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Professional Appointments and Education

06.2015 – present ‘Akademischer Oberrat’ (equiv. to Senior Lecturer)
Experimentalphysik V, University of Bayreuth, Bayreuth, Germany

01.2015 **Privatdozent**, University of Bayreuth, Bayreuth, Germany

11.2014 **Habilitation in Physics**, University of Bayreuth, Bayreuth, Germany
Wet granular dynamics: From single particle bouncing to collective motion

05.2009 – 06.2015 ‘Akademischer Rat’ (equiv. to Lecturer)
Experimentalphysik V, University of Bayreuth, Bayreuth, Germany

05.2006 – 04.2009 Postdoctoral Fellow, Dynamics of Complex Fluid Group
Max-Planck Institute for Dynamics and Self-organization, Göttingen,
Germany

05.2006 **Ph.D in Physical Acoustics**, Nanjing University, Nanjing, China
Transport and wave phenomena of granular materials under vertical vibrations

09.2001 – 05.2006 Research Assistant, State Key Laboratory of Modern Acoustics
Nanjing University, Nanjing, China

07.2000 **B. Sc. in Electronic Engineering**, Nanjing University, Nanjing, China
Design a PWM velocity controlling system for electric bicycles

09.1996 – 06.2000 Undergraduate Studies in Electronic Engineering
Nanjing University, Nanjing, China

Research Overview

My research focuses on the **dynamics of granular materials**: An interdisciplinary field related to

- **Physics**: nonlinear dynamics, complex fluids, wetting, soft matter, ...
- **Mechanical Engineering**: impact mechanics, vibration control ...
- **Chemical Engineering**: powder processing, granulation process ...
- **Geophysics**: landslide, volcano eruption, sediment transportation, dune migration ...
- **Civil Engineering**: soil mechanics, silo discharge ...

The **techniques** involved are vibration control, high-speed photography, X-ray tomography, microwave radar tracking, inkjet drop deposition, system automation, machine vision, pattern recognition and computer simulations.

Grants and Awards

2015 –	German Research Foundation (DFG) Grant: HU1939/4-1 (~209k€) <i>Patchy wet granular matter</i>
2012 – 2016	German Research Foundation (DFG) Grant: HU1939/2-1 (~118k€) <i>Dynamics of agitated wet granular matter</i>
2006 – 2009	Max-Planck Fellowship
2005	First-Class Nanrui Scholarship, Nanjing University
2004	Outstanding Graduate Student Award, Nanjing University

Publications

36 publications in peer reviewed journals and conference proceedings, h-index 9 (Google Scholar), Scopus ID: 24461507700, Researcher ID: K-9946-2015

* Corresponding author

Peer-reviewed Journal Publications

1. Andreas Zippelius and **Kai Huang***, “Density-wave fronts on the brink of wet granular condensation” *Scientific Reports* **7**, 3613 (2017). (arXiv:1702.06196).
2. Axelle Amon, Philipp Born, Karen Daniels, Joshua Dijkstra, **Kai Huang**, David Parker, Matthias Schröter, Ralf Stannarius, and Andreas Wierschem, “Focus on Imaging Methods in Granular Physics”, *Rev. Sci. Instrum* **88**, 051701 (2017). (arXiv:1703.02928).
3. Felix Ott, Stephan Herminghaus, and **Kai Huang*** “Radar for tracer particles”, *Rev. Sci. Instrum* **88**, 051801 (2017). (arXiv:1601.07032)
4. Manuel Baur and **Kai Huang***, “Dynamics of wet granular hexagons”, *Phys. Rev. E* **95**(R), 030901 (2017) (arXiv:1608.07254).
5. Thomas Müller, Ingo Rehberg and **Kai Huang***, “Influence of liquid film thickness on the coefficient of restitution for wet particles”, *Phys. Rev. E* **93**, 042904 (2016).
6. **Kai Huang**, “ $1/f$ noise on the brink of wet granular melting”, *New J. Phys.* **17**, 083005 (2015).
7. Lorenz Butzhammer, Simeon Voelkel, Ingo Rehberg and **Kai Huang***, “Pattern formation in wet granular matter under vertical vibrations”, *Phys. Rev. E* **92**, 012202 (2015).
8. Thomas Müller, Daniel de las Heras, Ingo Rehberg and **Kai Huang***, “Ordering in granular-rod monolayers driven far from thermodynamic equilibrium” *Phys. Rev. E* **91**, 062207 (2015).
9. Andrea Fortini* and **Kai Huang**, “Role of defects in the onset of wall-induced granular convection”, *Phys. Rev. E* **91**, 032206 (2015).
10. Christopher May, Michael Wild, Ingo Rehberg and **Kai Huang***, “Analog of surface melting in a macroscopic nonequilibrium system”, *Phys. Rev. E* **88**, 062201 (2013).
11. Frank Gollwitzer, Ingo Rehberg, Christof Krülle and **Kai Huang***, “Coefficient of restitution for wet particles”, *Phys. Rev. E* **86**, 011303 (2012).
12. **Kai Huang***, Martin Brinkmann* and Stephan Herminghaus, “Wet granular rafts: aggregation in two dimensions under shear”, *Soft Matter* **8**, 11939 (2012).

13. **Kai Huang*** and Ingo Rehberg, “Period tripling causes rotating spirals in agitated wet granular layers”, *Phys. Rev. Lett.* **107**, 028001 (2011).
14. **Kai Huang**, Christof Krülle and Ingo Rehberg*, “Snooping in the Sand”, *Zeitschrift für Angewandte Mathematik und Mechanik* **90**, 911 (2010) (invited review).
15. **Kai Huang**, Klaus Röller and Stephan Herminghaus, “Universal and non-universal aspects of wet granular matter under vertical vibrations”, *Euro. Phys. J. - Special Topics* **179**, 25 (2009).
16. Axel Feltrup, **Kai Huang**, Christof Krülle and Ingo Rehberg, “The rotation-reptation transition under broken rotational symmetry”, *Euro. Phys. J. - Special Topics* **179**, 19 (2009).
17. **Kai Huang***, Masoud Sohaili, Matthias Schröter, and Stephan Herminghaus*, “Fluidization of granular media wetted by liquid ⁴Helium”, *Phys. Rev. E* **79**, 010301(R) (2009).
18. Axel Fingerle, Klaus Röller, **Kai Huang** and Stephan Herminghaus*, “Phase transitions far from equilibrium in wet granular matter”, *New J. Phys.* **10**, 053020 (2008).
19. **Kai Huang***, Guoqing Miao, Peng Zhang, Yi Yun, and Rongjue Wei, “Shock wave propagation in vibrofluidized granular materials”, *Phys. Rev. E* **73**, 041302 (2006).
20. Guoqing Miao*, **Kai Huang**, Peng Zhang, Yi Yun, and Rongjue Wei, “Formation and transportation of sand-heap in an inclined and vertically vibrated container”, *Phys. Rev. E* **74**, 041304 (2006).
21. Peng Zhang*, Guoqing Miao, **Kai Huang**, Yi Yun and Rongjue Wei, “Experimental observation of kink in a perfect bidimensional granular system”, *Chin. Phys. Lett.* **22**, 1961 (2005).
22. **Kai Huang***, Peng Zhang, Guoqing Miao and Rongjue Wei, “Dynamic behaviors of supersonic granular media under vertical vibration”, *Ultrasonic* **44**, e1487 (2006).
23. Peng Zhang*, **Kai Huang**, Guoqing Miao and Rongjue Wei, “Interior dynamics of sub-harmonious surface wave in an idealized bi-dimensional granular layer”, *Ultrasonic* **44**, e1479 (2006).
24. Yi Yun*, Guoqing Miao, Peng Zhang, **Kai Huang** and Rongjue Wei, “Nonlinear acoustic wave propagating in one-dimensional layered system”, *Phys. Lett. A* **343**, 351 (2005).
25. Guoqing Miao*, **Kai Huang**, Yi Yun and Rongjue Wei, “Active thermal convection in vibrofluidized granular systems”, *Euro. Phys. J. B* **40**, 301 (2004).
26. **Kai Huang***, Guoqing Miao, and Rongjue Wei, “Transport of heap formed by granular materials on an inclined surface”, *Int. J. Mod. Phys. B* **17**, 4222 (2003).

Peer-Reviewed Conference Proceedings

27. Simeon Vökel and **Kai Huang***, “Dynamics of wetting explored with intjet printing” *EPJ Web Conf.* **140**, 09035 (2017) (arXiv:1611.03750).
28. Philipp Ramming and **Kai Huang***, “Clustering and melting of a wet granular monolayer”, *EPJ Web Conf.* **140**, 08003 (2017) (arXiv:1610.06466).
29. **Kai Huang***, “Impulse response of the Bayreuth Festspielhaus” *Fortschritte der Akustik - DAGA*, 238 (2017)(arXiv:1703.07080).
30. Thomas Müller, Frank Gollwitzer, Christof Krülle, Ingo Rehberg and **Kai Huang***, “Scaling of the normal coefficient of restitution for wet impacts”, *AIP Conf. Proc.* **1542**, 787 (2013).

31. **Kai Huang***, Lorenz Butzhammer and Ingo Rehberg, “Dynamics of rotating spirals in agitated wet granular matter”, *AIP Conf. Proc.* **1542**, 702 (2013).
32. **Kai Huang***, Guoqing Miao, Peng Zhang, Yifei Zhu and Rongjue Wei, “Dynamic behaviors of supersonic granular media under vertical vibration”, *Proceedings of the 7th International Conference of Theoretical and Computational Acoustics* (2005) (arXiv:cond-mat/0511687).
33. **Kai Huang**, Guoqing Miao and Rongjue Wei, “Experimental study of fluctuations of granular materials under vertical vibrations”, *Technical Acoustics*,(2005) suppl.(in Chinese).
34. Peng Zhang, **Kai Huang**, Guoqing Miao and Rongjue Wei, “Convection of kinks in a bidimensional granular system”, *Technical Acoustics*, (2005) suppl.(in Chinese).
35. **Kai Huang**, Guoqing Miao and Rongjue Wei, “Dynamic behaviors of the center of mass of vibrofluidized granular materials”, *Technical Acoustics*, (2004) suppl.(in Chinese).
36. **Kai Huang**, Guoqing Miao and Rongjue Wei, “Event driven simulations of granular materials under vertical vibration”, *Acoustics and Electronic Engineering*, (2003) suppl.(in Chinese).

Popular Science Articles

1. Kai Huang and Ingo Rehberg, “Digitalisierung in der Messtechnik (Digitalization in measurement techniques)”, *Spectrum* **2** (2015).
2. “Warum der Winter leise ist? (Why is winter quiet?)”, *Nord Bayerlische Kurier* Monday 30.January, 23 (2017) (explaining acoustic damping of snow to children).

Invited Talks and Conference Contributions

- ✉ >35 talks (13 invited) and >25 posters (2 First-Prize poster awards)
- ✉ Organize and chair sessions and symposiums in international conferences

Selected Talks

- 2017 **5th International Conference on Particle Based Methods**, Hanover (**invited**)
Wave propagation in granular materials: Role of cohesion
- Langevin Institute @ ESPCI**, Paris/France (**invited**)
Granular dynamics: From radar particle tracking to cohesion mediated collective motion
- Powders and Grains 2017**, Montpellier/France
Clustering and melting in a wet granular monolayer
- 37th Dynamics Days Europe**, Szeged/Hungary (**invited**)
Pattern formation in wet granular materials
- German Physical Society (DPG)-Spring Meeting**, Dresden
 Focus session: ‘Particulate matter: From microscopic interactions to collective motion’ (**organizer**)
- Physics of Fluid @ Uni. Twente**, Enschede, the Netherland (**invited**)
Dancing of wet particles: Impacts, assembly and pattern formation
- Department of Physics @ Uni. Saarland**, Saarbrücken (**invited**)
Wet granular dynamics: From single particle bouncing to collective motion
- 2016 **Patterns in Nature - Functions, Variations, and Control**, Bayreuth
Rotator crystals in wet granular matter
- 36th Dynamics Days Europe**, Corfu/Greece

- Minisymposium: Assembly of nonspherical particles (**organizer**)
Dancing screw nuts: Assembly of hexagonally shaped disks with attractive interactions
- Spring School on Imaging Particles**, Erlangen (invited)
Radar for tracer particles
- APS-Spring Meeting**, Baltimore/USA
Normal coefficient of restitution for wet particles
- 2015 **German Aeronautics and Space Research Center (DLR)**, Cologne (invited)
Dynamics of granular matter: From single particle bouncing to collective motion
- Institute for Multiscale Simulation @ Uni. Erlangen**, Erlangen (invited)
1/f noise on the brink of wet granular melting
- 2014 **JamPacked**, Erlangen
Assembly of driven wet grains: From spheres to hexagons
- DPG-Spring Meeting**, Dresden
Clustering of spinning wet granular hexagons in two dimensions
- 2013 **SIAM Conference on Applications of Dynamical Systems**, Snowbird/USA (invited)
Symmetry breaking induced rotating spirals in agitated in agitated wet granular matter
- DPG-Spring Meeting**, Regensburg
Surface melting Surface melting of wet granular matter in two dimensions
- 2012 **NonEquilibrium Collective Dynamics**, Potsdam
Dynamics of rotating spirals in agitated wet granular matter
- 2011 **Dynamics of Complex Fluid @ MPIDS**, Göttingen (invited)
Dancing of wet particles: from individual bouncing to collective motion
- 16th Fall Seminar on Nonlinear Dynamics**, Bayreuth
Period tripling causes rotating spirals in agitated wet granular matter
- 2010 **APS-Spring Meeting**, Portland/USA
Spiral pattern in wet granular matter under vertical vibrations
- Material Science Division @ Argonne National Lab**, Argonne/USA (invited)
Dynamics of wet granular matter

Teaching

- ☞ Teaching 7 hours per week (SWS) at both undergraduate and graduate levels
- ☞ Pedagogical training at the 'Fortbildungszentrum Hochschullehre' (certificate 2017)
- ☞ Promotionen gut betreuen (Ph.D student better mentoring) (QZP workshop, 2017)
- ☞ Junior Faculty Professional Development Workshop, 2017
- ☞ Intercultural training on problem solving and team building (certificate 2010)

	<u>University of Bayreuth</u>
Lecture	Acoustics: From fundamentals to applications Physics of Granular Matter (part of Nonlinear Dynamics and Pattern Formation)
Teaching Assistant	Classical Mechanics Electricity and Magnetism Optics and Heat

	Atomic, nuclear and particle physics
Lab Course	Polarization and light scattering, Gyroscope, Torsion, Electricity, Complex resistor
Advanced Lab Course	Pattern formation in liquid crystal systems <u>Nanjing University</u>
Exercise Course	Mathematical methods in physics
Computer Course	Programming with C++

Mentoring

2 Ph.D, 5 diplom|master, 6 bachelor students (2 with the highest grade of 1.0), and 1 pupil

Ph.D	Simeon Völkel , 2016 – <i>Patchy wet granular matter</i>
	Thomas Müller , 2012 – 2015 <i>Mesophases in Molecular and Granular Systems: From Liquid Crystalline Polymers to Granular Rods</i>
Diplom Master	Andreas Zippelius , 2016 – <i>Four phase spirals in agitated wet granular matter</i>
	Manuel Baur , 2015 – 2016 <i>Patchy wet granular matter</i>
	Michael Wild , 2012 – 2013 <i>Surface melting of granular matter</i>
	Christopher May , 2010 – 2011 <i>Phase transition of a two-dimensional cohesive granular matter under swirling motion</i>
	Frank Gollwitzer , 2009 – 2010 <i>Experimental investigation of cohesive granulates</i>
Bachelor	Jonas Landgraf , 2017 - <i>Dynamics of wetting explored with inkjet printing</i>
	Philipp Ramming , 2014 <i>Structure and dynamics of cohesive granular monolayers under vertical agitations</i>
	Simeon Völkel , 2014 <i>Measuring the contact angle hysteresis of a water droplet on a Teflon surface</i>
	Felix Ott , 2013 <i>Particle tracking in three dimensions with microwave radar</i>
	Laura Meißner , 2012 <i>Experimental investigations of restitution coefficient</i>
	Lorenz Butzhammer , 2012 <i>Pattern formation in cohesive granulates</i>
Pupil	Tristan Zürl , 2010, Graf-Münster Gymnasium, Bayreuth 'Facharbeit'(High school project) on Wet Granular Matter

Professional Services and Associations

Referee for journals (Phys. Rev. Lett., Phys. Rev. E, Phys. Rev. Mat., Soft Matter, Sci. Rep., New J. Phys., Adv. Powder Technol., Powder Technol. etc.) and funding agencies

- 2009 – Member of American Physical Society
- 2007 – Member of Germany Physical Society
- 2003 – 2006 Research Technician of Sound and Vibration System, Nanjing University

Outreach

- 2014 – 2016 Equal Opportunity Representative, University of Bayreuth
- 2016 – Juror, German Young Physicists' Tournament (GYPT)
(Help high school students prepare for international physics competition)

Language

- Chinese** native
- English** fluent, working language
- German** proficient in reading and speaking