

Biographical Sketch: Sergey V. Buldyrev

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Personal Information

Date of Birth: 06/22/1954
City, State/Province, Country of Birth: Saint Petersburg, Russia
Citizenship(s): USA
Language(s): English (fluent), Russian (native)
Marital Status Married, two children

Education

Saint-Petersburg State University, Russia	Mathematical Physics M.S., 1977
Saint-Petersburg State University, Russia	Polymer Physics Ph.D., 1988

Appointments/Affiliations

2004-present	Professor, Department of Physics, Yeshiva University.
2011-present	Visiting Professor, IMT Institute of Advanced Studies, Lucca, Italy.
2010-2011	Visiting Researcher, Departament de Física Fonamental, Universitat de Barcelona
2007-2010	Department Chair, Department of Physics, Yeshiva University.
2003-2004	Senior Research Associate, Center for Polymer Studies and Physics Department, Boston University, Boston, USA
1990-2003	Research Associate, Center for Polymer Studies and Physics Department, Boston University, Boston, USA
2002,2007	Visiting Professor, Dipartimento di Fisica, Universita di Roma La Sapienza, Rome, Italy.
1984-1989	Assistant Lecturer, Department of Physics, Saint Petersburg State University, Saint-Petersburg, Russia
1977-1984	Junior Research Fellow, Institute of Physics, Saint Petersburg State University, Saint-Petersburg, Russia

Professional Experience

1977-1989	Research in physics: applied computer simulations in polymer physics, chemical engineering, and mathematical physics. Teaching: calculus, linear algebra, mathematical physics, and computer programming.
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- 1990-2004: Research in physics: applied concepts of statistical mechanics and computer simulations to (i) Protein Folding and Aggregation, (ii) Neuroscience Research, (iii) Physics of Lungs, (iv) Statistical Properties of DNA sequences and Molecular Evolution, (v) Behavior of Complex Systems, (vi) Nonlinear Surface Growth, (vii) Transport in Disordered Media, (viii) Polymer Physics, (ix) Transformations in Liquids, and (x) Econophysics.
Research in education: developed software and curriculum guides for high school science education.
Teaching: a course on Virtual Molecular Dynamics Laboratory at the summer institute for high school teachers.
- 2004-present: Taught courses at Yeshiva University:
PHY 1221 Classical Mechanics
PHY 1510 Thermodynamics and Statistical Mechanics,
PHY 4931 Physics of Complex Systems,
PHY 3301 Computational Methods in Physical Sciences.
PHY 1041, PHY 1042 General Physics I and II.
Research in Statistical and Biological Physics.
- 2007-2010 Chairman, Department of Physics, Yeshiva University

Honors

First Award at the XIVth Inter-University Conference of Young Scientists, "Modern Problems in the Physical Chemistry of Solutions" (sponsored by the All-Union Mendeleyev Chemical Society), Leningrad, USSR, 1987.

Workshop Organizing

1. NATO Advances Research Workshop on New Kinds of Phase Transitions: Transformations in Disordered Substances, Volga River, Russia, 24-28 May 2001.
2. Pan-American Scientific Institute (PASI) "From disordered systems to complex systems", Mar del Plata, Argentina, December 11-20, 2006.

Books

New Kinds of Phase Transitions: Transformations in Disordered Substances, V. V. Brazhkin, **S. V. Buldyrev**, V. N. Ryzhov, and H. E. Stanley [eds.], (Kluwer, Dordrecht, 2002).

Refereeing

5 scientific journals, including Physical Review Letters and Proceedings of National Academy of Sciences of the United States.

Student Training

Trained over 20 graduate students, 20 undergraduate students, and 10 high school interns in the Center for Polymer Studies (BU). Supervised 15 undergraduates in independent study and research at Yeshiva College.

Course Development

Developed and taught a new graduate course “Topics in Applied Economics” (IMT, Lucca, Italy, 2010-2012).

Developed computer simulations for course curriculum PHY1510-261 “Thermodynamics and Statistical Mechanics” (Fall 2004, YU);

Developed a new course PHY 4931-341 “Physics of Complex Systems” (Fall 2004, YU)

Developed computational projects in C/C++ for course curriculum PHY 3301-231, “Computational Methods in Physical Sciences” (Spring 2005, YU).

Developed computer simulations for course curriculum PY744 A1 “Polymer Physics” (Fall 2002, BU);

As a Co-PI on the NSF grant ESI-9553883, developed course curriculum for “Virtual Molecular Dynamics Laboratory” Summer Institutes for high school teachers.

Develop Computer Simulations and Curriculum guides for an educational Web site “Virtual Molecular Dynamics Laboratory”, <http://polymer.bu.edu/vmdl/>.

Software Development

Authored a CD, published in: Giant Molecules, A. Yu. Grosberg and A. R. Khokhlov (Academic Press, 1997)

Memberships

American Physical Society, 1990-present.

Collaborators

(a) Collaborators:

A. Alencar (Harvard), L. A. N. Amaral (Northwestern U), A.C. Angell (Arizona U), R. Bansil (BU), A.-L. Barabasi (NorthEastern U), M. C. Barbosa (U Rio Grande, Brasil), L. A. Braunstein (U Mar del Plata, Argentina), V.V. Brazhkin (HPI, Moscow), T.M. Birshtein (IHMC, St. Petersburg) L. Cruz (Boston U), P.G. Debenedetti (Princeton), N. V. Dokholyan (UNC-CH), S. Erramilli (BU), G. Franzese (U Barcelona), A. L. Goldberger (Harvard), A. Yu. Grosberg (U Minnesota), S. Havlin (Bar-Ilan U), B. T. Hyman (Harvard), P. King (Imperial), Y. Lereah (U Tel-Aviv), G. Paul (Boston U), E. Pitard (CNRS, France), P. Poole (STFX), F. Pommolli (IMT, Lucca), M. Riccaboni (IMT, Lucca), P. J. Rossky (U Texas), F. Sciortino (U Rome 1), M.A. Salinger (Boston U), E.I. Shakhnovich (Harvard), H. E. Stanley (Boston U), F. Starr (Wesleyan U), B. Suki (Boston U), P. Tartaglia (U Roma 1), D. Teplow (UCLA), B. Urbanc (Boston U), G. M. Viswanathan (U Alagoas, Brasil), K. Yamasaki (U Tokyo), F. Zypman (Yeshiva U)

(b) Graduate and Postdoctoral Advisors:

Tatiana M. Birshtein, Saint Petersburg State University – graduate advisor, thesis: “Collapse and Adsorption of a Two-Dimensional Macromolecule: The Monte-Carlo Method,”

H. Eugene Stanley, Boston University – postdoctoral sponsor.

List of Publications (302 total):

Original Research Articles (187):

(i) Protein Folding and Aggregation:

1. N. Dokholyan, **S. V. Buldyrev**, H. E. Stanley and E. I. Shakhnovich, "Discrete molecular dynamics studies of the folding of a protein-like model," *Folding & Design* **3**, 577-587 (1998).
2. N. V. Dokholyan, **S. V. Buldyrev**, H. E. Stanley, and E. I. Shakhnovich, "Identifying the protein folding nucleus using molecular dynamics," *J. Mol. Biol.* **296**, 1183-1188 (2000).
3. A. Scala, N. V. Dokholyan, **S. V. Buldyrev**, H. E. Stanley, and E. I. Shakhnovich, "Thermodynamically important contacts in folding of model proteins," *Phys. Rev. E* **63**, 032901-4 (2001).
4. J. M. Borreguero, N. V. Dokholyan, **S. V. Buldyrev**, H. E. Stanley, and E. I. Shakhnovich, "Thermodynamics and folding kinetics analysis of the SH3 domain from Discrete Molecular Dynamics," *J. Mol. Biol.* **318**, 863-876 (2002).
5. F. Ding, N. V. Dokholyan, **S. V. Buldyrev**, H. E. Stanley, and E. I. Shakhnovich, "Direct molecular dynamic observation of protein folding transition state ensemble," *Biophys. J.* **83**, 3525-3532 (2002).
6. F. Ding, N. V. Dokholyan, **S. V. Buldyrev**, H. E. Stanley, and E. I. Shakhnovich, "Molecular dynamic simulation of the SH3 domain aggregation suggests a generic amyloidogenesis mechanism," *J. Mol. Biol.* **324**, 851-857 (2002).
7. F. Ding, J. M. Borreguero, **S. V. Buldyrev**, H. E. Stanley, and N. V. Dokholyan, "A Mechanism for the alpha-helix to beta-hairpin Transition," *Proteins: Structure, Function, and Genetics* **53**, 220-228 (2003).
8. J. M. Borreguero, F. Ding, **S. V. Buldyrev**, H. E. Stanley and N. V. Dokholyan, "Multiple Folding Pathways of the SH3 Domain," *Biophys. J.* **87**, 521-533 (2004).
9. S. Peng, F. Ding, B. Urbanc, **S. V. Buldyrev**, L. Cruz, H. E. Stanley, and N. V. Dokholyan, "Discrete molecular dynamics simulations of peptide aggregation," *Phys. Rev. E* **69**, 041908, (2004).
10. B. Urbanc, L. Cruz, S. Yun, **S. V. Buldyrev**, G. Bitan, D. B. Teplow, and H. E. Stanley, "In Silico Study of Amyloid Beta Protein Folding and Oligomerization," *Proc. Natl. Acad. Sci.* **101**, 17345-17350 (2004).

11. B. Urbanc, L. Cruz, F. Ding, D. Sammond, S. Khare, **S. V. Buldyrev**, H. E. Stanley, and N. V. Dokholyan, "Molecular Dynamics Simulation of Amyloid β Dimer Formation," *Biophys. J.* **87**, 2310-2321 (2004).

12. F. Ding, **S. V. Buldyrev**, and N. V. Dokholyan, "Folding Trp-Cage to NMR Resolution Native Structure Using a Coarse-Grained Protein Model," *Biophys. J.* **88**, 147-155 (2005).

13. J. M. Borreguero, B. Urbanc, N. D. Lazo, **S. V. Buldyrev**, D. B. Teplow, and H. E. Stanley, "Folding events in the 21-30 region of amyloid-beta-protein (A beta) studied in silico," *Proc. Natl. Acad. Sci.* **102**, 6015-6020 (2005).

14. A. R. Lam, J. M. Borreguero, F. Ding, N. V. Dokholyan, **S. V. Buldyrev**, H.E. Stanley, and E. Shakhnovich, "Parallel Folding Pathways in the SH3 Domain Protein," *J. Mol. Biol.* **373**, 1348-1360 (2007).

(ii) Neuroscience Research:

1. F. Caserta, W. D. Eldred, E. Fernandez, R. E. Hausman, L. R. Stanford, **S. V. Buldyrev**, S. Schwarzer and H. E. Stanley, "Determination of Fractal Dimension of Physiologically Characterized Neurons in Two and Three Dimensions," *J. Neurosci. Methods* **56**, 133-144 (1995).

2. B. T. Hyman, H.L. West, G. W. Rebeck, **S. V. Buldyrev**, R. N. Mantegna, M. Ukleja, S. Havlin, and H. E. Stanley, "Quantitative analysis of senile plaques in Alzheimer disease: Observation of log-normal size distribution and of differences associated with apolipoprotein E genotype and trisomy 21 (Down syndrome)," *Proc. Natl. Acad. Sci.* **92**, 3586-3590 (1995).

3. L. Cruz, B. Kutnjac-Urbanc, **S. V. Buldyrev**, R. Christie, T. Gomez-Isla, S. Havlin, M. McNamara, H. E. Stanley, and B. T. Hyman, "Aggregation and Disaggregation of Senile Plaques in Alzheimer Disease," *Proc. National Acad. Sci.* **94**, 7612-7616 (1997).

4. B. Urbanc, L. Cruz, **S. V. Buldyrev**, S. Havlin, H. E. Stanley and B. T. Hyman, "Dynamics of Plaque Formation in Alzheimer Disease," *Biophys. J.* **76**, 1330-1334 (1999).

5. R. B. Knowles, C. Wyart, **S. V. Buldyrev**, L. Cruz, B. Urbanc, M.E. Hasselmo, S. Havlin, H. E. Stanley and B. T. Hyman, "Plaque-induced neural network disruption in Alzheimer's disease," *Proc. National Acad. Sci.* **96**, 5274-5279 (1999).

6. B. Urbanc, L. Cruz, **S. V. Buldyrev**, S. Havlin, B. T. Hyman, and H. E. Stanley, "Dynamic Feedback in an Aggregation-Disaggregation Model," *Phys. Rev. E* **60**, 2120-2126 (1999).

7. **S. V. Buldyrev**, L. Cruz, T. Gomez-Isla, S. Havlin, H. E. Stanley, B. Urbanc and B. T. Hyman, "Description of Microcolumnar Ensembles in Association Cortex and their Disruption in Alzheimer and Lewy Body Dementias," *Proc. National Academy of Sciences* **97**, 5039-5043 (2000).

8. L. Cruz, **S. V. Buldyrev**, S. Peng, D. L. Roe, B. Urbanc, H. E. Stanley, and D. L. Rosene, "A Statistically-Based Density Map Method for Identification and Quantification of Regional Differences in Microcolumnarity in the Monkey Brain," *J. Neurosci. Methods* **141**, 321-332 (2005).

(iii) Physics of Lungs:

1. A.-L. Barabasi, **S. V. Buldyrev**, H. E. Stanley, and B. Suki, "Avalanches in the Lung: A Statistical Mechanical Approach," *Phys.Rev. Lett.* **76**, 2192-2195 (1996).

2. M. K. Sujeer, **S. V. Buldyrev**, S. Zapperi, J. Andrade, H. E. Stanley, and B. Suki, "Volume Distributions of Avalanches in Lung Inflation: A Statistical Mechanical Approach," *Phys. Rev. E* **56**, 3385-3394 (1997).

3. J. S. Andrade Jr., A. M. Alencar, M. P. Almeida, J. Mendez, **S. V. Buldyrev**, S. Zapperi, H. E. Stanley, and B. Suki, "Asymmetric flow in symmetric branched structures," *Phys.Rev. Lett.* **81**, 926-929 (1998).

4. A. M. Alencar, Z. Hantos, F. Hantos, F. Petak, J. Tolnai, T. Asztalos, S. Zapperi, J. S. Andrade, **S. V. Buldyrev**, H. E. Stanley, and B. Suki, "Scaling Behavior in Crackle Sound during Lung Inflation," *Phys. Rev E* **60**, 4659-4663 (1999).

5. M. P. Almeida, J. S. Andrade Jr., **S. V. Buldyrev**, F. S. A. Cavalcante, H. E. Stanley, and B. Suki, "Fluid Flow through Ramified Structures," *Phys. Rev. E* **60**, 5486-5494 (1999).

6. A. M. Alencar, **S. V. Buldyrev**, A. Majumdar, H. E. Stanley, and B. Suki, "Avalanche Dynamics of Crackle Sound in the Lung," *Phys. Rev. Lett.* **87**, 088101-4 (2001).

7. A. Majumdar, A. M. Alencar, **S. V. Buldyrev**, Z. Hantos, H. E. Stanley and B. Suki, "Characterization of the Branching Structure of the Lung from Macroscopic Pressure-Volume Measurements," *Phys. Rev. Lett.* **87**, 058102-4 (2001).

8. A. M. Alencar, S. Arold, **S. V. Buldyrev**, A. Majumdar, D. Stamenovic, H. E. Stanley, and B. Suki, "Dynamic Instabilities in the Inflating Lung," *Nature* **417**, 809-811 (2002).

9. A. Majumdar, A. M. Alencar, **S. V. Buldyrev**, Z. Hantos, H. E. Stanley, and B. Suki, "Fluid transport in branched structures with temporary closures: A model for quasistatic lung inflation," *Phys. Rev. E* **67**, 031912 (2003).

10. A. M. Alencar, **S. V. Buldyrev**, A. Majumdar, H. E. Stanley, and B. Suki, "Perimeter Growth of a Branched Structure: Application to Crackle Sounds in the Lung," *Phys. Rev. E* **68**, 11909 (2003).

11. A. Majumdar, A. M. Alencar, **S. V. Buldyrev**, Z. Hantos, K.R. Lutchen, H. E. Stanley, and B. Suki, "Relating airway diameter distributions and branching asymmetry in the lung," *Phys. Rev. Lett.* **95**, 168101 (2005).

12. A. M. Alencar, E. Wolfe, and **S.V. Buldyrev**, "Monte Carlo simulation of liquid bridge rupture: Application to lung physiology," *Phys. Rev. E* **74**, 026311 (2006).

(iv) Statistical Properties of DNA sequences and Molecular Evolution:

1. C. K. Peng, **S. V. Buldyrev**, A. Goldberger, S. Havlin, F. Sciortino, M. Simons and H. E. Stanley, "Long-Range Correlations in Nucleotide Sequences," *Nature* **356**, 168-171 (1992).

2. **S. V. Buldyrev**, A. L. Goldberger, S. Havlin, C.-K. Peng, M. Simons, and H. E. Stanley, "Generalized Levy Walk Model for DNA Nucleotide Sequences," *Phys. Rev. E* **47**, 4514-4523 (1993).

3. **S. V. Buldyrev**, A. L. Goldberger, S. Havlin, C.-K. Peng, H. E. Stanley and M. Simons, "Fractal Landscapes and Molecular Evolution: Modeling the Myosin Heavy Chain Gene Family," *Biophys. J.* **65**, 2675-2681 (1993).

4. **S. V. Buldyrev**, A. Goldberger, S. Havlin, C.-K. Peng, F. Sciortino, M. Simons and H. E. Stanley, "Long-Range Power Law Correlations in DNA," *Phys. Rev. Lett.* **71** 1776-1776 (1993).

5. C. K. Peng, **S. V. Buldyrev**, A. L. Goldberger, S. Havlin, M. Simons, and H. E. Stanley, "Finite Size Effects on Long-Range Correlations: Implications for Analyzing DNA Sequences," *Phys. Rev. E* **47**, 3730-3733 (1993).

6. C. K. Peng, **S. V. Buldyrev**, S. Havlin, M. Simons, H. E. Stanley and A. L. Goldberger, "Mosaic Organization of DNA Sequences," *Phys. Rev. E* **49**, 1685-1689 (1994).

7. S. M. Ossadnik, **S. V. Buldyrev**, A. L. Goldberger, S. Havlin, R.N. Mantegna, C.-K. Peng, M. Simons, and H. E. Stanley, "Correlation Approach to Identify Coding Regions in DNA Sequences," *Biophys. J.* **67**, 64-70 (1994).

8. R. N. Mantegna, **S. V. Buldyrev**, A. L. Goldberger, S. Havlin, C.-K. Peng, M. Simons, and H. E. Stanley, "Linguistic Features of Noncoding DNA-Sequences," *Phys. Rev. Lett.* **73**, 3169-3172 (1994).

9. **S. V. Buldyrev**, A. L. Goldberger, S. Havlin, R. N. Mantegna, M. E. Matsa, C.-K. Peng, M. Simons, and H. E. Stanley, "Long-Range Correlation Properties of Coding and Noncoding DNA Sequences: GenBank Analysis," *Phys. Rev. E* **51**, 5084-5091 (1995).
10. R. N. Mantegna, **S. V. Buldyrev**, A. L. Goldberger, S. Havlin, C.-K. Peng, M. Simons, and H. E. Stanley, "Systematic Analysis of Coding and Noncoding DNA Sequences Using Methods of Statistical Linguistics," *Phys. Rev. E* **52**, 2939-2950 (1995).
11. R. N. Mantegna, S. V. Buldyrev, A. L. Goldberger, S. Havlin, C.-K. Peng, M. Simons, and H. E. Stanley, "Linguistic Features of Noncoding DNA-Sequences – Reply," *Phys. Rev. Lett.* **76**, 1979-1981 (1996).
12. G. M. Viswanathan, **S. V. Buldyrev**, S. Havlin, and H. E. Stanley, "Quantification of DNA Patchiness using Correlation Measures," *Biophys. J.* **72**, 866-875 (1997).
13. N. V. Dokholyan, **S. V. Buldyrev**, S. Havlin, and H. E. Stanley, "Distribution of Base Pair Repeats in Coding and Noncoding DNA Sequences," *Phys. Rev. Lett.* **79**, 5182-5185 (1997).
14. R. H. R. Stanley, N. V. Dokholyan, **S. V. Buldyrev**, S. Havlin, and H. E. Stanley, "Clustering of Identical Oligonucleotides in Coding and Noncoding DNA Sequences," *J. Biomol. Structure and Dynamics* **17**, 79-87 (1999).
15. N. Dokholyan, **S. V. Buldyrev**, S. Havlin, and H. E. Stanley, "Distributions of Dimeric Tandem Repeats in Non-coding and Coding DNA Sequences," *J. Theor. Biol.* **202**, 273-282 (2000).
16. I. Grosse, H. Herzel, **S. V. Buldyrev**, and H. E. Stanley, "Species Independence of Mutual Information in Coding and Noncoding DNA," *Phys. Rev. E* **61**, 5624-5629 (2000).

(v) Behavior of Complex Systems:

1. B. Jovanovic, **S. V. Buldyrev**, S. Havlin, H. E. Stanley, "Punctuated Equilibrium and 'History Dependent' Percolation," *Phys. Rev. E* **50**, R2403-R2406 (1994).
2. S. Rabinovich, G. Berkolaiko, **S. V. Buldyrev**, and A. Shekhter, "Logistic Map – an Analytical Solution," *Physica A* **218**, 457-460 (1995).
3. G. M. Viswanathan, V. Afanasyev, **S. V. Buldyrev**, E. J. Murphy, P. A. Prince, and H. E. Stanley, "Levy Flight Search Patterns of Wandering Albatrosses," *Nature* **381**, 413-415 (1996).
4. G. M. Viswanathan, **S. V. Buldyrev**, S. Havlin, M. G. E. da Luz, E. Raposo, and H. E. Stanley, "Optimizing the Success of Random Searches," *Nature* **401**, 911-914 (1999).

5. G. M. Viswanathan, **S. V. Buldyrev**, E. Garger, V. A. Kashpur, L. S. Lucena, A. Shlyakhter, J. Tschiersch, and H. E. Stanley, "Log-Normal Behavior of ^{137}Cs Concentration Fluctuations Around Chernobyl," *Phys. Rev. E* **62**, 4389-4392 (2000).
6. **S. V. Buldyrev**, S. Havlin, A. Ya. Kazakov, M. G. E. da Luz, E. P. Raposo, H. E. Stanley, and G. M. Viswanathan, "Average Time Spent by Levy Flights and Walks on an Interval with Absorbing Boundaries," *Phys. Rev. E* **64**, 041108-11 (2001).
7. **S. V. Buldyrev**, M. Gitterman, S. Havlin, A. Ya. Kazakov, M. G. E. da Luz, E. P. Raposo, H. E. Stanley, and G. M. Viswanathan, "Properties of Levy flights on an interval with absorbing boundaries," *Physica A* **302**, 148-161 (2001).
8. E. Raposo, **S. V. Buldyrev**, M. G. da Luz, M. C. Santos, H. E. Stanley, G. M. Viswanathan, "Dynamical robustness of Levy search strategies," *Phys. Rev. Lett.* **91**, 240601-4 (2003).
9. **S. V. Buldyrev**, J. Ferrante, F. R. Zypman, "Dry friction avalanches: Experiment and theory," *Phys. Rev. E* **74**, 066110 (2006).
10. A. M. Edwards, R. A. Phillips, N. W. Watkins, M. P. Freeman, E. J. Murphy, V. Afanasyev, **S. V. Buldyrev**, M. G. E. da Luz, E. P. Raposo, H. E. Stanley, G. M. Viswanathan, "Revisiting Levy flight search patterns of wandering albatrosses, bumblebees and deer," *Nature* **449**, 1044-U5 (2007).
11. D. Rybski, **S. V. Buldyrev**, S. Havlin, F. Liljeros, and H.A. Makse, "Scaling laws of human interaction activity," *Proc. Natl. Acad. Sci.* **106**, 12640-12645 (2009).
12. D. Rybski, **S. V. Buldyrev**, S. Havlin, F. Liljeros, and H.A. Makse, "Communication activity in social networks: growth and correlations," *Europ. Phys. J. B* **84**, 147-159 (2011).
13. D. Rybski, **S.V. Buldyrev**, S. Havlin, F. Liljeros, H.A. Makse, "Communication activity in a social network: relation between long-term correlations and inter-event clustering" ,*Sci. Rep.* **2**, 560 (2012).

(vi) Nonlinear Surface Growth:

1. **S. V. Buldyrev**, S. Havlin, J. Kertesz, H. E. Stanley, and T. Vicsek, "Ballistic Deposition with Power Law Noise: A Variant of the Zhang Model," *Phys. Rev. A* **43**, 7113 (1991).
2. S. Havlin, **S. V. Buldyrev**, H. E. Stanley, and G. H. Weiss, "Probability Distribution of the Interface Width in Surface Roughening: Analogy with a Levy Flight," *J. Phys. A* **24**, L925-L931 (1991).

3. **S. V. Buldyrev**, A.-L. Barabasi, F. Caserta, S. Havlin, H. E. Stanley, and T. Vicsek, "Anomalous Interface Roughening in Porous Media: Experiment and Model," *Phys. Rev. A* **45**, R-8313 (1992).
4. Y. Lereah, I. Zarudi, E. Grunbaum, G. Deutscher, **S. V. Buldyrev**, and H. E. Stanley, "Morphology of Ge:Al Thin Films: Experiments and Model," *Phys. Rev. E* **49**, 649-656 (1994).
5. L. A. N. Amaral, A.-L. Barabasi, **S. V. Buldyrev**, S. Havlin, and H. E. Stanley, "A New Exponent Characterizing the Effect of Evaporation on Imbibition Experiments," *Phys. Rev. Lett.* **72**, 641-644 (1994).
6. L. A. N. Amaral, A.-L. Barabasi, **S. V. Buldyrev**, S. T. Harrington, S. Havlin, R. Sadr and H. E. Stanley, "Avalanches and the Directed Percolation Depinning Model: Experiments, Simulations and Theory," *Phys. Rev. E* **51**, 4655-4673 (1995).
7. **S. V. Buldyrev**, S. Havlin, J. Kertesz, R. Sadr, A. Shehter, and H. E. Stanley, "Surface Roughening with Quenched Disorder in High Dimensions: Exact Results for the Cayley Tree," *Phys. Rev. E* **52**, 373-388 (1995).
8. S. Havlin, L. A. N. Amaral, **S. V. Buldyrev**, S. T. Harrington, and H. E. Stanley, "Dynamics of Surface Roughening with Quenched Disorder," *Phys. Rev. Lett.* **74**, 4205-4208 (1995).
9. H. A. Makse, **S. V. Buldyrev**, H. Leschhorn, and H. E. Stanley, "The Pinning Paths of an Elastic Interface," *Europhys. Lett.* **41**, 251-256 (1998).
10. Y. Lereah, A. Gladkikh, **S. V. Buldyrev**, and H. E. Stanley, "Nanometer scale avalanche dynamics in diffusion limited propagation of Interfaces in Random Ge:Al Alloys," *Phys. Rev. Lett.* **83**, 784-787 (1999).
11. A. Fortini, M. I. Mendeleev, **S. Buldyrev**, and D. Srolovitz, "Asperity contacts at the nanoscale: Comparison of Ru and Au," *J. Appl. Phys.* **104**, 074320 (2008).
12. A. B. de Oliveira, A Fortini, **S. V. Buldyrev**, and D. Srolovitz, "Dynamics of the contact between a ruthenium surface with a single nanoasperity and a flat ruthenium surface: Molecular dynamics simulations", *Phys. Rev. B* **83**, 134101 (2011).
13. H. Eid, G. G. Adams, N. E. McGruer, A. Fortini, **S. Buldyrev** and D. Srolovitz, "A Combined Molecular Dynamics and Finite Element Analysis of Contact and Adhesion of a Rough Sphere and a Flat Surface", *Tribology Transactions* **54**, 920-928, (2011)

(vii) Transport in Disordered Media:

1. S. V. Siparov, **S. V. Buldyrev**, I. O. Protodyakonov, "Kinetics Of Desorption In Biporous Grain Of Sorbent For The Case Of A Nonlinear Thermal Sorption Equation," *J. Appl. Chemistry USSR* **56**, 2482-2486 (1983).
2. **S. V. Buldyrev**, "Calculation Of The Coefficients Of Formal Expansion Of The Green-Function Of A Multidimensional Parabolic Equation And The Diagram Technique," *Vestnik Leningrad. Univ. Ser. Mat. Mek. Astronom.* (1) 10-16 (1983).
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Research on science education (3):

1. **S. V. Buldyrev**, P. Garik, S. Glotzer, G. Huber, T. Mekonen, R. Selinger, M. H. Shann, L. S. Shore, H. E. Stanley, D. Stauffer, E. F. Taylor, and P. A. Trunfio, in *Das zufällige Universum: forschendes Lernen für Wahrscheinlichkeit und Fraktale* (Glatt Publishing Co., Frankfurt, Germany, 1993).
2. E. F. Taylor, **S. V. Buldyrev**, P. Garik, H. E. Stanley and P. Trunfio, "Science Research Models Used by High School Students: Comparison of Two Cases," *Interactive Learning Environments* **4**, 258-270 (1994).
3. **S. V. Buldyrev**, M. J. Erickson, P. Garik, L. S. Shore, H. E. Stanley, E. F. Taylor, P. A. Trunfio, and P. Hickman, "Science Research in the Classroom," *The Physics Teacher* **32**, 411-415 (1995).

Invited Talks (23):

1. "Avalanches and the Directed Percolation Depinning Model," *International Conf. on "Future of Fractals"*, Nagoya, Japan, 25-27 July, 1995.
2. "Scaling Behavior in Economics: Empirical Results and Modeling of Company Growth," *Enrico Fermi School on Physics, Course CXXXIV*, Varenna, Italy, 9-19 July, 1996.
3. "Analysis of DNA Sequences Using Methods of Statistical Physics," *Fifth International Bar-Ilan Conference on Frontiers in Condensed Matter Physics*, Ramat-Gan, Israel, 31 March -3 April 1997.
4. "Long Range Correlations in Noncoding DNA and Simple Repeat Expansion," *XIII Max Born Symposium, Wroclaw, Poland*, 26-30 May, 1999.
5. "Properties of Levy flights on an interval with absorbing boundaries: Application to biological foraging," *Second Minerva Workshop "Frontiers in the Physics of Complex Systems"* Dead Sea, Israel, 25-28 March, 2001.
6. "Levy Flights with Absorbing Boundary Conditions: a Model for Biological Foraging," *85th Statistical Mechanics Conference*, Rutgers University, May 6-8, (2001).
7. "Models for a Liquid-Liquid Phase Transition," *NATO Advances Research Workshop on New Kinds of Phase Transitions: Transformations in Disordered Substances*, Volga River, Russia, 24-28 May 2001

8. "Liquid anomalies and Liquid-Liquid Phase Transitions," *International workshop on Randomness and Complexity*, Eilat, Israel, 5-9 January 2003.
9. "Application of Discrete Molecular Dynamics to Protein Folding and Aggregation," *eCheminfo Web-based conference session*, May 2005 Protein Folding & Misfolding: Applications to Drug Discovery, chaired by Nikolay V. Dokholyan (University of North Carolina) and Marc Fasnacht (Columbia University)
10. "Molecular Dynamics Simulations of Protein Folding and Aggregation: What Coarse Grained Models Can Teach Us?" *XX Sitges Conference on Statistical Mechanics: Physical Biology: from Molecular Interactions to Cellular Behavior*, Sitges, Barcelona, Spain, 5-9 June 2006.
11. "The Growth of Business Firms: Theoretical Framework," *Applications of Physics in Financial Analysis*, Villa Gualino, Torino, Italy, 29 June 29- 1 July 2006.
12. "A Monatomic System with a Liquid-Liquid Critical Point and Two Distinct Glassy States," *Arrested Matter, Taormina, Italy*, November 22nd-26th, 2008.
13. "The structure of shells in complex networks," *The Science of Complexity, International Minerva Workshop*, Eilat, Israel, March 29th-April 1st, 2009.
14. "Collapse transition of hydrophobic polymers in a simplified water model," *CECAM workshop "Modeling and Simulation of Water at Interfaces from Ambient to Supercooled Conditions"*, Lausanne, Switzerland, June 29th to July 1st, 2009
15. "Nature of hydrophobic collapse and cold denaturation in a simple model of water," *6th International Discussion Meeting on Relaxations in Complex Systems*, Rome, Italy, August 30th- September 4th 2009
16. "What can simple models teach us about protein folding?" *Conference On Multiscale Modeling And Simulations Of Hard And Soft Materials*, Bangalore, India, December 17th –December 20th 2009
17. "Modeling anomalous liquids by spherically symmetric potentials"
AIMMS sponsored lecture series:
May 17, 2010, Dalhousie University, Halifax Canada
May 18, 2010, Acadia University in Wolfville, Canada
May 20, 2010, Memorial University, St. John's, Canada
18. "Water-like glass polyamorphism in a monoatomic isotropic Jagla model"
Dynamic Crossover Phenomena In Water And Other Glass-Forming Liquids. Fiesole, Florence, Italy, 11-13 November, 2010
19. "Catastrophic cascade of failures in interdependent networks"
Workshop on "Applications of statistical mechanics to complex systems"

Budapest, 11-13 January, 2011

20. “Widom line in a Liquid-Liquid phase transition”

International conference “Frontiers in statistical physics and complex systems”, Catania (Italy), 2-5 June, 2012

21. “The fragility of interdependency: Coupled networks and switching phenomena”,
108th Statistical Mechanics Conference, Rutgers University, 16 December, 2012

22. “New insights on simulations, theory and experiments in supercooled water”

Location : CECAM-HQ-EPFL, Lausanne, Switzerland

July 3, 2013 - July 5, 2013 Anomalous properties of liquids for a family of models with short range tetrahedral interactions

23. “liquid phase transition in a family of simple models of tetrahedral liquid”, 7th

International Discussion Meeting on Relaxations in Complex Systems Universitat Politècnica de Catalunya Barcelona, Catalonia (Spain) Sunday, July 21st–Friday, July 26th, 2013 Liquid