CV: Raphael (Rafi) Blumenfeld

August 2025

- Nationality: UK, Israel
- Address: Gonville & Caius College, Cambridge University, Trinity St., Cambridge CB2 1TA, UK
- Email: rbb11@cam.ac.uk
- Homepage: https://rafi.blumenfeld.co.uk
- Google Scholar citations

Education

- 1989 - Ph.D., Physics - Tel Aviv University
  Random systems - Nonlinear conductivity and distributions
  Supervisors: Profs. Amnon Aharony and David J. Bergman, **Summa cum Laude**.
- 1986 - M.Sc., Physics - Tel Aviv University
  Nonlinear random resistor networks, topological problems and fluctuations
  Supervisor: Prof. Amnon Aharony, **Summa cum Laude**.
- 1984 - B.Sc., Physics - Tel Aviv University
  Distinction (equivalent to a UK high First).
- 1973 - B.Tech. Diploma, Practical Mechanical Engineering - Ort Technikum Givatayim, Israel.

Languages

- English: Speaking - excellent; Reading - excellent; Writing - excellent
- Hebrew: Speaking - excellent; Reading - excellent; Writing - excellent
- Romanian: Speaking - excellent; Reading - excellent; Writing - satisfactory
- Chinese: Sufficient for communication with waiters in restaurants
- Esperanto: Beginner

Appointments

- 2024-present Director of Studies for Natural Sciences, Gonville & Caius College, Cambridge University
- 2024-present Senior Research Fellow, Imperial College London (52% FTE)
- 2020-2023 Senior Research Fellow, Imperial College London (52% FTE)
- 2019- Distinguished Visiting Professor, CSU, Hunan, China
- 2014-2017 Distinguished Visiting Professor, National University of Defense Technology, Changsha, Hunan, China
- 2013-present Editor, Granular Matter Journal, Springer
- 2010-12 Senior Visiting Fellow, Inst. of Shock Physics, Imperial College London, UK
- 2009-present College Lecturer, Gonville and Caius College, Cambridge, UK
- 2005-present Research Fellow, Earth Science and Engineering, Imperial College London, UK
- 1997-present Long-Term visitor, Cavendish Laboratory, Cambridge University, UK
- 2000-01 Research Associate, Physics Dept., University of Warwick, UK

- 1997-8 Project Leader, Mesoscale group, R & D, Molecular Simulations Inc., Cambridge, UK
- 1996-7 Research Scientist, Cambridge Hydrodynamics Inc (led by Prof S.A. Orszag), Princeton, NJ, USA
- 1993-6 Director's Fellow, Los Alamos National Laboratory, NM, USA
- 1992-3 Research Associate, Princeton University, NJ, USA
- 1989-92 Research Associate, Cavendish Laboratory, Cambridge University, UK
- 1987 Visiting Research Scientist, IBM (with Prof B. B. Mandelbrot), Yorktown Heights, USA

Honours / Awards / Grants

- 2024 6-month grant (CoI), Shell Brunei
- 2020-2023 3-year grant (CoI), Shell Brunei
- 2019- Awarded "High Level Foreign Talent", China government
- 2018 JSPS BRIDGE Fellowship BR180304
- 2016 4-year BP-ICAM grant
- 2015 Awardee of the "1000-Talent Plan", China government
- 2014- Distinguished Visiting Professor, NUDT, Hunan, China
- 2013-2016 Alan Howard PhD Student Scholarship
- 2012 Bye-Fellowship, Gonville and Caius College, Cambridge, UK
- 2011 Nuffield Undergraduate Research Bursary URB/39915
- 2010-2014 EPSRC Grant EP/H051716/1
- 2010 Visiting Grant, Tsukuba University, Japan
- 2008-11 Alan Howard phd Student Scholarship
- 2008-9 EOARD Grant 083046
- 2008 StatoilHydro Grant
- 2007-12 Member of the Room, Gonville and Caius College, Cambridge, UK
- 2005-8 EPSRC Grant GR/T28959/01
- 1993-6 Director's Fellowship, Los Alamos National Laboratory
- 1990-2 Leo Baeck Lodge Award
- 1989 Weiler Foundation Scholarship Award
- 1985, 1988-9 Distinction Award, Tel Aviv University
- 1982-8 Scholarship, Tel Aviv University

Organisation / Professional Activities

- 2025 Organiser, International conference, *9th Edwards Symposium - Statistical Physics in Emerging Soft Matter*, Cambridge, UK Sept. 10-12
- 2024 Session Chair at the conference on *Ergodicity in Physical Systems and Beyond*, Lincoln, UK, July 8 - 10

- 2024 Organiser, International conference, *8th Edwards Symposium- Statistical Physics of Soft and Multicomponent Systems*, Cambridge, UK Sept. 11-13
- 2023 Organiser, International conference, *7th Edwards Symposium- New Paradigms in Soft Matter and Statistical Physics*, Cambridge, UK Sept. 13-15
- 2022 Organiser, International conference, *6th Edwards Symposium- Soft Matter in the 21st Century*, Cambridge, UK Sept. 7-9
- 2021 Organiser, International conference, *5th Edwards Symposium- Emerging Trends in Soft Matter*, Cambridge, UK Sept. 8-10
- 2021 Session Chair, *Statistical Physics of Complex Systems*, Warwick University, UK, June 23-24
- 2019 Organiser, International conference, *4th Edwards Symposium- Emerging Trends in Soft Matter*, Cambridge, UK Sept. 4-6
- 2018 Session Chair at the *3rd Edwards Symposium - New Horizons in Soft Matter*, Cambridge, UK, Sept. 5 - 7
- 2018 Organiser, International conference, *3rd Edwards Symposium: Challenges and Opportunities in Soft Matter*, Cambridge, UK, Sept. 5 - 7
- 2018 6 lectures in the *Summer School on Soft Matter and Biophysics*, Jiao Tong University, Shanghai, China, July 1 - 5
- 2018 Session Chair at the *APS March Meeting*, Los Angeles, USA, March 5 - 9
- 2018 Focus Session organiser at the *APS March Meeting*, Los Angeles, USA, March 5 - 9
- 2017 Session Chair, *From Supercooled Liquids to Glasses: Current Challenges for Amorphous Materials*, Kavli Inst., Beijing, China, August 7 - 18
- 2017 Organiser, International conference, *2nd Edwards Symposium - Challenges and Opportunities in Soft Matter*, Cambridge, UK, September 6 - 8
- 2017 Organiser, *The 2nd International Granular Flow Workshop*, Guiyang, China, August 21 - 24
- 2017 Session Chair, *The 10th International Conference on Soft Matter and Biophysics*, Xiamen, China, March 25 - 28
- 2016 Member, core team of *The Edwards Centre for Soft Matter*, Cambridge University
- 2016 Session Chair and Moderator, *BP-ICAM Annual Conference 2016*, Manchester, UK, October 31 - November 2
- 2016 Session Chair, *3rd International Conference on Packing Problems*, Jiao Tong University, Shanghai, China, August 29 - September 1
- 2016 Member of the American Physical Society
- 2016 Organiser, International conference, *Soft Matter - Theoretical and Industrial Challenges, Celebrating the Pioneering Work of Sir Sam Edwards*, Cambridge, UK, September 7 - 9
- 2015 Member of the Granular Materials Committee, Engineering Mechanics Institute
- 2015 Organiser, International Workshop on *Soft and granular matter in ambient and extreme conditions 2015*, Changsha, Hunan, China, 31 August - 4 September
- 2015 Session Chair, *Beijing Soft Matter Workshop*, Beijing, China, 17 April
- 2015 Sole organiser, Workshop on *Computational methods in flow dynamics and granular science*, Changsha, Hunan, China, 14 April
- 2014 Organiser, International Workshop on *Soft and granular matter in ambient and extreme conditions*, Changsha, Hunan, China, 15-18 September

- 2014 Conference Scientific Committee member, *International Symposium on Energy Challenges and Mechanics*, Aberdeen, UK, 10-14 July
- 2012 Session Chair, in *8th European Solid Mechanics Conference*, Graz, Austria, 9-13 July
- 2011 Session Chair, in *Workshop: Complexity in the Oil Industry*, Natal, Brazil, 14-18 November
- 2008 Session Chair and Discussion Leader, *Structure and Packing* in *Gordon Conference on Granular and Granular-Fluid Flow*, Waterville, Maine, US, 22-26 July
- 2007 Session Chair, *Reservoir Simulation* in *Universities Forum on Reservoir Description and Simulation (UFORDS)*, Scarborough, UK, 2-6 September
- 2007 Organiser and chairman, *Workshop on Fractures*, *Complexity in the Oil Industry*, Natal, Brasil, 5-9 August
- 2007 Discussion leader on *Slow dynamics of granular materials and modelling quasi-statics*, in Workshop on **Jamming**, Aspen Center for Physics, Aspen, CO, USA, 20 June - 3 August
- 2007 Discussion leader on *Stress transmission and isostaticity theory*, in Workshop on **Jamming**, Aspen Center for Physics, Aspen, CO, USA, 20 June - 3 August
- 2004-6 Organiser and Chairman, *Working Group on Dimensional Reduction in many-variable systems*, EU COST action P10 *Physics of Risk*
- 2004 Programme Committee, SPIE conference *Fluctuation and Noise, FaN2004*, Maspalomas, Gran Canaria, Spain, 25-28 May
- 2003 Chairman, *Statics and Dynamics of Systems of Rigid Particles*, Isaac Newton Institute, Cambridge, UK 10 December
- 2003 Organising Committee, SPIE conference *Fluctuation and Noise, FaN2003*, Santa Fe, NM, USA, 1-4 June
- 1999-2001 Specialist Subject Reviewer, Quality Assurance Agency (QAA) for Higher Education, UK
- 2000 Organising Committee Member, MESOMECHANICS2000, China
- 1995 Organiser and Chairman, Workshop on *Fractal Analysis and Modelling of Materials*, Los Alamos National Laboratory, USA
- 1994-6 Organiser and Chairman, *Working Group on Protein Dynamics*, CNLS, Los Alamos National Laboratory, USA

Students

- 1990-92, 1999-present Supervision / tutorials: Parts IB (2nd year), II (3rd year), and III (MSci) Physics students, University of Cambridge.
- 1995 Yi Jiang, Los Alamos National Laboratory, PhD (summer student) - 1. Growth of planar Laplacian surfaces; 2. Parameter flow in coarse-graining of disordered systems.
- 1994-5 Rudolph Held, Los Alamos National Laboratory, MSc (summer student) - Characterization of, and flow in, porous media.
- 2007 Arutchelvi Harichandran, Imperial College London, Part III (MSc) - Distribution of heights on top of a granular pack.
- 2007 Ian Hewett, Cavendish Laboratory, Part II - A Study of Gas Permeation Through Granular Beds.
- 2007 Michael Peyton-Jones, Cavendish Laboratory, Sixth Form summer student - Quantitative analysis of contact forces in a two-dimensional poly-distributed particle bed using photoelastic methods.
- 2007 Golnaz Alipour, Stanford University, US, PhD - Analysis and numerical simulations of stress propagation in granular materials (joint advisor with Prof. M. Gerritsen)
- 2008 Joe Jordan, Cavendish Laboratory, Part III (MSci) - Statistics of force chain networks in granular systems.

- 2008 Anna Timoshina, Cavendish Laboratory, Part III (MSci) - Statistics of force chain networks in granular systems - skeletonisation.
- 2008 Hannah Davies, Cavendish Laboratory, Part III (MSci) - Shaken not Stirred: conductivity of shaken graphite particles.
- 2008 Phil Tooke, Cavendish Laboratory, Part III (MSci) - Structural analysis of deposited particles in two dimensions.
- 2009 Lauri Toikka, Cavendish Laboratory, Part III (MSci) - The famous particle packing problem.
- 2009-13 Rebecca Hihinashvili, Imperial College London, PhD - Morphological characterisation of porous materials for fuel cell technology.
- 2010 Zilvinas Rimas, Cavendish Laboratory, Part II (summer student) - Characterisation of force chain networks.
- 2010 Christopher Revell, Cavendish Laboratory, Part II (summer student) - Characterisation of packing of ellipses.
- 2010 Imbert Wang, Cavendish Laboratory, Part II (summer student) - Coarse-graining the fabric tensor of the Isostaticity stress field equations.
- 2010-4 Joseph F.P. Jordan, Imperial College London, PhD - Computing entropy and ordering of granular materials: From description to prediction.
- 2010 Finn Grimwood, Cavendish Laboratory, Part III (MSci) - Gravitational Flow of a DaVinci Fluid.
- 2010 Harry R. Kennard, Cavendish Laboratory, Part III (MSci) - The famous packing problem - ellipses.
- 2010 Simon Nathan, Cavendish Laboratory, Part III (MSci) - Couette Flow of a da Vinci Fluid.
- 2011 William Handley, Cavendish Laboratory, Part III (summer student) - Stress equations in isostatic and granular systems: hyperbolic or elliptic?
- 2011 Yipei Guo, Cavendish Laboratory, Part III (MSc) - Oscillatory shear flow of da Vinci fluids.
- 2011 Harrison Steggles, Cavendish Laboratory, Part III (MSci) - Dynamics of planar fractures in disordered media.
- 2011 Julian Ma, Cavendish Laboratory, Part III (MSci) - Stress transmission in disc-like granular systems.
- 2011 Christopher Revell, Cavendish Laboratory, Part III (MSci) - Shear flow of da Vinci fluids.
- 2012-5 Christopher Revell, Cavendish Laboratory, PhD - Stem cell sorting in mammalian embryos as a self-organising physical process.
- 2012 Giovanni Camisasca, Cavendish Laboratory, Part III (MSci) - Loop forces and mechanical equilibrium of 2D granular structures.
- 2012 Andrew Gibbons, Cavendish Laboratory, Part III (MSci) - Development of a systematic method to describe shapes of 3D objects.
- 2013 Alan Bowman, Cavendish Laboratory, Part III (MSci) - Ribbon dynamics in 3D.
- 2013 Reuven Shirazi, Cavendish Laboratory, Part III (MSci) - The Calderon problem in random resistor networks.
- 2013 Marise Westbroek, Cavendish Laboratory, Part III (MSci) - Dynamics of director fields in 2D.
- 2013-6 Shahar Amitai, Imperial College London, PhD - Predictive model for the design of porous media with application to fuel cells.
- 2014 Louis Bortolozzo, Cavendish Laboratory, Part III (MSci) - Development of a continuous stress field theory for 3D isostatic systems.
- 2014 Ling Huang (Walter), Physics Dept., NUDT, Hunan, China (MSc) - Dynamics and effects of penetrators into granular materials

- 2015 Zheng-Yu Yong, Physics Dept., NUDT, Hunan, China (MSc) - Structural evolution of granular materials
- 2016 Nikoletta Prastiti, Imperial College London, Part II (summer student) - Fractures in weakly consolidated media - stress and the process zone
- 2016 David A. King, Cavendish Laboratory, (MSci) - Toward an effective medium stress theory of stato-elastic media
- 2017 Ping Liu, Physics Dept., NUDT, Hunan, China (PhD) - Active objects in granular materials
- 2017 Do V. A. Nguyen, Cavendish Laboratory, (summer project) - Understanding plastic deformation in particulate system
- 2017 David A. King, Cavendish Laboratory, (PhD) - Statistical Mechanics for Dynamics of Slow and Dense Particulate Media
- 2018 Daniel L. Duffy, Cavendish Laboratory, Part III (MSci) - Relating proximity to the jamming critical point and isostatic regions in particulate media
- 2018 Yuliang Wang, Cavendish Laboratory, Part III (MSci) - Strain-driven hardening of fibrous networks
- 2018 Clara Wanjura, Cavendish Laboratory, (MSc) - The structural evolution of granular matter
- 2019 Daniel Owens, Cavendish Laboratory, Part III (MSci) - Statistics of stress distribution in loosely aggregated asteroids
- 2019 Jens Havgaard Nyhegn, Cavendish Laboratory, Part III (MSci) - Stress spirals and focusing in isostatic granular discs
- 2020 Sulaimaan Lim, Cavendish Laboratory, Part III (MSci) - A theoretical model for E.Coli survival strategy in the gut
- 2020 James M. Bird, Cavendish Laboratory, Part III (MSci) - Statistical mechanics of social situations: optimising high table conversations
- 2022 Alex D. C. Myhill, Cavendish Laboratory, Part III (MSci) - Structural dynamics of 2D superfluid granular systems
- 2023 Demosthenes Georgiou, Cavendish Laboratory, Part III (MSci) - A search for the densest random packing of the bi-disperse disks in d=2: a numerical investigation

Courses taught

- 2019, 2020 - Graduate course: "Complex Analysis and Calculus of Variations", Physics Dept., Imperial College London, UK
- 2014, 2015, 2016 - Graduate course: "Statistical Mechanics of Granular Media", Physics Dept., NUDT, China

Publications

Summary

- Over 110 papers in primary peer reviewed journals
- 28 contributions to Symposia and compiled volumes
(Google Scholar: Raphael Blumenfeld: Google Scholar citations)

I. Published and under-review papers

127. R. Blumenfeld,
Random close packing fraction of bidisperse discs: Theoretical derivation and exact bounds submitted, under review (2025)
https://arxiv.org/pdf/2509.20132

126. R. Blumenfeld,
Self-organisation - the underlying principle and a general model Journal, under review (2025)
https://arxiv.org/abs/2508.01877

125. M. Hou, X. Cheng, S. Yang, Q. Wu, S. Xiao H. Li, R. Blumenfeld,
Gravity-Dependent Rate Sensitivity in Granular Intrusion: Microgravity Experiments and Simulation Nature PJ Microgravity **12**: 19 (2026)
https://arxiv.org/abs/2508.01877

124. T. Matsushima, Z. Yu, D. Krengel, R. Blumenfeld,
Cell Structure of 2D Cohesive Granular Solid EPJ Web Conf. **340**, 07018 (2025)

123. R. Blumenfeld, T. Matsushima, J. Zhang,
Self-organization, detailed balance, and stress-structure correlations in 2D granular dynamics Eur. Phys. J. **340**, 04007 (2025)
https://arxiv.org/abs/2502.06085

122. D. Krengel, H. Jiang, T. Matsushima, R. Blumenfeld,
Effects of particle angularity on granular self-organization Phys. Rev. E **112**, 055407 (2025)
https://arxiv.org/abs/2502.06085

121. C. Huang, Y. Yu, P. R. King, B. Cheng, R. Blumenfeld,
Force chains bias the dynamic response to impacts in rubble-pile asteroids, Mon. Not. Roy. Astron. Soc. **543**, 2523 (2025)
https://arxiv.org/abs/2306.10581

120. X. Sun, Y. Wang, Y. Wang, R. Blumenfeld, J. Zhang,
Experimental evidence of detailed balance in granular systems, Granular Matter **27**:103 (2025);
https://arxiv.org/abs/2105.01355

119. X. Jiang, R. Blumenfeld, T. Matsushima,
Coordinated Stress-Structure Self-Organization in Granular Packing, Phys. Rev. E **111**, 045406 (2025);
https://journals.aps.org/pre/abstract/10.1103/PhysRevE.111.045406; https://arxiv.org/abs/2504.06321

118. C. C. Wanjura, A. Mayländer, O. Marti, R. Blumenfeld,
Detailed balance in non-equilibrium dynamics of granular matter: derivation and implications (2024)
https://arxiv.org/abs/2404.05059

117. R. Blumenfeld,
Granular solids transmit stress as two-phase composites, Phys. Rev. E **109**, 014901 (2024)
https://arxiv.org/abs/2306.10581

116. P. A. Gago, M. A. Madrid, S. Boettcher, R. Blumenfeld, P. King,
Effect of bevelled silo outlet in the flow rate during discharge, to appear in Powder Technology **428**, 118842 (2023); https://doi.org/10.1016/j.powtec.2023.118842

115. A. D. C. Myhill, R. Blumenfeld,
Steady states of two-dimensional granular systems are unique, stable, and sometimes satisfy detailed balance, Journal of Physics A: Mathematical and Theoretical **56**, 345001 (2023)
https://iopscience.iop.org/article/10.1088/1751-8121/ace56d, https://arxiv.org/abs/2306.10526

114. M. Liu, X. Ouyang, R. Lu, Z. Hao, R. Blumenfeld, X. Tang, G. Lei, H. Ouyang,
An Evaluation Method for Automotive Technical and Comprehensive Performance, Automotive Innovation **6**, 231 (2023)

113. X. Wang, R. Blumenfeld, X. Feng, D. A. Weitz,
Phase transitions in bacteria – From structural transitions in free living bacteria to phenotypic transitions in bacteria within biofilms, Physics of Life Reviews **43**, 98-138 (2022);
DOI: 10.1016/j.plrev.2022.09.004

112. R. Blumenfeld,
Comment on "Explicit analytical solution for random close packing in d=2 and d=3", Phys. Rev. Lett. **128**, 028002 (2022),
https://arxiv.org/abs/2201.10550

111. A. Yanagida, E. Corujo-Simon, C. K. Revell, P. Sahu, G. G. Stirparo, I. M. Aspalter, A. K. Winkel, R. Peters, H. De Belly, D. A.D. Cassani, S. Achouri, R. Blumenfeld, K. Franze, E. Hannezo, E. K. Paluch, J, Nichols, K. J. Chalut,
Cell surface fluctuations regulate early embryonic lineage sorting, Cell **185**, 777-793 (2022),
https://doi.org/10.1016/j.cell.2022.01.022

110. R. Blumenfeld,
Sub-anomalous diffusion and unusual velocity distribution evolution in cooling granular gases: theory,
https://arxiv.org/abs/2111.06260

109. R. Blumenfeld,
Erratum: Disorder Criterion and Explicit Solution for the Disc Random Packing Problem, Phys. Rev. Lett. **127**, 259901 (2021)

108. R. Blumenfeld,
Disorder Criterion and Explicit Solution for the Disc Random Packing Problem, Phys. Rev. Lett. **127**, 118002 (2021);
https://arxiv.org/abs/2106.11774

107. T. Matsushima, R. Blumenfeld,
Statistical properties of cell stresses in 2D granular solids, EPJ Web Conf., 249, 02006 (2021).

106. X. Jiang, T. Matsushima, R. Blumenfeld,
Structural characteristics of ordered clusters in packs of ellipses, EPJ Web Conf., 249, 06004 (2021).

105. P. Liu, X. Ran, Q. Cheng, W. Tang, J. Zhou, R. Blumenfeld,
Locomotion of Self-Excited Vibrating and Rotating Objects in Granular Environments, Appl. Sci. **11**, 2054 (2021)

104. J. He, R. Blumenfeld, H. Zhu,
Mechanical Behaviors of Sandy Sediments Bearing Pore-Filling Methane Hydrate under Different Intermediate Principal Stress, Int. J. Geomech., **21**(5), 04021043 (2021)

103. X. Sun, W. Kob, R. Blumenfeld, H. Tong, Y. Wang, J. Zhang,
Friction-controlled entropy-stability competition in granular systems, Phys. Rev. Lett. **125**, 268005 (2020);
https://arxiv.org/abs/2007.14145

102. P. Liu, X. Ran, R. Blumenfeld,
Sink-rise dynamics of horizontally oscillating active matter in granular media: Theory, Phys. Rev. Lett., submitted (2020);
https://arxiv.org/abs/2006.04160

101. C.C. Wanjura, P.A. Gago, T. Matsushima, R. Blumenfeld,
Structural Evolution of Granular Systems: Theory, Granular Matter **22**, 91 (2020);
https://arxiv.org/abs/1904.06549

100. R. Blumenfeld,
The unusual problem of upscaling isostaticity theory for granular matter, Granular Matter **22**, 38 (2020).

99. Y. Feng, R. Blumenfeld, C. Liu,
Support of Modified Archimedes' Law Theory in Granular Media, Soft Matter **15**, 3008 (2019)

98. C. Revell, R. Blumenfeld, K. J. Chalut,
Force-based three-dimensional model predicts mechanical drivers of cell sorting, Proc. Roy. Soc. **B 286**, 20182495 (2019); (https://royalsocietypublishing.org/doi/10.1098/rspb.2018.2495).

97. M. Schwartz, R. Blumenfeld,
Stress Tensor for Dense Granular Flow in Plug-Free Regions, Phys. Rev. **E 98**, 042905 (2018);
https://arxiv.org/abs/1608.01708

96. C. M. Verstreken, K. J. Chalut, R. Blumenfeld,
Equally probable positive and negative Poisson's ratios in disordered planar systems, Soft Matter **14**, 6554 - 6560 (2018)

95. W. Kang, Y. Feng, C. Liu, R. Blumenfeld,
Archimedes' law explains penetration of solids into granular media, Nature Comm. **9**,1101 (2018)

94. Q. Cheng, X. Ran, P. Liu, W. Tang, R. Blumenfeld,
Numerical simulation of a spinning sphere moving in granular matter, Acta Physica Sinica **67**, 014702 (2018). 10.7498/aps.66.014702

93. S. Amitai, A. Bertei, R. Blumenfeld,
Theory-based design of sintered granular composites triples three-phase boundary in fuel cells, Phys. Rev. **E 96**, 052903 (2017);
https://lanl.arxiv.org/abs/1706.05974

92. S. Amitai, R. Blumenfeld,
Affine and topological structural entropies in granular statistical mechanics: explicit calculations and equation of state, Phys. Rev. **E 95**, 052905 (2017);
https://arxiv.org/pdf/1701.05860.pdf

91. R. Blumenfeld, S. Amitai, J.F. Jordan, R. Hihinashvili,
Reply to comment on "On the failure of the volume function in granular statistical mechanics and an alternative formulation", Phys. Rev. Lett. **119**, 039802 (2017)

90. R. Blumenfeld,
Statistical mechanics of dense granular fluids - contacts as quasi-particles, Phys. Rev. Lett., submitted (2016);
https://arxiv.org/abs/1603.02015

89. T. Matsushima, R. Blumenfeld,
Fundamental structural characteristics of planar granular assemblies: self-organisation and scaling away friction and initial state, Phys. Rev.**E 95**, 032905 (2017);
https://arxiv.org/pdf/1207.2988.pdf

88. R. Blumenfeld, J. Ma,
Bending back stress chains and unique behaviour of granular matter in cylindrical geometries, Gran. Matt. **19**:29 (2017);
https://arxiv.org/abs/1606.06484

87. R. Blumenfeld, M.E.Cates, M. Warner,
Report on International workshop: Soft Matter - Theoretical and Industrial Challenges, celebrating the pioneering work of Sir Sam Edwards, Applied Rheology, **27**, 46 (2017)

86. S. Amitaim, R. Blumenfeld,
Modifying continuous-time random walks to model finite-size particle diffusion in granular porous media, J. Gran. Matt.**19**, 1-9 (2017);
https://arxiv.org/pdf/1501.03998v2.pdf

85. L. Huang, X. Ran, R. Blumenfeld,
Vertical dynamics of a horizontally-oscillating active object in a 2D granular medium, Phys. Rev. **E 94**, 062906 (2016);
https://arxiv.org/abs/1609.01457

84. R. Blumenfeld, S. Amitai, J. F. Jordan, R. Hihinashvili,
On the failure of the volume function in granular statistical mechanics and an alternative formulation, Phys. Rev. Lett., **116**, 148001 (2016);
https://arxiv.org/pdf/1507.03779v2.pdf

83. R. Blumenfeld,
Structural evolution of granular systems: Theory, (2014) https://arxiv.org/pdf/1412.6933v1.pdf

82. R. Blumenfeld, S. F. Edwards,
Granular statistical mechanics - a personal perspective, Euro. Phys. J. **223**, 2189-2204 (2014)

81. T. Matsushima, R. Blumenfeld,
On universal structural characteristics of granular packs, Phys. Rev. Lett. **112**, 098003 (2014);
https://arxiv.org/pdf/1305.6093.pdf

80. R. Blumenfeld, J. F. Jordan, S. F. Edwards,
Inter-dependence of the volume and stress ensembles and equipartition in statistical mechanics of granular systems, Phys. Rev. Lett. **109**, 238001 (2012);
https://arxiv.org/pdf/1204.2977.pdf

79. R. Hihinashvili, R. Blumenfeld,
Structural-entropic characteristics of dense planar granular systems, Granular Matter **14**, 277-282 (2012)

78. R. Blumenfeld, S. F. Edwards,
Theory of strains in auxetic materials, J. Superconductivity and Novel Magnetism **25**, 565-571 (2012);
https://arxiv.org/abs/1111.6684)

77. M. Schwartz, R. Blumenfeld,
Plug flow formation and growth in da Vinci Fluids, Granular Matter **13**, 241-245 (2011)

76. R. Blumenfeld, M. Schwartz, S. F. Edwards,
The flow equations and catch-up dynamics of da Vinci Fluids, Eur. Phys. J. **E 32**, 333-338 (2010)

75. G. Frenkel, R. Blumenfeld, P. King, M. Blunt,
Topological Analysis of Foams and Tetrahedral Structures, Adv. Eng. Mat. **11**, 169-176 (2009)

74. R. Blumenfeld, S. F. Edwards,
On granular stress statistics: compactivity, angoricity and some open issues, J. Phys. Chem. **B 113**, 3981 (2009)

73. M. Gerritsen, G. Kreiss, R. Blumenfeld,
Analysis of stresses in two-dimensional isostatic granular systems, Physica **A 387**, 6263 (2008)

72. M. Gerritsen, G. Kreiss, R. Blumenfeld,
Stress chain solutions in two-dimensional isostatic granular systems: fabric-dependent paths, leakage and branching, Phys. Rev. Lett. **101**, 098001 (2008)

71. G. Frenkel, R. Blumenfeld, Z. Grof, P. R. King,
The structure and statistics of 2D granular systems, Phys.Rev. **E 77**, 041304 (2008)

70. R. Blumenfeld, S. F. Edwards,
Blumenfeld and Edwards Reply to Comment on "Granular Entropy: Explicit Calculations for Planar Assemblies", Phys. Rev. Lett., **99**, 089402 (2007)

69. R. Blumenfeld,
Stresses in two-dimensional isostatic granular systems: Exact solutions, New Journal of Physics **9**, 160 (2007)

68. R. Blumenfeld,
Isostaticity and action at a distance in the cytoskeleton - A model awaiting experimental evidence, Biophysical Journal, **91**, 1970 (2006)

67. R. Blumenfeld, S. F. Edwards,
Geometric partition functions of cellular systems: Explicit calculation of the entropy in two and three dimensions, EuroPhys. J. **E 19**, 23 (2006)

66. R. Blumenfeld,
Auxetic strains - insight from iso-auxetic materials, Molecular Simulations **31**, 867 (2005)

65. R. Blumenfeld, S. F. Edwards, R. C. Ball,
Granular matter and the marginal rigidity state, J. Phys.: Cond. Mat. **17**, S2481 (2005);
https://arxiv.org/abs/cond-mat/0105348

64. R. Blumenfeld,
Stresses in isostatic granular systems and emergence of force chains, Phys. Rev. Lett., **93**, 118301 (2004);
https://arxiv.org/abs/cond-mat/0402556

63. R. Blumenfeld,
Stress in planar cellular solids: Coarse-graining the constitutive equation, Physica **A 336**, 361 (2004)

62. R. C. Ball, R. Blumenfeld,
From Plasticity to a renormalisation group, Phil. Trans. R. Soc. Lond. **361** , 731 (2003);
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Invited presentations in conferences

- 2025 **"Powders & Grains 2025"**, Goa, India, December 8-12: *Self-organisation in 2D granular dynamics and its statistical mechanics*
- 2025 **IRN GEOMECH conference on "Multi-Physics and Multiscale Couplings in Geo-environmental Mechanics"**, La Rochelle, France, June 16-18: *Stress-structure self-organisation in granular matter*
- 2025 **"Edwards Centre meeting"**, Cambridge, UK, January 17: *Cooperative stress-structure self-organisation and detailed balanced steady states in granular dynamics*
- 2024 **Conference on "Ergodicity in Physical Systems and Beyond "**, Lincoln, UK, July 8-10: *Self-organisation and detailed balance in non-ergodic out-of-equilibrium dense granular matter*
- 2023 **2nd Conference on "Mechanical Systems Dynamics"**, Peking University, Beijing, China, September 1-5: *Exact solution of the random close packing problem in d=2*

- 2021 **Conference on "Statistical Physics of Complex Systems"**, Warwick University, UK, June 23-24: *Self-organisation of dense granular matter: non-equilibrium entropy and detailed balance*

- 2020 **Workshop on "Bridging Micro-Meso-Macroscopic Scales in Particulate and Biological Systems"**, Duke Kunshan University, Kunshan, China, December 17-20 (Keynote talk): *Structural evolution of dense granular systems: Theory and non-equilibrium detailed balance*

- 2020 **Soft Matter Symposium on "Emerging Scales in Granular Media"**, Hong Kong University of Science and Technology, Hong Kong, January 14-16 (Keynote talk): *Surprising detailed balance in far-from-equilibrium structural dynamics of dense granular fluids*

- 2020 **Edwards Centre Mini-conference**, Cambridge, UK, January 10 (Keynote talk): *Structural self-organisation of granular matter during slow flow*

- 2019 **4th International Granular Flow Workshop**, Yangtze-River-Delta Physics Research Ctr., Liyang, Jiangsu, China, Sept. 15 - 17: *Theory of structural evolution during quasi-static flow of dense granular matter*

- 2019 **4th International Conference on Packings**, Yale University, CN, USA, June 3 - 7: *Structural evolution of granular packs: Theory*

- 2018 **KITS / IoP / CECAM Workshop: "Entropy without the Hot Air"**,Beijing, China, August 5 - 7: *Entropy-based contact statistical mechanics for particulates dynamics*

- 2018 **The 4th Asia-Pacific Regional Workshop for Complex Non-Equilibrium Systems**,Shanghai, China, June 28 - 30: *Contact statistical mechanics for particulates dynamics: Bridging between statics and dynamics*

- 2018 **APS March Meeting**, Los Angeles, USA, March 5 - 9: *Granular statistical mechanics: Bridging between statics and dynamics*

- 2017 **Outlook of Soft Matter Physics and Its Applications**, Beijing, China, December 16-17: *Granular statistical mechanics: Bridging between statics and dynamics*

- 2017 **The 2nd International Granular Flow Workshop**, Guiyang, China, August 21 - 24: *Granular statistical mechanics: different structural entropy sources, exact calculations, and the origin of N!*

- 2017 **From supercooled liquids to glasses: Current challenges for amorphous materials**, Kavli Inst. of Theoretical Science, Beijing, August 7 - 18: *Entropy in disordered particulate systems*

- 2017 **The 10th International Conference on Soft Matter and Biophysics**, Xiamen, China, March 25 - 28: *Self-organisation of structural characteristics in packing of granular materials in 2D and implications (opening talk)*

- 2016 **The 3rd International conference on Packing: across length scales**, Shanghai, China, August 29 - September 1: *Self-organisation of structural characteristics in packing of granular materials in 2D*

- 2016 **The 3rd International workshop on Soft and Granular Matter in Ambient and Extreme Conditions**, Changsha, Hunan, China, August 22 - 25

- 2016 **The American Physical Society March Meeting**, Baltimore, MD, USA, March 14 - 18: *Granular statistical mechanics – Building on the legacy of Sir Sam Edwards*

- 2016 **Dynamic Days**, Durham, NC, USA, January 7 - 10: *Granular statistical mechanics*

- 2015 **The 2nd International Workshop on Soft and granular matter in ambient and extreme conditions 2015**, Changsha, Hunan, China, 31 August - 4 September: *1. Statistical mechanics of Granular matter - I; 2. Statistical mechanics of Granular matter - II*

- 2015 **The Annual Meeting of Thermodynamic and Statistical Mechanics Education and Research Association of China 2015**, Changsha, Hunan, China, 12-15 July *A three-lecture series: 1. Statistical mechanics of athermal systems; 2. Statistical mechanics of granular, porous and cellular materials; 3. Discussion: Necessary curriculum for physics undergraduates*

- 2015 **EMI 2015**, Stanford, USA, 16-19 June: *Two talks: 1. Structural evolution of 2D granular solid under shear deformation; 2. From local structural characterisation of porous materials to structure-property relations: a systematic approach*
- 2015 **Beijing Soft Matter Workshop**, Beijing, China, 17 April *A local morphological descriptor of granular materials and its uses*
- 2014 **Avalanches in Functional Materials and Geophysics**, Cambridge, UK, 4-8 December *Local structural characterisation and statistical mechanics of porous and cellular media*
- 2014 **International Workshop on Soft and granular matter in ambient and extreme conditions**, Changsha, Hunan, China, 15-18 September *1. Stress transmission in dense granular materials; 2. Granular statistical mechanics*
- 2014 **International Symposium on Geomechanics from Micro to Macro**, Cambridge, UK, 1-3 September *Structural characterisation and understanding stress transmission in dense granular materials*
- 2014 **Dynamic Systems: From Statistical Mechanics to Engineering Applications**, Zurich, Switzerland, 9-10 January *Flow of dense granular fluids - a first-principle approach*
- 2014 **International Winter School and Symposium on Statistical Mechanics and Simulation of Nonlinear Dynamics**, Changsha, China, 3-7 Jan - *A six-lecture series: 1. Stress transmission in granular packs: why do conventional theories fail; 2. Isostaticity theory as a baseline model for stress transmission in granular assemblies; 3. Extension of isostaticity theory for real granular matter: stato-elasticity theory; 4. Statistical mechanics of granular media: the Edwards formalism; 5. Statistical mechanics of granular media: (ii) the volume-stress ensemble; 6. Fracture propagation in heterogenous media: process zone statistics and rich dynamics*
- 2013 **Powders and Grains 2013 Conference**, Sydney, Australia, 7-13 July *Statistical Mechanical Characteristics of Dense Planar Granular Matter*
- 2012 **8th European Solid Mechanics Conference**, Graz, Austria, 9-13 July *Statistical Mechanical Characteristics of Dense Planar Granular Matter*
- 2012 **8th European Solid Mechanics Conference**, Graz, Austria, 9-13 July *Elementary Volumes Distribution and Cell Structural Stability in 2D Granular Assemblies*
- 2012 **Petroleum Engineering and Rock Mechanics (PERM) Affiliates Meeting**, London, UK, 11 June *A systematic programme for predicting fracture network characteristics*
- 2011 **Workshop: Complexity in the Oil Industry**, Inst. of Physics, Natal, Brazil, 14-18 November *From characterization of porous media to macroscale structure-property relations - A systematic approach*
- 2011 **Workshop: Fluctuations and Response in Active Materials: From Driven Granular Systems to Swarming Bacteria**, Lorentz Center, Leiden, The Netherlands, 20-24 June *Driven dense granular matter as a da Vinci fluid*
- 2011 **Pore-Scale Modelling Consortium meeting**, Imperial College London, London, UK, 11 January *Failure and flow of granular matter: from yield rheology to da Vinci fluid*
- 2010 **Gordon Conference on Flow and Transport in Permeable Media**, Lewiston, ME, USA 11-16 July: *Systematic derivation of structure-property relations in porous and cellular materials*
- 2010 **Gordon Conference on Granular and Granular Flow** , Waterville, ME, USA 20-25 June: *Da Vinci fluid as a possible model for dense granular flow*
- 2010 **Mini-symposium on fractured reservoirs**, Delft, Nethrelands 10 June: *A model for dynamic fractures in inhomogeneous media*
- 2010 **PERM Affiliates meeting**, Imperial College London, UK 7 June: *Stress theory and fragility of granular matter*
- 2010 **Workshop - Particulate Matter: Does Dimensionality Matter?**, Dresden, Germany 30 May - 4 June: *Effects of dimensionality on statistical mechanics of granular matter*

- 2010 **Workshop on granular materials**, Tsukuba, Japan 4 March: *Continuum stress theory for large statically determinant structures and implications for granular materials*
- 2009 **IUTAM-ISIMM Symposium on Mathematical Modeling and Physical Instances of Granular Flows**, Reggio Calabria, Italy, 14-18 Sept.: *Stress transmission and yield flow of dense Granular materials*
- 2009 Workshop on **Statistical mechanics of static granular media**, Lorentz centre, Leiden, 6-10 July: Plenary talk, *Compactivity, Angoricity, and Open Issues in Granular Statistics*
- 2009 **Meeting of the PERM consortium**, London, 22 June: *Systematic characterization and analysis of pore space*
- 2008 Workshop on **Flow in Porous Media**, Brasilia, Brazil, 18-24 Oct: *Structural characteristics of porous media and systematic predictions of transport properties*
- 2008 Conference on **Granular Gases: Beyond the Dilute Limit**, Thurnau, Germany, 7-12 Sept: *Stress transmission in granular systems and incipient yield flow*
- 2008 **The BPI-Cavendish workshop**, BPI Inst, Cambridge University, UK, *Stresses in granular systems and yield flow*
- 2008 Petroleum Engineering and Rock Mechanics (PERM) Affiliates Meeting on **Pore-scale modelling**, London, UK, 16 June: *Microstructural characterization of porous media and systematic derivation of transport properties*
- 2008 IOP Meeting on **Condensed Matter and Materials Physics 2008**, London, UK, 26-28 March: *Granular matter as two-phase composites: Critical behaviour, stato-elasticity and new stress solutions*
- 2008 Air Force Office for Scientific Research and Air Force Research Lab Meeting on **Particulate Mechanics in Extreme Environments**, Eglin Florida, USA, 29-31 January: *Effects of formation dynamics on structural characteristics of grain assemblies*
- 2007 Meeting of the Society for Natural Philosophy on **The Interface Between Atomistic and Continuum Theories**, Houston Texas, US, 26-28 October: *Stress equations in statically determinate systems - a unique coarse-graining problem and solutions*
- 2007 **Universities Forum on Reservoir Description and Simulation (UFORDS)**, Scarborough, UK, 2-6 September: *Process zone driven fracture propagation - a first-principles equation and rich dynamics*
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- 2007 Conference on **Complexity in the Oil Industry**, Natal, Brasil, 5-9 August *Force chains in granular porous media: emergent self-organized networks and criticality*
- 2007 StatPhys Satellite meeting on **Statics and Dynamics of Granular Media and Colloidal Suspensions**, Naples, Italy: *Entropic description of granular and cellular structures*
- 2007 Petroleum Engineering and Rock mechanics (PERM) Affiliates Meeting, Imperial College London: *Structural - entropic characterization of porous media and systematic derivation of transport properties*
- 2007 USAF Workshop on **Particulate Mechanics in Extreme Environments**, University of Florida, Florida, US 23-25 January: **Isostaticity theory and modelling propagation of stresses in granular materials**
- 2006 20th Canberra International Physics Summer School on **Granular Matter**, The Australian National University, Canberra, Australia: **Structural-entropic characterization of porous media and systematic derivation of transport properties**
- 2005 Summer School on **Econophysics and complexity**, Academy of Economics Studies, Bucharest, Romania: **Rational modelling of multi-agent systems**

- 2004 Summer School on **Bridging between economists and physicists**, Academy of Economics Studies, Bucharest, Romania: **Dimensional reduction in economic systems**
- 2004 IMA Workshop on **Modeling of Soft Matter**, Institute for Mathematics and its Applications (IMA), Minneapolis, US: **Stress field equations in granular solids: A shift of paradigm**
- 2004 IChemE meeting on the **Behaviour of Structured Granular Materials Across Length Scales**, Leeds, UK: **Stresses and yield in granular materials**
- 2004 **Physics of Risk**, Nyborg, Denmark: **Econo-string theory: Representation of many-agent systems as planar strings**,
- 2003 **Flow Regimes, Transitions and Segregation in Granular and Particle-laden Flows**, Cambridge, UK: (i) *Granular piles and marginal rigidity*; (ii) *Stress transmission in granular systems.*
- 2001 **International conference on geometry, nonlinearity, and integrability in condensed matter and soft condensed matter physics**, Bansko, Bulgaria: *Domain wall dynamics on antiferromagnetic chains: Interactions, conservation laws and stable lattice solutions.*
- 1998 **The Polymer Consortium Annual Meeting**, Cambridge, UK: *Mesoscale polymer modeling: The fracture case study.*
- 1997 **77th Statistical Mechanics Conference**, Rutgers Univ., USA: *Why fractal patterns: A first-principles approach.*
- 1997 **Workshop on Nonlinear Phenomena in Transforming Solids**, Penn State Univ., USA: *Hierarchical structure of domains in magnetic layers.*
- 1996 **Workshop on Fracture, Friction and Deformation**, Los Alamos, USA: *Nonequilibrium fracture propagation: Steady-state, periodicity and intermittency.*
- 1996 **Workshop on Nonequilibrium Phase Transformations**, Santa Fe, USA: *Domain Wall Textures in 2D Ferromagnets.*
- 1995 **FRACTALS 95**, Marseilles, France: *A theory for the morphology of Laplacian growth via statistics of equivalent many-body systems.*
- 1995 **MRS Fall Meeting**, Boston, USA: *Review of analyses of fracture roughness.*
- 1994 **Gordon conference** on **Fractals**, San Miniato, Italy: *Formulaing a First-principles theory for stochastic Laplacian growth.*
- 1994 **Nonlinear Evolution Equations and Dynamical Systems** (NEEDS94), Los Alamos, NM, USA: *A morphological theory for Laplacian nonlinear growth processes via statistics of equivalent many-body systems.*
- 1994 **MRS General Meeting**, Boston, USA: *On a first-principles theory for growing interfaces in Laplacian fields: A many-body formulation and statistical analysis.*
- 1993 **Fractals in Natural Sciences**, Budapest, Hungary: *Quantifying morphology of scale-invariant strucrures beyond the fractal dimension.*
- 1992 Forum in **Compaction Forming Operations**, Aston University, Birmingham, UK: *Percolation as a model for disordered systems.*
- 1990 **NATO ASI Summer school** on **Propagation of Correlations in Constrained Systems**, Institute d'Etudes Scientifiques de Cargese, Corsica, France: 1) *Universally correlated scale-invariant side-branching in propagation of a two-dimensinal cracking growth*; 2) *Vortex-antivortex pairing of holes in frustrated XY spin system.*

Invited colloquia and departmental seminars

- 2022 Engineering Dept., Tsukuba University, Japan *Exact solution of the random close packing problem in d=2 - ramifications and extensions*
- 2022 Dept. of Physics, Tel Aviv University, Israel *Exact solution of the random close packing problem in two dimensions*
- 2022 Engineering Dept., Tsukuba University, Japan *Stress theory for ideal and real granular materials*
- 2021 J. Granular Matter monthly Webinar *Granular matter self-organises by entropy-stability competition into non-equilibrium detailed balance states*
- 2021 Inst. of Natural Sciences & Dept. of Physics and Astronomy, Jiao Tong University, Shanghai, China *Self-organisation of dense granular systems: theory, entropy, and non-equilibrium detailed balance*
- 2021 Engineering Dept., Tsukuba University, Japan *Introduction to statistical mechanics of granular media*
- 2016 Yukawa Inst., Kyoto University, Japan *Progress in statistical mechanics of a-thermal particulate systems*
- 2016 Engineering, Tsukuba University, Japan *Bending back and rich behaviour of stress chains in isostatic annuli*
- 2016 Aerospace Engineering, Peking University, Beijing, China *Towards a stress theory for real granular materials*
- 2016 Aerospace Engineering, Peking University, Beijing, China *Statistical mechanics of granular materials*
- 2016 Phyiscs, Beihang University, Beijing, China *Theory of stress in granular materials*
- 2015 Physics, Jiao Tong University, Shanghai, China *Towards a stress theory for real granular materials*
- 2015 Engineering, Tsukuba University, Tsukuba, Japan *Towards a fundamental stress theory for real granular materials*
- 2015 Engineering, Tsukuba University, Tsukuba, Japan *A local morphological descriptor of granular materials and its uses*
- 2014 College of Civil Engineering, Tongji University, Shanghai, China *Fracture propagation in geo-materials: The single fracture dynamics*
- 2014 Inst. of Theoretical Physics, Chinese Academy of Science, Beijing, China *Structural characterisation and statistical mechanics of granular and porous systems: A systematic method to derive structure-property relation and equations of state*
- 2014 Center of soft matter physics and its applications, Beihang University, Beijing, China *Towards a fundamental stress theory for real granular materials*
- 2013 Dept. of physics, University of Cambridge, UK *Recent perspectives in the science of granular matter*
- 2013 Graduate Lecture, Dept. of physics, University of Cambridge, UK *The science of granular matter*
- 2013 Dept. of chemical and environmental engineering, University of Nottingham, UK *Structural Characterization and Statistical Mechanics of Granular Matter*
- 2012 Physics Dept., University of Kent, Canterbury, UK *From statistical mechanics of granular, cellular and porous materials to structure-property relations: a systematic approach*
- 2012 Dept. of Mathematics, Open University, Norwich, UK *Statistical mechanics of granular, cellular and porous media and structure-property relations – a systematic approach*
- 2011 Institut fur Experimentelle Physik, Universitat Ulm, Ulm, Germany, *Controlled force mediation in the cytoskeleton: A dream model awaiting experimental verification*
- 2010 School of Physics and Astronomy, Tel Aviv University, Tel Aviv, Israel, *Colloquium: Da Vinci Fluid - a minimal model for flow of dense granular materials*

- 2010 School of Physics and Astronomy, Tel Aviv University, Tel Aviv, Israel, *From pore-scale structural characterization to macro-scale structure-property predictions*
- 2010 Department of Environmental Sciences, ETH, Zurich, Switzerland, *Da Vinci Fluid model for flow of dense granular materials*
- 2010 Engineering Dept, Tokyo University, Japan, *Understanding stress transmission in dense granular materials*
- 2010 Lecture course: Engineering Dept, Kyoto University, Japan, *1. Stress transmission in granular packs: why do conventional theories struggle? 2. Stress transmission in granular packs: isostaticity theory and beyond; 3. Entropic formalism for the statistics of granular packs; 4. Stresses and force chains in granular materials: misconceptions and new directions*
- 2009 Civil Engineering Dept, Sydney University, Australia, *Systematic derivation of structure-property relations in porous and cellular materials*
- 2009 Civil Engineering Dept, Sydney University, Australia, *Stress transmission and incipient yield flow in dense granular materials*
- 2008 Mathematics Dept, Brunel University, UK, *A Stresses in Granular Systems: A paradigm of Complexity*
- 2008 ICP, Stuttgart University, Germany, *Stresses in granular systems*
- 2008 Earth Sciences and Engineering, PERM Seminar, Imperial College London, UK, *The Rich Dynamics of Process Zone Limited Fracture Propagation in Heterogeneous Materials*
- 2008 DAMTP, Cambridge University, UK, *Stresses in granular systems and yield flow*
- 2008 Applied Modelling and Computation Group (AMCG), Earth Sciences and Engineering, Imperial College London, *Microstructural characterization of porous media and systematic derivation of transport properties*
- 2008 Earth Sciences and Energy Research, Weizmann Inst., Rehovot, Israel, *Structural-entropic characterization of porous media and flow properties*
- 2008 Physics Department, Tel Aviv University, Israel, *Stresses in isostatic systems and applications to granular materials*
- 2007 Physics Department, North Carolina State University, NC, USA, *Exact solutions to the isostaticity stresses equations in disordered 2d granular materials*
- 2007 Physics Department, Duke University, NC, USA, *Exact solutions to the isostaticity stresses equations in disordered 2d granular materials*
- 2006 Physics Department, Bar Ilan University, Tel Aviv, Israel, *Propagation of stresses in granular porous materials: between elasticity and isostaticity*
- 2006 Biology Department, Bar Ilan University, Tel Aviv, Israel, *Controlled force mediation in the cytoskeleton: A dream model awaiting experimental verification*
- 2006 Physics Department, University of Manchester, Manchester, UK, *Stresses in granular materials: between elasticity and isostaticity*
- 2006 Laboratoire de Physique ThÃ©orique, Ecole Normale SupÃ©rieure, Paris, Frances, *Propagation of stresses in granular porous materials: between elasticity and isostaticity*
- 2004 Applied Mathematics, Bristol University, UK, *Stress field equations in granular solids: A shift of paradigm*
- 2004 Institute of Physics of Geological Processes, Oslo, Norway, *Stress transmission in granular materials: Between elasticity and isostaticity*
- 2004 Cavendish Laboratory, Cambridge, *Stress transmission in granular materials: Between elasticity and isostaticity*
- 2003 Cavendish Laboratory, Cambridge, *Stress transmission in cellular solids: beyond elasticity.*
- 2003 Isaac Newton Institute, *Granular piles and marginal rigidity.*

- 2002 Kings College London, *Mechanics of cellular systems.*
- 2001 Leeds University, UK, *Pulling single chains and implications to rheology of dense polymers near the glass transition.*
- 2000 Max Planck Institute, Golm, *Chilling out polymer dynamics: Fluctuating disentanglement forces and rheological implications.*
- 1997 Max Planck Institute, Stuttgart, *Nonequilibrium mesoscale fracture propagation: Noise-free and noise-driven steady states, oscillations and intermittency.*
- 1996 Wake Forest University, North Carolina, *A new theoretical approach to surface growth: The Laplacian growth paradigm.*
- 1996 University of New Mexico, Albuquerque, *Growth of complex interfaces: Theory.*
- 1995 Santa Fe Institute, Santa Fe, *Theorizing on patterns of evolving interfaces: The Laplacian growth paradigm.*
- 1995 University of Texas, El Paso, *Statistics of interfaces in Laplacian growth.*
- 1995 New Mexico State University, Las Cruces, *A first-principles theory for Laplacian growth.*
- 1994 Emory University, Atlanta, Georgia, *Formulation of a first-principles theory for growing surfaces.*
- 1994 Arizona State University, *Characterization and analysis of morphologies of scale-invariant patterns and hierarchical structures beyond simple scaling.*
- 1993 Clarkson University, *Onset of scale-invariant side-branching in cracking patterns and comparison with diffusion-limited-aggregation.*