

RAN NI

School of Chemistry, Chemical Engineering and Biotechnology
Nanyang Technological University
62 Nanyang Drive, 637459, Singapore

Tel: +65 9451 0321, R.Ni@ntu.edu.sg and rannimail@gmail.com

Google Scholar: <http://scholar.google.nl/citations?hl=en&user=BGIQc1IAAAAJ>

PERSONAL PARTICULARS

Gender: Male

Date of birth: August 1984

Nationality: Chinese, Singapore Permanent Resident

ACADEMIC QUALIFICATION

- 2008 – 2012: PhD in Physics, Debye Institute for Nanomaterials Science, Utrecht University, The Netherlands
- 2005 – 2008: M.S in Chemical Engineering, Beijing University of Chemical Technology (BUCT), China
- 2001 – 2005: B.S. in Mathematics, Beijing University of Chemical Technology, China

WORK EXPERIENCES

- 2021 – now: Tenured Associate Professor in the School of Chemistry, Chemical Engineering and Biotechnology in Nanyang Technological University in Singapore
- 2016 – 2021: Tenure Track Assistant Professor in the School of Chemical & Biomedical Engineering in Nanyang Technological University in Singapore
- 2014 – 2016: NWO VENI Research Fellow at University of Amsterdam (Principal Investigator)
- 2012 – 2014: Post-Doctoral researcher working with Prof. P. G. Bolhuis (Amsterdam) and Prof. M. A. Cohen Stuart (Wageningen)

AWARDS AND GRANTS

- 2021: Nominated for 2022 Soft Matter Lectureship, Royal Society Of Chemistry
- 2020-2023: Academic Research Fund Tier 2 by Ministry of Education, Singapore
- 2021-2023: Academic Research Fund Tier 1 by Ministry of Education, Singapore
- 2021-2022: A*STAR-P&G Joint grant call – DigiSolutions Accelerator Grant Wave 2
- 2021-2022: Imperial College – NTU Collaboration Fund
- 2017-2019: Academic Research Fund Tier 1 by Ministry of Education, Singapore
- 2017-2021: Advanced Manufacturing and Engineering Young Individual Research Grant by A*STAR Science & Engineering Research Council (SERC), Singapore
- 2016-2018: Academic Research Fund Tier 1 by Ministry of Education, Singapore
- 2016: **Best Research Prize** by the European Cooperation in Science and Technology (COST) Action – Flowing Matter [An annual prize for European Early Stage Researchers in soft matter within eight years after the date of PhD]
- 2015 – 2016: **Open Collaborative Research Grant** (with Prof. Yanting Wang) funded by State Key Laboratory of Theoretical Physics, Chinese Academy of Sciences
- 2014: **NWO VENI Talent Personal Grant**
- 2011: Chinese Government Award for **Outstanding Self-financed Students Abroad**
- 2008: Elected to be the **Academic Stars of Graduates** in BUCT
- 2005: The **First Prize** in National Postgraduates Mathematical Contest in Modeling in China
- 2005: The Scholarship of Out School in BUCT, National Prize

- 2004: The **Honorable Mention** in International Mathematical Contest in Modeling,
- 2003: The Excellent Student in the Faculty of Science in BUCT.
- 2002: **The Cup of Higher Education Press** (Champion) in National Wide Mathematical Contest in Modeling in China
- 2002: The Champion in Mathematical Contest in Modeling in BUCT

RESEARCH INTERESTS

- Non-equilibrium hyperuniform fluids
- Programmable self-assembly of DNA coated colloids
- Deep learning assisted computational physics
- Dynamic assembly of active colloids
- Vitrimers
- Nucleation, equilibrium phase behavior, and glass transition in colloidal systems
- Self-assembly of fibril-forming polypeptides
- Equilibrium self-assembly of photonic metamaterials using anisotropic colloids

TEACHING EXPERIENCE

- Computation Methods for Bioengineers (Undergraduate) AY 2015, 2016, 2017, 2018
- Computation Methods for Chemical Engineers (Undergraduate) AY 2017, 2018
- Introduction to Computational Thinking (Undergraduate) AY 2019, 2020, 2021
- Numerical Methods and Data Analytics (Postgraduate) AY 2017, 2018, 2019, 2020, 2021

CURRENT PHD STUDENTS AND POSTDOCS

- Dr. Di Wang (2021 – now)
- Dr. Xuan Feng (2022 – now)
- Mr. Peilin Rao (2022 – now)
- Mr. Solomon Asghar (2021 – now) co-supervised with Prof. Giorgio Volpe in UCL, UK
- Mr. Yusheng Lei (2020 – now)
- Mr. Xiuyang Xia (2018 – now) co-supervised with Prof. Massimo Pica Ciamarra

PAST PHD STUDENTS SUPERVISED

- Dr. Zhan Ma (2017 – 2021) now a postdoc research fellow in University of Edinburgh, UK
- Dr. Krongtum (Aom) Sankaewtong (2016 – 2020) now a postdoc research fellow in University of Kyoto, Japan
- Dr. Pablo Sampedro Ruiz (2016 – 2020) now a Lecturer in Academia Adelante, Spain

PAST POSTDOCS SUPERVISED

- Dr. Qunli Lei (2016 – 2021) now a tenure track associate professor of Physics in Nanjing University, China
- Dr. Saurish Chakrabarty (2018 – 2020) now a tenure track assistant professor in Acharya Prafulla Chandra College, India
- Dr. Hao Hu (2016 – 2018) now a professor of Physics in Anhui University, China

SERVICE

- Associate Editor of National Science Open

JOURNAL REVIEWERS

- Proc. Natl. Acad. Sci. USA, Nature Physics, Nature Communications, Science Advances, Physical Review Letters/E, JACS, ACS Nano, Soft Matter, Langmuir, Journal of Chemical Physics, Advanced Materials, Nanoscale, Europhysics Letters, ACS Omega, AIP Advances, RSC Advances, iScience

REVIEWER FOR SCIENCE FOUNDATIONS

- European Research Council
- Austrian Science Fund

CONFERENCES AND WORKSHOPS ORGANIZED

- The 16th Pacific Polymer Conference, Singapore, December 2019 (Organizing committee member)
- 2019 International Workshop on Soft Matter and Biophysics Theories, Beijing, China, May 2019
- Designer Soft Matter, Singapore, June 2018

RECENT INVITED TALKS

- Keynote Speaker for The 7th International Soft Matter Conference, Osaka, Japan, September 2023
- Invited Speaker for “Frontiers in Non-equilibrium Physics”, Institute of Mathematical Sciences, Chennai, India, January 2023
- Invited Speaker for APS March Meeting Symposia “Disordered Hyperuniform Materials: Discovery and Design”, March 2022
- Invited Speaker for Pacifichem 2021, Honolulu, Hawaii, December 2021
- Invited Speaker for the Conference of Condensed Matter Physics, Liyang, China, July 2021
- Keynote speaker for the 8th International Conference on Nanoscience and Technology – “ChinaNano 2019”, Beijing, China, August 2019
- Invited Speaker for the SIMTech Physics and Engineering Colloquium, A*STAR, Singapore, July 2019
- Invited Speaker for the CECAM workshop “Emerging behaviour in active matter: computational challenges”, Lincoln, UK, June 2019
- Invited Speaker for the Kavli Institute for Theoretical Sciences Workshop “Out of equilibrium soft matter systems - from driven to active systems”, Beijing, China, May 2019
- Invited Speaker for the ICTS workshop “Entropy, Information and Order in Soft Matter”, Bangalore, India, August 2018
- Invited Speaker for the Conference of Condensed Matter Physics, Shanghai, China, July 2018

LIST OF PUBLICATIONS (*CORRESPONDING AUTHOR, # EQUAL CONTRIBUTION, + SELECTED PUBLICATIONS)

1. Xiuyang Xia, Ge Zhang, Massimo Pica Ciamarra, Yang Jiao, and Ran Ni*, Receptor uniformity affects super-selectivity in multivalent nano-particle binding, submitted (2022)⁺
2. Xiuyang Xia[#], Peilin Rao[#], Juan Yang, Massimo Pica Ciamarra, and Ran Ni*, Entropy driven thermogelling vitrimer, submitted (2022)⁺
3. Duyu Chen*, and Ran Ni*, Comment on "Explicit Analytical Solution for Random Close Packing in $d = 2$ and $d = 3$ ", under review in *Phys. Rev. Lett.* (2022)
4. Qunli Lei, Feng Tang, Jidong Hu, Yuqiang Ma*, and Ran Ni*, Duality, hidden symmetry and dynamic isomerism in 2D hinge structures, accepted in *Phys. Rev. Lett.* (2022)
5. Jing Yang, Ran Ni, and Massimo Pica Ciamarra, Interplay between jamming and MIPS in persistent self-propelling particles, *Phys. Rev. E.* 106, L012601 (2022)
6. Tongtao Li[#], Xiuyang Xia[#], Guanhong Wu, Qingfu Cai, Xuanyu Lyu, Jing Ning, Jing Wang, Min Kuang, Yuchi Yang, Massimo Pica Ciamarra, Ran Ni*, Dong Yang* and Angang Dong*, Mismatched ligand density enables ordered assembly of mixed-dimensional, cross-species materials, *Science Advances*, 8, eabq0969 (2022)

7. Zhan Ma, and Ran Ni*, Dynamical Clustering Interrupts Motility Induced Phase Separation in Chiral Active Brownian Particles, *J. Chem. Phys.*, 156, 021102 (2022) ⁺
8. Anshuman Pasupalak, Shawn Khuhan Samidurai, Yanwei Li, Yuanjian Zheng, Ran Ni, and Massimo Pica Ciamarra, Unconventional rheological properties in systems of deformable particles, *Soft Matter*, 17, 7708 (2021)
9. Qunli Lei[#], Wei Zheng[#], Feng Tang, Xiangang Wan, Ran Ni*, and Yuqiang Ma*, Self-Assembly of Isostatic Self-Dual Colloidal Crystals, *Phys. Rev. Lett.*, 127, 018001 (2021)
10. Qunli Lei, Hao Hu, and Ran Ni*, Barrier-Controlled Non-Equilibrium Criticality in Reactive Particle Systems, *Phys. Rev. E*, 103, 052607 (2021)
11. Zhongyu Zheng, Ran Ni, Yuren Wang and Yilong Han, Translational and rotational critical-like behaviors in the glass transition of colloidal ellipsoid monolayers, *Science Advances* 7, eabd1958 (2021)
12. Pablo Sampedro Ruiz, and Ran Ni*, Effect of particle size distribution on polydisperse hard disks, *J. Chem. Phys.* 152, 234502 (2020) [Highlighted as the *Editor's Pick*] ⁺
13. Qunli Lei[#], Xiuyang Xia[#], Juan Yang, Massimo Pica Ciamarra, Ran Ni*, Entropy-Controlled Cross-Linking in Linker-Mediated Vitrimers, *Proc. Natl Acad. Sci. USA*, 117, 27111 (2020) ⁺
14. Pin Nie, Joyjit Chattoraj, Antonio Piscitelli, Patrick Doyle, Ran Ni*, and Massimo Pica Ciamarra*, Frictional Active Brownian Particles, *Phys. Rev. E*, 102, 032612 (2020)
15. Kerong Deng, Xin Huang, Yulian Liu, Lili Xu, Ruipeng Li, Ji Tang, Qunli Lei, Ran Ni, Chunxia Li, Yong Sheng Zhao, Hongwu Xu, Zhongwu Wang, and Zewei Quan; Supercrystallographic Reconstruction of 3D Nanorod Assembly with Collectively Anisotropic Upconversion Fluorescence, *Nano Lett.*, 20, 7367 (2020)
16. Wei Zheng[#], Qunli Lei[#], Yuqiang Ma*, and Ran Ni*, Hierarchical glass transition of hard hemidisks with local assemblies, *Soft Matter*, 16, 8108 (2020)
17. Saurish Chakraborty, and Ran Ni*; Effect of heavy impurities on the dynamics of supercooled liquids, *J. Chem. Phys.*, 152, 234502 (2020)
18. Zhan Ma, Mingcheng Yang*, and Ran Ni*; Dynamic Assembly of Active Colloids: Theory and Simulation, *Advanced Theory and Simulations*, 3, 2000021 (2020) [invited review] ⁺(Wiley Top Cited Article 2020 – 2021)
19. Pin Nie, Joyjit Chattoraj, Antonio Piscitelli, Patrick Doyle, Ran Ni* and Massimo Pica Ciamarra*, The stability phase diagram of active Brownian particles, *Phys. Rev. Research*, 2, 023010 (2020)
20. Anshuman Pasupalak, Yanwei Li, Ran Ni*, and Massimo Pica Ciamarra*; Hexatic phase in a model of active biological tissues, *Soft Matter*, 16, 3914 (2020)
21. Ting Wang[#], Qunli Lei[#], Ming Wang, Guoying Deng, Xijian Liu, Chunlin Li, Qi Wang, Zhihua Liu, Jianwu Wang, Zequn Cui, Kevin Goldio Utama, Ran Ni*, and Xiaodong Chen*; Mechanical Tolerance of Cascade Bioreactions via Adaptive Curvature Engineering for Epidermal Bioelectronics, *Adv. Mater.*, 32, 2000991 (2020)
22. Benhui Hu, Christopher Berkey, Timothy Feliciano, Xiaohong Chen, Zhuyun Li, Chao Chen, Shahrouz Amini, Mui Hoon Nai, Qunli Lei, Ran Ni, Juan Wang, Wan Ru Leow, Shaowu Pan, Yongqiang Li, Pingqiang Cai, Ali Miserez, Suzhou Li, Chwee Teck Lim, Yun-Long Wu, Teri W. Odom, Reinhold H. Dauskardt and Xiaodong Chen, Thermal-disrupting interface mitigates intercellular cohesion loss for accurate topical antibacterial therapy, *Adv. Mater.*, 32, 1907030 (2020)
23. Xiuyang Xia, Hao Hu, Massimo Pica Ciamarra*, Ran Ni*, Linker-mediated self-assembly of mobile DNA coated colloids, *Science Advances*, 6, eaaz6921 (2020) ⁺
24. Qunli Lei and Ran Ni*, Hydrodynamics of random-organizing hyperuniform fluids, *Proc. Natl Acad. Sci. USA*, 116, 22983 (2019) ⁺
25. Pablo Sampedro Ruiz, Qunli Lei and Ran Ni*, Melting and re-entrant melting of polydisperse hard disks, *Communications Physics*, 2, 70 (2019) ⁺
26. Krongtum Sankaewtong[#], Qunli Lei[#], and Ran Ni*, Self-assembled multi-layer simple cubic photonic crystals of oppositely charged colloids in confinement, *Soft Matter*, 15, 3104 (2019) [Cover story]
27. Qunli Lei, Massimo Pica Ciamarra*, Ran Ni*, Non-Equilibrium Strongly Hyperuniform Fluids of Circle Active Particles with Large Local Density Fluctuations, *Science Advances*, 5, eaau7423 (2019) ⁺

28. Qunli Lei, Ran Ni*, Yuqiang Ma*, Self-Assembled Chiral Photonic Crystals From Colloidal Helices Racemate, *ACS Nano* 12, 6860 (2018)
29. Hao Hu, Pablo Sampedro Ruiz, Ran Ni*, Entropy stabilizes noncompact crystals of mobile DNA coated colloids, *Phys. Rev. Lett.* 120, 048003 (2018) ⁺
30. Zhan Ma, Qunli Lei, Ran Ni*, Driving dynamic colloidal assembly using eccentric self-propelled colloids, *Soft Matter*, 13, 8940 (2017) ⁺
31. Qunli Lei, Kunn Hadinoto, and Ran Ni*; Role of local assembly in the hierarchical crystallization of associating colloidal hard hemispheres, *Phys. Rev. Materials*, 1, 052601(R) (2017)
32. Qunli Lei, Kunn Hadinoto*, and Ran Ni*; Complexation of Polyelectrolytes with Hydrophobic Drug Molecules in Salt Free Solution: Theory and Simulations, *Langmuir*, 33, 3900 (2017)
33. Chen Xie, Xu Zhen, Qunli Lei, Ran Ni and Kanyi Pu, Self-Assembly of Semiconducting Polymer Amphiphiles for In Vivo Photoacoustic Imaging, *Advanced Functional Materials*, 27, 1605397 (2017)
34. Ran Ni, Nucleation in Colloidal systems: Theory and Simulations, *Self-Assembling Systems: Theory and Simulation*, WILEY-VCH, Edited by Li-Tang Yan (2016) [Invited Review] ⁺
35. Bo Li, Feng Wang, Di Zhou, Yi Peng, Ran Ni, and Yilong Han, Modes of surface premelting in colloidal crystals composed of attractive particles, *Nature*, 531, 485 (2016) [Highlighted by *Nature Physics*]
36. Ran Ni*, J. Mieke Kleijn, Sanne Abeln, Martien A. Cohen Stuart, and Peter G. Bolhuis, The competition between surface adsorption and folding of fibril-forming polypeptides, *Phys. Rev. E*, 91, 022711 (2015)
37. Ran Ni*, Martien A. Cohen Stuart, and Peter G. Bolhuis, Tunable long range forces mediated by self-propelled colloidal hard spheres, *Phys. Rev. Lett.*, 114, 018302 (2015) [Highlighted as Editors' Suggestion] ⁺
38. Ran Ni*, Martien A. Cohen Stuart, Marjolein Dijkstra, and Peter G. Bolhuis, Crystallizing hard-sphere glasses by doping with active particles, *Soft Matter*, 10 (35) 6609 (2014) [Highlighted as 2014 Soft Matter Hot Papers]
39. Zhongyu Zheng, Ran Ni, Feng Wang, Marjolein Dijkstra, Yuren Wang and Yilong Han, Structural signatures of dynamic heterogeneities in monolayers of colloidal ellipsoids, *Nature Communications*, 5, 3829 (2014)
40. Ran Ni*, Martien A. Cohen Stuart, and Marjolein Dijkstra, Pushing glass transition towards random close packing using self-propelled hard spheres, *Nature Communications*, 4, 2704 (2013) ⁺
41. Ran Ni*, Sanne Abeln, Marieke Schor, Martien A. Cohen Stuart, and Peter G. Bolhuis, Interplay between folding and assembly of fibril-forming polypeptides, *Phys. Rev. Lett.*, 111, 058101 (2013) ⁺
42. Ran Ni* and Marjolein Dijkstra*, Effect of bond length fluctuations on crystal nucleation of hard bead chains; *Soft Matter*, 9, 365 (2013) [Cover story]
43. Ran Ni*, Anjan P. Gantapara, Joost de Graaf, René van Roij and Marjolein Dijkstra*, Phase diagram of colloidal hard superballs: from cubes via spheres to octahedra, *Soft Matter*, 8, 8826 (2012) [Cover story] ⁺
44. Daniela J. Kraft, Ran Ni, Frank Smallenburg, Michiel Hermes, Kisun Yoon, Dave Weitz, Alfons van Blaaderen, Jan Groenewold, Marjolein Dijkstra, Willem K. Kegels, Surface roughness directed self-assembly of patchy particles into colloidal micelles, *Proc. Natl Acad. Sci. USA*, 109, 10787 (2012) [Cover story]
45. L. Filion, M. Hermes, R. Ni, E. C. M. Vermolen, A. Kuijk, C.G. Christova, J. Stiefelhagen, T. Vissers, A. van Blaaderen and M. Dijkstra, Self-assembly of a colloidal interstitial solid solution with a tunable sublattice doping, *Phys. Rev. Lett.*, 107, 168302 (2011)
46. Ran Ni[#], Frank Smallenburg[#], Laura Filion and Marjolein Dijkstra; Crystal Nucleation in binary hard-sphere mixtures: The effect of order parameter on the cluster composition; *Mol. Phys.*, 109, 1213 (2011) ⁺
47. Laura Filion[#], Ran Ni[#], Daan Frenkel and Marjolein Dijkstra; Simulations of nucleation in almost hard-sphere colloids: The discrepancy between experiment and simulation persists; *J. Chem. Phys.*, 134, 134901 (2011).
48. Ran Ni* and Marjolein Dijkstra*; Crystal nucleation of colloidal hard dumbbells; *J. Chem. Phys.*, 134, 034501 (2011)
49. Ran Ni, Simone Belli, René van Roij and Marjolein Dijkstra; Glassy dynamics, spinodal fluctuations, and the kinetic limit of nucleation in suspensions of colloidal hard rods; *Phys. Rev. Lett.*, 105, 088302 (2010) ⁺

50. Laura Fillion, Michiel Hermes, Ran Ni and Marjolein Dijkstra; Crystal nucleation of hard spheres using molecular dynamics, umbrella sampling and forward flux sampling: A comparison of simulation techniques; *J. Chem. Phys.*, 133, 244115 (2010)
51. Juan Yang, Ran Ni, Dapeng Cao and Wenchuan Wang; Polyelectrolyte-Macroion Complexation in 1:1 and 3:1 Salt Contents: A Brownian Dynamics Study, *J. Phys. Chem. B*, 112, 16505-16516 (2008)
52. Yiyu Hu, Ran Ni, Dapeng Cao and Wenchuan Wang; Effect of Bridging Conformation of Polyelectrolytes on Static and Dynamic Properties of Macroions, *Langmuir*, 24, 10138 (2008)
53. Ran Ni, Dapeng Cao, Wenchuan Wang and Arben Jusufi; Conformation of a Spherical Polyelectrolyte Brush in the Presence of Oppositely Charged Linear Polyelectrolytes, *Macromolecules*, 41, 5477 (2008)⁺
54. Ran Ni, Dapeng Cao and Wenchuan Wang; Release of Lysozyme from the Branched Polyelectrolyte-Lysozyme Complexation, *J. Phys. Chem. B*, 112, 4393 (2008)
55. Ran Ni, Dapeng Cao and Wenchuan Wang; Nanopattern of Inner Surface of Carbon Nanotubes for Self-Assembly of Nanoparticles: A multi-step Monte Carlo method, *J. Phys. Chem. C*, 111, 11802 (2007)
56. Ran Ni, Dapeng Cao and Wenchuan Wang; A Monte Carlo Study of Spherical Electrical Double Layer of Macroions-Polyelectrolytes Systems in Salt Free Solutions; *J. Phys. Chem. B*, 110, 26232 (2006)
57. Wu Xue, Minghe Yang and Ran Ni, An Optimal Design of Linear Lamp-House; *Chinese Journal of Engineering Mathematics*, 20, 19 (2003) (In Chinese)