

SALVATORE TORQUATO

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EDUCATION

Ph.D. (M.E.) State University of New York at Stony Brook, 1981
M.S. (M.E.) State University of New York at Stony Brook, 1977
B.S. (M.E.) Syracuse University, 1975

PROFESSIONAL EXPERIENCE

Lewis Bernard Professor in Natural Sciences, Princeton University, 2018 to present.

Professor, Chemistry, and Princeton Institute of Materials (Associated Faculty in Physics, Program in Applied and Computational Mathematics, Department of Mechanical & Aerospace Engineering, Princeton University, July 1992 to present. During this period, Senior Fellow in the Princeton Center for Theoretical Science and Associated Faculty in the Department of Chemical Engineering.

Member, School of Natural Sciences, Institute for Advanced Study, Princeton, New Jersey (Sabbatical leave from Princeton University), September 2021 - August 2022.

Visitor, School of Natural Sciences, Institute for Advanced Study, Princeton, New Jersey (Sabbatical leave from Princeton University), February 2017 - August 2017.

Visiting Professor, Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, Pennsylvania (Sabbatical leave from Princeton University), September 2012 - August 2013.

Visitor, School of Natural Sciences, Institute for Advanced Study, Princeton, New Jersey, September 2008 to August 2010.

Member, School of Natural Sciences, Institute for Advanced Study, Princeton, New Jersey (Sabbatical leave from Princeton University), September 2007 - August 2008.

Senior Faculty Fellow, Princeton Center for Theoretical Science, Princeton University, December 2005 - August 2013.

Member, School of Mathematics, Institute for Advanced Study, Princeton, New Jersey (Sabbatical leave from Princeton University), September 2003 - August 2004.

Visiting Professor, Center for Statistical Mechanics and Complexity, University of Rome, La Sapienza, Rome, Italy, June - July 2003.

Member, School of Mathematics, Institute for Advanced Study, Princeton, New Jersey (Sabbatical leave from Princeton University), September 1998 - August 1999.

Professor, Departments of Mechanical and Aerospace Engineering and of Chemical Engineering, North Carolina State University, July 1991 to June, 1992.

Visiting Professor, Courant Institute of Mathematical Sciences, New York University, and Engineering and Applied Sciences, Yale University, September 1990 - June 1991.

Associate Professor, Departments of Mechanical and Aerospace Engineering and of Chemical Engineering, North Carolina State University, July 1985 - August 1990.

Assistant Professor, Departments of Mechanical and Aerospace Engineering and of Chemical Engineering, North Carolina State University, July 1982 to June 1985. Joint appointment with Chemical Engineering began January 1984.

Assistant Professor, Department of Mechanical Engineering, General Motors Institute, Flint, Michigan, January 1981 - June 1982.

Research Assistant, Department of Mechanical Engineering, State University of New York at Stony Brook, Doctoral Research, July 1978 - December 1980.

Research Engineer, Grumman Aerospace Corporation, Bethpage, New York, Analysis and measurements of the three-dimensional turbulent vortex flow occurring in an advanced-concept wind energy device, January 1977 - June 1978.

Grumman Masters Fellow, Grumman Aerospace Corporation, Worked in four different sections of the company (Propulsion, Thermodynamics, Energy Conservation, Research) doing thermodynamic, fluid dynamic and heat transfer experimentation and analyses, while pursuing a Masters degree, July 1975 - June 1977.

RESEARCH INTERESTS

Statistical Mechanics of Liquids, Glasses, Quasicrystals and Crystals, Packing Problems, Hyperuniform Systems and Materials, Transport and Mechanical Properties of Heterogeneous Materials, Colloids and Self-Assembly Theory, Photonic Materials, Materials Optimization, Granular Media, Biological Materials, Percolation Theory, Image Science, Cancer Growth Modeling, Biophysics

AWARDS AND HONORS

Lewis Bernard Professor in Natural Sciences, Princeton University, 2018
American Chemical Soc. Joel Hildebrand Award in Theoretical Chemistry of Liquids, 2017
Simons Foundation Fellowship in Theoretical Physics, 2012
Fellow, Society for Industrial & Applied Mathematics, 2009
American Physical Society, David Adler Lectureship Award in Material Physics, 2009
Member, Institute for Advanced Study, 2007 - 2008
Society for Industrial & Applied Mathematics Ralph E. Kleinman Prize, 2007
Fellow, American Physical Society, 2004
Society of Engineering Science William Prager Medal, 2004
Member, Institute for Advanced Study, 2003-2004
Am. Soc. Mechanical Engineers Charles Russ Richards Memorial Award, 2002
Guggenheim Memorial Foundation Fellow, 1998
Member, Institute for Advanced Study, 1998-1999
Am. Soc. Mechanical Engineers Gustus L. Larson Memorial Award, 1994
Fellow, American Society of Mechanical Engineers, 1993
Alcoa Foundation Distinguished Engineering Research Award (5-year period), 1989
Alcoa Foundation Engineering Research Achievement Award, (1-year period), 1987
Grumman Masters Fellow Award, 1975 - 1977

COURSES TAUGHT

Statistical Mechanics (Graduate)
Classical Thermodynamics (Graduate and Undergraduate)
Random Heterogeneous Materials (Graduate)
Random Walks in Biology and Chemistry (Graduate)
Mathematical Methods for Engineering Analysis (Graduate)
Statistical Theory of Fluids (Graduate) - Co-lecturer
Mechanics of Ideal Fluids (Graduate)
Materials Science and Engineering (Graduate and Undergraduate)
Fluid Mechanics (Undergraduate)
Solid Mechanics (Undergraduate)

RESEARCH SUPPORT

Research support has been garnered from the following funding agencies: National Science Foundation, U. S. Department of Energy, Air Force Office of Scientific Research, National Institutes of Health, Petroleum Research Fund, Army Research Office, Office of Naval Research, and Defense Advanced Research Projects Agency.

PROFESSIONAL ACTIVITIES

American Physical Society
Society for Industrial and Applied Mathematics
American Chemical Society
Materials Research Society
Society of Engineering Science
American Society of Mechanical Engineers
American Institute of Chemical Engineers

Doctoral Dissertations Supervised Over the Last 12 Years

Aleksandar Donev, "Jammed Packings of Hard Particles" (2006).

Obioma Uche, "Manipulation of the Density and Structure of Many-particle Systems" (2006).

Mikael C. Rechtsman, "Inverse Problems in Statistical Mechanics and Photonics" (2008).

Jana L. Gevertz, "Multi-Scale Mathematical Modeling of Heterogeneous Tumor Growth" (2009).

Yang Jiao, "Characterization of the Structure of Heterogeneous Materials and Particle Packings" (2010).

Robert D. Batten, "Unusual and Excited States in Classical Interacting Many-Particle Systems" (2011).

Chase E. Zachary, "Characterizing Fluctuations in the Structures of Many-Particle Distributions and Random Heterogeneous Media" (2011).

Adam B. Hopkins, "The Microstructures of Cold Dense Systems as Informed by Hard Sphere Models and Optimal Packings" (2012).

Étienne Marcotte, "Inverse Statistical Mechanics, Lattice Packings, and Glasses" (2013).

Miroslav Hejna, "Nearly-Hyperuniform Network Models of Amorphous Silicon" (2013).

Steven D. Atkinson, "Structure and Rigidity in Maximally Random Jammed Packings of Hard Particles" (2016).

Chaney Lin, "Advances in Natural Quasicrystals and Quasicrystal Tilings" (2017).
Co-advised with Paul Steinhardt.

Ge Zhang, “Exotic Ordered and Disordered Many-Particle Systems with Novel Properties” (2017).

Duyu Chen, “Statistical Mechanics of Hyperuniform Materials and Particle Packings” (2018).

Zheng Ma, “Generation and Structural Characterization of Non-Hyperuniform and Hyperuniform Disordered Systems” (2020).

JaeUk Kim, “Hyperuniformity of Point Patterns and Two-Phase Composite Media” (2020).

Sayantana Dutta, “Data-Driven Computational Models of Fruit Fly Embryogenesis,” (2022). Co-advised with Stanislav Shvartsman.

INVITED LECTURES

Bounds on the Transport Properties of Two-Phase Random Media, Seminar given at the University of Pennsylvania, Philadelphia, Pennsylvania, April, 1982.

Effective Thermal Conductivity of a Two-Phase Random Material, Seminar given at Massachusetts Institute of Technology, Cambridge, Massachusetts, November, 1983.

Effect of Microstructure on the Bulk Properties Two-Phase Disordered Media, Seminar given at Clemson University, Clemson, South Carolina, February 1985.

New Expression for the Effective Thermal Conductivity of a Wide Class of Two-Phase Disordered Composite Media, 9th Symposium of Thermophysical Properties, Boulder, Colorado, June, 1985.

Thermal Conductivity of Composites, Seminar given at Stanford University, Stanford, California, August, 1985.

Predicting Bulk Properties of Composites, Seminar given at Duke University, Durham, North Carolina, October, 1985.

Transport and Mechanical Properties of Two-Phase Porous and Composite Media, Seminar given at Cornell University, Ithaca, New York, February, 1986.

Microstructure and Transport Properties of Disordered Composite Media, University of California Conference on Statistical Mechanics, Davis, California, March, 1986.

Effective Transport Properties of Disordered Multiphase Media from the Microstructure, SIAM Workshop on Multiphase Flow, Leesburg, Virginia, June, 1986.

Transport and Mechanical Properties of Composite Media, Seminar given at DuPont Research, Wilmington, Delaware, January, 1987.

On Predicting the Rate of Diffusion-Controlled Reactions, Seminar given at the Courant Institute of Mathematical Sciences, New York, New York, November, 1987.

Transport Properties of Disordered Heterogeneous Media from the Microstructure, Sixth Symposium on Energy Engineering Sciences, Argonne National Laboratories, Argonne, Illinois, May, 1988.

Bounds on the Effective Transport and Elastic Properties of a Random Array of Cylindrical Fibers in a Matrix, Applied Mechanics and Engineering Sciences Conference, University of California at Berkeley, California, June, 1988.

Transport and Mechanical Properties of Inhomogeneous Materials, Summer School on Inhomogeneous Materials, Royal Institute of Technology, Stockholm, Sweden, August, 1988.

Transport Properties of Heterogeneous Media from the Microstructure, Seminar given at the Benjamin Levich Institute for Physico-Chemical Hydrodynamics, City College of New York, New York, NY, October, 1988.

Bounds on Various Electrostatic and Hydrodynamic Capacities, SIAM Workshop on Random Media and Composites, Leesburg, Virginia, December, 1988. (with J. Rubinstein)

Structure and Transport Properties of Porous Media, Workshop on Porous Media Applications in Geosciences, Department of Energy, Germantown, Maryland, April, 1989.

Statistical Characterization of the Microstructure of Heterogeneous Media, Seminar given at Eastman Kodak Company, Rochester, New York, May, 1989.

Microstructure and Bulk Properties of Random Media, AMS-SIAM Summer Seminar, Mathematics of Random Media, Virginia Polytechnic Institute, Blacksburg, Virginia, June, 1989.

Structure, Transport Properties, and Mechanical Properties of Heterogeneous Media, Seminar given at Johns Hopkins University, Baltimore, Maryland, September 1989.

Structure and Macroscopic Properties of Random Multiphase Media, Seminar given at Duke University, Durham, North Carolina, January, 1990.

Structure and Macroscopic Properties of Random Heterogeneous Media, Seminar given at Yale University, New Haven, Connecticut, February, 1990.

Prediction of Transport and Mechanical Properties of Random Heterogeneous Media, Seminar given at Rensselaer Polytechnic Institute, Troy, New York, May, 1990.

Problems in Random Media: Structure, Diffusion and Flow, Seminar given at Courant Institute of Mathematical Sciences, New York, New York, October, 1990.

Microstructure and Transport Properties of Random Heterogeneous Media, Seminar given at Schlumberger-Doll Research Laboratory, Ridgefield, Connecticut, October, 1990.

Random Heterogeneous Media: Structure and Macroscopic Behavior Seminar given at Duke University, Durham, North Carolina, December, 1990.

Link Between Flow and Diffusion in Porous Media, Statistical Mechanics Meeting, Rutgers University, New Brunswick, New Jersey, December, 1990.

Random Heterogeneous Media: Microstructure, Diffusion, and Flow, Seminar given at Princeton University, Princeton, New Jersey, February, 1991.

Diffusion, Flow and Elastic Behavior of Heterogeneous Materials, Seminar given at the Levich Institute for Physico-Chemical Hydrodynamics, City College of New York, New York, New York March, 1991.

Diffusion and Reaction Among Traps: Some Theoretical and Simulation Results, Models for Non-Classical Reaction Rates, National Institutes of Health, Bethesda, Maryland, March, 1991.

Transport and Mechanical Properties of Heterogeneous Materials, Exxon Research and Engineering Company, Annandale, New Jersey, May, 1991.

Random Heterogeneous Materials: Microstructure and Macroscopic Behavior, Seminar given at the Johns Hopkins University, Baltimore, Maryland, May, 1991.

Microstructure and Effective Properties of Random Particulate Media, Euromech Conference on Random Particulate Media, Schumen, Bulgaria, June, 1991.

Microstructure and Macroscopic Behavior of Random Heterogeneous Materials, Conference on the Physics of Inhomogeneous Materials, International Center for Theoretical Physics, Trieste, Italy, June 1991.

Macroscopic Behavior of Random Inhomogeneous Materials from the Microstructure, Seminar given at the Ecole Polytechnique, Paris, France, June, 1991.

NMR Relaxation in Porous Media, Seminar given at the Institut Francais du Petrole, Paris, France, June, 1991.

Morphology and Macroscopic Behavior of Random Heterogeneous Materials, Seminar given at Princeton University, Princeton, New Jersey, October, 1991.

Transport in Random Porous Media, Tenth Symposium on Energy Engineering Sciences, Argonne National Laboratory, Argonne, Illinois, May 1992.

Microstructure and Macroscopic Behavior of Heterogeneous Materials, National Institute of Standards and Technology, Gaithersburg, Maryland, August, 1992.

Connection Between Morphology and Effective Properties of Heterogeneous Materials, American Society of Mechanical Engineers, Anaheim, California, November, 1992.

Heterogeneous Materials, Seminar given at the University of Pennsylvania, Philadelphia, Pennsylvania, November, 1992.

Morphology and Macroscopic Behavior of Random Heterogeneous Media Seminar given at Rutgers University, New Brunswick, New Jersey, December, 1992.

Heterogeneous Materials: Macroscopic Properties and Microstructure, Exxon Research, Annandale, New Jersey, January, 1993.

Heterogeneous Materials for Fun and Profit, Seminar given at the University of Pennsylvania, Philadelphia, Pennsylvania, March, 1993.

Heterogeneous Materials: Macroscopic Behavior and Microstructure, Seminar given at Michigan State University, East Lansing, Michigan, April, 1993.

Microstructure and Macroscopic Behavior of Heterogeneous Media: A Unified Approach, 69th Statistical Mechanics Meeting, Rutgers University, New Brunswick, New Jersey, May, 1993.

Rigorous Link Between the Effective Elastic Moduli and Effective Conductivity of Composite Materials, MEET'N'93 (Joint ASME, SES, and ASCE Meeting), Charlottesville, Virginia, June, 1993 (with L. V. Gibiansky).

Macroscopic Behavior of Random Media from the Microstructure, MEET'N'93 (Joint ASME, SES, and ASCE Meeting), Charlottesville, Virginia, June, 1993

Numerical Simulations of the Mechanical Properties of Multi-phase Composites, MEET'N'93 (Joint ASME, SES, and ASCE Meeting), Charlottesville, Virginia, June, 1993 (with E. J. Garboczi and A. R. Day).

Macroscopic Behavior of Random Heterogeneous Materials from the Microstructure, National Science Foundation Workshop on *Statistical Characterization of Material Microstructure and its Relation to Material Performance*, The Catholic University of America, Washington, DC , June, 1993.

Unified Methodology to Quantify the Morphology and Properties of Inhomogeneous Media, Electrical Transport and Optical Properties of Inhomogeneous Media Conference, Guanajuato, Mexico, August, 1993.

Unified Methodology to Characterize the Microstructure and Properties of Heterogeneous Materials, Institute for Advanced Study, Princeton, New Jersey, October, 1993.

Unified Methodology to Quantify the Morphology and Properties of Heterogeneous Materials, Worcester Polytechnic Institute, Worcester, Massachusetts, October, 1993.

Link Between the Conductivity and Elastic Moduli of Heterogeneous Materials, American Institute of Chemical Engineers, St. Louis, Missouri, November, 1993.

New Cross Property Relations for Composites, American Society of Mechanical Engineers, New Orleans, Louisiana, December, 1993.

Rigorous Link Between the Microstructure and Bulk Properties of Heterogeneous Materials, Materials Research Society Meeting, San Francisco, California, April, 1994.

Macroscopic Behavior of Random Media from the Microstructure, Society of Industrial and Applied Mathematics on *Emerging Issues in Mathematics and Computation from the Materials Sciences*, Pittsburgh, Pennsylvania, April, 1994.

Unified Methodology to Characterize the Microstructure and Properties of Composite Media, Society of Industrial and Applied Mathematics on *Emerging Issues in Mathematics and Computation from the Materials Sciences*, Pittsburgh, Pennsylvania, April, 1994.

Microstructure-Property Relations for Composite Materials, Gordon Research Conference on *Solid State Studies in Ceramics*, New Hampton School, New Hampshire, August, 1994.

Unified Methodology to Quantify the Microstructure and Properties of Composite Materials, International Union of Theoretical and Applied Mechanics Symposium on *Microstructure-Property Interactions in Composite Materials*, Aalborg, Denmark, August, 1994.

Morphology of Random Two-Phase Media, Workshop on *Space-Filling on Problems*, Les Houches School of Physics, Les Houches, France, January, 1995.

Transport and Mechanical Properties of Random Suspensions, Seminar given at the Benjamin Levich Institute for Hydrodynamics, City College of New York, New York, NY, May, 1995.

Transport Properties of Porous Media from the Microstructure, Thirteenth Symposium on Energy Engineering Sciences, Argonne National Laboratory, Argonne, Illinois, May 1995.

Structure and Properties of Disordered Heterogeneous Media *Controlling Complex Microstructures*, American Ceramics Society, New Orleans, Louisiana, November, 1995.

Rigorous Link Between the Electrical and Mechanical Properties of Composite Materials, Symposium on Electrically Based Microstructural Characterization, Materials Research Society, Boston, Massachusetts, November, 1995.

Random Heterogeneous Materials: Structure and Properties, Seminar given at SUNY Stony Brook, Stony Brook, New York, February, 1996.

A Unified Approach to Quantify the Structure and Properties of Heterogeneous Materials, Seminar given in the Ceramics Dept. at Rutgers University, New Brunswick, New Jersey, February, 1996.

Microstructure and Macroscopic Behavior of Random Heterogeneous Materials, AFOSR Workshop on Structural Mechanics, Virginia Beach, Virginia, June, 1996.

Random Heterogeneous Materials: Structure and Macroscopic Behavior, Applied Mathematics Studies for Materials Studies and Industrial Applications, Pennsylvania State University, State College, Pennsylvania, October, 1996.

Microstructure Characterization and Failure in Composites, International Mechanical Engineering Congress and Exposition, American Society of Mechanical Engineers, Atlanta, Georgia, November, 1996.

Morphology and Physical Properties of Random Heterogeneous Materials, International Mechanical Engineering Congress and Exposition, American Society of Mechanical Engineers, Atlanta, Georgia, November, 1996.

Design of Materials with Extreme Elastic or Thermoelastic Properties using Topology Optimization, International Union of Theoretical and Applied Mechanics, Cairo, Egypt, March, 1997 (with O. Sigmund).

On the Design of Hydrophone Piezocomposites, International Union of Theoretical and Applied Mechanics, Cairo, Egypt, March, 1997 (with O. Sigmund).

Composites with Extremal Thermal Expansion Coefficients, Smart Materials Technologies, International Society for Optical Engineering San Diego, California, March, 1997.

Optimal Design of Hydrophone Piezocomposites, Smart Materials Technologies, International Society for Optical Engineering San Diego, California, March, 1997.

Microstructure and Field Fluctuations in Random Media, Mathematical Aspects of Materials Science, Society of Industrial and Applied Mathematics, Philadelphia, Pennsylvania, May, 1997.

Conductivity and Microstructure of Hierarchical Composites, Mathematical Aspects of Materials Science, Society of Industrial and Applied Mathematics, Philadelphia, Pennsylvania, May, 1997.

Exact Expressions for the Effective Moduli of Random Media, 77th Statistical Mechanics Meeting, Rutgers University, New Brunswick, New Jersey, May, 1997.

Exact Series Expansions for Effective Stiffness Tensor of Composite Media, International Society for Analysis, Applications and Computing, University of Delaware, Newark, Delaware, June, 1997.

Transport Properties and Microstructure of Porous Media via Tomography, Textile Research Institute, Princeton, New Jersey, November, 1997.

Random Media: Exact Property Predictions and Reconstruction Techniques, Seminar given at Yale University, New Haven, Connecticut, April, 1998.

Reconstructing Heterogeneous Materials, American Ceramics Society, Columbus, Ohio, May, 1998.

Transport Properties of Porous Media from the Microstructure, 18th Symposium on Energy Engineering Sciences, Argonne, Illinois, May, 1998.

Reconstructing Heterogeneous Media: An Inverse Problem, 13th US National Congress of Applied Mechanics, Gainesville, Florida, June, 1998.

Exact Expression for the Effective Elastic Tensor of Disordered Composites, 13th US National Congress of Applied Mechanics, Gainesville, Florida, June, 1998.

Modeling of Physical Properties of Composite Materials, 13th US National Congress of Applied Mechanics, Gainesville, Florida, June, 1998.

Reconstructing Random Media, Conference on Computational Physics 1998, Granada, Spain, August, 1998.

Microstructure and Macroscopic Behavior of Random Heterogeneous Materials, AFOSR Workshop on Structural Mechanics, Dayton, Ohio, October, 1998.

Microstructure and Performance of Heterogeneous Materials, Cabot Workshop on Dispersions, Dayton, Ohio, October, 1998.

Random Packings of Spheres, Institute for Advanced Study, Princeton, New Jersey, November, 1998.

Reconstructing Random Media: An Intriguing Inverse Problem, Benjamin Levich Institute for Physico-Hydrodynamics, City College at CUNY, New York, New York, December, 1998.

Random Packings of Spheres: A Statistical-Mechanical Approach, Workshop on *Kepler Conjecture for Sphere Packings*, Institute for Advanced Study, Princeton, New Jersey, January, 1999.

Modeling Brain Tumor Growth, Seminar given at New York Hospital/ Cornell Medical School, New York, New York, March 1999.

Reconstructing Random Media: An Intriguing Inverse Problem, 81st Statistical Mechanics Meeting, Rutgers University, New Brunswick, New Jersey, May, 1999.

Composites, Hard Core/Soft Shell Model, and Brain Tumor Growth, 10th ACBM/NIST Computer Modelling Workshop, National Institute of Standards and Technology, Gaithersburg, Maryland, May, 1999.

Exact Expression for the Effective Elastic Tensor of Disordered Composites, Electrical, Transport and Optical Properties of Inhomogeneous Media V, Hong Kong, China, June, 1999.

Cellular Automata of Brain Tumor Growth Dynamics, Information Processing in Cells And Tissues, Indianapolis, Indiana, August, 1999 (with A. R. Kansal, G. R. Harsh, E. A. Chiocca and T. S. Deisboeck).

Optimally Designed and Multifunctional Composites, AFOSR Workshop on Structural Mechanics, Dayton, Ohio, September, 1999.

Transport Properties and Microstructure of Porous Media, Workshop on *Disordered Porous Materials*, Les Houches School of Physics, Les Houches, France, October, 1999.

Generating Microstructures from Limited Statistical Information, International Mechanical Engineering Conference, Nashville, Tennessee, November, 1999.

Challenges in Multifunctional Material Optimization, Defense Sciences Research Council Workshop on Optimization for Multifunctional Materials, Harvard University, Cambridge, Massachusetts, December, 1999.

Modeling Brain Tumor Growth, IBM Watson Research Center, Yorktown Heights, New York, January, 2000.

Is Random Close Packing of Spheres Well Defined?, Seminar given at California Institute of Technology, Pasadena, California, March, 2000.

Link Between the Effective Properties and Microstructure of Random Heterogeneous Materials, Workshop on *Homogenization and Effective Media Theories*, Mathematical Sciences Research Institute, Berkeley, California, March, 2000.

Advances in the Physics of Random Heterogeneous Media, Seminar given at Massachusetts Institute of Technology, Cambridge, Massachusetts, September, 2000.

Random Heterogeneous Media: Microstructure and Macroscopic Properties, Seminar given at Lehigh University, Bethlehem, Pennsylvania, September, 2000.

Heterogeneous Materials: Bridging the Microscopic and Macroscopic Worlds, Seminar given at Brown University, Providence, Rhode Island, October, 2000.

Random Heterogeneous Materials: Bridging the Microscopic and Macroscopic Worlds, International Mechanical Engineering Conference, Orlando, Florida, November, 2000.

An Interdisciplinary Approach to Brain Tumor Growth Dynamics, "Unanswered Questions and Pressing Challenges at the Interface of Biology and Engineering," International Mechanical Engineering Conference, Orlando, Florida, November, 2000.

Revisiting an Old Concept: Random Close Packing of Hard Spheres, Statistical Physics Seminar, Princeton University, Princeton, New Jersey, April, 2001.

Revisiting an Old Concept: Random Close Packing of Hard Spheres, Mathematical Physics Seminar, Rutgers University, New Brunswick, New Jersey, April, 2001.

Theory of Composites, 12th ACBM/NIST Computer Modelling Workshop, National Institute of Standards and Technology, Gaithersburg, Maryland, June, 2001.

Optimization of Microstructure and Effective Properties of Heterogeneous Materials, 2001 Mechanics and Materials Conference, San Diego, California, June, 2001.

Random Heterogeneous Materials: Bridging the Microscopic and Macroscopic Worlds, 2001 Mechanics and Materials Conference, San Diego, California, June, 2001.

Toward the Maximally Random Jammed State of Sphere Packings, "Challenges in Granular Physics," International Center for Theoretical Physics, Trieste, Italy, August, 2001.

Toward the Maximally Random Jammed State of Particle Packings, Exxon and Mobil Research, Annandale, New Jersey, October, 2001.

Advances in the Microstructure and Properties of Heterogeneous Materials, Seminar given at Northwestern University, Evanston, Illinois, November, 2001.

Jamming, Glasses, and Order Metrics, "Unifying Concepts in Glass Physics," Rome, Italy, February, 2002.

Computational Approach to Brain Tumor Growth Dynamics, Heterogeneity, and Treatment, Seminar given at the University of Virginia, Charlottesville, Virginia, March, 2002.

Sphere Packings, Maximal Disorder, and Jamming, Seminar given at the Massachusetts Institute of Technology, Cambridge, Massachusetts, April, 2002.

Advances in the Microstructure and Properties of Heterogeneous Materials, Seminar given at the University of California at Berkeley, Berkeley, California, April, 2002.

Toward the Maximally Random Jammed State of Sphere Packings, 87th Rutgers Statistical Mechanics Meeting, Rutgers University, New Brunswick, May, 2002.

Computational Approach to Brain Tumor Growth Dynamics, Heterogeneity, and Treatment, *Grand Rounds* presentation given in the Department of Neurosurgery at the University of Pennsylvania, Philadelphia, Pennsylvania, May, 2002.

Maximally Random Jammed State of Sphere Packings, 14th U.S. National Congress of Theoretical & Applied Mechanics, Virginia Tech, Blacksburg, Virginia, June, 2002.

Statistical Models for Heterogeneous Materials, Geometry and Mechanics of Structured Materials, Max Planck Institute for Complex Systems, Dresden, Germany, October, 2002.

The Quantification of Disorder in Heterogeneous Materials, 2002 ASME International Mechanical Engineering Congress, New Orleans, Louisiana, November, 2002.

Sphere Packings, Order Metrics, and Jamming, Seminar given at Cornell University, Ithaca, New York, April, 2003.

Sphere Packings: Metastability, Randomness, and Jamming, Seminar given at the University of Rome, La Sapienza, Rome, Italy, June, 2003.

Local Density Fluctuations, Hyperuniformity, and Order Metrics, Seminar given at the University of Rome, La Sapienza, Rome, Italy, July, 2003.

Random Media: Correlation Functions and Optimization, Seminar given at the University of Rome, La Sapienza, Rome, Italy, July, 2003.

Self-Assembly, Statistical Mechanics, and Materials Optimization, Invited talk given at the Department of Energy Workshop on New Directions in Mechanics, Warrenton, Virginia, September, 2003.

Sphere Packings, Jamming, and Order Metrics, Seminar given at Yale University, New Haven, Connecticut, October, 2003.

The Brain as a Heterogeneous Material, Physics of Neural Tissue Workshop, The Institute for Complex Adaptive Matter, Santa Fe, New Mexico, November, 2003.

Particle Packings, Jamming, and Order Metrics, Member's seminar given at the Institute for Advanced Study, Princeton, New Jersey, November, 2003.

Local Density Fluctuations, Hyperuniformity, and Order Metrics, 91st Rutgers Statistical Mechanics Meeting, Rutgers University, New Brunswick, May, 2004.

Statistical Representation of Microstructures, Gordon Research Conference on *Physical Metallurgy*, Holderness School, Plymouth, New Hampshire, July, 2004.

Random Particle Packings, Jamming, and Glasses, Workshop on *Flexibility in Complex Materials : Glasses, Amorphous Materials and Proteins* in honor of Michael Thorpe's 60th birthday, Sainte-Adèle, Québec, Canada, August, 2004.

Optimally Designed Multifunctional Materials, AFOSR Meeting on *Mechanics of Materials and Devices*, Wintergreen, Virginia, August, 2004.

Particle Packings, Jamming, and Order Metrics Seminar given at the University of Texas at Austin, August, 2004.

Heterogeneous Materials: Property Estimates and Optimization, Seminar given at the University of Texas at Austin, September, 2004.

Sphere Packings, Order Metrics, and Jamming Seminar given at Pennsylvania State University, September, 2004.

Optimal Particle Packings: Problems for the Ages, Plenary Prager Lecture, Society of Engineering Science, Lincoln, Nebraska, October, 2004.

Local Density Fluctuations, Hyperuniformity, and Order Metrics, Statistical Mechanics Seminar, Princeton University, Princeton, November, 2004.

Optimization Methods in Materials Science, Colloquium given at Princeton University in a colloquium in the PICASso/PICSciE series, Princeton, April, 2005.

New Provisional Lower Bounds on the Optimal Density of Sphere Packings, Banff Workshop on *Densest Packings of Spheres*, Banff, Canada, May, 2005.

Optimal Particle Packings: Problems for the Ages, *Frontiers in Soft Condensed Matter Workshop*, Exxon-Mobil Research and Engineering Company, Annandale, New Jersey, May, 2005.

Optimization of Microstructure and Properties of Heterogeneous Materials, Colloquium given at Schlumberger-Doll Research, Ridgefield, Connecticut, June, 2005.

Jamming in Optimal Particle Packings, *Conference on Granular Physics*, Kavli Institute for Theoretical Physics, UC Santa Barbara, June 2005.

Random Heterogeneous Materials for Fun and Profit, *Geophysical Fluid Dynamics Lecture Series*, Woods Hole Oceanographic Institute, Woods Hole, Massachusetts, July, 2005.

Using Topology Optimization to Design Composites with Tailored Properties, Seminar given at the Air Force Research Laboratory, Dayton, Ohio, August, 2005.

Optimally Designed Multifunctional Materials, AFOSR Meeting on *Mechanics of Materials and Devices*, Santa Fe, New Mexico, September, 2005.

Random Heterogeneous Materials and Stochastic Geometry, Plenary Lecture given in Honor of Dietrich Stoyan at the Workshop "Stochastic Geometry and Its Applications," October, 2005.

An Interdisciplinary Approach to Tumor Growth Modeling, Seminar given in the Department of Radiology, University of Pennsylvania, Philadelphia, Pennsylvania, October, 2005.

Bounds on the Optimal Density of Sphere Packings in High Dimensions, Colloquium given in the Program in Applied & Computational Mathematics, Princeton University, Princeton, New Jersey, November, 2005.

Optimal Particle Packings: Problems for the Ages, Seminar given in the Department of Physics, Syracuse University, Syracuse, New York, November, 2005.

An Interdisciplinary Approach to Brain Tumor Growth Dynamics, Heterogeneity, and Treatment, *Grand Rounds* presentation given in the Department of Neurosurgery at New York University School of Medicine, New York, New York, December, 2005.

Optimal Particle Packings: Problems for the Ages, Colloquium given at the Workshop “Physical and Mathematical Aspects of Packing Problems,” Aspen Center for Physics, Aspen, Colorado, June, 2006.

Optimization of Material Microstructures for Fun and Profit, Seminar given at Rohm and Haas Company, Spring House, Pennsylvania, July 2006.

Optimal Particle Packings: Problems for the Ages, Seminar given at Duke University, Durham, North Carolina, August, 2006.

Order Metrics and Classical Ground States, Seminar given at the Princeton Center for Theoretical Physics, Princeton University, Princeton, New Jersey, September, 2006.

Optimal Particle Packings: Problems for the Ages, Seminar given at the Benjamin Levich Institute for Physico-Chemical Hydrodynamics, City College of New York, New York, NY, November, 2006.

Jamming Categories and Order Metrics, Presentation given at the 96th Statistical Mechanics Meeting, Rutgers University, New Brunswick, New Jersey, December, 2006.

Disordered Classical Ground States, Berkeley Mini Statistical Mechanics Meeting, UC Berkeley, Berkeley, California, January, 2007.

Can Disordered Spheres Packings Ever be Maximally Dense? Workshop on “Packing Problems, Classical Ground States and Glasses,” Princeton Center for Theoretical Physics, Princeton University, Princeton, New Jersey, April, 2007.

Optimally Designed Multifunctional Materials, AFOSR Meeting on *Mechanics of Multifunctional Materials and Devices*, Monterey, California, June, 2007.

Quantifying Randomness in Jammed Packings, Presentation given at the “Jamming” Workshop, Aspen Center for Physics, Aspen, Colorado, July, 2007.

Ensemble versus Statistical Geometric Approach in Jammed Packings, Presentation given at the “Jamming” Workshop, Aspen Center for Physics, Aspen, Colorado, July, 2007.

Polytope Picture in Jammed Sphere Packings, Presentation given at the “Jamming” Workshop, Aspen Center for Physics, Aspen, Colorado, August, 2007.

Sphere Packings in High Dimensions: Disorder versus Order, Seminar given at the Institute for Advanced Study, Princeton, New Jersey, October, 2007.

Packing Hyperspheres in High-Dimensional Euclidean Spaces, Society of Engineering Sciences Annual Conference, Texas A&M University, College Station, Texas, October, 2007.

Optimal Sphere Packings in High Dimensions: Disorder vs. Order, Colloquium given at Laboratoire de Physique Théorique et Hautes Energies, Université Pierre et Marie Curie, Jussieu, Paris, France, March, 2008.

Hyperuniform Point Processes and Classical Ground States, Invited talk given in the *Workshop on Spatial Point Processes*, Université Pierre et Marie Curie, Jussieu, Paris, France, March, 2008.

Growing Brain Tumors in Silico, Seminar given to the Systems Biology Group in the School of Natural Sciences, Institute for Advanced Study, Princeton, New Jersey, April, 2008.

Can Disordered Sphere Packings Ever Be Maximally Dense?, Applied Mathematics and Computational Science Colloquium given at the University of Pennsylvania, Philadelphia, Pennsylvania, April, 2008.

Particle Packing Problems in Low Space Dimensions, PCCM Summer School on Condensed Matter Physics, Princeton University, Princeton, New Jersey, August, 2008.

Can Disordered Sphere Packings Ever Be Maximally Dense?, PCCM Summer School on Condensed Matter Physics, Princeton University, Princeton, New Jersey, August, 2008.

Classical Disordered Ground States, Physics Colloquium given at Vanderbilt University, Nashville, Tennessee, October, 2008.

Can Disordered Sphere Packings Ever Be Maximally Dense?, Applied Mathematics Colloquium, New Jersey Institute of Technology, Newark, New Jersey, December, 2008.

Unusual Classical Ground States of Matter, Applied and Computational Mathematics Colloquium, Princeton University, Princeton, New Jersey, February, 2009.

Packing Hyperspheres in High Dimensions: Does Disorder Win?, Physics Colloquium given at the University of Florida, Gainesville, Florida, April, 2009.

Unusual Classical Ground States of Matter, Computations in Science Seminars, James Franck Institute, University of Chicago, Chicago, Illinois, May, 2009.

Dense Packings of Nonspherical Particles, 7th Annual Northeastern Granular Materials Workshop, Yale University, New Haven, Connecticut, June, 2009.

Jammed Particle Packings: From Kepler to Bernal and Beyond, Widely Applied Mathematics Seminar, Harvard University, Cambridge, Massachusetts, September, 2009.

Particle Packing Problems for Fun and Profit, Colloquium given at Microsoft Research, Cambridge, Massachusetts, September, 2009.

Inverse Optimization Techniques for Targeted Self-Assembly, Synthesis and Processing Sciences Workshop, Office of Basic Energy Sciences, Warrenton, Virginia, October, 2009.

From Unusual Ground States to Packing Problems, Physics Colloquium given at New York University, New York, New York, December, 2009.

Unusual Classical Ground States of Matter: Soft Interactions, Geometry and Materials Seminar, School of Mathematics, Institute for Advanced Study, Princeton, New Jersey, February, 2010.

Unusual Classical Ground States of Matter: Sphere Packings, Geometry and Materials Seminar, School of Mathematics, Institute for Advanced Study, Princeton, New Jersey, March, 2010.

Toward an Ising Model for Cancer and Beyond, Workshop on "Understanding Cancer via the Theoretical Sciences," Princeton Center for Theoretical Science, Princeton University, Princeton, New Jersey, April, 2010.

From Unusual Ground States to Packing Problems, Conference on "Optimal Configurations on the Sphere and Other Manifolds," Vanderbilt University, Nashville, Tennessee, May, 2010.

Particle Packing Problems: From Kepler and Beyond, SIAM Conference on "Mathematical Aspects of Materials Science," Philadelphia, Pennsylvania, May, 2010.

A Universal and Complete Descriptor of Material Microstructures, Geometry and Materials Seminar, School of Mathematics, Institute for Advanced Study, Princeton, New Jersey, June, 2010.

An Ising Model of Cancer and Beyond: A View from the CPU, Workshop on "Cellular Differentiation and Response to Stress: Modeling Cancer Initiation and Progression," Sedona, Arizona, August, 2010.

Reformulation of the Covering and Quantizer Problems as Ground States of Interacting Particles, Colloquium given in the Program in Applied and Computational Mathematics, Princeton University, Princeton, New Jersey, December 2010.

Toward an Ising Model of Cancer and Beyond, Lewis-Sigler Institute Retreat, Princeton University, Princeton, New Jersey, January, 2011.

Unusual Classical Ground States of Matter, Materials Seminar, Courant Institute of Mathematical Sciences, New York University, New York City, New York, March, 2011.

Reformulation of the Covering and Quantizer Problems as Ground States of Interacting Particles, Mathematics Colloquium, Courant Institute of Mathematical Sciences, New York University, New York City, New York, March, 2011.

Targeted Self-Assembly, Hyperuniformity, and Novel Photonic Materials, 46th New England Complex Fluids Workshop, Yale University, New Haven, Connecticut, March, 2011.

Unusual Classical Ground States of Matter, Condensed Matter Physics Seminar, University of Rochester, Rochester, New York, May, 2011.

Tumor Heterogeneity: Spatial Organization and Emergent Behaviors, Workshop on the Physics of Tumor Heterogeneity, Princeton University, Princeton, New Jersey, June 2011.

Sphere Packings, Density Fluctuations, Coverings, and Quantizers, Workshop on Sphere Packing and Amorphous Materials, International Centre for Theoretical Physics, Trieste, Italy, July, 2011.

Inverse Optimization Techniques for Targeted Self-Assembly, Synthesis and Processing Sciences Workshop, Office of Basic Energy Sciences, Crystal City, Virginia, September, 2011.

Characterization and Generation of Aperiodic Hyperuniform Systems, Workshop on Towards Unifying Concepts in the Physics of Aperiodic Systems, Princeton Center for Theoretical Science, Princeton University, Princeton, New Jersey, October, 2011.

Geometry and Physics in High-Dimensional Euclidean Spaces, Presentation given at the 106th Statistical Mechanics Meeting, Rutgers University, New Brunswick, New Jersey, December, 2011.

Toward an Ising Model of Cancer and Beyond: A Theorist's Perspective on Cancer, Tutorial given at the 2012 March American Physical Society Meeting, Boston, Massachusetts, February, 2012.

Packing Nonspherical Particles: All Shapes Are Not Created Equal Presentation given at the 2012 March American Physical Society Meeting, Boston, Massachusetts, February, 2012.

Reformulation of the Covering and Quantizer Problems as Energy Minimizations, Fejes Tóth Lecture, Department of Mathematics and Statistics, University of Calgary, Calgary, Canada, April, 2012.

Dense Packings of Nonspherical Bodies and New Tilings of Three-Dimensional Euclidean Space, Discrete Geometry Seminar, Department of Mathematics and Statistics, University of Calgary, Calgary, Canada, April, 2012.

Unusual Low-Temperature States of Matter: Challenging Orthodoxy, Condensed Matter Theory Seminar, Department of Physics, Cornell University, Ithaca, New York, September, 2012.

Packings, Density Fluctuations, Coverings and Quantizers, Discrete Geometry and Combinatorics Seminar, Department of Mathematics, Cornell University, Ithaca, New York, September, 2012.

Unusual Low-Temperature Classical States of Matter, Soft Matter Seminar, University of Pennsylvania, Philadelphia, Pennsylvania, September, 2013.

Unusual Low-Temperature States of Matter: Challenging Orthodoxy, Department of Chemistry Colloquium, Princeton University, Princeton, New Jersey, October, 2012.

Continuum Percolation and Duality with Equilibrium Hard-Hyperparticle Systems, Workshop on Topology: Identifying Order in Complex Systems, University of Pennsylvania, Philadelphia, Pennsylvania, November, 2012.

Designer Potentials and Dense Packings of Hard Nonspherical Particles, Soft Condensed Matter Seminar, Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, Pennsylvania, September, 2012.

Disordered Particle Packings and Duality with Continuum Percolation, Presentation given at the 2012 Materials Research Society Meeting, Boston, Massachusetts, November, 2012.

Characterization and Generation of Aperiodic Hyperuniform Systems, Soft Matter Seminar, University of Pennsylvania, Philadelphia, Pennsylvania, March, 2013.

Unusual Low-Temperature States of Matter: Challenging Orthodoxy, James Franck Institute Seminar, University of Chicago, Chicago, Illinois, April, 2013.

Reconstructing Random Heterogeneous Materials for Fun and Profit, Saint-Gobain Northboro Research and Development Center, Massachusetts, June, 2013.

Designer Materials via Optimization Techniques, Mid-Atlantic Soft Matter Workshop, University of Delaware, Newark, Delaware, July, 2013.

Novel Designer Materials, Colloquium given at the Eindhoven Multiscale Institute, Technical University, Eindhoven, Netherlands, September, 2013.

Optimization in Heterogeneous Materials, Colloquium given at the Eindhoven Multiscale Institute, Technical University, Eindhoven, Netherlands, September, 2013.

Unifying Themes in the Geometry and Physics of Many-Particle Systems, Keynote Lecture at the Workshop on the Geometry and Physics of Spatially Random Structures, Freudenstadt, Germany, September, 2013.

Geometry and Physics in High-Dimensional Euclidean Spaces, Mathematics Colloquium, Pennsylvania State University, State College, Pennsylvania, October, 2013.

Inverse Optimization Techniques for Targeted Self-Assembly, Synthesis and Processing Sciences Workshop, Office of Basic Energy Sciences, Crystal City, Virginia, October, 2013.

Disordered Hyperuniform Many-Particle Systems: A New State of Matter, Physics Colloquium, Columbia University, New York, New York, December, 2013.

“Hyperuniform Disordered Materials: A New State of Matter, Berkeley Mini Statistical Mechanics Meeting, UC Berkeley, Berkeley, California, January, 2014.

Maximally Random Jammed Particle Packings, National Institute of Standards and Technology, Gaithersburg, Maryland, January, 2014.

Disordered Hyperuniform Materials: New States of Matter, Seminar given at the Laboratory for Non-Linear Spectroscopy, University of Florence, Florence, Italy, March 2014.

Hyperuniformity, Jammed Disordered Packings and Novel Photonic Materials, Invited Presentation given at Photonic Materials Workshop at the Laboratory for Non-Linear Spectroscopy, University of Florence, Florence, Italy, March 2014.

Hyperuniformity and Novel Photonic Materials, Seminar given at the University of Calabria, Cosenza, Italy, March, 2014.

Disordered Hyperuniform Materials: New States of Matter, Materials Science and Engineering Seminar, Massachusetts Institute of Technology, Cambridge, Massachusetts, April, 2014.

Randomness, Hyperuniformity and Maximally Random Jammed Particle Packings, Mechanical Engineering Seminar, Massachusetts Institute of Technology, Cambridge, Massachusetts, April, 2014.

Disordered Hyperuniform Materials: New States of Matter, Plenary Talk, American Conference of Theoretical Chemistry (ACTC) 2014, Telluride Science Research Center, Telluride, Colorado, July, 2014.

New Algorithm to Generate Jammed Sphere Packings, Conference on Computational Physics 2014, Boston University, Boston, Massachusetts, August, 2014.

Disordered Energy Minimizing Configurations, Workshop on Minimal Energy Point Sets, Lattices, and Designs,” Erwin Schrödinger Institute, Vienna, Austria, October, 2014.

Reformulation of the Covering and Quantizer Problems as the Ground States of Interacting Particles, Workshop on Minimal Energy Point Sets, Lattices, and Designs,” Erwin Schrödinger Institute, Vienna, Austria, October, 2014.

Disordered Hyperuniform Materials: New States of Matter, Colloquium Talk in the Program in Applied and Computational Mathematics, Princeton University, February, 2015.

Disordered Hyperuniform Materials: New States of Matter, Colloquium Talk in the Department of Physics, Carnegie-Mellon University, Pittsburgh, Pennsylvania, April, 2015.

Ensemble Theory for Stealthy Hyperuniform Disordered Ground States, 113th Rutgers Statistical Mechanics Meeting, Rutgers University, New Brunswick, May, 2015.

Disordered Hyperuniform Point Patterns in Physics, Mathematics and Biology, Shape Up: Exercises in Materials Geometry and Topology, Berlin, Germany, September, 2015.

Designing Multifunctional Materials via Optimization Techniques, Lawrence Livermore National Laboratory, Livermore, California, November, 2015.

Disordered Hyperuniform Materials: New States of Amorphous Matter, Materials Research Society Meeting, Boston, Massachusetts, December, 2015.

Disordered Hyperuniform Point Patterns in Physics, Mathematics and Biology, Predictive Multiscale Materials Modelling, Turing Gateway to Mathematics, Isaac Newton Institute, Cambridge University, Cambridge, England, December, 2015.

Disordered Hyperuniform Many-Particle Systems: New States of Amorphous Matter, Department of Chemistry, Cambridge University, Cambridge, England, December, 2015.

Disordered Hyperuniform Materials: New States of Amorphous Matter, Department of Materials Science and Engineering, Arizona State University, Tempe, Arizona, April, 2016.

Disordered Hyperuniform Materials: Novel States of Amorphous Matter, Society of Industrial and Applied Mathematics Conference on Mathematical Aspects of Materials Science, Philadelphia, Pennsylvania, May, 2016.

Designing Novel Multifunctional Materials via Inverse Optimization Techniques, Data Science and Optimal Learning for Material Discovery and Design, Sponsored by Los Alamos National Laboratory, Santa Fe, New Mexico, May, 2016.

Optimal and Disordered Hyperuniform Point Configurations, Workshop on Optimal and Random Point Configurations: From Statistical Physics to Approximation Theory, Institut Henri Poincaré, Paris, France, June, 2016.

Number Variance, Sphere Packing, Covering and Quantizer Problems: Energy Minimizing Point Configurations, Workshop on Optimal and Random Point Configurations: From Statistical Physics to Approximation Theory, Institut Henri Poincaré, Paris, France, June, 2016.

Disordered Hyperuniform Materials: New States of Amorphous Matter, ESPCI ParisTech, Paris, France, June, 2016.

Fundamental Aspects of the Glass Transition, Water and Water Systems, Ettore Majorana Foundation and Centre for Scientific Culture, Erice, Italy, July, 2016.

Disordered Hyperuniform Materials: New States of Amorphous Matter, Water and Water Systems, Ettore Majorana Foundation and Centre for Scientific Culture, Erice, Italy, July, 2016.

Amorphous Trivalent and Tetrahedral Networks, Water and Water Systems, Ettore Majorana Foundation and Centre for Scientific Culture, Erice, Italy, July, 2016.

Design of Novel Materials via Optimization Techniques, Sixth Karles Invitational Conference, Naval Research Laboratory, Washington, D.C., August, 2016.

Disordered Hyperuniform Materials: New States of Amorphous Matter, Materials Science and Engineering Seminar, University of Pennsylvania, Philadelphia, Pennsylvania, September, 2016.

Continuum Percolation and Duality with Hard-Particle Systems Across Dimensions, ICERM 16 Workshop on Stochastic Topology and Thermodynamic Limits, Brown University, Providence, Rhode Island, October, 2016.

Hyperuniform States of Matter: Overview and Progress Report, Princeton Center for Theoretical Science Workshop on Hyperuniform States of Matter in Physics, Mathematics and Biology, Princeton University, Princeton, New Jersey, December, 2016.

Hyperuniformity of Many-Particle Systems and Its Generalizations, Analysis Math-Physics Seminar, School of Mathematics, Institute for Advanced Study, Princeton, New Jersey, March, 2017.

Disordered Hyperuniform Materials: New States of Amorphous Matter, ExxonMobil Research and Engineering Company, Annandale, New Jersey, April, 2017.

Disordered Hyperuniform Many-Particle Systems: New States of Amorphous Matter, Physics Colloquium, Tufts University, Cambridge, Massachusetts, May, 2017.

Materials Discovery via Optimization Techniques, ExxonMobil 'Longer Range Research Meeting,' Sponsored by ExxonMobil and Princeton Andlinger Center, Princeton Marriott at Forrestal, New Jersey, May, 2017.

Random Heterogeneous Materials for Fun and Profit, ExxonMobil Research and Engineering Company, Annandale, New Jersey, May, 2017.

Design of Hyperuniform Materials with Novel Properties, PRISM Annual Research Symposium, Princeton University, Princeton, New Jersey, March 2018.

Hyperuniform Point Configurations, ICERM 18 Workshop on Computation and Optimization of Energy, Packing, and Covering, Brown University, Providence, Rhode Island, April, 2018.

Hidden Large-Scale Order in Biological Patterns and Collective Behavior, Princeton Center for Theoretical Science Workshop on Regular Patterns in Biology: Causes and Consequences, Princeton University, Princeton, New Jersey, April, 2018.

Uncovering Multiscale Order in the Prime Numbers via Scattering, 119th Rutgers Statistical Mechanics Meeting, Rutgers University, New Brunswick, May, 2018.

Disordered Hyperuniform Materials: New States of Amorphous Matter, National Institute of Standards and Technology, Gaithersburg, Maryland, June, 2018.

Novel Physical Properties of Disordered Stealthy Hyperuniform Materials and Bounded-Hole-Size Property, Workshop on “Correlated Disorder, Hyperuniformity and Local Self-Similarity,” University of Surrey, Surrey, England, June, 2018.

Large-Scale Density Fluctuations and Hyperuniformity: Many-Body Systems, Water and Water Systems, Ettore Majorana Foundation and Centre for Scientific Culture, Erice, Italy, July, 2018.

Large-Scale Density Fluctuations and Hyperuniformity: Network and Water Systems, Water and Water Systems, Ettore Majorana Foundation and Centre for Scientific Culture, Erice, Italy, July, 2018.

Disordered Hyperuniform States of Matter, Workshop of “Correlated Disorder and Hyperuniformity in Soft Matter and Photonics,” Paris, France, July, 2018.

Large-Scale Density Fluctuations and Hyperuniformity in the Physical, Mathematical and Biological Sciences, Penn Institute for Computational Science Colloquium, University of Pennsylvania, Philadelphia, Pennsylvania, October, 2018.

Uncovering Multiscale Order in the Prime Numbers via Scattering, Colloquium given at the Courant Institute of Mathematical Sciences, New York City, New York, November, 2018.

Tailored Disordered Hyperuniform Materials with Novel Properties, Presentation given at the 2018 Materials Research Society Meeting, Boston, Massachusetts, November, 2018.

Generation of Disordered Hyperuniform Materials with Novel Physical Properties, Presentation given at the International Conference on “Colloidal Science and Metamaterials,” Institut Pierre-Gilles de Gennes, Paris, France, February, 2019.

Disordered Hyperuniform Many-Particle Systems via Tessellations, Invited talk given at the 2019 March American Physical Society Meeting, Boston, Massachusetts, March, 2019.

Hyperuniform Many-Particle Systems, Physics Colloquium given at Boston University, Boston, Massachusetts, April, 2019.

Hyperuniform States of Matter, New Trends in Statistical Physics, 50 Years of the Sitges Conference, Sitges, Spain, May 2019.

Large-Scale Density Fluctuations and Hyperuniformity: Fundamentals, Polymers and Soft Materials: Glasses, Gels and Networks, Ettore Majorana Foundation and Centre for Scientific Culture, Erice, Italy, July, 2019.

Large-Scale Density Fluctuations and Hyperuniformity: Applications, Polymers and Soft Materials: Glasses, Gels and Networks, Ettore Majorana Foundation and Centre for Scientific Culture, Erice, Italy, July, 2019.

Multifunctional Disordered Composites with Novel Properties, The 5th Multifunctional Materials and Structures for Defense Workshop, Arlington, Virginia, August, 2019.

Structure and Novel Physical Properties of Disordered Hyperuniform Materials, Plenary Talk delivered at the 1st Conference on Disordered Materials, Potsdam, Germany, September, 2019.

Hidden Order in the Patterns of the Prime Numbers: Physics Meets Mathematics, School of Science Colloquium, The College of New Jersey, Ewing Township, New Jersey, October, 2019.

Tailored Disordered Hyperuniform Materials with Novel Multifunctional Properties, Invited Talk given to Air Force Research Laboratory, Dayton, Ohio, June, 2020.

Extraordinary Disordered Multifunctional Composites, AFOSR Virtual Meeting on Mechanics of Multifunctional Materials and Microsystems, September, 2020.

Hyperuniform States of Matter and Their Novel Bulk Properties, Colloquium (virtual) given to Brookhaven National Laboratory, October, 2020.

Hyperuniform States of Matter, Workshop on Collective Behavior of Particles in Fluids (Virtual) Paris, France, December, 2020.

Hyperuniform States of Matter and Their Novel Characteristics, Colloquium (virtual) given to Physics Department of the City University of New York, Queens College, Flushing, New York, April, 2021.

Hyperuniform Classical and Quantum States of Matter, Seminar (virtual) given in the International Localisation Seminar Series, June, 2021.

Hyperuniform States of Matter and Their Novel Transport Properties, Group of Global Excellence (GoGE) Program” (virtual), Seoul National University, South Korea, August 2021.

Nonlocal Effective Electromagnetic Wave Characteristics of Composite Media: Beyond the Quasistatic Regime, European Optical Society Annual Meeting (virtual), Rome, Italy, September, 2021.

Extraordinary Disordered Multifunctional Composites, AFOSR Virtual Meeting on Mechanics of Multifunctional Materials and Microsystems, September, 2021.

Disordered Hyperuniform Particle Packings, 34th M. Smoluchowski Symposium (virtual), Warsaw, Poland, September, 2021.

Hyperuniform States of Matter and Their Novel Transport Properties, International Colloquium Scuola Superiore Meridionale (virtual), Naples, Italy, December 2021.

Hyperuniformity of Classical and Quantum States of Matter, High Energy Theory Seminar, School of Natural Sciences, Institute for Advanced Study, Princeton, New Jersey, February, 2022.

Diffusion Spreadability as a Dynamic-Based Probe of Hyperuniform and Non-hyperuniform Media Across Length Scales, Invited Symposium on “Disordered Hyperuniform Materials: Discovery and Design”, American Physical Society, Chicago, Illinois, March, 2022.

Hyperuniform States of Matter, Donald R. Hamilton Colloquium, Department of Physics, Princeton, New Jersey, April, 2022.

Dynamic Measure of Hyperuniformity and Nonhyperuniformity in Heterogeneous Media via the Diffusion Spreadability, Geometry, Topology, and Symmetry in Soft and Living Matter, Simons Center for Geometry and Physics, Stony Brook University, Stony Brook, New York, May, 2022.

Order Metrics and Diffusion Spreadability to Characterize Two-Phase Microstructures Across Length Scales, Mathematical Physics Webinar, Rutgers University, September, 2022.

Disordered Hyperuniform Materials and Their Novel Optical Properties, Webinar given to the Optica Photonic Metamaterials Technical Group, September, 2022.

Hyperuniform States of Matter and Their Novel Transport Properties, Workshop on Disorder Correlated Media and Their Applications, University of Florence, Florence, Italy, October, 2022.

Hyperuniformity and Its Connection to Number theory and Discrete Geometry, Program in Number Theory And Physics, Simons Center for Geometry and Physics, State University at Stony Brook, Stony Brook, New York, October, 2022.

Extraordinary Disordered Multifunctional Composites, Multifunctional Materials for Defense Workshop, Arlington, Virginia, December, 2022.

Hyperuniformity of Point Processes and Two-phase Media, Workshop Hyperuniform structures, Rigid Point Processes and Related Topics, Lille, France, February, 2023.

PATENTS

“Narrow-Band Frequency Filters and Splitters, Photonic Sensors, and Cavities Having Pre-Selected Cavity Modes,” Inventors: Paul J. Steinhardt, Marian Florescu, and Salvatore Torquato; United States Patent 9465141 B2; Publication Date: February 6, 2018.

“Non-Crystalline Materials Having Complete Photonic, Electronic, or Phononic Band Gaps,” Inventors: Paul J. Steinhardt, Salvatore Torquato and Marian Florescu; United States Patent 10175389B2; Publication Date: January 8, 2019.

“Density Enhancement Methods and Compositions,” Inventors: Adam Bayne Hopkins and Salvatore Torquato; United States Patent 10207327B2; Publication Date: February 19, 2019.

“Hyperuniform and Nearly Hyperuniform Random Network Materials,” Inventors: Paul J. Steinhardt, Salvatore Torquato and Miroslav Hejna; United States Patent No. 10,662,065; Publication Date: May 26, 2020.

“Multilayer Parameter-Varying Fusion and Deposition Strategies for Additive Manufacturing,” Inventors: Adam Bayne Hopkins, Salvatore Torquato and Brandon Beberwyck; United States Patent 11279078; Publication Date: March 22, 2022.

PUBLICATIONS

Torquato’s published work has been cited over 50, 425 times and his h-index is 117 as of March 23, 2023, according to Google Scholar.

Books

S. Torquato, **Random Heterogeneous Materials: Microstructure and Macroscopic Properties**, Springer-Verlag, New York, 2002.

Chapters in Books

1. S. Torquato, “Diffusion-Absorption and Flow Processes in Disordered Porous Media,” in **Heterogeneous Media: Topics in Mathematical Modelling Methods**, Edited by K. Markov and L. Preziosi, Birkhauser, Boston (2000).
2. S. Torquato, “Modeling of Physical Properties of Composite Materials,” in **Research Trends in Solid Mechanics**, Edited by G. J. Dvorak, Elsevier Science Ltd., Oxford, United Kingdom (2000).

3. S. Torquato, "Theory of Random Heterogeneous Materials," in **Handbook of Materials Modeling**, Ed. Sidney Yip, Springer-Verlag, New York, 2005.
4. S. Torquato, "Microstructure Optimization," in **Handbook of Materials Modeling**, Ed. Sidney Yip, Springer-Verlag, New York, 2005.

Special Invited Articles

S. Torquato, "Glass Transition: Hard Knock for Thermodynamics," **Nature**, **405**, 521, 2000.

M. E. Kassner, S. Nemat-Nasser, Z. Suo, G. Bao, J. C. Barber, K. Brinson, H. Espinosa, S. Granick, P. Gumbsch, K-S. Kim, W. Knauss, L. Kubin, J. Langer, B. C. Larson, L. Mahadevan, A. Majumdar, S. Torquato, and F. van Swol, "New Directions in Mechanics," **Mechanics of Materials**, **37**, 231 (2004).

Articles

1. S. Torquato and G. Stell, "Latent Heat of Vaporization of a Fluid," **Journal of Physical Chemistry**, **85**, 3029 (1981).
2. S. Torquato and G. Stell, "An Equation for the Latent Heat of Vaporization," **Industrial and Engineering Chemistry Fundamentals**, **21**, 202 (1982).
3. S. Torquato and G. Stell, "Microstructure of Two-Phase Random Media. I. The n-Point Probability Functions," **Journal of Chemical Physics**, **77**, 2071 (1982).
4. S. Torquato and G. Stell, "Microstructure of Two-Phase Random Media. II. The Mayer-Montroll and Kirkwood-Salsburg Hierarchies," **Journal of Chemical Physics**, **78**, 3262 (1983).
5. S. Torquato and G. Stell, "Microstructure of Two-Phase Random Media. III. The n-Point Matrix Probability Functions for Fully Penetrable Spheres," **Journal of Chemical Physics**, **79**, 1505 (1983).
6. S. Torquato and G. Stell, "Microstructure of Two-Phase Random Media. IV. Expected Surface Area of a Dispersion of Penetrable Spheres and Its Characteristic Function," **Journal of Chemical Physics**, **80**, 878 (1984).
7. S. Torquato and P. Smith, "Latent Heat of Vaporization of a Widely Diverse Class of Fluids," **Journal of Heat Transfer**, **106**, 252 (1984).
8. S. Torquato, "Bulk Properties of Two-Phase Disordered Media. I. Cluster Expansion for the Effective Dielectric Constant of Dispersions of Penetrable Spheres," **Journal of Chemical Physics**, **81**, 5079 (1984).
9. S. Torquato and F. Lado "Characterisation of the Microstructure of Distributions of Rigid Rods and Discs in a Matrix," **Journal of Physics A: Mathematics & General**, **18**, 141 (1985).
10. S. Torquato and G. Stell, "Microstructure of Two-Phase Random Media. V. The n-Point Matrix Probability Functions for Impenetrable Spheres," **Journal of Chemical Physics**, **82**, 980 (1985).
11. S. Torquato and G. Stell, "Bounds on the Effective Thermal Conductivity of a Dispersion of Fully Penetrable Spheres," **International Journal of Engineering Science**, **23**, 375 (1985).
12. S. Torquato, G. Stell and J. D. Beasley, "Third-Order Bounds on the Effective Bulk and Shear Moduli of a Dispersion of Fully Penetrable Spheres," **International Journal of Engineering Science**, **23**, 385 (1985).
13. J. M. Haile, C. Massobrio, and S. Torquato, "Two-Point Probability Function for Two-Phase Random Media: Computer-Simulation Results for Impenetrable Spheres," **Journal of Chemical Physics**, **83**, 4075 (1985).

14. S. Torquato, "Bulk Properties of Two-Phase Disordered Media. II. Effective Conductivity of a Dilute Dispersion of Penetrable Spheres," **Journal of Chemical Physics**, **83**, 4776 (1985).
15. S. Torquato, "Effective Electrical Conductivity of Two-Phase Disordered Composite Media," **Journal of Applied Physics**, **58**, 3790 (1985).
16. S. Torquato and J. D. Beasley, "Effective Properties of Fiber-Reinforced Materials. I. Bounds on the Effective Thermal Conductivity of Dispersions of Fully Penetrable Cylinders," **International Journal of Engineering Science**, **24**, 415 (1986).
17. S. Torquato and J. D. Beasley, "Effective Properties of Fiber-Reinforced Materials. II. Bounds on the Effective Elastic Moduli of Dispersions of Fully Penetrable Cylinders," **International Journal of Engineering Science**, **24**, 435 (1986).
18. F. Lado and S. Torquato, "Effective Properties of Two-Phase Disordered Composite Media. I. Simplification of Bounds on the Conductivity and Bulk Modulus of Dispersions of Impenetrable Spheres," **Physical Review B**, **33**, 3370 (1986).
19. S. Torquato and F. Lado, "Effective Properties of Two-Phase Disordered Composite Media: II. Evaluation of Bounds on the Conductivity and Bulk Modulus of Dispersions of Impenetrable Spheres," **Physical Review B**, **33**, 6428 (1986).
20. S. Torquato, "Bulk Properties of Two-Phase Disordered Media. III. New Bounds on the Effective Conductivity of Dispersions of Penetrable Spheres," **Journal of Chemical Physics**, **84**, 6345 (1986).
21. S. Torquato, "Effective Transport Properties of Multiphase Media from the Microstructure," **Advances in Multiphase Flow and Related Problems**, Edited by G. Papanicolaou, Society for Industrial and Applied Mathematics, 238 (1986).
22. S. Torquato, "Interfacial Surface Statistics Arising in Diffusion and Flow Problems in Porous Media," **Journal of Chemical Physics**, **85**, 4622 (1986).
23. J. D. Beasley and S. Torquato, "Bounds on the Conductivity of Suspensions of Impenetrable Spheres," **Journal of Applied Physics**, **60**, 3576 (1986).
24. S. Torquato, "Two-Point Distribution Function for a Dispersion of Impenetrable Spheres in a Matrix," **Journal of Chemical Physics**, **85**, 6248 (1986).
25. S. Torquato, "Concentration Dependence of Diffusion-Controlled Reactions Among Static Reactive Sinks," **Journal of Chemical Physics**, **85**, 7178 (1986).
26. S. Torquato, "Microstructure Characterization and Bulk Properties of Disordered Two-Phase Media," **Journal of Statistical Physics**, **45**, 843 (1986).
27. S. Torquato and J. D. Beasley, "Bounds on the Permeability of a Random Array of Partially Penetrable Spheres," **Physics of Fluids**, **30**, 633 (1987).

28. S. Torquato, "Bounds on the Thermal Conductivity of Disordered Heterogeneous Media," **Proceedings of the 1987 ASME/JSME Thermal Engineering Conference**, **2**, 359 (1987).
29. S. Torquato, "Characterization of the Microstructure of Disordered Media: A Unified Approach," **Physical Review B**, **35**, 5385 (1987).
30. S. Torquato, F. Lado, and P. A. Smith, "Bulk Properties of Two-Phase Disordered Media. IV. Mechanical Properties of Suspensions of Penetrable Spheres at Nondilute Concentrations," **Journal of Chemical Physics**, **86**, 6388 (1987).
31. S. Torquato, "Transport Properties of Disordered Composite Materials from the Microstructure," **6th International Conference on Composite Materials**, London, England, Vol. 4, 302 (1987).
32. P. M. Richards and S. Torquato, "Upper and Lower Bounds for the Rate of Diffusion-Controlled Reactions," **Journal of Chemical Physics**, **87**, 4612 (1987).
33. A. K. Sen, F. Lado, and S. Torquato, "Bulk Properties of Composite Media. I. Simplification of Bounds on the Shear Modulus of Suspensions of Impenetrable Spheres," **Journal of Applied Physics**, **62**, 3503 (1987).
34. A. K. Sen, F. Lado, and S. Torquato, "Bulk Properties of Composite Media. II. Evaluation of Bounds on the Shear Modulus of Suspensions of Impenetrable Spheres," **Journal of Applied Physics**, **62**, 4135 (1987).
35. S. Torquato, "Thermal Conductivity of Disordered Heterogeneous Media from the Microstructure," **Reviews in Chemical Engineering**, **4**, 151 (1987).
36. P. A. Smith and S. Torquato, "Computer Simulation Results for the Two-Point Probability Function of Composite Media," **Journal of Computational Physics**, **76**, 176 (1988).
37. S. Torquato and F. Lado, "Bounds on the Conductivity of a Random Array of Cylinders," **Proceedings of the Royal Society of London A**, **417**, 59 (1988).
38. S. Torquato, J. D. Beasley, and Y. C. Chiew, "Two-Point Cluster Function for Continuum Percolation," **Journal of Chemical Physics**, **88**, 6540 (1988).
39. J. Rubinstein and S. Torquato, "Diffusion-Controlled Reactions: Mathematical Formulation, Variational Principles, and Rigorous Bounds," **Journal of Chemical Physics**, **88**, 6372 (1988).
40. S. Torquato and F., "Bounds on the Effective Transport and Elastic Properties of a Random Array of Cylindrical Fibers in a Matrix," **Journal of Applied Mechanics**, **55**, 347 (1988).
41. S. Torquato, "Transport Properties of Disordered Heterogeneous Media from the Microstructure," **Proceedings from the Sixth Symposium on Energy Engineering Sciences**, DOE CONF-8805106, 172 (1988).

42. S. B. Lee and S. Torquato, "Porosity for the Penetrable-Concentric-Shell Model of Two-Phase Disordered Media: Computer-Simulation Results," **Journal of Chemical Physics**, **89**, 3258 (1988).
43. A. K. Sen and S. Torquato, "Series Expansions for Clustering in Continuum- Percolation Models with Interactions," **Journal of Chemical Physics**, **89**, 3799 (1988).
44. S. B. Lee and S. Torquato, "Pair-Connectedness and Mean Cluster Size for Continuum-Percolation Models: Computer-Simulation Results," **Journal of Chemical Physics**, **89**, 6427 (1988).
45. P. A. Smith and S. Torquato, "Computer Simulation Results for Bounds on the Effective Conductivity of Composite Media," **Journal of Applied Physics**, **65**, 893 (1989).
46. S. Torquato and J. Rubinstein, "Diffusion-Controlled Reactions. II. Further Bounds on the Rate Constant," **Journal of Chemical Physics**, **90**, 1644 (1989).
47. J. D. Beasley and S. Torquato, "New Bounds on the Permeability of a Random Array of Spheres," **Physics of Fluids A**, **1**, 199 (1989).
48. A. K. Sen and S. Torquato, "Effective Conductivity of Anisotropic Two-Phase Composite Media," **Physical Review B**, **39**, 4504 (1989).
49. S. B. Lee, I. C. Kim, C. A. Miller, and S. Torquato, "Random-Walk Simulation of Diffusion-Controlled Processes Among Static Traps," **Physical Review B**, **39**, 11833 (1989).
50. S. B. Lee and S. Torquato, "Measure of Clustering in Continuum Percolation: Computer-Simulation of the Two-Point Cluster Function," **Journal of Chemical Physics**, **91**, 1173 (1989).
51. J. Rubinstein and S. Torquato, "Flow in Random Porous Media: Mathematical Formulation, Variational Principles, and Rigorous Bounds," **Journal of Fluid Mechanics**, **206**, 25 (1989).
52. J. Rubinstein and S. Torquato, "Bounds on Various Electrostatic and Hydrodynamic Capacities," **Random Media and Composites**, Eds. R. V. Kohn and G.W. Milton, Society of Industrial and Applied Mathematics, 60 (1989).
53. C. A. Miller and S. Torquato, "Diffusion-Controlled Reactions Among Spherical Traps: Effect of Polydispersity in Trap Size," **Physical Review B**, **40**, 7101 (1989).
54. S. Torquato and I. C. Kim, "Efficient Simulation Technique to Compute Effective Properties of Heterogeneous Media," **Applied Physics Letters**, **55**, 1847 (1989).
55. S. Torquato and A. K. Sen, "Conductivity Tensor of Anisotropic Composite Media from the Microstructure," **Journal of Applied Physics**, **67**, 1145 (1990).

56. S. Torquato, B. Lu and J. Rubinstein, "Nearest-Neighbor Distribution Function for Systems of Interacting Particles," **Journal of Physics A: Mathematics and General**, **23**, L103 (1990).
57. S. Torquato, B. Lu, and J. Rubinstein, "Nearest-Neighbor Distribution Functions in Many-Body Systems," **Physical Review A**, **41**, 2059 (1990).
58. S. Torquato and B. Lu, "Rigorous Bounds on the Fluid Permeability : Effect of Polydispersivity in Grain Size," **Physics of Fluids A**, **2**, 487 (1990).
59. B. Lu and S. Torquato, "Photographic Granularity– Mathematical Formulation and Effect of Impenetrability of Grains," **Journal of the Optical Society of America A**, **7**, 717 (1990).
60. J. F. Thovert, I. C. Kim, S. Torquato, and A. Acrivos, "Bounds on the Effective Properties of Polydispersed Suspensions of Spheres: An Evaluation of Two Relevant Morphological Parameters," **Journal of Applied Physics**, **67**, 6088 (1990).
61. S. B. Lee and S. Torquato, "Monte Carlo Study of Correlated Continuum Percolation: Universality and Percolation Thresholds," **Physical Review A**, **41**, 5338 (1990).
62. S. Torquato, "Relationship Between Permeability and Diffusion-Controlled Trapping Constant of Porous Media," **Physical Review Letters**, **64**, 2644 (1990).
63. S. Torquato, "Bounds on Thermoelastic Properties of Suspensions of Spheres," **Journal of Applied Physics**, **67**, 7223 (1990).
64. S. Torquato and S. B. Lee, "Computer Simulations of Nearest-Neighbor Distribution Functions and Related Quantities for Hard-Sphere Systems," **Physica A**, **167**, 361 (1990).
65. B. Lu and S. Torquato, "Local Volume Fraction Fluctuations in Heterogeneous Media," **Journal of Chemical Physics**, **93**, 3452 (1990).
66. B. Lu and S. Torquato, "n-Point Probability Functions for a Lattice Model of Heterogeneous Media," **Physical Review B**, **42**, 4453 (1990)
67. J. A. Given, I. C. Kim, S. Torquato and G. Stell, "Comparison of Analytical and Numerical Results for the Mean Cluster Density in Continuum Percolation," **Journal of Chemical Physics**, **93** 5128 (1990).
68. F. Lado and S. Torquato, "Two-Point Probability Function for Distributions of Oriented Hard Ellipsoids," **Journal of Chemical Physics**, **93**, 5912 (1990).
69. I. C. Kim and S. Torquato, "Monte-Carlo Calculations of Connectedness and Mean Cluster Size for Bidispersions of Overlapping Spheres," **Journal of Chemical Physics**, **93**, 5998 (1990).

70. I. C. Kim and S. Torquato, "Determination of the Effective Conductivity of Heterogeneous Media by Brownian Motion Simulation," **Journal of Applied Physics**, **68**, 3892 (1990).
71. C. A. Miller and S. Torquato, "Effective Conductivity of Hard Sphere Dispersions," **Journal of Applied Physics** **68**, 5486 (1990).
72. S. Torquato, "Random Heterogeneous Media: Microstructure and Improved Bounds on the Effective Properties," **Applied Mechanics Reviews**, **44**, 37 (1991).
73. C. A. Miller and S. Torquato, "Improved Bounds on Elastic and Transport Properties of Fiber-Reinforced Composites: Effect of Polydispersivity in Fiber Radius," **Journal of Applied Physics**, **69**, 1948 (1991).
74. I. C. Kim and S. Torquato, "Effective Conductivity of Suspensions of Hard Spheres by Brownian Motion Simulation," **Journal of Applied Physics**, **69**, 2280 (1991).
75. B. Lu and S. Torquato, "General Formalism to Characterize the Microstructure of Polydispersed Random Media," **Physical Review A**, **43**, 2078 (1991).
76. S. Torquato and F. Lado, "Trapping Constant, Thermal Conductivity, and the Microstructure of Random Suspensions of Oriented Spheroids," **Journal of Chemical Physics**, **94**, 4453 (1991).
77. C. A. Miller, I. C. Kim and S. Torquato, "Trapping and Flow Among Random Arrays of Oriented Spheroidal Inclusions," **Journal of Chemical Physics**, **94**, 5592 (1991).
78. S. Torquato, "Microstructure and Effective Properties of Random Media," **Lectures in Applied Mathematics**, Edited by W. Kohler and B. White, American Mathematical Society, Rhode Island, **27**, 323 (1991).
79. I. C. Kim and S. Torquato, "First Passage Time Calculation of the Conductivity of Continuum Models of Multiphase Composites," **Physical Review A**, **43**, 3198 (1991).
80. S. Torquato and J. Rubinstein, "Improved Bounds on the Effective Conductivity of High-Contrast Suspensions," **Journal of Applied Physics**, **69**, 7118 (1991).
81. M. Avellaneda, S. Torquato and I. C. Kim, "Diffusion and Geometric Effects for Passive Advection by Random Arrays of Vortices," **Physics of Fluids A**, **3**, 1880 (1991).
82. C.A. Miller, A.R. Kerstein and S. Torquato, "Sterically Hindered Fragmentation in Reactive Solids," **Journal of Physics A: Mathematics and General**, **24**, 3077 (1991).
83. S. Torquato, "Trapping of Finite-Sized Brownian Particles in Porous Media," **Journal of Chemical Physics**, **95**, 2838 (1991).
84. S. Torquato and M. Avellaneda, "Diffusion and Reaction in Heterogeneous Media: Pore Size Distribution, Relaxation Times, and Mean Survival Time," **Journal of Chemical Physics**, **95**, 6477 (1991).

85. M. Avellaneda and S. Torquato, "Rigorous Link Between Fluid Permeability, Electrical Conductivity, and Relaxation Times for Transport in Porous Media," **Physics of Fluids A**, **3**, 2529 (1991).
86. S. Torquato, "Diffusion and Reaction Among Traps: Some Theoretical and Simulation Results," **Journal of Statistical Physics**, **65**, 1173 (1991).
87. S. Torquato and M. Avellaneda "Cross-Property Relations for Transport in Porous Media: Rigorous Link Between Fluid Permeability, Electrical Conductivity, and Relaxation Times," **Multiphase Transport in Porous Media**, American Society of Mechanical Engineers, 73 (1991).
88. I. C. Kim and S. Torquato, "Diffusion of Finite-Sized Brownian Particles in Porous Media," **Journal of Chemical Physics**, **96**, 1498 (1992).
89. B. Lu and S. Torquato, "Lineal-Path Function for Random Heterogeneous Materials," **Physical Review A**, **45**, 922 (1992).
90. S. Torquato and F. Lado, "Improved Bounds on the Effective Elastic Moduli of Random Arrays of Cylinders," **Journal of Applied Mechanics**, **59**, 1 (1992).
91. I. C. Kim and S. Torquato, "Effective Conductivity of Suspensions of Overlapping Spheres," **Journal of Applied Physics**, **71**, 2727 (1992).
92. B. Lu and S. Torquato, "Nearest Surface Distribution Functions for Polydispersed Particle Systems," **Physical Review A**, **45**, 5530 (1992).
93. B. Lu and S. Torquato, "Lineal-Path Function for Random Heterogeneous Materials. 2. Effect of Polydispersivity," **Physical Review A**, **45**, 7292 (1992).
94. S. Torquato, "Transport in Random Porous Media," Proceedings of the Tenth Symposium on Energy Engineering Sciences, CONF-9205147, 102 (1992).
95. S. Torquato and I. C. Kim, "Cross-Property Relations for Momentum and Diffusional Transport in Porous Media," **Journal of Applied Physics**, **72**, 2612 (1992).
96. S. Torquato, "Connection Between the Morphology and Effective Properties of Heterogeneous Materials," **Macroscopic Behavior of Heterogeneous Materials from the Microstructure**, Edited by S. Torquato and D. Krajcinovic, American Society of Mechanical Engineers, AMD-Vol. **147**, 53, (1992).
97. B. Lu and S. Torquato, "Chord-Length and Free-Path Distribution Functions in Many-Body Systems," **Journal of Chemical Physics** **98**, 6472 (1993).
98. S. Torquato and B. Lu, "Chord-Length Distribution Function for Two-Phase Random Media," **Physical Review E**, **47**, 2950 (1993).
99. J. W. Eischen and S. Torquato, "Determining Elastic Behavior of Composites by the Boundary Element Method," **Journal of Applied Physics**, **74**, 159 (1993).

100. I. C. Kim and S. Torquato, "Effective Conductivity of Composites Containing Spheroids: Simulations and Comparison to Theory," **Journal of Applied Physics**, **74**, 1844 (1993).
101. L. V. Gibiansky and S. Torquato, "Link Between the Conductivity and Elastic Moduli of Composite Materials," **Physical Review Letters**, **71**, 2927 (1993).
102. R. Blumenfeld and S. Torquato, "A Coarse-Graining Procedure to Generate and Analyze Heterogeneous Materials— Theory," **Physical Review E**, **48**, 4492 (1993).
103. L. M. Schwartz, N. Martys, D. P. Bentz, E. J. Garboczi, and S. Torquato, "Cross-Property Relations and Permeability Estimation in Model Porous Media," **Physical Review E**, **48**, 4584 (1993).
104. S. Torquato, "Macroscopic Behavior of Random Media from the Microstructure," **Applied Mechanics Reviews** **47**, S29 (1994).
105. L. M. Schwartz, F. Auzerais, J. Dunsmuir, N. Martys, and S. Torquato, "Transport and Diffusion in Three Dimensional Composite Media," **Physica A**, **207**, 28 (1994).
106. S. Torquato, "Unified Methodology to Quantify the Morphology and Properties of Inhomogeneous Media," **Physica A**, **207**, 79 (1994).
107. N. Martys, S. Torquato, and D. P. Bentz, "Universal Scaling of Fluid Permeability for Sphere Packings," **Physical Review E**, **50**, 403 (1994).
108. E. Cinlar and S. Torquato, "Exact Determination of the Two-Point Cluster Function for One-Dimensional Continuum Percolation," **Journal of Statistical Physics**, **78**, 827 (1995).
109. D. Coker and S. Torquato, "Simulation of Diffusion and Reaction in Digitized Heterogeneous Media," **Journal of Applied Physics**, **77**, 955 (1995).
110. S. Torquato, "Mean Nearest-Neighbor Distance in Random Packings of Hard D -Dimensional Spheres," **Physical Review Letters**, **74**, 2156 (1995).
111. S. Torquato, "Nearest-Neighbor Statistics for Packings of Hard Spheres and Disks," **Physical Review E**, **51**, 3170 (1995).
112. D. A. Coker and S. Torquato, "Extraction of Morphological Quantities from a Digitized Medium," **Journal of Applied Physics**, **77**, 6087 (1995).
113. J. Quintanilla and S. Torquato, "New Bounds on the Elastic Moduli of Suspensions of Spheres," **Journal of Applied Physics**, **77**, 4361, (1995).
114. M. D. Rintoul and S. Torquato, "Algorithm to Compute Void Statistics for Random Arrays of Disks," **Physical Review E**, **52**, 2635 (1995).

115. L. V. Gibiansky and S. Torquato, "Geometrical-Parameter Bounds on the Effective Moduli of Composites," **Journal of the Mechanics and Physics of Solids**, **43**, 1587 (1995).
116. S. Torquato and M. D. Rintoul, "Effect of the Interface on the Properties of Composite Media," **Physical Review Letters**, **75**, 4067 (1995).
117. L. V. Gibiansky and S. Torquato, "Rigorous Link Between the Conductivity and Elastic Moduli of Fibre-Reinforced Composite Materials," **Philosophical Transactions of the Royal Society of London A**, **353**, 243 (1995).
118. M. D. Rintoul, S. Torquato and G. Tarjus, "Nearest-Neighbor Statistics in a One-Dimensional Random Sequential Adsorption Process," **Physical Review E**, **53**, 450 (1996).
119. L. V. Gibiansky and S. Torquato, "Bounds on the Effective Moduli of Cracked Materials," **Journal of the Mechanics and Physics of Solids**, **44**, 233 (1996).
120. L. V. Gibiansky and S. Torquato, "Connection Between the Conductivity and Bulk Modulus of Isotropic Composite Materials," **Proceedings of the Royal Society of London A**, **452**, 253 (1996).
121. J. Quintanilla and S. Torquato, "Microstructure and Conductivity of Hierarchical Laminate Composites," **Physical Review E**, **53**, 4368 (1996).
122. L. V. Gibiansky and S. Torquato, "Phase-Interchange Relations for the Elastic Moduli of Two-Phase Composites," **International Journal of Engineering Science**, **34**, 739 (1996).
123. M. D. Rintoul, S. Torquato, C. L. Y. Yeong, S. Erramilli, D. Keane, D. L. Dabbs, and I. A. Aksay, "Structure and Transport Properties of a Porous Magnetic Gel via X-ray Microtomography," **Physical Review E**, **54**, 2663 (1996).
124. D. A. Coker, S. Torquato, and J. H. Dunsmuir "Morphology and Physical Properties of Fountainebleau Sandstone via a Tomographic Analysis," **Journal of Geophysical Research** **101**, 17497 (1996).
125. J. Quintanilla and S. Torquato, "Lineal Measures of Clustering in Overlapping Particle Systems," **Physical Review E**, **54**, 4027 (1996).
126. J. Quintanilla and S. Torquato, "Clustering Properties of d -Dimensional Overlapping Spheres," **Physical Review E** **54**, 5331 (1996); Erratum, **56**, 3732 (1997).
127. M. D. Rintoul and S. Torquato, "Metastability and Crystallization in Hard-Sphere Systems," **Physical Review Letters**, **77**, 4198 (1996).
128. O. Sigmund and S. Torquato, "Composites with Extremal Thermal Expansion Coefficients," **Applied Physics Letters**, **69**, 3203 (1996). Highlighted in "News and Views" section of **Nature**, **385**, 121 (1997).

129. M. D. Rintoul and S. Torquato, "Computer Simulations of Dense Hard-Sphere Systems," **Journal of Chemical Physics**, **105**, 9258 (1996); Erratum, **107**, 2698 (1997).
130. S. Torquato and L. V. Gibiansky, "Rigorous Link Between the Electrical and Mechanical Properties of Composite Materials," Symposium on Electrically Based Microstructural Characterization, Materials Research Society Proceedings eds. R.A. Gerhardt, S.R. Taylor and E.J. Garboczi, vol. 411, pp. 387-392 (1996).
131. J. Quintanilla and S. Torquato, "Microstructure Functions for a Model of Statistically Inhomogeneous Random Media," **Physical Review E**, **55**, 1558 (1997).
132. H. Cheng and S. Torquato, "Effective Conductivity of Periodic Arrays of Spheres with Interfacial Resistance," **Proceedings of the Royal Society of London A**, **453**, 145 (1997).
133. J. Quintanilla and S. Torquato, "Local Volume Fraction Fluctuations in Random Media," **Journal of Chemical Physics**, **106**, 2741 (1997).
134. M. D. Rintoul and S. Torquato, "Reconstruction of the Structure of Dispersions," **Journal of Colloid and Interface Science**, **186**, 467 (1997).
135. L.V. Gibiansky and S. Torquato, "Optimal Design of 1-3 Composite Piezoelectrics," **Structural Optimization**, **13**, 23 (1997).
136. S. Torquato and C. L. Y. Yeong, "Universal Scaling for Diffusion-Controlled Reactions Among Traps," **Journal of Chemical Physics**, **106**, 8814 (1997).
137. J. Quintanilla and S. Torquato, "Clustering in a Continuum Percolation Model," **Advances in Applied Probability**, **29**, 327 (1997).
138. L.V. Gibiansky and S. Torquato, "On the Use of Homogenization Theory to Design Optimal Piezocomposites for Hydrophone Applications," **Journal of the Mechanics and Physics of Solids**, **45**, 689 (1997).
139. O. Sigmund and S. Torquato, "Design of Materials with Extreme Thermal Expansion using a Three-Phase Topology Optimization Method," **Journal of the Mechanics and Physics of Solids**, **45**, 1037 (1997).
140. L.V. Gibiansky and S. Torquato, "Thermal Expansion of Isotropic Multiphase Composites and Polycrystals," **Journal of the Mechanics and Physics of Solids**, **45**, 1223 (1997).
141. H. Cheng and S. Torquato, "Effective Conductivity of Dispersions of Spheres with a Superconducting Interface," **Proceedings of the Royal Society**, **453**, 1331 (1997).
142. S. Torquato, "Exact Expression for the Effective Elastic Tensor of Disordered Composites," **Physical Review Letters** **79**, 681 (1997).

143. M. D. Rintoul and S. Torquato, "Precise Determination of the Critical Threshold and Exponents in a 3D Continuum Percolation Model," **Journal of Physics A: Mathematics and General**, **30**, L585 (1997).
144. H. Cheng and S. Torquato, "Electric Field Fluctuations in Random Dielectric Composites," **Physical Review B**, **56**, 8060 (1997).
145. S. Torquato, "Effective Stiffness Tensor of Composite Media: I. Exact Series Expansions," **Journal of the Mechanics and Physics of Solids**, **45**, 1421 (1997).
146. C. L. Y. Yeong and S. Torquato, "Reconstructing Random Media," **Physical Review E**, **57**, 495 (1998).
147. S. Torquato, L. V. Gibiansky, M. J. Silva, and L. J. Gibson, "Effective Mechanical and Transport Properties of Cellular Solids," **International Journal of Mechanical Sciences**, **40**, 71 (1998).
148. S. Torquato, "Morphology and Effective Properties of Disordered Heterogeneous Media," **International Journal of Solids and Structures**, **35**, 2385 (1998).
149. O. Sigmund, S. Torquato and I.A. Aksay, "On the Design of 1-3 Piezocomposites using Topology Optimization," **Journal of Materials Research**, **13**, 1038, (1998).
150. L.V. Gibiansky and S. Torquato, "New Method to Generate Three-Point Bounds on Effective Properties of Composites: Application to Viscoelasticity," **Journal of the Mechanics and Physics of Solids**, **46**, 749 (1998).
151. L. Berlyand, M. D. Rintoul and S. Torquato, "First-Passage Percolation, Semi-Directed Bernoulli Percolation and Failure in Brittle Materials," **Journal of Statistical Physics**, **91**, 603 (1998).
152. C. L. Y. Yeong and S. Torquato, "Reconstructing Random Media: II. Three-Dimensional Media from Two-Dimensional Cuts," **Physical Review E**, **58**, 224 (1998).
153. M. D. Rintoul and S. Torquato, "Hard-Sphere Statistics Along the Metastable Amorphous Branch," **Physical Review E**, **58**, 532 (1998).
154. L.V. Gibiansky and S. Torquato, "New Approximation for the Effective Energy of Non-linear Conducting Composites," **Journal of Applied Physics**, **84**, 301 (1998).
155. S. Torquato, "Effective Stiffness Tensor of Composite Media: II. Applications to Isotropic Dispersions," **Journal of the Mechanics and Physics of Solids**, **46**, 1411 (1998).
156. T. M. Truskett, S. Torquato, S. Sastry, P. G. Debenedetti, and F. H. Stillinger, "A Structural Precursor to Freezing in the Hard-Disk and Hard-Sphere Systems," **Physical Review E**, **58**, 3083 (1998).
157. S. Sastry, T. M. Truskett, P. G. Debenedetti, S. Torquato, and F. H. Stillinger, "Free Volume in the Hard-Sphere Liquid," **Molecular Physics**, **95**, 289 (1998).

158. D. Cule and S. Torquato, "Electric-Field Distribution in Composite Media," **Physical Review B**, **58**, 11829 (1998).
159. T. M. Truskett, S. Torquato and P. G. Debenedetti, "Density Fluctuations in Many-Body Systems," **Physical Review E**, **58**, 7369 (1998).
160. L.V. Gibiansky and S. Torquato, "Rigorous Connection Between Physical Properties of Porous Rocks," **Journal of Geophysical Research**, (Solid Earth), **103**, 23911 (1998).
161. L. Gibiansky and S. Torquato, "Effective Energy of Nonlinear Elastic and Conducting Composites: Approximations and Cross-Property Bounds," **Journal of Applied Physics**, **84**, 5969 (1998).
162. L.V. Gibiansky and S. Torquato, "Matrix Laminates: Realizable Approximations for the Effective Moduli of Piezoelectric Composites," **Journal of Materials Research**, **14**, 569 (1999).
163. S. Torquato, I. C. Kim and D. Cule, "Effective Conductivity, Dielectric Constant, and Diffusion Coefficient of Digitized Composite Media via First-Passage-Time Equations," **Journal of Applied Physics**, **85**, 1560 (1999).
164. J. Quintanilla and S. Torquato, "Local Volume Fraction Fluctuations in Periodic Heterogeneous Media," **Journal of Chemical Physics**, **110**, 3215 (1999).
165. S. Torquato, C. Yeong, M. D. Rintoul, D. Milius and I. A. Aksay, "Characterizing the Structure and Mechanical Properties of Interpenetrating Multiphase Cermets," **Journal of the American Ceramic Society**, **82**, 1263 (1999).
166. A. P. Roberts and S. Torquato, "Chord-Distribution Functions of Three-Dimensional Random Media: Approximate First-Passage Times of Gaussian Processes," **Physical Review E**, **59**, 4953 (1999).
167. S. Pecullan, L. V. Gibiansky and S. Torquato, "Scale Effects on the Effective Elastic Moduli of Hierarchical Composites," **Journal of the Mechanics and Physics of Solids**, **47**, 1509 (1999).
168. O. Sigmund and S. Torquato, "Design of Smart Composite Materials Using Topology Optimization," **Smart Materials and Structures**, **8**, 365 (1999).
169. T. M. Truskett, P. G. Debenedetti, S. Sastry and S. Torquato, "A Single-Bond Approach to Orientation-Dependent Interactions and its Implications for Water," **Journal of Chemical Physics**, **111**, 2647 (1999).
170. D. Cule and S. Torquato, "Generating Random Media from Limited Microstructural Information via Stochastic Optimization," **Journal of Applied Physics**, **86**, 3428 (1999).

171. B. Xu, F. Arias, S. T. Brittain, X-M. Zhao, B. Gryzbowski, S. Torquato and G. M. Whitesides, "Making Negative Poisson's Ratio Microstructures by Soft Lithography," **Advanced Materials**, **11**, 1186 (1999).
172. J. Quintanilla and S. Torquato "Percolation for a Model of Statistically Inhomogeneous Random Media," **Journal of Chemical Physics**, **111**, 5947 (1999).
173. S. Torquato, "Exact Conditions on Physically Realizable Correlation Functions of Random Media," **Journal of Chemical Physics**, **111**, 8832 (1999).
174. S. Torquato, "Modeling of Physical Properties of Composite Materials," **International Journal of Solids and Structures**, **37**, 411 (2000).
175. A. R. Kansal, S. Torquato, G. R. Harsh, E. A. Chiocca, and T. S. Deisboeck, "Cellular Automaton of Idealized Brain Tumor Growth Dynamics," **Biosystems**, **55**, 119 (2000).
176. S. Torquato, T. M. Truskett and P. G. Debenedetti, "Is Random Close Packing of Spheres Well Defined?," **Physical Review Letters**, **84**, 2064 (2000).
177. A. R. Kansal, S. Torquato, G. R. Harsh, E. A. Chiocca, and T. S. Deisboeck, "Simulated Brain Tumor Growth Dynamics using a Three-Dimensional Cellular Automaton," **Journal of Theoretical Biology**, **203**, 367 (2000).
178. I. C. Kim, D. Cule and S. Torquato, Comment on "Walker Diffusion Method for Calculation of Transport Properties of Composite Materials," **Physical Review E**, **61**, 4659 (2000).
179. C. Manwart, S. Torquato and R. Hilfer, "Stochastic Reconstruction of Sandstones," **Physical Review E**, **62**, 893 (2000).
180. T. M. Truskett, S. Torquato and P. G. Debenedetti, "Towards a quantification of disorder in materials: Distinguishing equilibrium and glassy sphere packings," **Physical Review E** **62**, 993 (2000).
181. A. R. Kansal, T. M. Truskett and S. Torquato, "Nonequilibrium Hard-Disk Packings with Controlled Orientational Order," **Journal of Chemical Physics**, **113**, 4844 (2000).
182. S. Hyun and S. Torquato, "Effective Elastic and Transport Properties of Regular Honeycombs for All Densities," **Journal of Materials Research**, **15**, 1985 (2000).
183. D. K. Stillinger, F. H. Stillinger, S. Torquato, T. M. Truskett and P. G. Debenedetti, "Triangle Distribution and Equation of State for Classical Rigid Disks," **Journal of Statistical Physics**, **100**, 49 (2000).
184. J. Quintanilla, S. Torquato and R. Ziff, "Efficient measurement of the percolation threshold for fully penetrable discs," **Journal of Physics A: Mathematics & General**, **33**, L399 (2000).

185. A. R. Kansal, S. Torquato, E. A. Chiocca, and T. S. Deisboeck, "Emergence of a Subpopulation in a Computational Model of Tumor Growth," **Journal of Theoretical Biology**, **207**, 431 (2000).
186. F. H. Stillinger, D. K. Stillinger, S. Torquato, T. M. Truskett and P. G. Debenedetti, "Equation of State of the Rigid Disk from its Triangle Distribution," **Journal of Chemical Physics**, **113**, 10186 (2000).
187. S. Hyun and S. Torquato, "Designing Composite Microstructures with Targeted Properties," **Journal of Materials Research**, **16**, 280 (2001).
188. N. Sheehan and S. Torquato, "Generating Microstructures with Specified Correlation Functions," **Journal of Applied Physics**, **89**, 53 (2001).
189. T. M. Truskett, P. G. Debenedetti and S. Torquato, "Thermodynamic Implications of Confinement for a Water-Like Fluid," **Journal of Chemical Physics**, **114**, 2401 (2001).
190. S. Torquato and S. Hyun, "Effective-Medium Approximation for Composite Media: Realizable Single-Scale Dispersions," **Journal of Applied Physics**, **89**, 1725 (2001).
191. T. S. Deisboeck, M. E. Berens, A. R. Kansal, S. Torquato, A. Rachamimov, D. N. Louis and E. A. Chiocca, "Patterns of Self-Organization in Tumor Systems: Complex Growth Dynamics in a Novel Brain Tumor Spheroid Model," **Cell Proliferation**, **34**, 115 (2001).
192. F. H. Stillinger, S. Torquato, J. M. Eroles and T. M. Truskett, "Iso- $g^{(2)}$ Processes in Equilibrium Statistical Mechanics," **Journal of Physical Chemistry B** **105**, 6592 (2001).
193. S. Torquato and F. H. Stillinger, "Multiplicity of Generation, Selection, and Classification Procedures for Jammed Hard-Particle Packings," **Journal of Physical Chemistry B** **105**, 11849 (2001).
194. A. R. Kansal and S. Torquato, "Globally and Locally Minimal Weight Branched Tree Networks," **Physica A** **301**, 601 (2001).
195. S. Hyun and S. Torquato, "Optimal and Manufacturable Two-Dimensional, Kagomé-Like Cellular Solids," **Journal of Materials Research** **17**, 137 (2002).
196. A. R. Kansal and S. Torquato, "Prediction of Trapping Rates in Mixtures of Partially Absorbing Spheres," **Journal of Chemical Physics** **116**, 10589 (2002).
197. S. Torquato, "Statistical Description of Microstructures," **Annual Review of Materials Research** **32**, 77 (2002).
198. F. H. Stillinger, H. Sakai and S. Torquato, "Statistical Mechanical Models with Effective Potentials: Definitions, Applications, and Thermodynamic Consequences," **Journal of Chemical Physics** **117**, 288 (2002).

199. H. Sakai, F. H. Stillinger, and S. Torquato "Equi- $g(r)$ Sequences of Systems Derived from the Square-Well Potential," **Journal of Chemical Physics** **117**, 297 (2002).
200. S. Torquato and F. H. Stillinger, "Controlling the Short-Range Order and Packing Densities of Many-Particle Systems," **Journal of Physical Chemistry B**, **106**, 8354 (2002).
201. T. M. Truskett, P. G. Debenedetti and S. Torquato, Comment on "Observations on an Equation of State for Water Confined in Narrow Slit-Pores," **Journal of Chemical Physics**, **117**, 8162 (2002).
202. A. R. Kansal, S. Torquato, and F. H. Stillinger, "Computer Generation of Dense Poly-disperse Sphere Packings," **Journal of Chemical Physics**, **117**, 8212 (2002).
203. A. R. Kansal, S. Torquato, and F. H. Stillinger, "Diversity of Order and Packing Densities for Jammed Hard-Particle Configurations," **Physical Review E**, **66**, 041109 (2002).
204. J. R. Errington, P. G. Debenedetti, and S. Torquato, "Cooperative Origin of Low-Density Domains in Liquid Water," **Physical Review Letters**, **89**, 215503 (2002).
205. S. Torquato, S. Hyun and A. Donev, "Multifunctional Optimal Composite Microstructures: Simultaneous Transport of Heat and Electricity," **Physical Review Letters**, **89**, 266601 (2002).
206. J. E. Schmitz, A. R. Kansal and S. Torquato, "Cellular Automaton Simulation of Brain Tumor Treatment and Resistance," **Journal of Theoretical Medicine**, **4**, 223 (2002).
207. J. R. Errington, P. G. Debenedetti, and S. Torquato, "Quantification of Order in the Lennard-Jones System," **Journal of Chemical Physics**, **118**, 2256 (2003).
208. F. H. Stillinger, H. Sakai and S. Torquato, "Lattice-Based Random Jammed Configurations for Hard Particles," **Physical Review E**, **67**, 031107 (2003).
209. A. Donev and S. Torquato, "Energy-Efficient Actuation in Infinite Lattice Structures," **Journal of the Mechanics and Physics of Solids**, **51**, 1459 (2003).
210. J. Crawford, S. Torquato and F. H. Stillinger, "Aspects of Correlation Function Realizability," **Journal of Chemical Physics**, **119**, 7065 (2003).
211. S. Torquato and F. H. Stillinger, "Local Density Fluctuations, Hyperuniformity, and Order Metrics," **Physical Review E**, **68**, 041113 (2003).
212. S. Torquato, S. Hyun, and A. Donev, "Optimal Design of Manufacturable Three-Dimensional Composites with Multifunctional Characteristics," **Journal of Applied Physics**, **94**, 5748 (2003).
213. C. D. Pham and S. Torquato, "Strong-Contrast Expansions and Approximations for the Effective Conductivity of Multiphase Composites," **Journal of Applied Physics**, **94**, 6591 (2003).

214. S. Hyun, A. M. Karlsson, S. Torquato and A. G. Evans, "Simulated Properties of Kagomé and Tetragonal Truss Core Panels," **International Journal of Solids and Structures**, **40**, 6989 (2003).
215. S. Torquato, A. Donev, and F. H. Stillinger, "Breakdown of Elasticity Theory for Jammed Hard-Particle Packings: Conical Nonlinear Constitutive Theory," **International Journal of Solids and Structures** **40**, 7143 (2003).
216. A. Donev, S. Torquato, F. H. Stillinger, and R. Connelly, "Jamming in Hard Sphere and Disk Packings," **Journal of Applied Physics**, **95**, 989 (2004).
217. A. Donev, I. Cisse, D. Sachs, E. A. Variano, F. H. Stillinger, R. Connelly, S. Torquato, and P. M. Chaikin "Improving the Density of Jammed Disordered Packings using Ellipsoids," **Science**, **33**, 990 (2004).
218. A. Donev, S. Torquato, F. H. Stillinger, and R. Connelly, "A Linear Programming Algorithm to Test for Jamming in Hard-Sphere Packings," **Journal of Computational Physics**, **197**, 139 (2004).
219. S. Torquato and C. D. Pham, "Optimal Bounds on the Trapping Constant and Permeability of Porous Media," **Physical Review Letters**, **92**, 255505 (2004).
220. A. Donev, F. H. Stillinger, P. M. Chaikin, and S. Torquato, "Unusually Dense Crystal Ellipsoid Packings," **Physical Review Letters**, **92**, 255506 (2004).
221. S. Torquato and A. Donev, "Minimal Surfaces and Multifunctionality," **Proceedings of the Royal Society of London A**, **460**, 1849 (2004).
222. O. Uche, F. H. Stillinger, and S. Torquato, "Concerning Maximal Packing Arrangements of Binary Disk Mixtures," **Physica A**, **342**, 428 (2004).
223. A. Gabrielli and S. Torquato, "Voronoi and Void Statistics for Superhomogeneous Point Processes," **Physical Review E**, **70**, 041105 (2004).
224. A. Donev, S. Torquato, F. H. Stillinger, and R. Connelly, Comment on "Jamming at zero temperature and zero applied stress: The epitome of disorder," **Physical Review E**, **70**, 043301 (2004).
225. O. U. Uche, F. H. Stillinger and S. Torquato, "Constraints on Collective Density Variables: Two Dimensions," **Physical Review E**, **70**, 046122 (2004).
226. F. H. Stillinger and S. Torquato, "Pair Correlation Function Realizability: Lattice Model Implications," **Journal of Physical Chemistry B**, **108**, 19589 (2004).
227. C. D. Pham and S. Torquato, "Exactly Realizable Bounds on the Trapping Constant and Permeability," **Journal of Applied Physics**, **97**, 013535 (2005).
228. A. Donev, S. Torquato and F. H. Stillinger, "Neighbor List Collision-Driven Molecular Dynamics for Nonspherical Hard Particles: I. Algorithmic Details," **Journal of Computational Physics**, **202**, 737 (2005).

-
229. A. Donev, S. Torquato and F. H. Stillinger, "Neighbor List Collision-Driven Molecular Dynamics for Nonspherical Hard Particles: II. Applications to Ellipses and Ellipsoids," **Journal of Computational Physics**, **202**, 765 (2005).
230. A. Donev, S. Torquato and F. H. Stillinger, "Pair Correlation Function Characteristics of Nearly Jammed Disordered and Ordered Hard-Sphere Packings," **Physical Review E**, **71**, 011105 (2005).
231. W. Man, A. Donev, F. H. Stillinger, M. T. Sullivan, W. B. Russel, D. Heeger, S. Inati, S. Torquato and P. M. Chaikin, "Experiments on Random Packings of Ellipsoids," **Physical Review Letters**, **94**, 198001 (2005).
232. S. Torquato, A. Donev, A. G. Evans and C. J. Brinker, "Manufacturable Extremal Low-Dielectric, High-Stiffness Cellular Solids," **Journal of Applied Physics**, **97**, 124103 (2005).
233. A. Donev, F. H. Stillinger and S. Torquato, "Unexpected Density Fluctuations in Disordered Jammed Hard-Sphere Packings," **Physical Review Letters**, **95**, 090604 (2005).
234. F. H. Stillinger and S. Torquato, "Realizability Issues for Iso- $g^{(2)}$ Processes," **Molecular Physics**, **103**, 2943 (2005).
235. Y. Jung and S. Torquato, "Fluid Permeabilities of Triply Periodic Minimal Surfaces," **Physical Review E**, **72**, 056319 (2005).
236. M. C. Rechtsman, F. H. Stillinger and S. Torquato, "Optimized Interactions for Targeted Self-Assembly: Application to Honeycomb Lattice," **Physical Review Letters**, **95**, 228301 (2005).
237. O. U. Uche, F. H. Stillinger and S. Torquato, "On the Realizability of Pair Correlation Functions," **Physica A**, **360**, 21 (2006).
238. M. C. Rechtsman, F. H. Stillinger and S. Torquato, "Designed Isotropic Potentials via Inverse Methods for Self-Assembly," **Physical Review E**, **73**, 011406 (2006).
239. A. Donev, J. Burton, F. H. Stillinger, and S. Torquato, "Tetratic Order in the Phase Behavior of a Hard-Rectangle System," **Physical Review B** **73**, 054109 (2006).
240. S. Torquato and F. H. Stillinger, "Exactly Solvable Disordered Hard-Sphere Packing Model in Arbitrary-Dimensional Euclidean Spaces," **Physical Review E**, **73**, 031106 (2006).
241. A. Donev, F. H. Stillinger and S. Torquato, "Do Binary Hard Disks Exhibit an Ideal Glass Transition?," **Physical Review Letters**, **96**, 225502 (2006).
242. J. H. Conway and S. Torquato, "Packing, Tiling and Covering with Tetrahedra," **Proceedings of the National Academy of Sciences**, **103**, 10612 (2006).

243. A.-P. Hynninen, T. Panagiotopoulos, M. C. Rechtsman, F. H. Stillinger and S. Torquato, "Global Phase Diagram of the Honeycomb Potential," **Journal of Chemical Physics**, **125**, 024505 (2006).
244. M. C. Rechtsman, F. H. Stillinger and S. Torquato, "Self-Assembly of the Simple Cubic Lattice via an Isotropic Potential," **Physical Review E**, **74**, 021404 (2006).
245. O. Uche, S. Torquato and F. H. Stillinger, "Collective Coordinates Control of Density Distributions," **Physical Review E**, **74**, 031104 (2006).
246. S. Torquato and F. H. Stillinger, "New Conjectural Lower Bounds on the Optimal Density of Sphere Packings," **Experimental Mathematics**, **15**, 307 (2006).
247. S. Torquato, "Necessary Conditions on Realizable Two-Point Correlation Functions of Random Media," **Industrial and Engineering Chemistry Research**, **45**, 6923 (2006).
248. P. M. Chaikin, A. Donev, W. Man, F. H. Stillinger, and S. Torquato, "Some Observations on the Random Packing of Hard Ellipsoids," **Industrial and Engineering Chemistry Research**, **45**, 6960 (2006).
249. M. Skoge, A. Donev, F. H. Stillinger and S. Torquato, "Packing Hyperspheres in High-Dimensional Euclidean Spaces," **Physical Review E**, **74**, 041127 (2006).
250. J. L. Gevertz and S. Torquato, "Modeling the Effects of Vasculature Evolution on Early Brain Tumor Growth," **Journal of Theoretical Biology**, **243**, 517 (2006).
251. S. Torquato, O. U. Uche and F. H. Stillinger, "Random Sequential Addition of Hard Spheres in High Euclidean Dimensions," **Physical Review E**, **74**, 061308 (2006).
252. Y. Jung, K. T. Chu and S. Torquato, "A Variational Level Set Approach for Surface Area Minimization of Triply Periodic Media," **Journal of Computational Physics**, **223**, 711 (2007).
253. M. C. Rechtsman, F. H. Stillinger and S. Torquato, "Synthetic Diamond and Wurtzite Structures Self-Assemble with Isotropic Pair Interactions," **Physical Review E**, **75**, 031403 (2007).
254. A. Donev, R. Connelly, F. H. Stillinger and S. Torquato, "Underconstrained Jammed Packings of Nonspherical Hard Particles: Ellipses and Ellipsoids," **Physical Review E**, **75**, 051304 (2007).
255. H. Fan, C. Hartshorn, T. Buchheit, D. Tallant, R. Sullivan, D. J. Lacks, S. Torquato, and C. J. Brinker, "Evidence for New Modulus/Density Scaling Relationships and Framework Architectures in Porous, Self-Assembled Nanostructures," **Nature Materials**, **6**, 418 (2007).
256. A. Donev, F. H. Stillinger and S. Torquato, "Calculating the Free Energy of Nearly Jammed Hard-Particle Packings Using Molecular Dynamics," **Journal of Computational Physics**, **225**, 509 (2007).

-
257. Y. Jiao, F. H. Stillinger and S. Torquato, "Modeling Heterogeneous Materials via Two-Point Correlation Functions: Basic Principles," **Physical Review E**, **76**, 031110 (2007).
258. A. Donev, F. H. Stillinger and S. Torquato, "Configurational Entropy of Binary Hard-Disk Glasses: Nonexistence of an Ideal Glass Transition," **Journal of Chemical Physics**, **127**, 124509 (2007).
259. S. Torquato and F. H. Stillinger, "Toward the Jamming Threshold of Sphere Packings: Tunneled Crystals," **Journal of Applied Physics**, **102**, 093511 (2007).
260. M. C. Rechtsman, F. H. Stillinger and S. Torquato, "Negative Thermal Expansion in Single-Component Systems with Isotropic Interactions," **Journal of Physical Chemistry A**, **111**, 12816 (2007).
261. S. Torquato and F. H. Stillinger, "New Duality Relations for Classical Ground States," **Physical Review Letters**, **100**, 020602 (2008).
262. A. Gabrielli, M. Joyce and S. Torquato, "Tilings of Space and Superhomogeneous Point Processes," **Physical Review E**, **77**, 031125 (2008).
263. Y. Jiao, F. H. Stillinger and S. Torquato, "Modeling Heterogeneous Materials via Two-Point Correlation Functions: II. Algorithmic Details and Applications," **Physical Review E**, **77**, 031135 ((2008).
264. A. Scardicchio, F. H. Stillinger and S. Torquato, "Estimates of the Optimal Density of Sphere Packings in High Dimensions," **Journal of Mathematical Physics**, **49**, 043301 (2008).
265. M. C. Rechtsman and S. Torquato, "Effective Dielectric Tensor for Electromagnetic Wave Propagation in Random Media," **Journal of Applied Physics**, **103**, 084901 (2008).
266. C. E. Zachary, F. H. Stillinger and S. Torquato, "Gaussian-Core Model Phase Diagram and Pair Correlations in High Euclidean Dimensions," **Journal of Chemical Physics**, **128**, 224505 (2008).
267. Y. Jiao, F. H. Stillinger and S. Torquato, "Optimal Packings of Superdisks and the Role of Symmetry," **Physical Review Letters**, **100**, 245504 (2008).
268. R. D. Batten, F. H. Stillinger and S. Torquato, "Classical Disordered Ground States: Super-Ideal Gases, and Stealth and Equi-Luminous Materials," **Journal of Applied Physics**, **104**, 033504 (2008).
269. M. C. Rechtsman, H-C. Jeong, P. M. Chaikin, S. Torquato and P. J. Steinhardt, "Optimized Structures for Photonic Quasicrystals," **Physical Review Letters**, **101**, 073902 (2008).

-
270. J. L. Gevertz and S. Torquato, "A Novel Three-Phase Model of Brain Tissue Microstructure," **PLoS Computational Biology**, **4**, e1000152 (2008).
271. M. C. Rechtsman, F. H. Stillinger and S. Torquato, "Negative Poisson's Ratio Materials via Isotropic Interactions," **Physical Review Letters**, **101**, 085501 (2008).
272. J. L. Gevertz, G. Gillies and S. Torquato, "Simulating Tumor Growth in Confined Heterogeneous Environments," **Physical Biology**, **5**, 036010 (2008).
273. S. Torquato, A. Scardicchio and C. E. Zachary, "Point Processes in Arbitrary Dimension from Fermionic Gases, Random Matrix Theory, and Number Theory," **Journal of Statistical Mechanics: Theory and Experiment**, P11019 (2008).
274. S. Torquato, "Inverse Optimization Techniques for Targeted Self-Assembly," **Soft Matter**, **5**, 1157 (2009).
275. A. B. Hopkins, F. H. Stillinger and S. Torquato, "Dense Sphere Packings from Optimized Correlation Functions," **Physical Review E**, **79**, 031123 (2009).
276. A. Scardicchio, C. E. Zachary and S. Torquato, "Statistical Properties of Determinantal Point Processes in High-Dimensional Euclidean Spaces," **Physical Review E**, **79**, 041108 (2009).
277. Y. Jiao, F. H. Stillinger and S. Torquato, "Optimal Packings of Superballs," **Physical Review E**, **79**, 041309 (2009).
278. J. Gevertz and S. Torquato, "Mean Survival Times of Absorbing Triply Periodic Minimal Surfaces," **Physical Review E**, **80**, 011102 (2009).
279. R. D. Batten, F. H. Stillinger and S. Torquato, "Novel Low-Temperature Behavior in Classical Many-Particle Systems," **Physical Review Letters**, **103**, 050602 (2009).
280. S. Torquato and Y. Jiao, "Dense Packings of the Platonic and Archimedean Solids," **Nature**, **460**, 876 (2009).
281. R. D. Batten, F. H. Stillinger and S. Torquato, "Interactions Leading to Disordered Ground States and Unusual Low-Temperature Behavior," **Physical Review E**, **80**, 031105 (2009).
282. Y. Jiao, F. H. Stillinger, and S. Torquato, "A Superior Descriptor of Random Textures and Its Predictive Capacity," **Proceedings of the National Academy of Sciences**, **106**, 17634 (2009).
283. S. Torquato and Y. Jiao, "Dense Packings of Polyhedra: Platonic and Archimedean Solids," **Physical Review E**, **80**, 041104 (2009).
284. M. Florescu, S. Torquato, and P. J. Steinhardt, "Complete Band Gaps in Two-Dimensional Photonic Quasicrystals," **Physical Review B**, **80**, 155112 (2009).

-
285. M. C. Rechtsman and S. Torquato, "New Method for Obtaining Upper Bounds on Photonic Band Gaps," **Physical Review B**, **80**, 155126 (2009).
286. J. L. Gevertz and S. Torquato, "Growing Heterogeneous Tumors in Silico," **Physical Review E**, **80**, 051910 (2009).
287. M. Florescu, S. Torquato and P. J. Steinhardt, "Designer Disordered Materials With Large Complete Photonic Band Gaps," **Proceedings of the National Academy of Sciences**, **106**, 20658 (2009).
288. C. E. Zachary and S. Torquato, "Hyperuniformity in Point Patterns and Two-Phase Random Heterogeneous Media," **Journal of Statistical Mechanics: Theory and Experiment**, P12015 (2009).
289. Y. Jiao, F. H. Stillinger, and S. Torquato, "Geometrical Ambiguity of Pair Statistics: Point Configurations," **Physical Review E**, **81**, 011105 (2010).
290. A. B. Hopkins, F. H. Stillinger and S. Torquato, "Spherical Codes, Maximal Local Packing Density, and the Golden Ratio," **Journal of Mathematical Physics**, **51**, 043302 (2010).
291. Y. Jiao, F. H. Stillinger and S. Torquato, "Distinctive Features Arising in Maximally Random Jammed Packings of Superballs," **Physical Review E**, **81**, 041304 (2010).
292. A. B. Hopkins, F. H. Stillinger and S. Torquato, "Densest Local Packing Diversity of N Spheres Around a Central Sphere: General Concepts and Application to Two Dimensions," **Physical Review E**, **81**, 041305 (2010).
293. S. Torquato and Y. Jiao, "Exact Constructions of a Family of Dense Periodic Packings of Tetrahedra," **Physical Review E**, **81**, 041310 (2010).
294. R. D. Batten, F. H. Stillinger and S. Torquato, "Phase Behavior of Colloidal Superballs: Shape Interpolation from Spheres to Cubes," **Physical Review E**, **81**, 061105 (2010).
295. Y. Jiao, F. H. Stillinger, and S. Torquato, "Geometrical Ambiguity of Pair Statistics. II. Heterogeneous Media," **Physical Review E**, **82**, 011106 (2010).
296. S. Torquato, "Optimal Design of Heterogeneous Materials," **Annual Review of Materials Research**, **40**, 101 (2010).
297. S. Torquato and F. H. Stillinger, "Jammed Particle Packings: From Kepler to Bernal and Beyond," **Reviews of Modern Physics**, **82**, 2633 (2010).
298. S. Torquato, "Reformulation of the Covering and Quantizer Problems as Ground States of Interacting Particles," **Physical Review E**, **82**, 056109 (2010).
299. M. Florescu, S. Torquato and P. J. Steinhardt, "Effects of Random Link Removal on the Photonic Band Gaps of Honeycomb Networks," **Applied Physics Letters**, **97**, 201103 (2010).

300. S. Torquato and Y. Jiao, "Robust Algorithm to Generate a Diverse Class of Dense Disordered and Ordered Sphere Packings via Linear Programming," **Physical Review E**, **82**, 061302 (2010).
301. Y. Jiao, F. H. Stillinger and S. Torquato, "Nonuniversality of Density and Disorder of Jammed Sphere Packings," **Journal of Applied Physics**, **109**, 013508 (2011).
302. W. T. Gilleland, S. Torquato and W. B. Russel, "New Bounds on the Sedimentation Velocity for Hard, Charged, and Adhesive Hard Sphere Colloids," **Journal of Fluid Mechanics**, **667**, 403 (2011).
303. A. B. Hopkins, F. H. Stillinger, and S. Torquato, "Densest Local Packing Diversity. II. Application to Three Dimensions," **Physical Review E**, **83**, 011304 (2011).
304. S. Torquato, "Toward an Ising Model of Cancer and Beyond," **Physical Biology**, **8**, 015017 (2011).
305. É. Marcotte, F. H. Stillinger and S. Torquato, "Optimized Monotonic Convex Pair Potentials Stabilize Low-Coordinated Crystals," **Soft Matter**, **7**, 2332 (2011).
306. S. Torquato, C. E. Zachary and F. H. Stillinger, "Duality Relations for the Classical Ground States of Soft-Matter Systems," **Soft Matter**, **7**, 3780 (2011).
307. É. Marcotte, F. H. Stillinger and S. Torquato, "Unusual Ground States via Monotonic Convex Pair Potentials," **Journal of Chemical Physics**, **134**, 164105 (2011).
308. C. E. Zachary, Y. Jiao and S. Torquato, "Hyperuniform Long-Range Correlations are a Signature of Disordered Jammed Hard-Particle Packings," **Physical Review Letters**, **106**, 178001 (2011).
309. C. E. Zachary and S. Torquato, "Anomalous Local Coordination, Density Fluctuations, and Void Statistics in Disordered Hyperuniform Many-Particle Ground States," **Physical Review E**, **83**, 051133 (2011).
310. C. E. Zachary, Y. Jiao and S. Torquato, "Hyperuniformity, Quasi-Long-Range Correlations, and Void-Space Constraints in Maximally Random Jammed Particle Packings. I. Polydisperse Spheres" **Physical Review E**, **83**, 051308 (2011).
311. C. E. Zachary, Y. Jiao and S. Torquato, "Hyperuniformity, Quasi-Long-Range Correlations, and Void-Space Constraints in Maximally Random Jammed Particle Packings. II. Anisotropy in Particle Shape" **Physical Review E**, **83**, 051309 (2011).
312. R. B. Batten, D. A. Huse, F. H. Stillinger, and S. Torquato, "Novel Ground-State Crystals with Controlled Vacancy Concentrations: From Kagomé to Honeycomb to Stripes," **Soft Matter**, **7**, 6194 (2011).
313. J. H. Conway, Y. Jiao and S. Torquato, "A New Family of Tilings of Three-Dimensional Euclidean Space by Tetrahedra and Octahedra," **Proceedings of the National Academy of Sciences**, **108**, 11009 (2011).

314. R. D. Batten, F. H. Stillinger and S. Torquato, "Inherent Structures for a Soft Long-Range Interaction in Two-Dimensional Many-Particle Systems," **Journal of Chemical Physics**, **135**, 054104 (2011).
315. A. B. Hopkins, Y. Jiao, F. H. Stillinger and S. Torquato, "Phase Diagram and Structural Diversity of the Densest Binary Sphere Packings," **Physical Review Letters**, **107**, 125501 (2011).
316. C. E. Zachary and S. Torquato, "High-Dimensional Generalizations of the Kagomé and Diamond Crystals and the Decorrelation Principle for Periodic Sphere Packings," **Journal of Statistical Mechanics: Theory and Experiment**, P10017 (2011).
317. Y. Jiao and S. Torquato, "Communication: A Packing of Truncated Tetrahedra that Nearly Fills All of Space and Its Melting Properties," **Journal of Chemical Physics**, **135**, 151101 (2011).
318. Y. Jiao and S. Torquato, "Maximally Random Jammed Packings of Platonic Solids: Hyperuniform Long-Range Correlations and Isostaticity," **Physical Review E**, **84**, 041309 (2011).
319. C. E. Zachary and S. Torquato, "Improved Reconstructions of Random Media Using Dilation and Erosion Processes," **Physical Review E**, **84**, 056102 (2011).
320. Y. Jiao, H. Berman, T-R. Kiehl and S. Torquato, "Spatial Organization and Correlations of Cell Nuclei in Brain Tumors," **PLoS One**, **6**, e27323 (2011).
321. H. Cohn, Y. Jiao, A. Kumar and S. Torquato, "Rigidity of Spherical Codes," **Topology and Geometry**, **15**, 2235 (2011).
322. Y. Jiao and S. Torquato, "Emergent Behavior From a Cellular Automaton Model for Invasive Tumor Growth in Heterogeneous Microenvironments," **PLoS Computational Biology**, **7**, e1002314 (2011).
323. S. Torquato, "Effect of Dimensionality on the Continuum Percolation of Overlapping Hyperspheres and Hypercubes," the **Journal of Chemical Physics**, **136**, 054106 (2012).
324. C. J. Gommers, Y. Jiao and S. Torquato, "Density of States for a Specified Correlation Function and the Energy Landscape," **Physical Review Letters**, **108**, 080601 (2012).
325. A. B. Hopkins, F. H. Stillinger and S. Torquato, "Densest Binary Sphere Packings," **Physical Review E**, **85**, 021130 (2012).
326. G. W. Scherer, J. Zhang, J. A. Quintanilla and S. Torquato, "Hydration and Percolation at the Setting Point," *Cement and Concrete Research*, **42** 665 (2012).
327. Y. Jiao and S. Torquato, "Diversity of Dynamics and Morphologies of Invasive Solid Tumors," **AIP Advances**, **2**, 011003 (2012).

328. C. J. Gommers, Y. Jiao and S. Torquato, "Microstructural Degeneracy Associated with a Two-Point Correlation Function and Its Information Content," **Physical Review E**, **85**, 051140 (2012).
329. Y. Jiao and S. Torquato, "Characterization of the Microstructure and Transport Properties of Biopolymer Networks," **Physical Biology**, **9**, 036009 (2012).
330. S. Torquato and Y. Jiao, "Organizing Principles for Densest Packings of Nonspherical Hard Particles: Not All Shapes Are Created Equal," **Physical Review E**, **86**, 011102 (2012).
331. S. Torquato and Y. Jiao, "Effect of Dimensionality on the Continuum Percolation of Overlapping Hyperspheres and Hypercubes: II. Simulation Results and Analyses," **Journal of Chemical Physics**, **137**, 074106 (2012).
332. A. B. Hopkins, F. H. Stillinger and S. Torquato, "Nonequilibrium Static Diverging Length Scale on Approaching a Prototypical Model Glassy State," **Physical Review E**, **86**, 021505 (2012).
333. S. Atkinson, Y. Jiao, and S. Torquato, "Maximally Dense Packings of Two-Dimensional Convex and Concave Noncircular Particles," **Physical Review E**, **86**, 031302 (2012).
334. R. Gabbriellini, Y. Jiao and S. Torquato, "Families of Tessellations of Space by Elementary Polyhedra via Retessellations of the FCC Tiling," **Physical Review E**, **86**, 041141 (2012).
335. É. Marcotte, F. H. Stillinger and S. Torquato, "Nonequilibrium Static Growing Length Scales in Supercooled Liquids on Approaching the Glass Transition," **Journal of Chemical Physics**, **138**, 12A508 (2013).
336. É. Marcotte, F. H. Stillinger and S. Torquato, "Communication: Designed Diamond Ground State via Optimized Isotropic Monotonic Pair Potentials," **Journal of Chemical Physics**, **138**, 061101 (2013).
337. S. Martis, É. Marcotte, F. H. Stillinger and S. Torquato, "Ground States of Directional Pair Potentials via Collective-Density Variables," **Journal of Statistical Physics**, **150**, 414 (2013).
338. S. Torquato and Y. Jiao, "Effect of Dimensionality on the Percolation Threshold of Overlapping Nonspherical Hyperparticles," **Physical Review E**, **87**, 022111 (2013).
339. S. Torquato and Y. Jiao, "Effect of Dimensionality on the Percolation Thresholds of Various d-Dimensional Lattices," **Physical Review E**, **87**, 032149 (2013).
340. M. Florescu, P. J. Steinhardt and S. Torquato, "Optical Cavities and Waveguides in Hyperuniform Disordered Photonic Solids," **Physical Review B**, **87**, 165116 (2013).
341. Y. Jiao and S. Torquato, "Evolution and Morphology of Microenvironment-Enhanced Malignancy of Three-Dimensional Invasive Solid Tumors," **Physical Review E**, **87**, 052707 (2013).

342. É. Marcotte and S. Torquato, "Efficient Linear Programming Algorithm to Generate the Densest Lattice Sphere Packings," **Physical Review E**, **87**, 063303 (2013).
343. M. Hejna, P. J. Steinhardt and S. Torquato, "Nearly Hyperuniform Network Models of Amorphous Silicon," **Physical Review B**, **87**, 245204 (2013).
344. R. Xie, G. G. Long, S. J. Weigand, S. C. Moss, S. Roorda, S. Torquato, and P. J. Steinhardt, "Hyperuniformity in Amorphous Silicon Based on the Measurement of the Infinite-Wavelength Limit of the Structure Factor," **Proceedings of the National Academy of Sciences**, **110**, 13250 (2013).
345. W. Man, M. Florescu, K. Matsuyama, P. Yadak, G. Nahal, S. Hashemizad, E. Williamson, P. Steinhardt, S. Torquato, and P. Chaikin, "Photonic Band Gap in Isotropic Hyperuniform Disordered Solids with Low Dielectric Contrast," **Optics Express**, **21**, 19972 (2013).
346. A. B. Hopkins, F. H. Stillinger and S. Torquato, "Disordered Strictly Jammed Binary Sphere Packings Attain an Anomalously Large Range of Densities," **Physical Review E**, **88**, 022205 (2013).
347. W. Man, M. Florescu, E. Williamson, S. Hashemizad, Y. He, B. Leung, D. Liner, P. J. Steinhardt, S. Torquato and P. M. Chaikin, "Novel Experiments on Freeform Waveguides and Isotropic Photonic Bandgaps in Hyperuniform Disordered Systems," **Proceedings of the National Academy of Sciences**, **110** 15886 (2013).
348. R. A. DiStasio, Jr., É. Marcotte, R. Car, F. H. Stillinger, and S. Torquato, "Designer Spin Systems via Inverse Statistical Mechanics," **Physical Review B**, **88**, 134104 (2013).
349. G. Zhang, F. H. Stillinger and S. Torquato, "Probing the Limitations of Isotropic Pair Potentials to Produce Ground-State Structural Extremes Via Inverse Statistical Mechanics," **Physical Review E**, **88**, 042309 (2013).
350. G. Zhang and S. Torquato, "Precise Algorithm to Generate Random Sequential Addition of Hard Hyperspheres at Saturation," **Physical Review E**, **88**, 042309 (2013).
351. É. Marcotte, R. A. DiStasio, Jr., F. H. Stillinger, and S. Torquato, "Designer Spin Systems via Inverse Statistical Mechanics: II. Ground State Enumeration and Classification" **Physical Review B**, **88**, 184432 (2013).
352. S. Atkinson, F. H. Stillinger, and S. Torquato, "Detailed Characterization of Rattlers in Exactly Isostatic, Strictly Jammed Sphere Packings," **Physical Review E**, **88**, 062208 (2013).
353. Y. Kallus, É. Marcotte and S. Torquato, "Jammed Lattice Sphere Packings," **Physical Review E**, **88**, 062151 (2013).
354. R. Gabbriellini, Y. Jiao and S. Torquato, "Dense Periodic Packings of Tori," **Physical Review E**, **89**, 022133 (2014).

355. Y. Jiao, T. Lau, H. Hatzikirou, M. Meyer-Hermann, J. C. Corbo, and S. Torquato, "Avian Photoreceptor Patterns Represent a Disordered Hyperuniform Solution to a Multiscale Packing Problem," **Physical Review E**, **89**, 022721 (2014).
356. E.-Y. Guo, N. Chawlaw, T. Jing, S. Torquato and Y. Jiao, "Three-Dimensional Reconstruction of Percolating Filamentary Microstructures from Two-Dimensional Micrographs via Dilation-Erosion Method," **Materials Characterization**, **89**, 33 (2014).
357. D. Chen, Y. Jiao and S. Torquato, "Equilibrium Phase Behavior and Maximally Random Jammed State of Truncated Tetrahedra," **Journal of Physical Chemistry B**, **118**, 7981 (2014).
358. H. Liasneuski, D. Hlushkou, S. Khirevich, A. Hölzel, U. Tallarek and S. Torquato "Impact of Microstructure on the Effective Diffusivity in Random Packings of Hard Spheres," **Journal of Applied Physics**, **116**, 034904 (2014).
359. Y. Kallus and S. Torquato, "Marginal Stability in Jammed Packings: Quasicontacts and Weak Contacts," **Physical Review E**, **90**, 022114 (2014).
360. D. Chen, Y. Jiao and S. Torquato, "Computational Model for Tumor Dormancy with an Emergent Switch Behavior to a Proliferative State," **PLOS One**, **9**, e109934 (2014).
361. J. Spangenberg, G. W. Scherer, A. B. Hopkins and S. Torquato, "Viscosity of Bimodal Suspensions with Hard Spherical Particles," **Journal of Applied Physics**, **116**, 184902 (2014).
362. M. A. Klatt and S. Torquato, "Characterization of Maximally Random Jammed Sphere Packings. I. Voronoi Correlation Functions," **Physical Review E**, **90**, 052120 (2014).
363. S. Atkinson, F. H. Stillinger, and S. Torquato, "Existence of Isostatic, Maximally Random Jammed Monodisperse Hard-Disk Packings," **Proceedings of the National Academy of Sciences**, **111**, 18436 (2014).
364. R. Dreyfus, Y. Xu, T. Still, L. A. Hough, A. G. Yodh and S. Torquato, "Diagnosing the Hyperuniformity of Two-Dimensional, Disordered, Jammed Packings of Soft Spheres," **Physical Review E**, **91**, 012302 (2015).
365. S. Torquato, G. Zhang and F. H. Stillinger, "Ensemble Theory for Stealthy Hyperuniform Disordered Ground States," **Physical Review X**, **5**, 021020 (2015).
366. G. Zhang, F. H. Stillinger and S. Torquato, "Ground States of Stealthy Hyperuniform Potentials: I. Entropically Favored Configurations," **Physical Review E**, **92**, 022119 (2015).
367. G. Zhang, F. H. Stillinger and S. Torquato, "Ground States of Stealthy Hyperuniform Potentials: II. Stacked-Slider Phases," **Physical Review E**, **92**, 022120 (2015).
368. J. Sun, B. K. Clark, S. Torquato and R. Car, "The Phase Diagram of High-Pressure Superionic Ice," **Nature Communications**, **6**, 8156 (2015).

-
369. D. Hlushkou, H. Liasneuski, U. Tallarek and S. Torquato, "Effective diffusion coefficients in random packings of polydisperse hard spheres from two-point and three-point correlation functions," **Journal of Applied Physics**, **118**, 124901 (2015).
370. J. Tian, Y. Xu, Y. Jiao and S. Torquato, "A Geometric-Structure Theory for Maximally Random Jammed Packings," **Scientific Reports**, **5**, 16722 (2015).
371. G. Cinacchi and S. Torquato, "Hard Convex Lens-Shaped Particles: Densest-Known Packings and Phase Behavior," **Journal of Chemical Physics**, **143**, 224506 (2015).
372. D. Chen and S. Torquato, "Confined Disordered Strictly Jammed Binary Sphere Packings in Three Dimensions," **Physical Review E**, **92**, 062207 (2015).
373. E. Chertkov, R. DiStasio and G. Zhang, R. Car and S. Torquato, "Inverse Design of Disordered Stealthy Hyperuniform Spin Chains," **Physical Review B**, **93**, 064201 (2016).
374. S. Atkinson, G. Zhang, A. B. Hopkins and S. Torquato "Critical Slowing Down and Hyperuniformity on Approach to Jamming," **Physical Review E**, **94**, 012902 (2016).
375. S. Torquato, "Hyperuniformity and Its Generalizations," **Physical Review E**, **94**, 022122 (2016).
376. S. Torquato, "Disordered Hyperuniform Heterogeneous Materials," **Journal of Physics: Condensed Matter**, **28**, 414012 (2016).
377. M. A. Klatt and S. Torquato, "Characterization of Maximally Random Jammed Sphere Packings: II. Correlation Functions and Density Fluctuations," **Physical Review E**, **94**, 022152 (2016).
378. S. Atkinson, F. H. Stillinger, and S. Torquato, "Static Structural Signatures of Nearly Jammed Disordered and Ordered Hard-Sphere Packings: Direct Correlation Function," **Physical Review E**, **94**, 032902 (2016).
379. A. Andrianov, A. Scardicchio and S. Torquato, "Extreme Lattices: Symmetries and Decorrelations," **Journal of Statistical Mechanics: Theory and Experiment**, P113301 (2016).
380. G. Zhang, F. H. Stillinger and S. Torquato, "The Perfect Glass Paradigm," **Scientific Reports**, **6**, 36963 (2016).
381. D. Chen, W. Y. Aw, D. Devenport and S. Torquato, "Structural Characterization and Statistical-Mechanical Model of Epidermal Patterns," **Biophysical Journal**, **111**, 2534 (2016).
382. G. Zhang, F. H. Stillinger and S. Torquato, "Transport, Geometrical and Topological Properties of Stealthy Disordered Hyperuniform Two-Phase Systems," **Journal of Chemical Physics**, **145**, 244109 (2016).

-
383. J. Kim and S. Torquato, "Effect of Window Shape on the Detection of Hyperuniformity via the Local Number Variance," **Journal of Statistical Mechanics: Theory and Experiment**, **2017**, 013402 (2017).
384. R. M. Ziff and S. Torquato, "Percolation of Disordered Jammed Sphere Packings," the **Journal of Physics A: Mathematical and Theoretical**, **50**, 085001 (2017).
385. E. Ogüz, J. E. S. Socolar, P. J. Steinhardt and S. Torquato "Hyperuniformity of Quasicrystals," **Physical Review B**, **95**, 054119 (2017).
386. C. Lin, P.J. Steinhardt and S. Torquato, "Hyperuniformity Variation With Quasicrystal Local Isomorphism Class," **Journal of Physics: Condensed Matter**, **29**, 20 (2017).
387. L. D. Abreu, J. M. Pereira, J. L. Romero and S. Torquato, "The Weyl-Heisenberg Ensemble: Hyperuniformity and Higher Landau Levels," **Journal of Statistical Mechanics: Theory and Experiment**, **2017**, 043103 (2017).
388. B. D. Wilts, X. Sheng, M. Holler, A. Diaz, M. Guizar-Sicairos, J. Raabe, R. Hoppe, S-H. Liu, R. Langford, O. D. Onelli, D. Chen, S. Torquato, U. Steiner, C. G. Schroer, S. Vignolini, and A. Seppe, "Evolutionary-Optimised Photonic Network Structure in Beetle Wing Scales Characterised by X-Ray Nanotomography," **Advanced Materials**, **2017**, 1702057 (2017).
389. Z. Ma and S. Torquato, "Random Scalar Fields and Hyperuniformity," **Journal of Applied Physics**, **121**, 244904 (2017).
390. G. Zhang, F. H. Stillinger and S. Torquato, "Can Exotic Disordered 'Stealthy' Particle Configurations Tolerate Arbitrarily Large Holes?," **Soft Matter**, **13**, 6197 (2017).
391. F. Martelli, S. Torquato, N. Giovambattista and R. Car, "Large-Scale Structure and Hyperuniformity of Amorphous Ices," **Physical Review Letters**, **119**, 136002 (2017).
392. G. Zhang, F. H. Stillinger and S. Torquato, "Classical Many-Particle Systems With Unique Disordered Ground States," **Physical Review E**, **96**, 042146 (2017).
393. E. Lomba, J. J. Weis and S. Torquato, "Disordered Hyperuniformity in Two-Component Nonadditive Hard-Disk Plasmas," **Physical Review E**, **96**, 062126 (2017).
394. D. Chen and S. Torquato, "Designing Disordered Hyperuniform Two-Phase Materials with Novel Physical Properties," **Acta Materialia**, **142**, 152 (2018).
395. E. Lomba, J.-J. Weis, and S. Torquato, "Disordered Multihyperuniformity Derived from Binary Plasmas," **Physical Review E**, **97**, 010102(R) (2018).
396. M. A. Klatt and S. Torquato, "Characterization of Maximally Random Jammed Sphere Packings: III. Transport and Electromagnetic Properties Via Correlation Functions," **Physical Review E**, **97**, 012118 (2018).
397. J. Kim and S. Torquato, "Effect of Imperfections on the Hyperuniformity of Many-Body Systems," **Physical Review B**, **97**, 054105 (2018).

-
398. G. Zhang, F. Martelli and S. Torquato, "Structure Factor of the Primes," **Journal of Physics A: Mathematical and Theoretical**, **51**, 115001 (2018).
399. R. DiStasio, G. Zhang, F. H. Stillinger and S. Torquato, "Rational Design of Stealthy Hyperuniform Patterns with Tunable Order," **Physical Review E**, **97**, 023311 (2018).
400. S. Torquato, "Hyperuniform States of Matter," **Physics Reports**, **745**, 1, (2018).
401. C. Lin, P. J. Steinhardt and S. Torquato, "Light Localization in Local Isomorphism Classes of Quasicrystals," **Physical Review Letters**, **120**, 247401 (2018).
402. F. Martelli, N. Giovambattista, S. Torquato and R. Car, "Searching for Crystal-Ice Domains in Amorphous Ices," **Physical Review Materials**, **2**, 075601 (2018).
403. D. Chen, E. Lomba and S. Torquato, "Binary Mixture of Charged Colloids: New Route to Synthesize Disordered Hyperuniform Materials," **Physical Chemistry Chemical Physics**, **20**, 17557 (2018).
404. S. Torquato, "Perspective: Basic Understanding of Condensed Phases of Matter Via Packing Models," **Journal of Chemical Physics**, **149**, 020901 (2018)
405. Z. Ma and S. Torquato, "Precise Algorithms to Compute Surface Correlation Functions of Two-Phase Heterogeneous Media and Their Applications," **Physical Review E**, **98**, 013307 (2018).
406. S. Torquato and D. Chen, "Multifunctional Hyperuniform Cellular Networks: Optimality, Anisotropy and Disorder," **Multifunctional Materials**, **1**, 015001 (2018).
407. S. Torquato, G. Zhang and M. de Courcy-Ireland, "Uncovering Multiscale Order in the Prime Numbers via Scattering," **Journal of Statistical Mechanics: Theory and Experiment**, **2018**, 093401 (2018).
408. D. Chen, G. Zhang and S. Torquato, "Inverse Design of Novel Colloidal Crystals Via Optimized Patchy Interactions," **Journal of Physical Chemistry B**, **122**, 8462 (2018).
409. S. Torquato and D. Chen, "Multifunctionality of Particulate Composites via Cross-Property Maps," **Physical Review Materials**, **2**, 095603 (2018).
410. G. Cinacchi and S. Torquato, "Hard Convex Lens-Shaped Particles: Metastable, Glassy and Jammed States," **Soft Matter**, **14**, 8205 (2018).
411. J. Kim, G. Zhang, F. H. Stillinger and S. Torquato, "Inversion Problems for Fourier Transforms of Particle Distributions," **Journal of Statistical Mechanics: Theory and Experiment**, **2018**, 113302 (2018).
412. E. C. Ogüz, J. E. S. Socolar, P. J. Steinhardt, and S. Torquato, "Hyperuniformity and Anti-Hyperuniformity in One-Dimensional Substitution Tilings," **Acta Crystallographica**, **A75** 3 (2018).

-
413. Z. Ma and S. Torquato, "Hyperuniformity of Generalized Random Organization Models," **Physical Review E**, **99**, 022115 (2019).
414. T. Middlemas, F. H. Stillinger and S. Torquato, "Hyperuniformity Order Metric of Barlow Packings," **Physical Review E**, **99**, 022111 (2019).
415. M. A. Klatt, J. Lovrić, D. Chen, S. C. Kapfer, F. M. Schaller, P. W. A. Schönhofer, B. S. Gardiner, A.-S. Smith, G. E. Schröder-Turk and S. Torquato, "Universal Hidden Order in Amorphous Cellular Geometries," **Nature Communications**, **10**, 811 (2019).
416. J. Kim and S. Torquato, "New Tessellation-Based Procedure to Design Perfectly Hyperuniform Disordered Dispersions for Materials Discovery," **Acta Materialia**, **68** 143 (2019).
417. S. Torquato, G. Zhang, and M. de Courcy-Ireland, "Hidden Multiscale Order in the Primes," **Journal of Physics A: Mathematical and Theoretical**, **52**, 135002 (2019).
418. J. Kim and S. Torquato, "Methodology to Construct Large Realizations of Perfectly Hyperuniform Disordered Packings," **Physical Review E**, **99**, 052141 (2019).
419. F. H. Stillinger and S. Torquato, "Structural Degeneracy in Pair Distance Distributions," **Journal of Chemical Physics**, **150**, 204125 (2019).
420. A. G. Meyra, G. J. Zarragoicoechea, A. L. Maltz, E. Lomba, and S. Torquato, "Hyperuniformity on Spherical Surfaces," **Physical Review E**, **100**, 022107 (2019).
421. S. Dutta, N. J.-V. Djabrayan, S. Torquato, S. Y. Shvartsman and M. Krajnc, "Self-Similar Dynamics of Nuclear Packing in the Early *Drosophila* Embryo," **Biophysical Journal**, **117**, 743 (2019).
422. M. A. Klatt, P. J. Steinhardt and S. Torquato, "Phoamtonics: Photonic Band Gaps of 3D Foams," **Proceedings of the National Academy of Sciences**, **116**, 23480 (2019).
423. F. H. Stillinger and S. Torquato, "Jammed Hard-Sphere HCP Crystals Permeated with Trivacancy Tunnels," **Journal of Applied Physics**, **126**, 194901 (2019).
424. G. Cinacchi and S. Torquato, "Hard Convex Lens-Shaped Particles: Characterization of Dense Disordered Packings," **Physical Review E**, **100**, 062902 (2019).
425. M. M. Miloëvić, W. Man, G. Nahal, P. J. Steinhardt, S. Torquato, P. M. Chaikin, T. Amoah, B. Yu, R. A. Mullen, and M. Florescu, "Hyperuniform Disordered Waveguides and Devices For Near Infrared Silicon Photonics," **Scientific Reports**, **9** 20338 (2019).
426. M. A. Klatt, J. Kim and S. Torquato, "Cloaking the Underlying Long-Range Order of Randomly Perturbed Lattices," **Physical Review E**, **101**, 032118 (2020).

-
427. G. Zhang and S. Torquato, "Realizable Hyperuniform Particle Configurations with Targeted Spectral Functions," **Physical Review E**, **101**, 032124 (2020).
428. S. Torquato, "Predicting Transport Characteristics of Hyperuniform Porous Media via Rigorous Microstructure-Property Relations," **Advances in Water Resources**, **140**, 103565 (2020).
429. J. Kim and S. Torquato, "Multifunctional Composites for Elastic and Electromagnetic Wave Propagation," **Proceedings of the National Academy of Sciences**, **117**, 8764 (2020).
430. E. Lomba, J-J. Weis, L. Guisandez and S. Torquato, "A Minimal Statistical-Mechanical Model for Multihyperuniform Patterns in Avian Retina," **Physical Review E**, **102**, 012134 (2020).
431. M. Röding, Z. Ma, and S. Torquato, "Predicting Permeability via Statistical Learning on Higher-Order Microstructural Information," **Scientific Reports**, **10**, 15239 (2020).
432. Z. Ma, E. Lomba and S. Torquato, "Optimized Large Hyperuniform Binary Colloidal Suspensions in Two Dimensions," **Physical Review Letters**, **125**, 068002 (2020).
433. H. Wang, F. H. Stillinger and S. Torquato, "Sensitivity of Pair Statistics on Pair Potentials in Many-Body Systems," **Journal of Chemical Physics**, **153**, 124106 (2020).
434. Z. Ma and S. Torquato, "Generation and Structural Characterization of Debye Random Media," **Physical Review E**, **102**, 043310 (2020).
435. T. Middlemas and S. Torquato, "Nearest-Neighbor Functions for Disordered Stealthy Hyperuniform Many-Particle Systems," **Journal of Statistical Mechanics: Theory & Experiment**, **2020**, 103302 (2020).
436. S. Yu, C-W. Qiu, Y. Chong, S. Torquato, and N. Park, "Engineered Disorder in Photonics," **Nature Review Materials**, in press.
437. J. Kim and S. Torquato, "Effective Elastic Wave Characteristics of Composite Media," **New Journal of Physics**, **22**, 123050 (2020).
438. J. Kim and S. Torquato, "Characterizing the Hyperuniformity of Ordered and Disordered Two-Phase Media," **Physical Review E**, **103**, 012123 (2021).
439. A. Bose and S. Torquato, "Quantum Phase Transitions in Long-Range Hyperuniform Spin Chains in a Transverse Field," **Physical Review B**, **103**, 014118 (2021).
440. S. Yu, C. W. Qiu, Y. Chong, S. Torquato, and N. Park, "Engineered Disorder in Photonics," **Nature Reviews Materials**, **6**, 226 (2021).
441. C. E. Maher, F. H. Stillinger, and S. Torquato, "Kinetic Frustration Effects on Dense Two-Dimensional Packings of Convex Particles and Their Structural Characteristics," **Journal of Physical Chemistry B**, **125**, 2450 (2021).

-
442. S. Torquato and J. Kim, "Nonlocal Effective Electromagnetic Wave Characteristics of Composite Media: Beyond the Quasistatic Regime," **Physical Review X**, **11**, 021002 (2021).
443. S. Torquato, J. Kim and M. A. Klatt, "Local Number Fluctuations in Hyperuniform and Nonhyperuniform Systems: Higher-Order Moments and Distribution Functions," **Physical Review X**, **11**, 021028 (2021).
444. S. Torquato, "Structural Characterization of Many-Particle Systems on Approach to Hyperuniform States," **Physical Review E**, **11**, 021028 (2021).
445. T. E. Gartner III, S. Torquato, R. Car, and P. G. Debenedetti, "Manifestations of Metastable Criticality in the Long-Range Structure of Model Water Glasses," **Nature Communications**, **12**, 3398 (2021).
446. S. Torquato, "Swimming in Circles Can Lead to Exotic Hyperuniform States of Active Living Matter," Commentary in **Proceedings of the National Academy of Sciences**, **118**, e2107276118 (2021).
447. M. A. Klatt, P. J. Steinhardt, and S. Torquato, "Qualitatively Different Dependence of Optimal Photonic Band Gaps on Dielectric Contrast for Crystal Versus Disordered Networks," **Physical Review Letters**, **127**, 037401 (2021).
448. M. A. Klatt, R. M. Ziff and S. Torquato, "Critical Pore Radius and Transport Properties of Disordered Hard- and Overlapping-Sphere Models," **Physical Review E**, **104**, 014127 (2021).
449. M. Skolnick and S. Torquato, "Understanding Degeneracy of Two-Point Correlation Functions via Debye Random Media," **Physical Review E**, **104**, 045306 (2021).
450. S. Torquato, "Diffusion Spreadability as a Probe of the Microstructure of Complex Media Across Length Scales," **Physical Review E**, **104**, 054102 (2021).
451. C. E. Maher, F. H. Stillinger, and S. Torquato, "Characterization of Void Space, Large-Scale Structure, and Transport Properties of Maximally Random Jammed Packings of Superballs," **Physical Review Materials**, **6**, 025603 (2022).
452. F. Sgrignuoli, S. Torquato, and L. Dal Negro, "Subdiffusive Wave Transport and Weak Localization Transition in Three-Dimensional Stealthy Hyperuniform Disordered Systems," **Physical Review B**, **105**, 064204 (2022).
453. H. Wang, and S. Torquato, "Dynamic Measure of Hyperuniformity and Nonhyperuniformity in Heterogeneous Media via the Diffusion Spreadability," **Physical Review Applied**, **17**, 034022 (2022). (**Editor's Suggestion**)
454. S. Torquato, M. Skolnick and J. Kim, "Local Order Metrics for Two-Phase Media Across Length Scales," **Journal of Physics A: Mathematical and Theoretical**, **55**, 274003 (2022).

-
455. S. Torquato, "Extraordinary Disordered Hyperuniform Multifunctional Composites," **Journal of Composite Materials**, **56**, 3635 (2022).
456. S. Torquato and Y. Jiao, "Exclusion Volumes of Convex Bodies in High Space Dimensions: Applications to Virial Coefficients and Continuum Percolation," **Journal of Statistical Mechanics: Theory and Experiment**, **2022**, 093404 (2022).
457. S. Torquato and H. Wang, "Precise Determination of Pair Interactions from Pair Statistics of Many-Body Systems In and Out of Equilibrium," **Physical Review E**, **106**, 044122 (2022).
458. H. Wang, F. H. Stillinger and S. Torquato, "Realizability of Iso- g_2 Processes Via Effective Interactions," submitted to **Journal of Chemical Physics**, **157**, 224106 (2022).
459. M. A. Klatt, P. J. Steinhardt and S. Torquato, "Wave Propagation and Band Tails of Disordered Systems in the Thermodynamic Limit," **Proceedings of the National Academy of Sciences**, **119**, e2213633119 (2022).
460. H. Wang and S. Torquato, "Equilibrium States Corresponding to Targeted Hyperuniform Nonequilibrium Pair Statistics," **Soft Matter**, **19**, 550-564 (2023).
461. O. H. E. Philcox and S. Torquato, "The Disordered Heterogeneous Universe: Galaxy Distribution and Clustering Across Length Scales," **Physical Review X**, **13**, 011038 (2023).
462. M. Skolnick and S. Torquato, "Simulated Diffusion Spreadability for Characterizing the Structure and Transport Properties of Two-Phase Materials," **Acta Materialia**, in press.