

Jun.-Prof. Dr.-Ing. Weihan Li

Center for Ageing, Reliability and Lifetime Prediction of
Electrochemical and Power Electronic Systems (CARL)
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Lab Website



Google Scholar



ORCID



ResearchGate



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Research Summary

My research develops physics-informed and interpretable machine learning methods for complex physical systems, with a focus on electrochemical energy storage. I establish a methodological framework that integrates electrochemical modeling with data-driven approaches to enable reliable, transferable, and interpretable prediction and control under real-world uncertainty and limited data. My work bridges model-based scientific understanding and machine learning, contributing to the development of next-generation data-driven modeling paradigms with applications in battery diagnostics, aging analysis, and digital twins.

Education

- 01/2018–11/2021 Dr.-Ing., Electrical Engineering, RWTH Aachen University
Doctoral thesis: "Battery digital twin with physics-based modeling, battery data and machine learning." Passed with highest distinction (summa cum laude). Advisor: Prof. Dirk Uwe Sauer
- 09/2016–08/2017 Visiting Student, Massachusetts Institute of Technology (MIT), USA
Master's thesis: "Advanced battery management using fast adaptive observers, machine learning, and electrochemistry models." Grade: 1.0 (highest distinction). Advisor: Prof. Anuradha Annaswamy
- 10/2014–09/2017 M.Sc., Automotive Engineering and Transport, RWTH Aachen University
- 10/2009–09/2014 B.Sc., Automotive Engineering, Tongji University, China
Bachelor's thesis: "ABS Simulation & Analysis in Electric Hydraulic Brake Systems"

Academic Appointments

- 08/2025–09/2025 Visiting Professor, Stanford University, USA
Theodore-von-Kármán-Fellowship, Stanford Energy Control Lab, Prof. Simona Onori
- 02/2025–present Junior Professor (W1), RWTH Aachen University
*Junior Professorship in Artificial Intelligence and Digitalization for Batteries
Principal Investigator of an independent research group (18 PhD candidates)*
- 01/2024–present BMFTR Research Group Leader, RWTH Aachen University (CARL)
BMFTR-funded Junior Research Group (€2.2M), "Fast Performance Characterization of Batteries from Production Lines with Machine Learning (SPEED)"
- 04/2023–09/2023 Visiting Researcher, Imperial College London, UK
Electrochemical Science and Engineering Group, Prof. Gregory Offer
- 10/2022 Visiting Researcher, University of Oxford, UK
Battery Intelligence Lab, Prof. David Howey
- 02/2022–12/2023 Junior Research Group Leader, RWTH Aachen University (CARL)
Principal Investigator of the independent research group "AI for batteries"
- 01/2018–01/2022 Research Associate and PhD candidate, RWTH Aachen University (ISEA)
From 10/2020, team leader "Battery algorithms", Head: Prof. Dirk Uwe Sauer
- 03/2017–08/2017 Research Assistant, MIT, USA
Active Adaptive Control Lab, Head: Prof. Anuradha Annaswamy
- 09/2016–02/2017 Research Assistant, MIT, USA
Sloan Automotive Lab, Head: Dr. Victor Wong

Research Grants (Selected)

Research funding (as PI) exceeding €9M from 29 grants, including major competitive funding from Horizon Europe, Marie Skłodowska-Curie Actions, and multiple German federal ministries (BMFTR, BMW, BMV), with industrial research support exceeding €2M from leading international industrial partners.

Most Important Awards

2026	Member, Die Junge Akademie <i>Germany's first academy for outstanding early-career researchers, jointly supported by the Berlin-Brandenburg Academy of Sciences and Humanities (BBAW) and the German National Academy of Sciences Leopoldina.</i>
2024 & 2025	Highly Cited Researcher, Clarivate <i>Recognition as one of the world's most highly cited researchers, identifying scientists whose publications rank in the top 1% by citations in their field.</i>
2024	BMFTR Junior Research Group Grant <i>Competitive national program supporting up to five outstanding early-career researchers annually to establish an independent research group with five-year funding (€2.2M).</i>
2023	Reichart Prize, Academy of Public Sciences in Erfurt <i>Awarded by one of Germany's oldest scientific academies (founded in 1754) for research contributions with strong scientific and societal relevance.</i>
2022	Deutscher Studienpreis (German Thesis Award), Körber Foundation <i>One of Germany's most prestigious awards for young researchers, awarded under the patronage of the President of the German Bundestag; only three doctoral theses are selected annually across all natural and technical sciences.</i>
2022	Battery Young Researcher Award, Batteries European Partnership Association <i>European-level recognition awarded by Battery 2030+ and BEPA for outstanding contributions by young researchers advancing battery science and technology.</i>

Other Awards & Honors (Selected)

2025	Offer of Tenure Track Professorship, Uppsala University, Sweden (declined)
2024	Umbrella Award, Umbrella Cooperation <i>Award for interdisciplinary collaboration and innovation in energy research.</i>
2024	Theodore-von-Kármán-Fellowship, RWTH Aachen University <i>Fellowship supporting outstanding early-career researchers.</i>
2023	vgbe Innovation Award, vgbe Research Foundation <i>Award for innovative contributions in energy and power engineering.</i>
2023	Innovation Award, RWTH Aachen University <i>Award for outstanding innovation and technology-oriented research contributions.</i>
2023	Borchers Badge, RWTH Aachen University <i>Distinction for outstanding doctoral achievements.</i>
2014	Deutschlandstipendium (German National Scholarship), BMFTR <i>National scholarship program supporting high-achieving students in Germany.</i>
2012	Shell Eco-Marathon Asia, Category Prototype, Gold Medal <i>International engineering competition for energy-efficient vehicle design.</i>
2012	Honda Energy-Saving Sports Tournament, Silver Medal <i>National engineering competition focused on energy-efficient mobility concepts.</i>
2010 & 2013	China National Scholarship <i>Highest national scholarship awarded to the top 0.2% of students in China.</i>

Invited Talks & Keynotes

Invited speaker at 80+ international conferences and leading research institutions worldwide, including multiple keynote and plenary talks.

Keynotes / Plenary Talks (Selected)

2026	Munich Battery Discussions, Munich, Germany
2025	BrainLink Workshop, Incheon, South Korea
2025	Advanced Battery Management Workshop (ACC), Denver, USA
2025	Symposium on Emerging and Digital Battery Technologies, Oslo, Norway
2025	Advanced Battery Power Conference, Aachen, Germany
2025	PyBaMM Conference, London, UK

Invited Talks (Selected)

2025	University of California, Los Angeles (UCLA), USA
2025	University of Oklahoma, USA
2024	IEEE Transportation Electrification Conference & Expo, Chicago, USA
2024	Materials Research Society (MRS) Spring Meeting, Seattle, USA
2024	UTBM, Belfort, France
2023	Massachusetts Institute of Technology (MIT), Cambridge, USA
2023	Northeastern University, Boston, USA
2023	American Control Conference, San Diego, USA
2022	University of California, Berkeley, USA
2022	University of Oxford, Oxford, UK
2022	Imperial College London, London, UK
2021	Stanford University, USA

Professional Activities

Editorial Roles

2022–present	Member, Young Editorial Board, eTransportation (Elsevier)
2024–2025	Guest Editor, Polymers (special issue on energy storage manufacturing)
2022–2024	Guest Editor, Communication Engineering (Springer Nature)
2022–2023	Guest Editor, Journal of Energy Storage (Elsevier)
2022	Guest Editor, Sustainability

Conference Leadership (Selected)

2026	Co-Organizer, Sino-German Frontiers of Science and Technology Symposium (Alexander von Humboldt Foundation), Suzhou, China
2025–present	Organizing Committee, ITEC+EATS, USA
2025	Co-Organizer, Special Session, IECON, Madrid, Spain
2024	Co-Organizer, Special Session, IPEMC 2024 – ECCE Asia, Chengdu, China
2023–present	Founder and Organizer, Symposium on Physics and Machine Learning for Batteries, an international forum with ~200 participants annually from academia and industry, Aachen, Germany

2023 Co-Organizer, Invited Track, IFAC World Congress, Yokohama, Japan
 2023–present Session Chair at major international conferences, e.g., Advanced Automotive Battery Conference (Europe and USA), International Battery Seminar (USA), Battery Safety Conference (USA)

Professional Service

2026–present Member, Technical Working Group “E-Mobility in Energy Systems,” VDE
 2025–present Member, Device Technologies for Energy Storage Ad Hoc Committee, EDS

Memberships

VDE, ECS, IEEE EDS, MRS, IEEE

Review Activities

Reviewer for leading journals including Joule, Nature Machine Intelligence, Nature Computational Science, Nature Materials, Nature Sustainability, Nature Communications, Advanced Energy Materials, Energy Storage Materials, Journal of Power Sources, IEEE Transactions, among others.

Industry Advisory (Selected)

2023–2025 Scientific Advisor, Voltfang GmbH, Germany
 2022–2023 Scientific Advisor, EXIST Business Startup Grant, BMW
 2020–2022 Scientific Advisor, Safion GmbH, Germany

Institutional Responsibilities at RWTH (Selected)

2026–present Member, Profile Area Modeling & Simulation Sciences (MSS)
 2025–present Chairman, QVM Committee, Faculty of Electrical Engineering & Information Technology
 2025–present Member, Center for Artificial Intelligence (AI Center)
 2025–present Board Member, Center for Ageing, Reliability and Lifetime Prediction of Electrochemical and Power Electronic Systems (CARL)
 2025–present Member, Profile Area Energy, Chemical & Process Engineering (ECPE)
 2022–present Steering Committee Member, Center for Young Academics
 2023–2024 Member, Faculty Search Committee (W3)

Supervision

2022–present Principal supervisor of 18 PhD students
Daniel Luder (2022–present), Jue Chen (2022–present), Satish Rapol (2022–present), Thorsten Tegetmeyer-Klein (2023–present), Paul Busch (2023–present), Runyang Lian (2023–present), Hanna Hoch (2024–present), Thomas Ngo (2024–present), Jonathan Wohlmuth (2024–present), Xiaojie Tang (2025–present), Genc Luzha (2025–present), Jannis Kaiser (2025–present), Roman Morozov (2025–present), Dominic Peltzer (2025–present), Konrad Dittrich (2025–present), Zirui Liu (2025–present), David Juroszek (2026–present), Moritz Effen (2026–present)
 2022–present Supervision of 16 visiting PhD students and researchers
 2022–present PhD examination committee member (8 doctoral theses, international institutions)
 2018–present Supervision of 32 bachelor’s theses and 132 master’s theses

Teaching

2024–present Development and delivery of M.Sc. courses at RWTH Aachen University, including:
 – Artificial Intelligence for Energy Technology (5 SWS)
 – Battery Modelling and Machine Learning (2.5 SWS)

	<ul style="list-style-type: none"> – Fundamentals of Thermodynamics and Data Processing for Batteries (2 SWS) – Master Research Labs: Machine Learning for Batteries (8 SWS)
2024–2025	Engagement in the development of two M.Sc. programs (“Battery Science and Technology in Engineering” and “Battery Systems Engineering”), including the design of new courses, teaching materials, and digital learning formats
2021–present	Lecturer, annual seminar “Li-ion batteries for E-Mobility”
2021–present	Guest lectures and tutorials at international conferences (e.g., ACC, EPE, ECS)

Public Engagement & Science Communication

2026	Podcast appearances (“Espresso Talks”, “BETTERE EXPEDITION”) on AI and battery technologies
2025	Featured researcher in “Aachener Geheimnisse” (book by Andrea Goffart)
2024	Public lecture “The world of AI: basics, opportunities, and applications” (~100 attendees, Aachen)
2024	Science outreach talk with secondary school students (~30 participants, Young Science Hamburg)