

Dr.-Ing. Laura König-Mattern

Curriculum vitae

Career

- 01/2025– **Group Leader**, *Center for the Transformation of Chemistry*, Computational Biorefining
today
- 10/2022 – **Doctoral exchange**, *École polytechnique fédérale de Lausanne*, Laboratory of Sustainable and Catalytic Processing, Supervisor: Prof. Jeremy Luterbacher
03/2023
- 09/2019– **PhD student**, *Max Planck Institute for Dynamics of Complex Technical Systems, Magdeburg*, Process Systems Engineering, Supervisor: Prof. Kai Sundmacher, Thesis: Systematic Solvent Screening and Design for Biomass Fractionation Processes
12/2024
Final Grade: summa cum laude

Education

- 04/2017– **Master of Science**, *Systems Engineering and Engineering Cybernetics*,
08/2019 Otto von Guericke University Magdeburg
Final grade: 1.4
- 10/2013– **Bachelor of Science**, *Biosystems Engineering*,
04/2017 Otto von Guericke University Magdeburg
Final grade: 2.0
- 08/2005– **Abitur**, *Gymnasium Geschwister Scholl*, Gardelegen
07/2013 Final grade: 1.4

Awards and distinctions

- 09/2025 **Nomination for Otto-Hahn-Medal**, *Max Planck Institute for Dynamics of Complex Technical Systems*
- 09/2025 **100 klügste Köpfe der Hauptstadtwissenschaft**, *Tagesspiegel*
- 07/2025 **Deutscher Studienpreis**, *Körber-Stiftung*, 2nd prize, 10,000 €
- 11/2024– **Add-on Fellowship for Interdisciplinary Life Science**, *Joachim Herz Foundation*, 15,500 €
01/2027
- 11/2023 **Falling Walls Summit**, *Wilhelm and Else Heraeus Foundation*
- 10/2021 **Award for Science Communication**, *Federal Ministry of Education and Research (BMBF)*, Bioeconomy-Camp, 3,000 €

03/2021– **Christiane Nüsslein-Volhard scholarship**, *Christiane Nüsslein-Volhard*
03/2023 *Foundation, Bayer*, 9,600 €
08/2012– **School scholarship**, *Joachim Herz Foundation, Robert Bosch Foundation*,
08/2013 1,800 €

Peer-reviewed articles

- [1] **L. König-Mattern**, L. Rihko-Struckmann, and K. Sundmacher, "Systematic solvent selection enables the fractionation of wet microalgal biomass," *Separation and Purification Technology*, vol. 354, p. 129 462, 2025.
- [2] A. O. Komarova, C. M. Warne, H. Pétremand, **L. König-Mattern**, J. Stöckelmaier, C. Oostenbrink, G. M. Guebitz, J. Luterbacher, and A. Pellis, "Xylose Acetals - a New Class of Sustainable Solvents and Their Application in Enzymatic Polycondensation," *ChemSusChem*, e202401877, 2024.
- [3] **L. König-Mattern**, E. I. Sanchez Medina, A. O. Komarova, S. Linke, L. Rihko-Struckmann, J. Luterbacher, and K. Sundmacher, "Machine learning-supported solvent design for lignin-first biorefineries and lignin upgrading," *Chemical Engineering Journal*, vol. 495, p. 153 524, 2024.
- [4] E. Matthies, K. Beer, M. Böcher, K. Sundmacher, **L. König-Mattern**, J. Arlinghaus, A. Blöbaum, M. Jaeger-Erben, and K. Schmidt, "Framework conditions for the transformation toward a sustainable carbon-based chemical industry – a critical review of existing and potential contributions from the social sciences," *Journal of Cleaner Production*, vol. 470, p. 143 279, 2024.
- [5] **L. König-Mattern***, A. O. Komarova*, A. Ghosh, S. Linke, L. K. Rihko-Struckmann, J. Luterbacher, and K. Sundmacher, "High-throughput computational solvent screening for lignocellulosic biomass processing," *Chemical Engineering Journal*, vol. 452, p. 139 476, 2023, * Authors contributed equally.
- [6] J. Kopton, L. K. Rihko-Struckmann, **L. König-Mattern**, and K. Sundmacher, "Superstructure optimization of a microalgal biorefinery design with life cycle assessment-based and economic objectives," *Biofuels, Bioproducts and Biorefining*, vol. 17, no. 6, pp. 1515–1527, 2023.
- [7] **L. König-Mattern**, S. Linke, L. Rihko-Struckmann, and K. Sundmacher, "Computer-aided solvent screening for the fractionation of wet microalgae biomass," *Green Chemistry*, 10.1039.D1GC03471E, 2021.
- [8] F. Frenzel, **L. König-Mattern**, V. Stock, L. Voss, M. B. Paul, H. Sieg, A. Braeuning, A. Voigt, and L. Böhmert, "NanoPASS: An easy-to-use user interface for nanoparticle dosimetry with the 3DSDD model," *Particle and Fibre Toxicology*, vol. 17, no. 1, p. 45, 2020.

- [9] L. Böhmert, **L. König**, H. Sieg, D. Lichtenstein, N. Paul, A. Braeuning, A. Voigt, and A. Lampen, "In vitro nanoparticle dosimetry for adherent growing cell monolayers covering bottom and lateral walls," *Particle and Fibre Toxicology*, vol. 15, no. 1, p. 42, 2018.

Monographies

- [10] **L. König-Mattern**, "Systematic Solvent Screening and Design for Biomass Fractionation Processes," Ph.D. dissertation, Otto von Guericke University Magdeburg, Magdeburg, 2024.

Keynote lectures

- [11] **L. König-Mattern**, E. I. Sanchez Medina, A. O. Komarova, S. Linke, L. Rihko-Struckmann, J. Luterbacher, and K. Sundmacher, *Tailored solvent design for lignin dissolution using graph neural networks*, Keynote Lecture, 14th European Congress of Chemical Engineering and 7th European Congress of Applied Biotechnology, Berlin, Germany, 2023.

First-authored conference contributions

- [12] **L. König-Mattern**, *Computational methods for a bio-based, circular future*, Oral Presentation, Halle (Saale), Germany, 2025.
- [13] **L. König-Mattern**, E. I. Sanchez Medina, A. O. Komarova, S. Linke, L. Rihko-Struckmann, J. Luterbacher, and K. Sundmacher, *PSEvolve: A graph-based solvent design framework*, Oral Presentation, ESCAPE34, Florence, Italy, 2024.
- [14] **L. König-Mattern**, E. I. Sanchez Medina, L. Rihko-Struckmann, and K. Sundmacher, *Machine learning-based solvent screening for lignocellulose biorefineries and lignin upgrading*, Poster Presentation, BioSPRINT Spring School: Opportunities and challenges of process intensification application in lignocellulosic biorefineries, Frankfurt am Main, Germany, 2024.
- [15] **L. König-Mattern**, A. O. Komarova, S. Linke, L. Rihko-Struckmann, J. Luterbacher, and K. Sundmacher, *Computational solvent screening for the organosolv fractionation of lignocellulosic biomass*, International Symposium on Green Chemistry, La Rochelle, France, 2022.
- [16] **L. König-Mattern**, S. Linke, L. Rihko-Struckmann, and K. Sundmacher, *Computer-aided solvent selection for the design of sustainable biorefinery processes*, Poster Presentation, SmartProSys Symposium, virtual, 2022.
- [17] **L. König-Mattern**, S. Linke, L. Rihko-Struckmann, and K. Sundmacher, *Lipid extraction in microalgal biorefineries: A COSMO-RS approach*, Oral Presentation, International Conference on Renewable Resources & Biorefineries, Bruges, Belgium, 2022.

- [18] **L. König-Mattern**, S. Linke, L. Rihko-Struckmann, and K. Sundmacher, *Computational solvent screening for efficient microalgal-based biorefineries exemplified by Phaeodactylum tricornutum*, Oral Presentation, International Conference on Algal Biomass, Biofuels and Bioproducts, virtual, 2021.
- [19] **L. König-Mattern**, S. Linke, L. Rihko-Struckmann, and K. Sundmacher, *Computational solvent screening for the fractionation of wet microalgal biomass exemplified by Phaeodactylum tricornutum*, 13th European Congress of Chemical Engineering and 6th European Congress of Applied Biotechnology, virtual, 2021.
- [20] **L. König**, V. Wiedmeyer, A. Voigt, and K. Sundmacher, *Crystallization in standard batch crystallizers and advanced helically coiled flow tubes: Numerical limits of current simulation methods*, Poster Presentation, Young Professionals Conference on Process Engineering, Magdeburg, Germany, 2019.

Related non-peer-reviewed articles

- [21] **L. König-Mattern**, “Die chemische Industrie im Wandel: Mit Algorithmen und Biomasse zu nachhaltigen Prozessen,” Körber Foundation, Deutscher Studienpreis, Essay, 2025.
- [22] **L. König-Mattern**, L. Rihko-Struckmann, and K. Sundmacher, “Green Chemistry from the Computer,” in *Highlights from the Yearbook of the Max-Planck Society 2024*, 2025.
- [23] **L. König-Mattern**, L. Rihko-Struckmann, and K. Sundmacher, “Computer-based Separation Processes for Bio-based Production of Chemicals,” Max Planck Institute for Dynamics of Complex Technical Systems, Research report highlights, 2025.
- [24] **L. König-Mattern**, “Computer-Aided Solvent Selection for Biomass Processing,” in *Biannual Report of the Max Planck Institute for Dynamics of Complex Technical Systems 2021/2022*, 2023.