

Gennady Gor

Assistant Professor

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Research Interests

My primary area of expertise is modeling of chemical and mechanical processes in porous and nanostructured materials, ranging from nanoporous adsorbents and polymer membranes to geological materials. My toolkit spans various modeling techniques that cover both the micro and macro scales. I use molecular modeling: Monte Carlo and molecular dynamics simulations, classical density functional theory (cDFT); additionally I employ electronic structure DFT and finite element methods (FEM). Specifically, I am interested in the mechanical effects of fluids sorption by porous and soft materials. These effects are manifested in numerous applied areas of research: membrane separations, high energy storage batteries, chemical sensing, shale gas recovery, carbon sequestration, etc.

Professional Preparation

National Research Council Research Associate, U.S. Naval Research Laboratory; 09/2014-08/2016.

Postdoctoral Research Associate, Princeton University; 08/2011-08/2014.

Postdoctoral Research Associate, Rutgers University; 08/2009-08/2011.

Ph.D. Theoretical Physics, St. Petersburg State University; 04/2009.

M.S. Physics, St. Petersburg State University, Russia; 01/2006.

B.S. Physics, St. Petersburg State University, Russia; 06/2003.

Appointments

Assistant Professor; Department of Chemical, Environmental and Pharmaceutical Engineering, New Jersey Institute of Technology; started 09/2016.

5 Recent Relevant Publications (of 35 total)

Gor G. Y., Bernstein N. "Adsorption-Induced Surface Stresses of the Water/Quartz Interface: *Ab Initio* Molecular Dynamics Study" *Langmuir* 2016, 32 (21), p. 5259-5266

Gor G. Y., Bernstein N. "Revisiting Bangham's Law of Adsorption-Induced Deformation: Changes of Surface Energy and Surface Stress" *Phys. Chem. Chem. Phys.* 2016, 18, 9788-9798

Gor G. Y., Siderius D. W., Rasmussen C. J., Krekelberg W. P., Shen V. K., Bernstein N. Relation Between Pore Size and the Compressibility of a Confined Fluid *J. Chem. Phys.* 2015, 143, 194506

Gor G. Y., Bertinetti L., Bernstein N., Hofmann T., Fratzl P., Huber P. "Elastic Response of Mesoporous Silicon to Capillary Pressures in the Pores" *Appl. Phys. Lett.* 2015, 106, 261901

Gor G. Y., Rasmussen C. J., Neimark A. V. "Capillary Condensation Hysteresis in Overlapping Spherical Pores: Monte-Carlo Simulations Study" *Langmuir* 2012, 28 (33), p. 12100-12107

5 Other Significant Publications

Gor G. Y., Cannarella J., Leng C. Z., Vishnyakov A., Arnold C. B. "Swelling and Softening of Lithium-Ion Battery Separators in Electrolyte Solvents" *J. Power Sources* 2015, 294, p. 167-172

Gor G. Y. "Adsorption Stress Changes the Elasticity of Liquid Argon Confined in a Nanopore" *Langmuir* 2014, 30 (45), p. 13564-13569

Gor G. Y., Cannarella J., Prevost J. H., Arnold C. B. "A Model for the Behavior of Battery Separators in Compression at Different Strain/Charge Rates" *J. Electrochem. Soc.* 2014, 161(11), F3065-F3071

Gor G. Y., Thommes M., Cychosz K., Neimark A. V. "Quenched Solid Density Functional Theory Method for Characterization of Mesoporous Carbons by Nitrogen Adsorption" *Carbon* 2012, 50 (4), p. 1583-1590

Gor G. Y., Neimark A. V. "Adsorption-Induced Deformation of Mesoporous Solids" *Langmuir* 2010, 26 (16), p. 13021-13027

Synergistic Activities

- **Grant Reviewer:** ACS PRF, NSF CBET, Technology Foundation STW (The Netherlands), National Center of Science and Technology Evaluation (Kazakhstan), Skoltech-MIT Next Generation Program (Russia)
- **Journal Editor:** Associate Editor for Adsorption Science & Technology (from 08/2016)
- **Journal Reviewer:** Adsorption; Chemical Physics Letters; Colloids and Surfaces A; Energy and Fuels; Europhysics Letters; Greenhouse Gases: Science and Technology; International Journal of Heat and Mass Transfer; Journal of Chemical Physics; Journal of Mechanics and Physics of Solids; Journal of Molecular Structure; Journal of Physics and Chemistry of Solids; Journal of Physical Chemistry Letters; Journal of The Electrochemical Society; Langmuir; Metals; Proceeding of The Royal Society
- **Conference Organization:**
Programming and scheduling: CPM-7 The 7th International Workshop on Characterization of Porous Materials: From Angstroms to Millimeters, May 3-6, 2015, Delray Beach, FL, USA;
Session co-chair: “Molecular Simulation of Adsorption I” and “Thermodynamics of Energy Systems” 2015 AIChE Annual Meeting, Salt Lake City, UT, USA;
Session organizer: “Minisymposium: Fluids in Nanoporous Media” at Interpore-8 Meeting, May 9-12, 2016, Cincinnati, OH, USA
- **Education and Mentoring:**
Teaching undergraduate chemical engineering thermodynamics; NJIT, Fall 2016;
Lecturer/WSE Postdoctoral Fellow, grad. course in scientific writing; Princeton University 2012-2013;
Lecturer, grad. course in kinetics of first order phase transition, SPbSU, 2006-2009;
High-school teacher of physics (part-time) 2002-2006

Awards

NSF Travel Grant for the FOA12 conference participation (2016), National Research Council Research Associateship Award (2014), Princeton CMI Best Paper Award for Postdoctoral Fellows (2013), Best Presentation of the Session on AIChE Annual Meeting (2012), International Association of Chemical Thermodynamics Junior Award “For Excellence in Thermodynamics” (2010)

Collaborators and Co-Editors (within last 48 months)

Craig B. Arnold (Princeton); Christian Balzer (ZAE Bayern); Noam Bernstein (NRL); Luca Bertinetti (MPI Colloids and Interfaces); John Cannarella (DuPont); Qian Cao (U Helsinki); Richard Cimino (Rutgers); Katie Cychosz (Quantachrome); William J. DeSisto (U Maine); Thomas Elliot (Princeton); Wei Fan (UMass); Peter Fratzl (MPI Colloids and Interfaces); Brian G. Frederick (U Maine); Jason Fry (U Maine); Tyrone Ghampson (U Maine); Xuefeng Guo (UMN); Tommy Hofmann (Helmholtz-Center Berlin); Patrick Huber (TUHH); Helmut Kaiser (Indiana U); Leonid Khriachtchev (U Helsinki); William Krekelberg (NIST); Karsten Krogh-Jespersen (Rutgers); John Landers (Rutgers); Ming-Tsung Lee (UPenn); Collen Leng (GA Tech); Xinyi Liu (Princeton); Yuri B. Melnichenko (ORNL); Alexander Neimark (Rutgers); Oskar Paris (Montanuniversity); Rachel Pollock (U Maine); Johannes Prass (TimberTower); Jean Prevost (Princeton); Christopher Rasmussen (DuPont); Gudrun Reichenauer (ZAE Bayern); M. Manuela L. Ribeiro Carrott (U de Evora); Patricia A. Russo (U de Evora); Vincent Shen (NIST); Daniel Siderius (NIST); Patrick Sinko (U Michigan); Howard Stone (Princeton); Matthias Thommes (Quantachrome); Michael Tsapatsis (UMN); Aleksey Vishnyakov (Rutgers); Brenna R. Walsh (U Maine); M. Clayton Wheeler (U Maine);

Graduate and Postdoctoral Advisors

Noam Bernstein, NRC Postdoctoral Advisor (2014-2016, U.S. Naval Research Laboratory, Washington, DC)
Jean H. Prevost, Postdoctoral Advisor (2011-2014, Princeton University, Princeton, NJ)
Alexander V. Neimark, Postdoctoral Advisor (2009-2011, Rutgers University, Piscataway, NJ)
Fedor M. Kuni, Ph.D. Advisor (2006-2009, St. Petersburg State University, St. Petersburg, Russia)

Thesis Advisor

Christopher Dobrzanski, NJIT, CBPE Department (2016-)