

Curriculum Vitae

Personal Data

Title	Prof. Dr.-Ing.
First name	Henning
Name	Wessels
Current position	Professor (W2) for Data-driven mechanics
Current institution(s)/ site(s), country	TU Braunschweig, Institute of Applied Mechanics (IAM), Division Data-Driven Modeling of Mechanical Systems, Germany
Identifiers/ORCID	https://orcid.org/0000-0002-2542-1130

Qualifications and Career

Stages	Periods and Details
Degree programme	<ul style="list-style-type: none"> ▪ Mechanical Engineering (M.Sc.), 10.2013 – 02.2016, Leibniz University Hannover (LUH), Germany ▪ Mechanical Engineering (B.Sc.), 10.2010 – 11.2013, Leibniz University Hannover, Germany
Doctorate	<ul style="list-style-type: none"> ▪ 10.07.2019, Prof. Peter Wriggers & Prof. Eugenio Oñate, Institute of Continuum Mechanics (IKM), Leibniz University Hannover, Germany “Thermo-mechanical modeling for selective laser melting” 10.15488/5331 ▪ 2017: visiting researcher at UC Berkeley with Prof. Tarek Zohdi
Stages of academic/ professional career	<ul style="list-style-type: none"> ▪ Since 02.2025: Professor for Data-driven mechanics at IAM ▪ 05.2021 – 01.2025: Assistant professor (TT) for Data-driven modelling and simulation of mechanical systems at IAM ▪ 10.2019 – 02.2021: Postdoc at IKM, Leibniz University Hannover

Supplementary Career Information

Parental leave/part time: 04/2019 - 02/2020, 07/2020 - 02/2021 (eq. to 11 months of full leave)

Academic inactivity/unemployment: 03/2021 - 04/2021 (2 months)

Activities in the Research System

Memberships and functions

2027	Co-organizer of section “S25: Machine Learning and Data Science in Mathematics and Mechanics” at GAMM annual meeting / Germany
2026	Co-organizer of minisymposium at WCCM-ECCOMAS / Germany
2026	Organizer of GAMM AG Data workshop held at TU Braunschweig
2025	Member of organizing committee of GACM colloquium held at TU Braunschweig
2025	Co-organizer of invited session at SIM-AM 2025 / 60 session attendees / Italy
2024	Co-organizer of Young Researchers’ Minisymposium at GAMM annual meeting / Germany
2023	Co-organizer of invited session at SIM-AM 2024 / Germany
2023	Co-organizer of conference session at GACM colloquium / Austria

- 2022 Co-organizer of conference session at GACM colloquium / Germany
- 2021 - 2024 PI at the DFG funded Research Training Group 2075-2 "Modelling the constitutional evolution of building materials and structures with respect to aging" (2 doctoral researchers)
- since 2022 Member, General Assembly of Computational Mechanics (GACM)
- since 2021 Member, Association of Applied Mathematics and Mechanics (GAMM)
- since 2021 Member of faculty committees (AI circle, examination committee civil engineering)
- since 2021 Mentor in the study program computational science and engineering

Reviewing activities

- since 2025 Reviewer for the German Research Foundation (DFG), Germany
- since 2024 Member of the review panel PKELF for proposals in the context of radioactive waste disposal funded by the federal ministry BMUKN, Germany
- since 2022 Reviewer for DAAD and Alexander-von-Humboldt foundation, Germany
- since 2018 Journal reviewer e.g. for CMAME, computational mechanics, computers and structures, IJNME

Supervision of Researchers in Early Career Phases

Supervised dissertations

- 03/2026 David Anton: Uncertainty Quantification in Constitutive Model Calibration and Discovery in Computational Solid Mechanics.
- 11/2025 Vahab Knauf Narouie: Statistical Finite Element Methods for State Estimation and Constitutive Model Discovery.
- 10/2022 Alexander Henkes: Artificial Neural Networks in Continuum Micromechanics. <https://d-nb.info/128050143X/34>

External examiner of dissertations

- 12/2025 Reza Kaboli, TU Chemnitz; "Numerische Simulation der Verteilung von Verstärkungspartikeln beim gepulsten Plasma-Pulver-Auftragsschweißen von Metall-Matrix-Werkstoffen". First examiner Jonas Hensel
- 08/2025 Hamidreza Eivazi, TU Clausthal; "Physics-informed machine learning for multi-scale simulations". First examiner Andreas Rausch
- 08/2025 Ali Harandi, RWTH Aachen; "Bridging classical and deep learning approaches for multiscale and multiphysics systems" First examiner Stefanie Reese
- 03/2025 Ahmet Oguzhan Yuksel, University of Cambridge; "SPDE-derived random fields in structural optimisations and elastodynamics". Supervisor Fehmi Cirak, First examiner Allan McRobie
- 10/2024 Jian Tang, ETH Zürich; "Scientific machine learning for thermo-microstructure modelling in additive manufacturing". First examiner Laura de Lorenzis, co-examiners Ehsan Hosseini, Christian Leinenbach

Scientific Results

Category A – Articles in peer-reviewed journals, contributions to peer-reviewed conferences or to anthology volumes, and book publications

1. V. Knauf Narouie, J.-H. Urrea-Quintero, Cirak, F. and **H. Wessels**. “Unsupervised Constitutive Model Discovery from Sparse and Noisy Data.” *Computer Methods in Applied Mechanics and Engineering* 452 (2026). [10.1016/j.cma.2025.118722](https://doi.org/10.1016/j.cma.2025.118722) **Open Access**
2. J.-H. Urrea-Quintero, D. Anton, L. de Lorenzis and **H. Wessels**. “Automated constitutive model discovery by pairing sparse regression algorithms with model selection criteria.” *Computer Methods in Applied Mechanics and Engineering* 449 (2026). [10.1016/j.cma.2025.118551](https://doi.org/10.1016/j.cma.2025.118551) **Open Access**
3. V. Narouie, **H. Wessels**, F. Cirak and U. Römer. “Mechanical state estimation with a Polynomial-Chaos-Based Statistical Finite Element Method.” *Computer Methods in Applied Mechanics and Engineering* 441 (2025). [10.1016/j.cma.2025.117970](https://doi.org/10.1016/j.cma.2025.117970) **Open Access**
4. D. Anton, J.-A. Tröger, **H. Wessels**, U. Römer, A. Henkes and S. Hartmann. „Deterministic and statistical calibration of constitutive models from full-field data with parametric physics-informed neural networks.” *Advanced Modeling and Simulation in Engineering Sciences* 12.1 (2025). [10.1186/s40323-025-00285-7](https://doi.org/10.1186/s40323-025-00285-7) **Open Access**
5. U. Römer, S. Hartmann, J.-A. Tröger, D. Anton, **H. Wessels**, M. Flaschel and L. de Lorenzis. “Reduced and All-at-Once Approaches for Model Calibration and Discovery in Computational Solid Mechanics”. In *Applied Mechanics Review* (2025). [10.1115/1.4066118](https://doi.org/10.1115/1.4066118) **Open Access**
6. L. Paul, J.-H. Urrea-Quintero, U. Fiaz, A. Hussein, H. Yaghi, J. Stahlmann, U. Römer and **H. Wessels**. “Gaussian processes enabled model calibration in the context of deep geological disposal.” *Data-Centric Engineering* 6 (2025). [10.1017/dce.2025.17](https://doi.org/10.1017/dce.2025.17) **Open Access**
7. A. Henkes, L. Herrmann, **H. Wessels** and S. Kollmannsberger. “Generative Adversarial Networks Enable Outlier Detection and Property Monitoring for Additive Manufacturing of Complex Structures”. In *Engineering Applications of Artificial Intelligence* (2024). [10.1016/j.engappai.2024.108993](https://doi.org/10.1016/j.engappai.2024.108993) **Open Access**
8. G. Agarwal, J.-H. Urrea-Quintero, **H. Wessels** and T. Wick. “Parameter identification and uncertainty propagation of hydrogel coupled diffusion-deformation using POD-based reduced-order modeling”. In: *Computational Mechanics* (2024). [10.1007/s00466-024-02517-w](https://doi.org/10.1007/s00466-024-02517-w) **Open Access**
9. A. Henkes, J. K. Eshraghian, and **H. Wessels**. “Spiking neural networks for nonlinear regression”. In: *Royal Society Open Science* 11.5 (2024). [10.1098/rsos.231606](https://doi.org/10.1098/rsos.231606) **Open Access**
10. V. B. Narouie, **H. Wessels** and U. Römer. “Inferring Displacement Fields from Sparse Measurements Using the Statistical Finite Element Method”. In: *Mechanical Systems and Signal Processing* 200 (2023). [10.1016/j.ymsp.2023.110574](https://doi.org/10.1016/j.ymsp.2023.110574)
11. A. Henkes and **H. Wessels**. “Three-dimensional microstructure generation using generative adversarial neural networks in the context of continuum micromechanics”. In: *Computer Methods in Applied Mechanics and Engineering* 400 (2022). [10.1016/j.cma.2022.115497](https://doi.org/10.1016/j.cma.2022.115497)
12. A. Henkes, **H. Wessels** and R. Mahnken. “Physics informed neural networks for continuum micromechanics”. In: *Computer Methods in Applied Mechanics and Engineering* 393 (2022). [10.1016/j.cma.2022.114790](https://doi.org/10.1016/j.cma.2022.114790)
13. **H. Wessels**, C. Weißenfels and P. Wriggers. “The neural particle method - an updated Lagrangian physics informed neural network for computational fluid dynamics”. In: *Computer Methods in Applied Mechanics and Engineering* 368 (2020). [10.1016/j.cma.2020.113127](https://doi.org/10.1016/j.cma.2020.113127)

14. J.-P. Fürstenau, **H. Wessels**, C. Weißenfels and P. Wriggers. "Generating virtual process maps of SLM using powder-scale SPH simulations." Computational Particle Mechanics 7.4 (2020). [10.1007/s40571-019-00296-3](https://doi.org/10.1007/s40571-019-00296-3)
15. **H. Wessels**, T. Bode, C. Weißenfels, P. Wriggers and T. Zohdi. "Investigation of heat source modeling for selective laser melting." Computational Mechanics 63(5) (2019). [10.1007/s00466-018-1631-4](https://doi.org/10.1007/s00466-018-1631-4)
16. **H. Wessels**, C. Weißenfels and P. Wriggers. "Metal particle fusion analysis for additive manufacturing using the stabilized optimal transportation meshfree method." Computer Methods in Applied Mechanics and Engineering 339 (2018). [10.1016/j.cma.2018.04.042](https://doi.org/10.1016/j.cma.2018.04.042)

Category B – Any other form of published results

Published source code:

1. A. Henkes and **H. Wessels**. „Three-dimensional microstructure generation using generative adversarial neural networks in the context of continuum micromechanics (1.0)“. In: Zenodo.org (2022). [10.5281/zenodo.6924533](https://doi.org/10.5281/zenodo.6924533) **Open Access**
2. A. Henkes, **H. Wessels** and R. Mahnken. „Physics informed neural networks for continuum micromechanics (1.0)“. In: Zenodo.org (2022). [10.5281/zenodo.6913330](https://doi.org/10.5281/zenodo.6913330) **Open Access**
3. **H. Wessels**, C. Weißenfels and P. Wriggers. „The neural particle method - an updated Lagrangian physics informed neural network for computational fluid dynamics (Code)“. In: gitlab.com (2020). <https://gitlab.com/henningwessels/npm> **Open Access**

Published dataset (Honored with FAIR Data Award Lower Saxony):

4. J.-A. Tröger, S. Hartmann, D. Anton and **H. Wessels**. „Digital image correlation measurement of linear elastic steel specimen“. In: Zenodo.org (2024). [10.5281/zenodo.11257192](https://doi.org/10.5281/zenodo.11257192) **Open Access**

Academic distinctions

2025	Appointed to W2 professorship AI in Mechanics, University of Kassel (rejected)
2024	FAIR Data Award at the FDM data days Lower Saxony, Germany
2023	Sustainability award at GAMM annual meeting, Dresden, Germany
2022	Awarded a Feodor-Lynen fellowship of the Alexander-von-Humboldt foundation for a research stay at Brown University with George Em Karniadakis (not realized due to the pandemic)
07/2019	PhD (Dr.-Ing.) awarded with distinction, LUH, Hannover, Germany
04/2017 - 09/2017	Fulbright fellowship, visiting researcher at the department of mechanical engineering (Prof. Tarek I. Zohdi), University of California, Berkeley, USA
11/2015	Honored with the scholarship "Niedersachsenstipendium"
09/2014 - 02/2015	Erasmus scholarship, Aristotle University Thessaloniki, Greece
11/2014	Honored with the scholarship "Deutschlandstipendium"
09/2006 - 01/2007	Scholarship within the Voltaire program of the Franco-German Youth Office