

Curriculum Vitae

Personal Information

DATE OF BIRTH: Wiesbaden, Germany | April 1st, 1992

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HOME PAGE: <https://gerhardjung.github.io/>, [Google Scholar](#)

Main Areas of Research

Computer simulations in soft matter physics, non-Markovian dynamics, dynamic coarse-graining, machine learning techniques, glass transition, confinement, rheology, non-equilibrium dynamics

Academic Experience

12/2023 | LIPHY, GRENOBLE (FRANCE)

- *Postdoctoral researcher*

Present | Advisor: Eric Bertin, Misaki Ozawa

Area of study: Decentralized machine learning, statistical physics of social agents

10/2021 | CNRS, MONTPELLIER (FRANCE)

- *Postdoctoral researcher*

12/2023 | Advisor: Prof. Ludovic Berthier, Prof. Giulio Biroli

Area of study: Glass transition, machine learning, amorphous defects

06/2021 | UNIVERSITY OF KYOTO (JAPAN)

- *JSPS Fellow*

10/2021 | Advisor: Prof. Ryoichi Yamamoto

Area of study: Active particles in viscoelastic media

03/2019 | UNIVERSITY OF INNSBRUCK (AUSTRIA)

- *Postdoctoral researcher*

05/2021 | Advisor: Prof. Thomas Franosch

Area of study: Glass transition, crystallization, confined geometry

05/2018 | DURHAM UNIVERSITY (UK)

- *Visiting researcher*

10/2018 | Advisor: Prof. Suzanne Fielding

Area of study: Soft glassy materials, yielding transition, rheology

10/2014 | UNIVERSITY OF MAINZ (GERMANY)

- *Doctoral and postdoctoral researcher*

02/2019 | Advisor: Prof. Friederike Schmid

Area of study: Non-Markovian dynamics, systematic coarse-graining, rheology, nonequilibrium dynamics

Education

01/10/2014	UNIVERSITY OF MAINZ
-	<i>Doctor rerum naturalium</i> (fast-track program)
13/12/2018	Advisor: Prof. Friederike Schmid
	Thesis title: ' <i>Frequency-dependent phenomena and memory in soft matter systems.</i> ' Grade: 0.7 (<i>summa cum laude</i>)
21/12/2017	UNIVERSITY OF MAINZ
	<i>Master of Science</i>
	Advisor: Prof. Friederike Schmid
	Thesis title: ' <i>Frequency-dependent hydrodynamic interaction between two solid spheres.</i> ' Grade: 1.0
24/10/2011	UNIVERSITY OF MAINZ
-	<i>Bachelor of Science</i>
15/08/2014	Advisor: Prof. Friederike Schmid
	Thesis title: ' <i>Phase diagrams of model lipid bilayers.</i> ' Grade: 1.0 (<i>with distinction</i>)
12/08/2002	GYMNASIUM ELTVILLE
-	<i>High School</i>
07/06/2011	

Awards

2021:	JSPS 'short-term postdoctoral fellowship'
2019:	<i>Dr. rer. nat.</i> with 'summa cum laude'
2016 - 2019:	Member of the 'Graduate School of Excellence Materials Science in Mainz'
2013 - 2015:	Admission to the 'Studienstiftung des deutschen Volkes' (scholarship)
2013 - 2014:	Recipient of the 'Deutschlandstipendium' (scholarship)

Teaching and Mentoring

LECTURER	Advanced statistical physics
TUTORIALS	Mathematical methods of physics, modelling (computer science), statistical physics, electrodynamics, computer simulations in statistical physics
SUPERVISOR	Co-supervision of one PhD student Co-supervision of one Master student Supervision of two Bachelor students and one Master student

Organization of Academic Events

2022:	AISSAI Workshop on 'Machine Learning Glassy Dynamics' (5 days)
2018:	CECAM workshop on 'Dynamic coarse-graining and memory effects in soft matter systems' (2 days)
2017:	SFB TRR146 students retreat (5 days)

Languages

ENGLISH:	fluent
GERMAN:	mother tongue
FRENCH:	advanced

Publications

Publications in peer-reviewed journals

1. Dynamic heterogeneity at the experimental glass transition predicted by transferable machine learning (**Editor's Suggestion**)
G. Jung, G. Biroli, L. Berthier, *Phys. Rev. B*, **109**, 064205 (2024)
2. Mobility, response and transport in non-equilibrium coarse-grained models (Invited Special Issue: *Non-Markovian Effects in Nonequilibrium Systems*)
G. Jung, *J. of Phy. A: Math. and Theo.* **57**, 095004 (2024)
3. Force renormalization for probes immersed in an active bath
J. Shea, **G. Jung**, F Schmid, arXiv:2310.02683, *Soft Matter* **20**, 1767 (2024)
4. Noise-cancellation algorithm for simulations of Brownian particles
R. Rusch, T. Franosch, **G. Jung**, *Phys. Rev. E* **109**, 015303 (2024)
5. Dynamic coarse-graining of linear and non-linear systems: Mori–Zwanzig formalism and beyond
B. Jung, **G. Jung**, *J. Chem. Phys.* **159**, 084110 (2023)
6. Direct numerical simulations of a microswimmer in a viscoelastic fluid
T. Kobayashi, **G. Jung**, Y. Matsuoka, Y. Nakayama, JJ. Molina, R. Yamamoto, *Soft Matter* **19**, 7109 (2023)
7. Predicting dynamic heterogeneity in glass-forming liquids by physics-inspired machine learning
G. Jung, G. Biroli, L. Berthier, *Phys. Rev. Lett.* **130**, 238202 (2023)
8. Computer simulations and mode-coupling theory of glass-forming confined hard-sphere fluids
G. Jung, T. Franosch, *Phys. Rev. E* **107**, 054101 (2023)
9. Stability of branched tubular membrane structures
M. Jung, **G. Jung**, F. Schmid, *Phys. Rev. Lett.* **130**, 148401 (2023)
10. Passive probe particle in an active bath: can we tell it is out of equilibrium?
J. Shea, **G. Jung**, F. Schmid, *Soft Matter* **18**, 6965 (2022)
11. Structural properties of liquids in extreme confinement
G. Jung, T. Franosch, *Phys. Rev. E* **106**, 014614 (2022)
12. Layering and Packing in Confined Colloidal Suspensions (Open Access)
A. Villada-Balbuena, **G. Jung**, A. B. Zuccolotto-Bernez, T. Franosch, S. Egelhaaf, *Soft Matter* **18**, 4699 (2022)
13. Non-Markovian systems out of equilibrium: Exact results for two routes of coarse graining (Invited Special Issue: *Emerging Leaders 2021*)
G. Jung, *J. Phys.: Condens. Matter* **34**, 204004 (2022)
14. Fluctuation-dissipation relations far from equilibrium: A case study (Open Access)
G. Jung, F. Schmid, *Soft Matter* **17**, 6413 (2021)
15. Introducing memory in coarse-grained molecular simulations (Review Article, Open Access)
V. Klippenstein, M. Tripathy, **G. Jung**, F. Schmid, N. van der Vegt, *JCPB* **125**, 4931 (2021)
16. Tagged-particle motion in quasi-confined colloidal hard-sphere liquids
L. Schrack, C. F. Petersen, **G. Jung**, M. Caraglio, T. Franosch, *J. Stat. Mech* **043301** (2021)

17. Model reduction techniques for the computation of extended Markov parameterizations for generalized Langevin equations (Open Access)
N. Bockius, J. Shea, **G. Jung**, F. Schmid, M. Hanke, *JCMP* **33**, 214003 (2021)
18. Wall slip and bulk yielding in soft particle suspensions
G. Jung, S. Fielding, *Journal of Rheology* **65**, 199 (2021)
19. An improved integration scheme for mode-coupling-theory equations
M. Caraglio, L. Schrack, **G. Jung**, T. Franosch, *Comm. Comp. Phys.* **29**, 628 (2021)
20. Tagged-particle dynamics in confined colloidal liquids
G. Jung, L. Schrack, T. Franosch, *Phys. Rev. E* **102**, 032611 (2020)
21. Confinement-induced demixing and crystallization
G. Jung, C. F. Petersen, *Phys. Rev. Res.* **2**, 033207 (2020)
22. Dynamic properties of quasi-confined colloidal hard-sphere liquids near the glass transition
L. Schrack, C. F. Petersen, **G. Jung**, M. Caraglio, T. Franosch, *J. Stat. Mech.* 093301 (2020)
23. Dynamical properties of densely packed confined hard-sphere fluids
G. Jung, M. Caraglio, L. Schrack, T. Franosch, *Phys. Rev. E* **102**, 012612 (2020)
24. Scaling equations for mode-coupling theories with multiple decay channels
G. Jung, T. Voigtmann, T. Franosch, *J. Stat. Mech.* **7**, 073301 (2020)
25. Frequency-dependent dielectric polarizability of flexible polyelectrolytes in electrolyte solution: A Dissipative Particle Dynamics simulation
G. Jung, S. Kasper, F. Schmid, *J. of the Electrochemical Soc.* **166**, B3194 (2019)
26. Generalized Langevin dynamics: Construction and numerical integration of non-Markovian particle-based models
G. Jung, M. Hanke, F. Schmid, *Soft Matter* **14**, 9368 (2018).
27. Frequency-dependent hydrodynamic interactions between two solid spheres
G. Jung, F. Schmid, *Phys. of Fluids* **29**, 126101 (2017)
28. Iterative reconstruction of memory kernels
G. Jung, M. Hanke, F. Schmid, *J. Chem. Theory and Comp.* **13**, 2481 (2017).
29. Computing bulk and shear viscosities from simulations of fluids with dissipative and stochastic interactions
G. Jung, F. Schmid, *J. Chem. Phys.* **144**, 204104 (2016)

Preprints

1. Roadmap on machine learning glassy liquids
G. Jung et al., preprint arXiv:2311.14752
2. How boundary interactions dominate emergent driving of passive probes in active matter
J. Shea, **G. Jung**, F. Schmid, preprint arXiv:2401.09227

Review activities

Reviewer for international journals: Physical Review Letters, Communications Physics, Journal of Chemical Physics, Europhysics Letters, Physical Review E, Journal of Statistical Physics, Frontiers in Physics, Molecular Simulation, Macromolecular Theory and Simulations