes in oil droplets and living cells: the potential role of tensegrity in the origin of life", in: *Habitability of the Universe Before Earth*, R. Gordon & A. Sharov eds., Academic Press, 2018, pp. 427-490.

#### **D. Mechanisms of Antifoaming.**

59. N. D. Denkov, P. Cooper, J.-Y. Martin, "Mechanisms of Action of Mixed Solid-Liquid Antifoams. 1. Dynamics of Foam Film Rupture", *Langmuir* **15** (1999) 8514.
60. N. D. Denkov, "Mechanisms of Action of Mixed Solid-Liquid Antifoams. 2. Stability of Oil Bridges in Foam Films", *Langmuir* **15** (1999) 8530.
61. N. D. Denkov, K. G. Marinova, C. Christova, A. Hadjiiski, P. Cooper, "Mechanisms of Action of Mixed Solid-Liquid Antifoams. 3. Exhaustion and Reactivation", *Langmuir* **16** (2000) 2515-2528.

62. E. Basheva, D. Ganchev, N. Denkov, K. Kasuga, N. Satoh, K. Tsujii, "Role of Betaine as Foam Booster in the Presence of Silicone Oil Drops", *Langmuir* **16** (2000) 1000.
63. N. D. Denkov, K. G. Marinova, "Antifoaming Action of Oils", Proceedings 3rd Euroconference on Foams, Emulsions, and their Applications, June, 2000, Delft, The Netherlands; Verlag MIT Publishing, Bremen, 2000, pp. 199-206.
64. E. S. Basheva, S. Stoyanov, N. D. Denkov, K. Kasuga, N. Satoh, K. Tsujii, "Foam Boosting by Amphiphilic Molecules in the Presence of Silicone Oil", *Langmuir* **17** (2001) 969-979.
65. K. G. Marinova, N. D. Denkov, "Foam Destruction by Mixed Solid-Liquid Antifoams in Solutions of Alkyl Glucoside: Electrostatic Interactions and Dynamic Effects", *Langmuir* **17** (2001) 2426-2436.
66. L. Arnaudov, N. D. Denkov, I. Surcheva, P. Durbut, G. Broze, A. Mehreteab, "Effect of Oily Additives on the Foamability and Foam Stability. 1. Role of Interfacial Properties." *Langmuir* **17** (2001) 6999-7010.
67. A. Hadjiiski, S. Tcholakova, N. D. Denkov, P. Durbut, G. Broze, A. Mehreteab, "Effect of Oily Additives on the Foamability and Foam Stability. 2. Entry Barriers." *Langmuir* **17** (2001) 7011-7021.
68. K. G. Marinova, N. D. Denkov, P. Branlard, Y. Giraud, M. Deruelle, "Optimal Hydrophobicity of Silica in Mixed Oil-Silica Antifoams", *Langmuir* **18** (2002) 3399.
69. K. G. Marinova, N. D. Denkov, S. Tcholakova, M. Deruelle, "Model Studies of the Effect of Silica Hydrophobicity on the Efficiency of Mixed Oil-Silica Antifoams", *Langmuir* **18** (2002) 8761-8769.
70. N. Denkov, S. Tcholakova, K. G. Marinova, A. Hadjiiski, "Role of Oil Spreading for the Efficiency of Mixed Oil-Solid Antifoams", *Langmuir* **18** (2002) 5810-5818.
71. N. Denkov, K. G. Marinova, S. Tcholakova, M. Deruelle, "Mechanism of Foam Destruction by Emulsions of PDMS-Silica Mixtures", Proc. 3<sup>rd</sup> World Congress on Emulsions, 24-27 September, 2002, Lyon, France; paper 1-D-199.
72. K. G. Marinova, S. Tcholakova, N. Denkov, S. Roussev, M. Deruelle, "Model Studies on the Mechanism of Deactivation (Exhaustion) of Mixed Oil-Silica Antifoams", *Langmuir* **19** (2003) 3084-3089.
73. K. G. Marinova, D. Christova, S. Tcholakova, E. Efremov, N. D. Denkov, "Hydrophobization of Glass Surface by Adsorption of Poly(dimethylsiloxane)" *Langmuir* **21** (2005) 11729-11737.

#### **E. Kinetic properties of dispersed surfactant micelles and solid particles.**

74. P. A. Kralchevsky, N. D. Denkov, I. B. Ivanov, A. D. Nikolov, "Attraction between Brownian Particles of Identical Charge in Colloid Crystals", *Chem. Phys. Lett.* **166** (1990) 452.
75. D. N. Petsev, N. D. Denkov, "Diffusion of Charged Colloidal Particles at Low Volume Fraction: Theoretical Model and Light Scattering Experiments", *J. Colloid Interface Sci.* **149** (1992) 329.
76. N. D. Denkov, D. N. Petsev, "Light Scattering and Diffusion in Suspension of Strongly Charged Particles", *Physica A* **183** (1992) 462.

77. D. N. Petsev, N. D. Denkov and K. Nagayama, "Diffusion and Light Scattering in Dispersions of Charged Particles with Thin Electrical Double Layers", *Chemical Physics* **175** (1993) 265.
78. P. A. Kralchevsky, Y. Radkov and N. Denkov, "Adsorption from Surfactant Solutions under Diffusion Control", *J. Colloid Interface Sci.* **161** (1993) 361.
79. J. T. Petkov, N. D. Denkov, K. D. Danov, O. D. Velev, R. Aust, F. Durst, "Measurement of the Drag Coefficient of Spherical Particles Attached to Fluid Interfaces", *J. Colloid Interface Sci.* **172** (1995) 147.
80. J. T. Petkov, K. D. Danov, N. D. Denkov, R. Aust, F. Durst, "Precise Method for Measuring the Shear Surface Viscosity of Surfactant Monolayers", *Langmuir* **12** (1996) 2650.
81. R. G. Alargova, J. T. Petkov, N. D. Denkov, D. N. Petsev, I. B. Ivanov, "Modification of Ultrafiltration Membranes by Deposition of Colloid Particles", *Colloids Surfaces A: Physicochem. Engin. Aspects* **134** (1998) 331.
82. P. D. Todorov, P. A. Kralchevsky, N. D. Denkov, G. Broze, A. Mehreteab, "Kinetics of Solubilization of *n*-Decane and Benzene by Micellar Solutions of Sodium Dodecyl Sulfate", *J. Colloid Interface Sci.* **245** (2002) 371.
83. N. C. Christov, N. D. Denkov, P. A. Kralchevsky, G. Broze, A. Mehreteab, "Kinetics of Triglyceride Solubilization by Micellar Solutions of Nonionic Surfactant and Triblock Copolymer: 1. The Empty and Swollen Micelles", *Langmuir* **18** (2002) 7880-7886.
84. P. A. Kralchevsky, N. D. Denkov, P. D. Todorov, G. S. Marinov, G. Broze, A. Mehreteab, "Kinetics of Triglyceride Solubilization by Micellar Solutions of Nonionic Surfactant and Triblock Copolymer: 2. Theoretical Model", *Langmuir* **18** (2002) 7887-7895.
85. P. D. Todorov, G. S. Marinov, P. A. Kralchevsky, N. D. Denkov, P. Durbut, G. Broze, and A. Mehreteab, "Kinetics of Triglyceride Solubilization by Micellar Solutions of Nonionic Surfactant and Triblock Copolymer: 3. Experiments with Single Drops", *Langmuir* **18** (2002) 7896-7905.
86. N. C. Christov, N. D. Denkov, P. A. Kralchevsky, K. P. Ananthapadmanabhan, A. Lips, "Synergistic Sphere-to-rod Micelle Transition in Mixed Solutions of Sodium Dodecyl Sulfate and Cocoamidopropyl Betaine", *Langmuir* **20** (2004) 565.
87. K.D. Danov, P.A. Kralchevsky, N.D. Denkov, K.P. Ananthapadmanabhan, A. Lips "Mass transport in micellar surfactant solutions: 1. Relaxation of micelle concentration, aggregation number and polydispersity", *Advances Colloid Interface Sci.* **119** (2006) 1-16.
88. K.D. Danov, P.A. Kralchevsky, N.D. Denkov, K.P. Ananthapadmanabhan, A. Lips, "Mass transport in micellar surfactant solutions: 2. Theoretical modeling of adsorption at a quiescent interface", *Advances Colloid Interface Sci.* **119** (2006) 17-33.
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10. N. Denkov, "Foam Control by Oil-Based Antifoams", *Eurofoam Conference*, 7-10 July, 2002, Manchester, UK – Plenary Lecture.
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28. N. D. Denkov, S. Tcholakova, "Physical chemistry of enzyme action in detergency", *International workshop "Grass stain removal"*, Port Sunlight, UK, 18 November, 2007 – invited lecture.

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42. N. D. Denkov, S. Tcholakova, T. Danner “Drop breakup and coalescence during emulsification: an old research problem with new technological perspectives”, International Workshop for the opening of the joint IP3 Laboratory between KIT and BASF, Karlsruhe Institute of Technology (KIT), Karlsruhe, 18 December, 2009 – invited lecture.
43. N. D. Denkov, S. Tcholakova, “Role of bubble surface properties and capillary forces for foam dynamics”, International Workshop “Inorganic Foams”, 28 January, 2010, Saint Gobin Research Center, Aubervilliers, France – invited lecture.
44. N. Denkov, S. Tcholakova, K. Golemanov, A. Lips “Viscous friction in sheared foams and emulsions”, *6<sup>th</sup> Annual European Rheology Conference AERC 2010*, 7-9 April, Gothenburg, Sweden – keynote lecture.
45. N. Denkov, S. Tcholakova, Z. Vinarov, S. Stoyanov, A. Lips “Enzymes in Digestion”, *Unilever Workshop “Enzymes in Challenging Environments”*, 2-3 February 2012, Liverpool, UK – invited lecture.
46. N. Denkov, S. Tcholakova, S. Stoyanov, A. Lips “Enzymes in Cleaning”, *Unilever Workshop “Enzymes in Challenging Environments”*, 2-3 February 2012, Liverpool, UK – invited lecture.
47. N. Denkov, S. Tcholakova, “Foam boosting by cosurfactants and polymers at low surfactant concentrations”, *Unilever Workshop “Dynamic Foams”*, 23 March 2012, Port Sunlight, UK – invited lecture.
48. N. Denkov, S. Tcholakova, “Role of surface forces in stabilization of foams and emulsions”, *Workshop of COST action CM1101 “Discussion on Hydration Forces”*, 1-4 April 2012, Sofia, Bulgaria.
49. N. Denkov, S. Tcholakova, “Surfactants and Polymers at Interfaces”, *SoftComp Annual Meeting*, 29-31 May, 2012, Heraklion, Crete, Greece – invited lecture.
50. N. Denkov, S. Tcholakova, “Rheology of steadily sheared foams – experimental facts and theoretical models”, *Eufoam 2012*, 8-11 July, 2012, Lisbon, Portugal.
51. N. Denkov, “Overview of antifoamers and defoamers”, *European Detergents Conference*, 23-24 October, 2012, Fulda, Germany – invited lecture.
52. N. Denkov, S. Tcholakova, “Physico-chemical model of Ostwald Coarsening”, *Infoamal Workshop*, 9-11 January, 2013, Paris, France.
53. N. Denkov, “Physico-chemical control of foam properties”, *AVANT Institute Symposium*, 18 April, 2013, Paris, France – invited lecture.
54. N. Denkov, Z. Vinarov, S. Tcholakova, “In-vitro models for assessment of bio-accessibility of hydrophobic nutrients and drugs”, *Training Course “Colloids and Medical Applications”*, 31 August - 1 September, 2013, Sofia, Bulgaria – invited lecture.

55. N. Denkov, Z. Vinarov, S. Tcholakova, “Role of nutrient components for bio-accessibility of cholesterol and lipid digestion products”, *Training Course “Colloids and Medical Applications”*, 31 August - 1 September, 2013, Sofia, Bulgaria – invited lecture.
56. N. Denkov, S. Tcholakova, “Physico-chemical control of foam properties”, *27<sup>th</sup> Conference of European Colloid and Interface Society (ECIS 2013)*, 2–6 September, 2013, Sofia, Bulgaria – keynote lecture.
57. N. Denkov, S. Tcholakova, Z. Vinarov, “Control of fat lipolysis by biophysical and physico-chemical approaches”, *Lorentz Center workshop: Biophysics, Biochemistry and Physiology of Fat Digestion*, 16-20 September, 2013, Leiden, The Netherlands – invited lecture.
58. N. Denkov, “Molecules at interfaces: molecular origin of surface tension, methods for measuring, surfactants, thermodynamics and kinetics of adsorption”, International school for PhD students *Structure and dynamics of liquid foams and their applications*, 3-9 November, 2013; Orsay, France.
59. N. Denkov, “Foam films: thermodynamics, surface forces, methods for investigation”, International school for PhD students *Structure and dynamics of liquid foams and their applications*, 3-9 November, 2013; Orsay, France.
60. N. Denkov, S. Tcholakova “Coalescence of bubbles and drops in foams and emulsions”, International school for PhD students *Structure and dynamics of liquid foams and their applications*, 3-9 November, 2013; Orsay, France.
61. N. Denkov, S. Tcholakova “Dissipative processes in sheared foams and role of interfacial rheology”, International school for PhD students *Structure and dynamics of liquid foams and their applications*, 3-9 November, 2013; Orsay, France.
62. N. Denkov, S. Tcholakova “Physico-chemical control of foam properties: 1. Foam rheology”, International school for PhD students *Structure and dynamics of liquid foams and their applications*, 3-9 November, 2013; Orsay, France.
63. N. Denkov, S. Tcholakova, Z. Mitrinova, K. Golemanov “Physico-chemical control of foam properties: 2. Ostwald ripening”, International school for PhD students *Structure and dynamics of liquid foams and their applications*, 3-9 November, 2013; Orsay, France.
64. N. Denkov, “Antifoams and defoamers: Composition, mechanisms and applications”, International school for PhD students *Structure and dynamics of liquid foams and their applications*, 3-9 November, 2013; Orsay, France.
65. N. Denkov, S. Tcholakova, I. Lesov “Foamed suspensions as precursors for production of porous materials with hierarchical pore-size distribution”, *15<sup>th</sup> International Workshop on Nanoscience and Nanotechnology*, 21-23 November, 2013; Sofia, Bulgaria – invited lecture.
66. N. Denkov, S. Tcholakova, “Foam as a dynamic network of microfluidic channels”, *Smart and Green Interfaces* annual conference 22-24 April, 2014; Marseille, France – keynote lecture.
67. N. Denkov “Link between surface rheology and foam dynamics”, International conference *Interfacial dynamics in foams and emulsions*, 19-20 June, 2014, Université Paris Sud, Orsay, France – invited lecture.

68. N. Denkov, S. Tcholakova, I. Lesov “Porous ceramic materials from foam precursors – design rules”, 88<sup>th</sup> ACS 2014 Colloid & Surface Science Symposium, 22-25 June, 2014; University of Pennsylvania, Philadelphia, PA, USA.
69. N. Denkov, Z. Vinarov, S. Tcholakova, S. Stoyanov “Physical chemistry and biophysics of fat digestion”, 88<sup>th</sup> ACS 2014 Colloid & Surface Science Symposium, 22-25 June, 2014; University of Pennsylvania, Philadelphia, PA, USA.
70. N. Denkov, S. Tcholakova, I. Lesov “Porous ceramic materials from foam precursors: design rules”, 10<sup>th</sup> Eufoam Conference, 7-10 July, 2014; University of Thessaloniki, Greece.
71. K. Golemanov, S. Tcholakova, N. Borisova, N. Denkov, E. Pelan, S. D. Stoyanov, “Interfacial rheological properties of saponin adsorption layers”, ”, *IACIS 2015*, 24/05/2015- 29/05/2015, Mainz, Germany, oral.
72. S. Tcholakova, N. Denkov, “Physico-chemical control of bubble Ostwald ripening in foams”, *ECIS 2015*, 06/09/2015-11/09/2015, Bordeaux, France, keynote lecture.
73. N. Denkov, Zh. Valkova, D. Cholakova, I. Lesov, S. Tcholakova, S. K. Smoukov, “Self-emulsification by Emulsion Cooling and Heating”, *International Workshop "Advanced Materials"*, 10/09/2017- 13/09/2017, Pomorie, Bulgaria, invited lecture.
74. N. Denkov, “Surfactants at Interfaces”, *Colloids and Complex Fluids for Energies*, 04/12/2017- 06/12/2017, Rueil-Malmaison, France, invited tutorial lecture.

**Invited Seminars**  
**in Foreign Universities and Research Institutes**

1. N. D. Denkov, P. A. Kralchevsky, O. D. Velev, I. B. Ivanov, K. Nagayama, "Mechanism of Two-dimensional Colloid Crystal Formation in Thin Liquid Films", Institute for Chemistry, Kyoto University, Kyoto, Japan; October, 1994.
2. N. D. Denkov, D. N. Petsev, K. Danov, "Flocculation and Coalescence in Miniemulsions", Colloid Society of Tsukuba, Tsukuba, Japan; December, 1994.
3. N. D. Denkov, H. Yoshimura, K. Nagayama, “Method for Controlled Formation of Vitrified Films for Cryo-electron Microscopy”, International Institute for Advanced Research (IIAR), Matsushita Electrical Industrial Co., Kyoto, Japan; March, 1995.
4. N. D. Denkov, H. Yoshimura, K. Nagayama, T. Kouyama, “Nanoparticle Arrays in Freely-suspended Vitrified Films”, Yanagida Biomotron Project (ERATO, JRDC) Osaka, Japan; March, 1995.
5. N. D. Denkov, H. Yoshimura, K. Nagayama, T. Kouyama, “Cryo-electron Microscopy of Bacteriorhodopsin Vesicles”, Max Planck Institute for Biochemistry, Munchen, August, 1995.
6. N. D. Denkov, P. A. Kralchevsky, I. B. Ivanov, K. Nagayama, "Formation of Ordered Two-dimensional Arrays of Solid Particles", Rhone Poulenc R&D Center (CRA), Paris, France, February 1996.

7. N. D. Denkov, "Antifoaming Effect of Silica-Silicon Oil Mixtures", Rhone Poulenc R&D Center (CRIT) Lyon, France, November 1996.
8. N. D. Denkov, "Optical Properties of Deposited Particulate Layers", Rhone Poulenc R&D Center (CRA), Paris, France, February 1997.
9. N. D. Denkov, P. A. Kralchevsky, I. B. Ivanov, "Thin Liquid Films as a Tool for Study and Manipulation of Micro- and Nanoparticles", Centre National de la Recherche Scientific - Institute Charles Sadron, Strasbourg, France, May, 1998.
10. N. D. Denkov, P. A. Kralchevsky, "Stability of Liquid Films in the Presence of Colloid Particles", Uppsala University, Uppsala, Sweden; February, 2000.
11. N. D. Denkov, K. Marinova, "Role of Silica Treatment on the Activity of Mixed Antifoams", Rhodia Silicones, Lyon, France; March, 2000.
12. N. D. Denkov, P. A. Kralchevsky, I. B. Ivanov, "Kinetics of Solubilization of Triglycerides in Surfactant Solutions", Colgate-Palmolive R&D Center, Liege, Belgium; March, 2000.
13. N. D. Denkov, "Foam Destruction by Oils and Oil-Silica Mixtures", Unilever R&D Center, Edgewater, NJ, USA; September, 2001.
14. N. D. Denkov, K. Marinova, "Optimal Hydrophobicity of Silica in Mixed Oil-Silica Antifoams", Rhodia Silicones, Lyon, France; September, 2001.
15. N. D. Denkov, I. B. Ivanov, "Thermodynamic and Kinetic Stability of Emulsions", BASF Research Center, Ludwigshafen, Germany; June 2002.
16. N. D. Denkov, K. Marinova, "Theoretical Modeling of the Antifoam Exhaustion", Rhodia Silicones, Lyon, France; July, 2002.
17. N. D. Denkov, I. B. Ivanov, "Foam Generation and Stability in Surfactant-Polymer Solutions Containing Oil", Unilever R&D Center, Edgewater, NJ, USA; July 2002.
18. N. D. Denkov, P. Denkova, S. Tcholakova, "Investigation of Food Emulsions by Low Resolution NMR", Kraft Foods R&D Center, Glenview, IL, USA, July, 2002.
19. N. D. Denkov, "Mechanisms of Foam Destruction by Oil-based Antifoams", Rhodia Research Center, Lyon, France; September, 2002.
20. N. D. Denkov, S. Tcholakova, I. B. Ivanov, B. Campbell, "Coalescence in Protein Stabilized Emulsions", Rhodia Research Center, Lyon, France; September, 2002.
21. N. D. Denkov, S. Tcholakova, I. B. Ivanov, B. Campbell, "Coalescence Stability of Protein Emulsions", Stanford University, Stanford, USA; December, 2002.
22. N. D. Denkov, S. Tcholakova, I. B. Ivanov, B. Campbell, "Coalescence Stability of Protein Emulsions", University of California at Berkeley, Berkeley, USA; December, 2002.
23. N. D. Denkov, "Foam Destruction by Oil-based Antifoams", University of California at Berkeley, Berkeley, USA; December, 2002.
24. N. D. Denkov, "Mechanisms of Deactivation of Mixed Oil-Silica Antifoams", Schering-Plough Research Institute (SPRI), Kenilworth, NJ, USA; August, 2003.

25. N. D. Denkov, S. Tcholakova, I. B. Ivanov, B. Campbell, "Coalescence in Protein-stabilized Emulsions ", Unilever R&D Center, Port Sunlight, UK; May, 2004.
26. N. D. Denkov, V. Subramanian, D. Gurovich, A. Lips, "Foams under flow – wall slip and viscous friction", Unilever R&D Center, Vlaardingen, The Netherlands, 9 July, 2004.
27. N. D. Denkov, "Foam control by oils and oil-silica mixtures", Baker Petrolite, Sugar Land, Texas, 23 June, 2005.
28. N. D. Denkov, "Foam control by oil-based antifoams ", Unilever R&D Center, Port Sunlight, UK; 30 June, 2005.
29. N. D. Denkov, S. Tcholakova, N. Vankova, I. B. Ivanov, "Kinetics of emulsification in turbulent flow", BASF R&D, Ludwigshafen, Germany; 24 November, 2005.
30. N. D. Denkov, "Mechanisms of antifoam action", BASF R&D, Ludwigshafen, Germany; 25 November, 2005.
31. N. D. Denkov, "Foam control by oil-based antifoams", Waker R&D center, Burghausen, Germany; 11 July, 2006.
32. N. D. Denkov, "Mechanisms of foam destruction by silicone oil-based antifoams", Dow Corning R&D center, Seneffe, Belgium; January, 2007.
33. N. D. Denkov, S. Tcholakova, K. Golemanov, "Bubble breakup in sheared foams", Unilever Global Technology Center, Trumbull, CT, USA; January, 2007.
34. N. D. Denkov, S. Tcholakova, N. Vankova, I. B. Ivanov, "Emulsification in turbulent flow", BASF R&D, Ludwigshafen, Germany; February, 2007.
35. N. D. Denkov, "Foam stability: Effect of surfactants, solid particles, and oily drops", Institute for Chemistry, Technical University of Chemnitz, Chemnitz, Germany; 12 July, 2007.
36. N. D. Denkov, S. Tcholakova, I. B. Ivanov, "Comparison of the globular proteins with surfactants and solid particles as emulsifiers", Unilever R&D Center, Vlaardingen, Netherlands, 20 November, 2007.
37. N. D. Denkov, S. Tcholakova, "Enzyme and surfactant action in detergency", Unilever R&D Center, Port Sunlight, UK, 11 July, 2008.
38. N. D. Denkov, S. Tcholakova, A. Lips, "Viscous friction in sheared foams and emulsions", Unilever R&D Center, Vlaardingen, Netherlands, 14 July, 2008.
39. N. D. Denkov, "Foam and emulsion stabilization by proteins", Heineken R&D Center, Zoeterwoude, Netherlands, 14 July, 2008.
40. N. D. Denkov, S. Tcholakova, K. Golemanov, "Bubble and drop breakup in sheared foams and emulsions", Dow Corning R&D Center, Seneffe, Belgium; 15 October, 2008.
41. N. D. Denkov, S. Tcholakova, K. Golemanov, A. Lips, "Role of surfactants in foam rheology", Kamerling Onnes Laboratory, Leiden University, 12 December, 2008.
42. N. D. Denkov, S. Tcholakova, K. Golemanov, A. Lips, "Rheology of foams and concentrated emulsions", Stranski-Kaishev seminar, Institute of Physical Chemistry, Bulgarian Academy of Sciences, 31 March, 2009.

43. N. D. Denkov, S. Tcholakova, K. Golemanov, A. Lips, “Role of surfactant type and surface mobility in foam rheology”, University Paris-Sud, Marne-la-Vallee, 22 June, 2009.
44. N. D. Denkov, S. Tcholakova, “Enzyme action in detergency: Role of surfactants and calcium for activity of proteases and lipases”, Unilever R&D Center, Port Sunlight, 18 November, 2009.
45. N. D. Denkov, S. Tcholakova, “Physical chemistry of foams: Stabilization by surfactants and particles”, 6 April, 2010, Saint Gobain Research Center, Aubervilliers, France.
46. N. D. Denkov, S. Tcholakova, B. Campbell, “Coalescence stability of protein stabilized emulsions”, Dept. Chemical and Bioprocessing Engineering, Pontificia Universidad Católica de Chile, Chile, 8 October, 2010.
47. N. D. Denkov, S. Tcholakova, A. Lips, “Comparison of surfactants, proteins and solid particles as emulsifiers”, ESPCI ParisTech, Paris, France, 11 October, 2010.
48. N. D. Denkov, S. Tcholakova, K. Golemanov, A. Lips, “Role of surfactant type and surface mobility in foam rheology”, Univ. Manchester, Manchester, UK, 29 January, 2011.
49. N. D. Denkov, S. Tcholakova, A. Lips, “Comparison of surfactants, proteins and solid particles as emulsifiers”, Univ. Manchester, Manchester, UK, 29 January, 2011.
50. N. D. Denkov “Novel surfactants for advanced technologies”, X<sup>th</sup> National Conference for students and PhD students in Chemistry, Univ. Sofia, Sofia, Bulgaria, 17 May, 2011 (opening lecture).
51. N. D. Denkov, S. Tcholakova, I. Lesov ”Mineral foams – role of surfactants and foaming procedures”, 20 September, 2011, Saint Gobain Research Center, Aubervilliers, France.
52. N. D. Denkov, S. Tcholakova, N. Vankova ”Drop breakup in concentrated emulsions”, 27 October, 2011, Lund University, Lund, Sweden.
53. N. Denkov, S. Tcholakova, Z. Vinarov, S. Stoyanov, A. Lips “In vitro model of fat lipolysis”, 30 January 2012, Unilever R&D Center, Colworth, UK.
54. N. D. Denkov, S. Tcholakova, N. Vankova, T. Danner, “Emulsification in turbulent flow”, BASF R&D Center, Ludwigshafen, Germany, 7 February, 2012.
55. N. D. Denkov, S. Tcholakova, K. Golemanov, A. Lips, “Role of surfactant type and surface mobility in foam rheology”, BASF R&D Center, Lemforde, Germany, 9 February, 2012.
56. N. Denkov, S. Tcholakova, Z. Vinarov, S. Stoyanov “In vitro study of fat lipolysis”, 28 March 2012, Food Physics, Univ. Wageningen, The Netherlands.
57. N. Denkov, S. Tcholakova, Z. Vinarov, S. Stoyanov “Physical-chemistry of fat lipolysis – in vitro model, new results and leads”, 29 March 2012, Unilever R&D Center, Vlaardingem, The Netherlands.
58. N. Denkov, S. Tcholakova, “Emulsification in turbulent and regular flows”, 24 April 2012, Nestle R&D Center (Nestec), Lausanne, Switzerland.
59. N. Denkov, S. Tcholakova, “Foaming at low surfactant concentrations”, 8 November 2012, Unilever R&D Center, Port Sunlight, UK.

60. N. Denkov, S. Tcholakova, “Foam control by complex surfactant mixtures”, 27 November 2012, Unilever R&D Center, Trumbull, USA.
61. N. Denkov, S. Tcholakova, “Low temperature cleaning: mechanistic insights”, 27 January 2014, Unilever R&D Center, Port Sunlight, UK.
62. N. D. Denkov, S. Tcholakova, “Physico-chemical control of foam properties”, Dow Corning R&D Center, Seneffe, Belgium; 21 February, 2014.
63. N. D. Denkov “Hierarchical structured and porous materials”, Department of Materials Science and Metallurgy, University of Cambridge, UK; 11 March, 2014.
64. N. Denkov, S. Tcholakova, “Physico-chemical control of foam properties”, 24 March 2014, ESPCI, Paris, France.
65. N. Denkov, S. Tcholakova, I. Lesov, “Porous materials from foam precursors: design rules”, 24 March 2014, ESPCI, Paris, France.
66. N. Denkov, S. Tcholakova, “Physical chemistry of foams: role of surfactant adsorption layers and particles”, Foams Workshop, 3 November 2016, Saint Gobain, Paris, France.

### **Advisor to PhD Theses and Diploma Works**

#### **Ph. D. Theses:**

1. Veselin N. Paunov, “Lateral Capillary Forces between Particles Attached at a Fluid Interface”, Sofia, 1997; Supervisor P. A. Kralchevsky, Co-advisors N. D. Denkov, O. D. Velev.
2. Jordan Petkov, “Measurements of Interfacial Rheological Properties, Including Methods with Test Particle”, Sofia, 2001; Supervisor I. B. Ivanov, Co-advisors N. D. Denkov, T. D. Gurkov.
3. Assen Hadjiiski, “Film Trapping Technique: Development and Applications”, Sofia, 2002; Supervisor I. B. Ivanov, Co-advisor N. D. Denkov.
4. Krastanka G. Marinova, “Mechanisms of Action and Exhaustion of Fast Antifoams”, Sofia, 2002; Supervisors: I. B. Ivanov and N. D. Denkov.
5. Slavka Tcholakova, “Stability of Protein Emulsions”, Sofia, 2004; Supervisors N. D. Denkov and I. B. Ivanov.
6. Nina Vankova, “Emulsification in turbulent flow”, Sofia, 2008; Supervisor N. D. Denkov, Co-advisor S. Tcholakova.
7. Nikolai C. Christov, “Dynamic effects in oil solubilization and membrane emulsification”, Sofia, 2008; Supervisors: P. A. Kralchevsky, K. D. Danov, Co-advisor N. D. Denkov.
8. Konstantin N. Golemanov, “Viscous friction and breakup of fluid particles in foams and concentrated emulsions”, Sofia, 2009; Supervisor N. D. Denkov, Co-advisor S. Tcholakova.
9. Radka E. Petkova “Foaminess and stability of foams, generated from surfactant-polymer mixtures”, Sofia, 2013; Supervisors: N. D. Denkov, S. Tcholakova.
10. Ivan I. Lesov “Foams stabilized by particles”, Sofia, 2014; Supervisors: N. D. Denkov, S. Tcholakova.

11. Zahari P. Vinarov, "In vitro studies of enzyme lipolysis of triglycerides in the gastro-intestinal tract"; Supervisors: N. D. Denkov, S. Tcholakova; Sofia, 2014.
12. Nadia Ilieva Politova-Brinkova, "Coalescence of water drops in oil medium: factors for control and application for synthesis of nano-structured materials"; Supervisors: S. Tcholakova, N. D. Denkov; Sofia, 2018.
13. Borislava Borisova Damianova, "Foaming at low surfactant concentrations", Supervisors: N. D. Denkov, S. Tcholakova (under preparation).
14. Dilek Fahredin Gazolu, "Emulsification in media with non-Newtonian behavior", Supervisors: S. Tcholakova, N. D. Denkov (under preparation).
15. Monika Ivanova Kovadzhieva, "Properties of porous materials, obtained by drying of particle-stabilized foams"; Supervisors: S. Tcholakova, N. D. Denkov (under preparation).
16. Nevena Borisova Borisova, "Adsorption and foaming properties of saponin solutions"; Supervisors: S. Tcholakova, N. D. Denkov (under preparation).
17. Kristina Stefanova Rusanova, "Role of the rheological properties of surfactant adsorption layers for liquid film drainage"; Supervisors: S. Tcholakova, N. D. Denkov (under preparation).

#### **Diploma Works:**

1. Slavka Tcholakova, "Energy of Interaction between Miniemulsion Droplets Stabilized by Protein", Faculty of Chemistry, Sofia University, 1996.
2. Ergin Ahmed, "Optical Properties of Thin Layers of Dispersed TiO<sub>2</sub>", Faculty of Chemistry, Sofia University, 1998.
3. Selver Suleiman, "Influence of Sodium Dodecyl Dioxyethylene Sulfate on the Charge of Soybean Oil Dryops and on the Size of Nonionic Micelles", Faculty of Chemistry, Sofia University, 1999.
4. Christina Christova, "Stability of Foams in the Presence of Antifoam Additives", Faculty of Chemistry, Sofia University, 2000.
5. Denitza Lambreva, "Effect of Silica Hydrophobicity on the Efficiency of Mixed Silica-Oil Antifoams", Faculty of Chemistry, Sofia University, 2000.
6. Nina Vankova, "Investigation of the Structure of Mixed Micelles from Anionic and Nonionic Surfactants by Light Scattering and NMR", Faculty of Chemistry, Sofia University, 2002.
7. Prabhjyot Singh, "Antifoam Effect of Oils", City College of New York, New York; Unilever R&D, Edgewater, NJ 2005 (Co-adviser Prof. C. Maldarelli).
8. Radostina Stefanova, "Factors affecting the exhaustion of fast antifoams", Faculty of Chemistry, Sofia University, 2008 (Co-adviser Assist. Prof. S. Tcholakova).
9. Mikhaela Grozdanova, "Role of solid particles in oil-based antifoams", Faculty of Chemistry, Sofia University, 2009 (Co-adviser Assoc. Prof. S. Tcholakova).
10. Ivan Lesov, "Drop breakup in concentrated emulsions", Faculty of Chemistry, Sofia University, 2009 (Co-adviser Assoc. Prof. S. Tcholakova).



11. Lilia Petrova, "Mechanisms of removal of protein layers from solid substrates, in the presence of enzymes and surfactants", Faculty of Chemistry, Sofia University, 2010 (Co-adviser Assoc. Prof. S. Tcholakova).
12. Zlatina Mitrinova, "Factors determining the rate of Ostwald ripening of bubbles in foams", Faculty of Chemistry, Sofia University, 2010 (Co-adviser Assoc. Prof. S. Tcholakova).
13. Siana Alatova, "Mechanisms of suppression of pancreatic lipase under *in vitro* conditions, mimicking the digestive tract" Faculty of Chemistry, Sofia University, 2010 (Co-adviser Assoc. Prof. S. Tcholakova).
14. Borislava Damianova, "Development of procedures for determination of the composition of the reaction mixture for hydrolysis of triacylglycerols by pancreatic enzymes", Faculty of Chemistry, Sofia University, 2010 (Co-adviser Assoc. Prof. S. Tcholakova).
15. Nadia Politova, "Effect of cationic polymers on the rheological properties of surfactant-stabilized foams", Faculty of Chemistry, Sofia University, 2010 (Co-adviser Assoc. Prof. S. Tcholakova).
16. Roslava Petrova, "Generation and properties of water-in-oil emulsions, containing steviosides in the aqueous phase", Faculty of Chemistry, Sofia University, 2011 (Co-adviser Assoc. Prof. S. Tcholakova).
17. Nadia Politova, "Factors affecting the process of foaming", Faculty of Chemistry and Pharmacy, Sofia University, 2012 (Co-adviser Assoc. Prof. S. Tcholakova).
18. Christo Kalachev „Kinetics of drop-drop coalescence during emulsification“, Faculty of Chemistry and Pharmacy, Sofia University, 2012 (Co-adviser Assoc. Prof. S. Tcholakova).
19. Borislava Damianova, "In vitro study of the effect of surfactants on triglyceride lipolysis in the presence of bile acids", Faculty of Chemistry and Pharmacy, Sofia University, 2012 (Co-adviser Assoc. Prof. S. Tcholakova).
20. Yana Petkova „Mechanism of inhibition of pancreatic lipase by emulsifiers in the absence of bile acids“ Faculty of Chemistry and Pharmacy, Sofia University, 2012 (Co-adviser Assoc. Prof. S. Tcholakova).
21. Dilek Gazolu „Mechanisms of removal of oily soils from solid substrates“, Faculty of Chemistry and Pharmacy, Sofia University, 2012 (Co-adviser Assoc. Prof. S. Tcholakova).
22. Nevena Borisova „Rheological properties of adsorption saponin layers, studied in Langmuir trough“, Faculty of Chemistry and Pharmacy, Sofia University, 2012 (Co-adviser Assoc. Prof. S. Tcholakova).
23. Julieta Popova „Effect of fatty acids on the foaminess and on surface properties of mixed solutions of SLES and CAPB“ Faculty of Chemistry and Pharmacy, Sofia University, 2012 (Co-adviser Assoc. Prof. S. Tcholakova).
24. Kristina Neshkova „Equilibrium thickness and rate of thinning of foam films stabilized by saponins“ Faculty of Chemistry and Pharmacy, Sofia University, 2012 (Co-adviser Assoc. Prof. S. Tcholakova).
25. Monika Kovadzhieva „Generation and stability of foams, formed from suspensions of silica particles and amphoteric surfactant“ Faculty of Chemistry and Pharmacy, Sofia University, 2012 (Co-adviser Assoc. Prof. S. Tcholakova).

26. Dilek Gazolu „Effects of surfactants and calcium ions on the energies of air-water, oil-water and solid-water interfaces“, Faculty of Chemistry and Pharmacy, Sofia University, 2014 (Co-adviser Prof. S. Tcholakova).
27. Nevena Borisova „Rheological properties of saponin adsorption layers “, Faculty of Chemistry and Pharmacy, Sofia University, 2014 (Co-adviser Prof. S. Tcholakova).
28. Kristina Neshkova, „Role of surface rheological properties on the thinning behaviour of thin liquid films, formed from saponin solutions between various hydrophobic phases“ Faculty of Chemistry and Pharmacy, Sofia University, 2014 (Co-adviser Prof. S. Tcholakova).
29. Monika Kovadzhieva „Generation and stability of foams, formed from suspensions of carbonate particles and surfactants“ Faculty of Chemistry and Pharmacy, Sofia University, 2014 (Co-adviser Prof. S. Tcholakova).
30. Maria Chenkova, “Foaming at low surfactant concentrations“, Faculty of Chemistry and Pharmacy, Sofia University, 2014 (Co-adviser Prof. S. Tcholakova).
31. Viktoria Aleksandrova „Separation of polyphenols and saponins in plant extracts“, Faculty of Chemistry and Pharmacy, Sofia University, 2014 (Co-adviser Prof. S. Tcholakova).
32. Nevse Molla „Effect of surfactant type on fenofibrate solubilization in the presence and in the absence of bile salts“ Faculty of Chemistry and Pharmacy, Sofia University, 2014 (Co-adviser Prof. S. Tcholakova).
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