

## CURRICULUM VITAE

**Alessio Zaccone**

### A: Personal Details

Nationality: Italian

Date of birth: 7 September 1981

### B: Employment history

- 2018 – **Associate Professor of Physics (tenured)**, Department of Physics “A. Pontremoli”, University of Milan. Visiting scholar at the Department of Chemical Engineering and Biotechnology, University of Cambridge.
- 2015 – 2018 **University Lecturer** and Head of the Statistical Physics Group at the the Department of Chemical Engineering and Biotechnology, University of Cambridge.
- 2014 - 2015 **Moessbauer Professor (W2 tenure-track) of Theoretical Physics**, Physik-Department, Technical University Munich.
- 2011 - 2014 **Oppenheimer Research Fellow in Physics (independent group leader)**, Cavendish Laboratory, University of Cambridge, UK. Research on soft matter, disordered solids, self-assembled biomaterials, granular materials, disordered systems, complex nanoparticles. Collaborative research stays at ETH Zurich during summer vacations.
- 2010 - 2011 Swiss National Science Foundation Research Fellow at Cavendish Laboratory, University of Cambridge UK, theory of soft and biological matter.

### C: Education

- 2006 - 2010 **PhD in Statistical Physics** supervised by Prof. M. Morbidelli and Prof. H.-J. Hermann, ETH Zurich.  
PhD viva voce exam on 28 October 2009, awarded on 27/04/2010. Short post-doc period at ETH until 30 September 2010.
- 2000 - 2005 MSc (Laurea), Politecnico di Torino (Italy). Grade: 110/110.

### D: International recognition (honours & awards)

- The Gauss Professorship Award for 2020 at University of Goettingen, awarded by the Goettingen Academy of Sciences and Humanities, Germany
- Journal of Physics: Materials (IoP) Emerging Leader nomination (listed as one of the emerging leaders in the field of materials physics worldwide)
- American Chemical Society I&ECR Class of 2017 Influential Researcher Award (listed as one of the 37 most influential scientists with <10 years of independent career for impact on chemical sciences)
- Italian Scientific Habilitation (Abilitazione Scientifica Nazionale) as Full Professor in the class of Theoretical Condensed Matter Physics (Fisica teorica della materia, 02B2)
- Anthony L. Lyster Fellowship in Physics, Queens’ College, University of Cambridge
- Swiss National Foundation (SNF) Professorship Award 2014
- Rudolf Mössbauer Fellowship Award, Technical University Munich, 2014
- Oppenheimer Research Fellowship, University of Cambridge, 2011
- Swiss National Foundation (SNF) Fellowship for Postdoctoral Researchers, 2010
- Alexander von Humboldt Fellowship, 2010
- ETH Medal Award for outstanding PhD thesis, 2010.

### E: Scientific productivity

- **109 articles published** in leading peer-reviewed journals (including: **11 in Phys. Rev. Lett.**, **4 in PNAS**, **2 in Science Advances**, **1 in Nature Communications**, **1 in Nano Letters**), of which **>60 as the senior/lead author and project leader**. H-index = 30.

## **F: Other appointments**

### Teaching roles

- 2019 – present: responsible for “Mathematical Methods for Physics 1”, in the BSc level degree in Physics at University of Milan.
- 2018 – present: responsible for “Mathematical Methods for Physics 2: Differential Geometry and Group Theory”, in the MSc level degree in Physics at University of Milan.
- 2015 – 2018: responsible for the teaching of Part IA Physics modules (1<sup>st</sup> year undergraduate courses in Physics) and Part II modules of Quantum Condensed Matter Physics and Statistical & Thermal Physics (3<sup>rd</sup> year undergraduates) at the Cavendish Laboratory and Queens’ College, University of Cambridge.
- 2016 – 2018: responsible for teaching PartIIA “Process Dynamics & Control” and PartIIA “Partial Differential Equations”, at the University of Cambridge.
- 2014 – 2015: responsible for the MSc-level course “Advanced Statistical Mechanics”, Physics Department, Technical University Munich.

## **G: Third-party funding record**

- US Army Research Laboratory (US ARL) and US Army Research Office (US ARO) Grants for a research associate (senior scientist) position to work on theory and computer simulations of polymer glasses (**616’000 GBP** since 01/10/2016).
- Industrial grant from Synthomer Inc. to fund a PhD student for three years (**60’000 GBP**) to develop a numerical package to predict aggregation phenomena in colloidal systems under turbulent flow conditions.
- Rudolf Mössbauer Grant at TU Munich, partly from Marie-Curie EU Excellence Program (**650’000 EUR**), from 2014 till 2016. Used to fund myself and two PhD students (Rico Milkus and Johannes Krausser).
- Swiss National Foundation Professorship (endowed with **1’400’000 CHF**, awarded in 2014).
- Winton Programme for the Physics of Sustainability: **80’000 GBP** for 3 years supporting a PhD student under my supervision (Breannan O. Conchuir), 2011-2014.
- Ernest Oppenheimer Fund: **150’000 GBP** supporting myself for a 3-year Research Fellowship at the University of Cambridge, 2011-2014.
- Swiss National Foundation: **60’000 CHF** supporting myself for a 1-year post-doc at the University of Cambridge, 2010 – 2011.

## **H: International collaborations (all of which led to joint publications)**

Dr T. Sirk (US Army), Prof. D. Weitz (Harvard), Prof. J.-L. Tamarit (Barcelona), Prof. M. Ballauff (Berlin), Prof. P. Mueller-Buschbaum (Munich), Prof. Y.-J. Wang (Beijing), Prof. M.-Q. Jiang (Beijing), Prof. W.-H. Wang (Beijing), Prof. K. Samwer (Goettingen), Prof. G. Wilde (Muenster), Prof. D. Frenkel (Cambridge), Prof. D. Bonn (Amsterdam), Prof. M. Bonn (Max Planck Mainz), Prof. J. Brujic (NYU), Prof. T. Knowles (Cambridge), Prof. C. Kaminski (Cambridge), Prof. E. M. Terentjev (Cambridge), Prof. P. Cicuta (Cambridge), Prof. S. U. Egelhaaf (Duesseldorf), Prof. P. Schall (Amsterdam), Prof. Yunjiang Wang, Prof. Minqiang Jiang, Prof. Wei-Hua Wang (Beijing), Prof. V. Fodera’ (Copenhagen), Prof. D. Rodney (Lyon), Prof. G. Ruocco (Rome), Dr. M. Baggioli (Madrid).

## **I: PhD students**

### Current PhD students

- Thomas Gray, PhD student 2016 – until 2019
- Luca Banetta, PhD student starting Jan. 2017 – until 2020
- Bingyu Cui, PhD student 2017 – until 2020

### Former PhD students:

- Dr Rico Milkus, PhD student 2014-2017, now working in industry (Beissbarth, Munich)
- Dr Johannes Krausser, PhD student 2014-2017, now post-doc in Physics at University College London
- Dr Breannan O. Conchuir, PhD student 2011-2014, now R&D group leader at IBM.

## **Publications in peer-reviewed journals.**

### **10 important papers are highlighted with asterisk.**

1. A. Zaccone and K. Trachenko.  
*Explaining the low-frequency shear elasticity of confined liquids.*  
**Proceedings of the National Academy of Sciences of the USA**, advance online article DOI: 10.1073/pnas.2010787117.
2. B. Cui and A. Zaccone.  
*Analytical prediction of logarithmic Rayleigh scattering in amorphous solids from tensorial heterogeneous elasticity with power-law disorder.*  
**Soft Matter**, advance online article DOI: 10.1039/d0sm00814a.
3. G. Chevallard, K. Samwer, and A. Zaccone.  
*Atomic-scale expressions for viscosity and fragile-strong behavior in metal alloys based on the Zwanzig-Mountain formula.*  
**Physical Review Research** 2, 033134 (2020).
4. I. Kriuchevskiy, V. V. Palyulin, R. Milkus, R. M. Elder, T. W. Sirk, and A. Zaccone.  
*Scaling up the lattice dynamics of amorphous materials by orders of magnitude.*  
**Physical Review B** 102, 024108 (2020).
5. J. Rouwhorst, C. Ness, S. Stoyanov, A. Zaccone, P. Schall.  
*Nonequilibrium continuous phase transition in colloidal gelation with short-range attraction.*  
**Nature Communications** 11, 3558 (2020).
6. J. Rouwhorst, P. Schall, C. Ness, T. Blijdenstein, and A. Zaccone.  
*Nonequilibrium master kinetic equation modeling of colloidal gelation.*  
**Physical Review E** 102, 022602 (2020).
7. M. Baggioli, C. Setty, A. Zaccone.  
*Effective theory of superconductivity in strongly coupled amorphous materials.*  
**Physical Review B** 101, 214502 (2020).
8. A. Zaccone and E. M. Terentjev.  
*Rheology of hard glassy materials.*  
**Journal of Physics: Condensed Matter** 32, 395402 (2020).
9. J. M. van Doorn, R. Higler, R. Wegh, R. Fokkink, A. Zaccone, J. Sprakel, J. van der Gucht.  
*Propagation and attenuation of mechanical signals in ultrasoft 2D solids.*  
**Science Advances**, accepted, in press.
10. B. Cui, J. F. Gebbia, M. Romanini, S. Rudic, R. Fernandez-Perea, F. Javier Bermejo, J.-L. Tamarit, and A. Zaccone.  
*Secondary relaxation in the THz range in 2-Adamantanone from theory and experiments.*  
**Physical Review B** 101, 104202 (2020).
11. A. Zaccone.  
*Relaxation and vibrational properties in metal alloys and other disordered systems.*  
**Journal of Physics: Condensed Matter** (invited topical review) 32, 203001 (2020).
12. M. Baggioli and A. Zaccone.  
*Unified theory of vibrational spectra in hard amorphous materials.*  
**Physical Review Research** 2, 013267 (2020).
13. L. Banetta and A. Zaccone.  
*Pair correlation function of charge-stabilized colloidal systems under sheared conditions.*

**Colloid and Polymer Science** 298, 761–771 (2020).

14. D. Han, Dan Wei, J. Yang, H.-L. Li, M.-Q. Jiang, Y.-J. Wang, L.-H. Dai, and A. Zaccone.  
*Atomistic structural mechanism for the glass transition: Entropic contribution.*  
**Physical Review B** 101, 014113 (2020).
15. M. Baggioli and A. Zaccone.  
*Vibrational spectrum and specific heat in glasses from random matrix theory.*  
**Physical Review E** 100, 062131 (2019).
16. M. Baggioli, B. Cui, A. Zaccone.  
*Theory of the phonon spectrum in host-guest crystalline solids with avoided crossing.*  
**Physical Review B (Rapid Communication)** 100, 220201(R) (2019).
17. B. Cui, A. Zaccone, D. Rodney.  
*Nonaffine lattice dynamics with the Ewald method reveals strongly nonaffine elasticity of  $\alpha$ -quartz.*  
**Journal of Chemical Physics** 151, 224509 (2019).
18. M. Baggioli and A. Zaccone.  
*Low-energy optical phonons induce glassy-like vibrational and thermal anomalies in ordered crystals.*  
**Journal of Physics: Materials** 3, 015004 (2020) (Emerging Leaders 2020 Collection).
19. R. M. Elder, A. Zaccone, T. W. Sirk.  
*Identifying nonaffine softening modes in glassy polymer networks: A pathway to chemical design.*  
**ACS Macro Letters** 8, 1160 (2019).
20. G. Ding, C. Li, A. Zaccone, W. H. Wang, H. C. Lei, F. Jiang, Z. Ling, and M. Q. Jiang.  
*Ultrafast extreme rejuvenation of metallic glasses by shock compression.*  
**Science Advances** 5, eaaw6249 (2019).
21. M. Baggioli and A. Zaccone.  
*Hydrodynamics of disordered marginally-stable matter.*  
**Physical Review Research** 1, 012010(R) (2019).
22. B. Cui, G. Ruocco, A. Zaccone.  
*Theory of elastic constants of athermal amorphous solids with internal stresses.*  
**Granular Matter** 21, 69 (2019) - Special Issue In Memoriam T. Behringer.
23. L. Banetta and A. Zaccone.  
*Radial distribution function of Lennard-Jones fluids in shear flows from intermediate asymptotics.*  
**Physical Review E** 99, 052606 (2019).
24. M. Baggioli and A. Zaccone.  
*Universal origin of boson peak vibrational anomalies in ordered crystals and amorphous materials.*  
**Physical Review Letters** 122, 145501 (2019).\*
25. J. Yang, Y.J. Wang, E. Ma, A. Zaccone, L.H. Dai, M.Q. Jiang.  
*Structural parameter of orientational order to predict the boson vibrational anomaly in glasses.*  
**Physical Review Letters** 122, 015501 (2019).
26. M. Lu, L. Banetta, L.J. Young, E.J. Smith, G.B. Bates, A. Zaccone, G. S. Kaminski-Schierle, A. Tunnacliffe, C. F. Kaminski.  
*Live-cell super-resolution microscopy reveals a primary role for diffusion in polyglutamine-driven aggresome assembly.*  
**Journal of Biological Chemistry** 294, 257-268 (2018).

27. B. Cui, Z. Evenson, B. Fan, M. Li, W.-H. Wang, A. Zaccone.  
*Possible origin of beta relaxation in amorphous metal alloys from atomic-mass differences of the constituents.*  
**Physical Review B** 98, 144201 (2018).
28. C. Eccles, S. Roy, T. H. Gray and A. Zaccone.  
*Reply to 'Comment on "Temperature dependence of nuclear fission time in heavy-ion fusion-fission reactions"'.*  
**Physical Review C** 98, 029802 (2018).
29. V.V. Palyulin, C. Ness, R. Milkus, R.M. Elder, T.W. Sirk, A. Zaccone.  
*Parameter-free predictions of the viscoelastic response of glassy polymers from nonaffine lattice dynamics.*  
**Soft Matter** 14, 8475 (2018). Featured on the journal cover.\*
30. B. Cui and A. Zaccone.  
*Generalized Langevin Equation and fluctuation-dissipation theorem for particle-bath systems in external oscillating fields.*  
**Physical Review E** 97, 060102(R) (2018).
31. J. Krausser, A. Lagogianni, K. Samwer, A. Zaccone.  
*Reply to 'Comment on "Disentangling interatomic repulsion and anharmonicity in the viscosity and fragility of glasses"'.*  
**Physical Review B** 98, 016202 (2018).
32. M. Dang, R. Zargar, D. Bonn, A. Zaccone, P. Schall.  
*Nonequilibrium free energy of colloidal glasses under shear.*  
**Journal of Physics D: Applied Physics** 51, 324002 (2018).
33. B. Cui, J. Gebbia, J.-L. Tamarit, A. Zaccone.  
*Disentangling alpha and beta relaxation in orientationally disordered crystals with theory and experiments.*  
**Physical Review E** 97, 053001 (2018).
34. G. M. Cicuta, J. Krausser, R. Milkus, A. Zaccone.  
*Unifying model for random matrix theory in arbitrary space dimensions.*  
**Physical Review E** 97, 032113 (2018).\*
35. V. Vetri, F. Piccirilli, J. Krausser, G. Buscarino, U. Lapinska, B. Vestergaard, A. Zaccone, V. Fodera'.  
*Ethanol controls the self-assembly and mesoscopic properties of amyloid spherulites.*  
**Journal of Physical Chemistry B** 122, 3101 (2018).
36. A. Zaccone.  
*Harnessing entropy in single-molecule force spectroscopy with semiconducting polymers.*  
**Chem** 4, 191-193 (2018).
37. R. Milkus, C. Ness, V. Palyulin, J. Weber, A. Lapkin, A. Zaccone.  
*Interpretation of the vibrational spectra of glassy polymers using coarse-grained simulations.*  
**Macromolecules**, 51, 1559-1572 (2018).
38. R. Higler, J. Krausser, J. van der Gucht, A. Zaccone, J. Sprakel.  
*Linking slow dynamics and microscopic connectivity in dense suspensions of charged colloids.*  
**Soft Matter**, 14, 780 (2018).
39. L. Perez-Ocampo, A. Zaccone, M. Laurati.  
*A well defined glass state obtained by oscillatory shear.*

- Journal of Rheology** 62, 197 (2018).
40. C. S. Eccles, S. Roy, T. H. Gray, A. Zaccone.  
*Temperature dependence of nuclear fission time in heavy-ion fusion-fission reactions.*  
**Physical Review C** 96, 054611 (2017).
  41. A. Maestro and A. Zaccone.  
*Nonaffine deformation and tunable yielding of colloidal assemblies at the air-water interface.*  
**Nanoscale** 9, 18343 (2017).
  42. C. Ness, V.V. Palyulin, R. Milkus, R. Elder, T. Sirk, A. Zaccone.  
*Nonmonotonic dependence of polymer glass mechanical response on chain bending stiffness.*  
**Physical Review E (Rapid Communication)** 96, 030501(R) (2017).
  43. B Cui, J. Yang, J. Qiao, M. Jiang, L. Dai, Y.-J. Wang, and A. Zaccone.  
*Atomic theory of viscoelastic response and memory effects in metallic glass.*  
**Physical Review B** 96, 094203 (2017).
  44. J. Krausser, R. Milkus, A. Zaccone.  
*Non-affine lattice dynamics of defective fcc crystals.*  
**Soft Matter** 13, 6079 (2017).
  45. V. Hieronymus-Schmidt, H. Roesner, G. Wilde, A. Zaccone.  
*Shear banding in metallic glasses described by alignments of Eshelby quadrupoles.*  
**Physical Review B** 95, 134111 (2017).
  46. M. Abkenar, T. H. Gray, A. Zaccone.  
*Dissociation rates from single-molecule pulling experiments under large thermal fluctuations or large applied force.*  
**Physical Review E** 95, 042413 (2017).
  47. S.H. Varol, F. Meng, B. Hosseinkhani, C. Malm, D. Bonn, M. Bonn, A. Zaccone, S. H. Parekh.  
*Nanoparticle amount, and not size, determines chain alignment and nonlinear hardening in polymer nanocomposites.*  
**Proceedings of the National Academy of Sciences of the USA** 114, E3170–E3177 (2017).
  48. C. Ness and A. Zaccone.  
*Effect of hydrodynamic interactions on the lifetime of colloidal bonds.*  
**Industrial & Engineering Chemistry Research** 56 (13), 3726–3732 (2017).
  49. J. Krausser, A. Lagiogianni, K. Samwer, A. Zaccone.  
*Disentangling interatomic repulsion and anharmonicity in the viscosity and fragility of glasses.*  
**Physical Review B** 95, 104203 (2017).
  50. J. Sprakel, A. Zaccone, F. Spaepen, P. Schall, D. A. Weitz.  
*Direct observation of entropic stabilization of bcc crystals near melting.*  
**Physical Review Letters** 118, 088003 (2017).
  51. R. Milkus and A. Zaccone.  
*Atomic-scale origin of dynamic viscoelastic response and creep in disordered solids.*  
**Physical Review E** 95, 023001 (2017).
  52. B. Cui, R. Milkus, and A. Zaccone.  
*Direct link between boson-peak modes and dielectric alpha-relaxation in glasses.*  
**Physical Review E** 95, 022603 (2017).

53. M. Laurati, P. Masshof, K. J. Mutch, S. U. Egelhaaf, and A. Zacccone.  
*Long-lived neighbors determine the rheological response of glasses.*  
**Physical Review Letters** 118, 018002 (2017). \*
54. B. Cui, R. Milkus, A. Zacccone.  
*The relation between stretched-exponential relaxation and the vibrational density of states in glassy disordered systems.*  
**Physics Letters A** 381, 446 (2017).
55. W.Y. Chen, L. Young, M. Lu Meng, A. Zacccone, F. Ströhl, N. Yu, G. Kaminski Schierle, C. Kaminski.  
*Fluorescence self-quenching from reporter dyes informs on the structural properties of amyloid clusters formed in vitro and in cells.*  
**Nano Letters** 17, 143 (2017).
56. A. Saric, T. Michaels, A. Zacccone, T.P.J. Knowles, D. Frenkel.  
*Kinetics of spontaneous filament nucleation via oligomers: insights from theory and simulation.*  
**Journal of Chemical Physics** 145, 211926 (2016).
57. A. Zacccone, I. Terentjev, T. Herling, T.P.J. Knowles, A. Aleksandrova, E.M. Terentjev.  
*Kinetics of fragmentation and dissociation of two-strand protein filaments: coarse-grained simulations and experiments.*  
**Journal of Chemical Physics** 145, 105101 (2016).
58. A. Lappala, A. Zacccone and E.M. Terentjev.  
*Polymer glass transition occurs at the marginal rigidity point with  $z^*=4$ .*  
**Soft Matter** 12, 7330 (2016).
59. A. Lagogianni, J. Krausser, Z. Evenson, K. Samwer, A. Zacccone.  
*Unifying interatomic potential,  $g(r)$ , elasticity, viscosity, and fragility of metallic glasses: analytical model, simulations, and experiments.*  
**Journal of Statistical Mechanics: Theory and Experiment** 084001 (2016) - Special Issue on Structure in Glassy and Jammed Systems.
60. B.O. Conchuir, C. Tarantini, C. McNeill, S. Huettner, A. Zacccone.  
*Chain-assisted charge transport in semicrystalline conjugated polymers.*  
**Journal of Physical Chemistry C** 120, 14539 (2016).
61. M. Lattuada, A. Zacccone, H. Wu, M. Morbidelli.  
*Population-balance description of shear-induced clustering, gelation and suspension viscosity in sheared DLVO colloids.*  
**Soft Matter** 12, 5313 (2016).
62. R. Milkus and A. Zacccone.  
*Local inversion-symmetry breaking controls the boson peak in glasses and crystals.*  
**Physical Review B** 93, 094204 (2016). \*
63. F. Mura and A. Zacccone.  
*Effects of shear flow on phase nucleation and crystallization.*  
**Physical Review E** 93, 042803 (2016). \*
64. M. T. Dang, D. Denisov, B. Struth, A. Zacccone, P. Schall.  
*Reversibility and hysteresis in the sharp yielding transition of colloidal glasses under oscillatory shear.*  
**European Physical Journal E** 39, 44 (2016).
65. M. Schlegel, J. Brujic, E. M. Terentjev, A. Zacccone.  
*Local structure controls the nonaffine shear and bulk moduli of disordered solids.*  
**Scientific Reports** 6, 18724 (2016).

66. K. Kyriakos, M. Philipp, C.-H. Lin, M. Dyakonova, M. Vishnevetskaya, I. Grillo, A. Zacccone, A. Miasnikova, A. Laschewski, P. Mueller-Buschbaum, C. Papadakis.  
*Quantifying the interactions in the aggregation of thermoresponsive polymers - the effect of cononsolvency.*  
**Macromolecular Rapid Communications** 37, 420 (2016).
67. J. Krausser, K. Samwer, A. Zacccone.  
*Interatomic repulsion softness directly controls the fragility of supercooled metallic melts.*  
**Proceedings of the National Academy of Sciences of the USA** 112, 13762 (2015). \*
68. D. Denisov, M.T. Dang, B. Struth, A. Zacccone, G. H. Wegdam, P. Schall.  
*Sharp symmetry-change marks the mechanical failure transition of glasses.*  
**Scientific Reports** 5, 14359 (2015).
69. M. Mermet-Guyennet, J. de Castro, S. Varol, M. Habibi, B. Hosseinkhani, N. Martzel, R. Sprik, M. Denn, A. Zacccone, S. Parekh, D. Bonn.  
*Size-dependent reinforcement of composite rubbers.*  
**Polymer** 73, 170 (2015).
70. M. van der Linden, B. O. Conchuir, E. Spigone, A. Niranjana, A. Zacccone, P. Cicuta.  
*Microscopic origin of the Hofmeister effect in gelation kinetics of colloidal silica.*  
**Journal of Physical Chemistry Letters** 6, 2881 (2015).
71. A. Zacccone, I. Terentjev, L. Di Michele, E. M. Terentjev.  
*Fragmentation and depolymerization of non-covalently bonded filaments.*  
**Journal of Chemical Physics** 142, 114905 (2015).
72. S. Gu, J. Kaiserc, G. Marzuna, A. Ott, Y. Lu, M. Ballauff, A. Zacccone, S. Barcikowski, P. Wagener.  
*Ligand-free gold nanoparticles as a reference material for kinetic modelling of catalytic reduction of 4-nitrophenol.*  
**Catalysis Letters** 145, 1105 (2015).
73. A. Zacccone, P. Schall, E. M. Terentjev.  
*Microscopic origin of nonaffine nonlinear deformation in bulk metallic glasses.*  
**Physical Review B** 90, 140203(R) (2014).
74. S. Gu, S. Wunder, Y. Lu, M. Ballauff, R. Fenger, K. Rademann, B. Jaquet, A. Zacccone.  
*Kinetic analysis of the catalytic reduction of 4-nitrophenol by metallic nanoparticles.*  
**Journal of Physical Chemistry C** 118, 18618-18625 (2014). \*
75. A. Zacccone, M. Siebenbürger, H. H. Winter, M. Ballauff.  
*Linking self-assembly, rheology, and gel transition in attractive colloids.*  
**Journal of Rheology** 58, 1219 (2014).
76. B. O. Conchuir, Y.M. Harshe, M. Lattuada, A. Zacccone.  
*Analytical model of fractal aggregate stability and restructuring in shear flows.*  
**Industrial & Engineering Chemistry Research** 53, 9109 (2014).
77. A. Zacccone and E.M. Terentjev.  
*Short-range correlations control the G/K and Poisson ratios of amorphous solids and metallic glasses.*  
**Journal of Applied Physics** 115, 033510 (2014).
78. A. Moussa, M. Lattuada, B. O. Conchuir, A. Zacccone, M. Morbidelli, M. Soos.  
*Flow-Induced aggregation and breakup of particle clusters controlled by surface nanoroughness.*  
**Langmuir** 29, 14386 (2013).



79. A. Lappala, A. Zaccone, E.M. Terentjev.  
*Ratcheted diffusion through crowded nanochannels.*  
**Scientific Reports** 3, 3103 (2013).
80. V. Fodera', A. Zaccone, M. Lattuada, A.M. Donald.  
*Electrostatics controls the formation of amyloid superstructures in protein aggregation.*  
**Physical Review Letters** 111, 108105 (2013).
81. A. Zaccone.  
*Slowing-down of diffusion-controlled reactions in dense liquid matter.*  
**Journal of Chemical Physics** 138, 186101 (2013).
82. A. Zaccone and E. M. Terentjev.  
*Disorder-assisted melting and the glass transition in amorphous solids.*  
**Physical Review Letters** 110, 178002 (2013). \*
83. B. O. Conchuir and A. Zaccone.  
*Mechanism of flow-induced biomolecular and colloidal aggregate breakup.*  
**Physical Review E** 87, 032310 (2013).
84. A. Zaccone, J.J. Crassous, M. Ballauff.  
*Colloidal gelation with variable attraction energy.*  
**Journal of Chemical Physics** 138, 104908 (2013).
85. A. Zaccone.  
*Elastic deformations in covalent amorphous solids.*  
**Modern Physics Letters B** 27, 1330002 (2013).
86. T. Gibaud, A. Zaccone, E. Del Gado, V. Trappe, P. Schurtenberger.  
*Unexpected decoupling of stretching and bending modes in protein gels.*  
**Physical Review Letters** 110, 058303 (2013).
87. L. DiMichele, A. Zaccone, and E. Eiser.  
*Predictive theory of polymer-network mediated attraction between colloid particles.*  
**Proceedings of the National Academy of Sciences of the USA** 109, 10187 (2012).
88. A. Zaccone and E.M. Terentjev.  
*Theory of molecular crowding in Brownian hard-sphere liquids.*  
**Physical Review E** 85, 061202 (2012).
89. A. Zaccone and E.M. Terentjev.  
*Theory of thermally-activated ionization and dissociation of bound states.*  
**Physical Review Letters** 108, 038302 (2012).
90. A. Zaccone, J.R. Blundell, and E.M. Terentjev.  
*Network disorder and nonaffine deformations in marginal solids.*  
**Physical Review B** 84, 174119 (2011).
91. A. Zaccone, J.J. Crassous, B. Beri, and M. Ballauff.  
*Quantifying the reversible association of thermoresponsive nanoparticles.*  
**Physical Review Letters** 107, 168303 (2011).
92. A. Zaccone, N. Dorsaz, C. DeMichele, F. Piazza, M. Morbidelli, and G. Foffi.  
*Crowding, intermolecular interactions and shear-flow effects in the diffusion model of chemical reactions.*  
**Journal of Physical Chemistry B** 115, 7383 (2011).

93. A. Zaccone and E. Scossa-Romano.  
*Approximate analytical description of the nonaffine response of amorphous solids.*  
**Physical Review B** 83, 184205 (2011). \*
94. A. Zaccone, D. Gentili, H. Wu, M. Morbidelli, and E. Del Gado.  
*Shear-driven solidification of dilute colloidal suspensions.*  
**Physical Review Letters** 106, 138302 (2011).
95. D. Xie, H. Wu, A. Zaccone, L. Braun, and M. Morbidelli.  
*Criticality for shear-induced gelation of charge-stabilized colloids.*  
**Soft Matter** 6, 2692 (2010).
96. A. Zaccone, D. Gentili, H. Wu, and M. Morbidelli.  
*Shear-induced reaction-limited aggregation kinetics of Brownian particles at arbitrary concentrations.*  
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105. A. Zaccone, H. Wu, M. Lattuada, and M. Morbidelli.  
*Charged molecular films on Brownian particles: structure, interactions and relation to stability.*  
**Journal of Physical Chemistry B** 112, 6793 (2008).
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*Correlation between surfactant adsorption/association phenomena and colloidal stability studied by light scattering.*  
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107. A. Zaccone, M. Lattuada, H. Wu, and M. Morbidelli.  
*Theoretical elastic moduli for disordered packings of interconnected spheres.*  
**Journal of Chemical Physics** 127, 174512 (2007).
108. A. Zaccone, A. Gäbler, S. Maaß, D. Marchisio, and M. Kraume.  
*Drop breakage in liquid-liquid stirred dispersions - Modelling of single drop breakage.*  
**Chemical Engineering Science** 62, 6297-6307 (2007).
109. S. Maass, A. Gäbler, A. Zaccone, A. Paschedag, and M. Kraume.  
*Experimental investigations and modelling of breakage phenomena in stirred liquid/liquid systems.*  
**Chemical Engineering Research & Design** 85, 703 (2007).

#### **Invited talks (a selection)**

- Zaccone A. (2020). Understanding the boson peak in glasses and glassy polymers. **Invited talk** at the American Physical Society March Meeting 2020, Denver (USA), 02/03/2020.
- Zaccone A. (2018). Generalized Langevin Equation modelling of viscoelastic and dielectric properties of glasses. **Invited talk** at the CECAM workshop on “Dynamic Coarse-Graining and Memory Effects in Soft Matter Systems”, at Max-Planck Institute for Polymer Research, Mainz, Germany, 24-26/10/2018.
- Zaccone A. (2018). Microscopic modelling of dielectric alpha and beta relaxation in glasses and orientationally disordered crystals based on Generalized Langevin Equations. **Invited talk** at the 10<sup>th</sup> Broadband Dielectric Spectroscopy Conference, Brussels, Belgium, 27-31/08/2018.
- Zaccone A. (2017). The origin of the boson peak and its link with the dielectric and dynamic mechanical response of amorphous solids. **Invited talk** at the 8<sup>th</sup> International Discussion Meeting on Relaxation in Complex Systems, Wisla, Poland, 25-27/08/2017.
- Zaccone A. (2017). Colloids in shear. **Invited plenary talk** at the SoftComp Annual meeting 2017, organized by the SoftComp (Soft Composites) EU research network. Venice, Italy, 29-31 May 2017.
- Zaccone A. (2017). Understanding polymer glasses and their deformations at the monomer-level. **Invited talk** at the German Physical Society (DPG) Spring Meeting (Division of Chemical Physics). Dresden, Germany, 19-24/03/2017.
- Zaccone A. (2017). Towards a nonequilibrium atomic-scale theory of the dynamical response of metallic glasses. **Invited talk** at the German Physical Society (DPG) Spring Meeting (Metal and Material Physics Division). Dresden, Germany, 19-24/03/2017.
- Zaccone A. (2017). Molecular-level framework for the dynamic mechanical response and yielding of polymer glasses. Contributed talk at the 2017 Mach Conference, co-organized by Johns-Hopkins University and US Army Research Lab. Annapolis MD, USA, 7-9/04/2017.
- Zaccone A. (2017). Bottom-up framework for the atomistic simulations of mechanical response of polymer glasses. **Invited talk** at the US Army Research Laboratory, Weapons & Materials Division, Aberdeen Proving Grounds, MD, USA, 04/01/2017.
- Zaccone A. (2016). Nonaffine lattice dynamics of metallic glasses. **Invited talk** at the Glass Meeting Goettingen (GMG) workshop. University of Goettingen, Germany, 16/06/2016.
- Zaccone A. (2015). Yielding of colloidal glasses. **Invited talk** at the Flowing Matter Across the Scales, COST conference. Rome, Italy, 25/03/2015.
- Zaccone A. (2011). Shear-induced solidification of dilute colloidal suspensions: the ambiguous role of shear. **Keynote presentation** at the 25<sup>th</sup> European Colloid and Interface Society (ECIS) Conference. Berlin, Germany, 04-09/09/2011.

Zaccone A. (2010). Shear-driven solidification in colloidal suspensions: from Brownian liquids to granular suspensions. **Invited talk** at the Gordon Research Conference on Granular & Granular-Fluid Flow. Colby College, Waterville, USA, 24/06/2010.

Zaccone A. (2015). Inversion-symmetry breaking controls the boson peak of glasses and disordered crystals. **Invited talk** at the Institute of Physics, University of Amsterdam (UvA).

Zaccone A. (2015). Statistical mechanics of self-assembly of functional nanoparticles and protein systems. **Invited talk** at the National Institute of Standards and Technology, Center for Neutron Research, Gaithersburg MD, USA.

Zaccone A. (2015). Mechanical response of soft functional materials. Invited seminar at the Department of Physics, Georgetown University, Washington DC, USA, 06/2015.

Zaccone A. (2014). Microscopic origin of nonlinear nonaffine deformations in metallic glasses. **Invited talk** at Physikalisches Institut, University of Goettingen.

Zaccone A. (2014). Molecular self-assembly and gelation. **Invited talk** at Institute of Applied Physics, University of Tuebingen, Germany.

Zaccone A. (2013). Molecular-level theory of soft and biological matter. **Invited talk**, Department of Physics, Durham University, UK 29/05/2013.

Zaccone A. (2013). Mechanics of disordered matter at the molecular level and the glass transition. **Invited talk** within the Theoretical Physics Seminar series, Department of Physics, University of Bristol, UK 15/05/2013.

Zaccone A. (2013). The low-T side of the glass transition: melting of amorphous solids and polymers. **Invited talk** at the School of Physics and Astronomy, University of Leeds, UK 19/02/2013.

Zaccone A. (2012). Statistical mechanics of elasticity in disordered solids. **Invited talk** within the Series of Seminars in Statistical Mechanics, Laboratoire de Physique Theorique de l'Ecole Normale Supérieure, Paris, France, 26/01/2012.

Zaccone A. (2012). Mechanical properties of disordered matter. **Invited talk** within the Lorentz Seminar, Lorentz Institute for Theoretical Physics, University of Leiden, The Netherlands, 7/02/2012.

Zaccone A. (2009). Activated-rate processes in shear and application to shear-induced phenomena in soft matter. **Invited talk** at the Helmholtz Institute for Materials and Energy (formerly Hahn-Meitner Institute), Berlin, Germany, 16/11/2009.