

Laura König-Mattern

Curriculum Vitae

Education

- 09/2019– **PhD student**, *Max Planck Institute for Dynamics of Complex Technical Systems*, today *Magdeburg*, Process Systems Engineering, supervisor: Prof. Kai Sundmacher
- 10/2022 – **Doctoral exchange**, *École polytechnique fédérale de Lausanne*, Laboratory of Sustainable and Catalytic Processing, Supervisor: Prof. Jeremy Luterbacher
03/2023
- 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

Scholarships and awards

- 10/21 **Award for Science Communication**, *Federal Ministry of Education and Research (BMBF)*, Bioeconomy-Camp, 3,000 €
- 03/21– **Christiane Nüsslein-Volhard scholarship**, *Christiane Nüsslein-Volhard Foundation*,
03/2023 *Bayer*
- 08/2012– **Pupils scholarship**, *Joachim Herz Foundation*, *Robert Bosch Foundation*
08/2013

Publications

- [1] L. König-Mattern, E. Sanchez Medina, A. O. Komarova, S. Linke, L. K. Rihko-Struckmann, J. Luterbacher, and K. Sundmacher, *Machine learning-supported solvent design for lignin-first biorefineries and lignin upgrading*, Apr. 2024. DOI: 10.2139/ssrn.4796907, Under Review
- [2] L. König-Mattern, L. Rihko-Struckmann, and K. Sundmacher, "Computational solvent selection as a step towards efficient biorefining of wet microalgal biomass – a case study for *Phaeodactylum tricornutum*," Under Review, Apr. 2024

- [3] 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, Nov. 2023. DOI: 10.1002/bbb.2540
- [4] 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. 139476, Jan. 2023. DOI: 10.1016/j.cej.2022.139476
- [5] 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. DOI: 10.1039/D1GC03471E
- [6] F. Frenzel *et al.*, "NanoPASS: An easy-to-use user interface for nanoparticle dosimetry with the 3DSDD model," *Particle and Fibre Toxicology*, vol. 17, no. 1, p. 45, Dec. 2020. DOI: 10.1186/s12989-020-00368-w
- [7] 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, Dec. 2018. DOI: 10.1186/s12989-018-0278-9

Keynote lectures

- [8] 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, Sep. 2023

Conference contributions

- [9] 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, Jun. 2024
- [10] 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, Apr. 2024

- [11] L. Rihko-Struckmann, J. Kopton, L. König-Mattern, and K. Sundmacher, *Multi-objective life cycle optimization for sustainable biorefinery design*, Poster Presentation, 11th International Conference on Life Cycle Management, Lille, France, Sep. 2023
- [12] 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, Jun. 2022
- [13] 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, May 2022
- [14] E. Kipper, L. König-Mattern, L. Rihko-Struckmann, and K. Sundmacher, *Optimizing an extraction process for the diatom Phaeodactylum tricornutum using 2-Butanol as solvent*, Poster Presentation, Ladies Night for Women in Engineering Sciences, Magdeburg, Germany, Apr. 2022
- [15] 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, Mar. 2022
- [16] 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, Jun. 2021
- [16] 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, Jun. 2021
- [17] A. Voigt, L. König-Mattern, P. Meier, and K. Sundmacher, *Process optimization of a continuously operated helically coiled flow tube crystallizer*, Poster Presentation, 21st International Symposium on Industrial Crystallization, Potsdam, Germany, Aug. 2021
- [18] C. McHardy, L. König-Mattern, Y. Bai, J. Knappert, C. Rauh, L. Rihko-Struckmann, and K. Sundmacher, "Prozessintegration von Zellaufschluss und Extraktion zur Fraktionierung feuchter Mikroalgen-Biomasse," *Chemie Ingenieur Technik*, vol. 92, no. 9, pp. 1371–1371, Sep. 2020. DOI: 10.1002/cite.202055060

- [19] 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, Mar. 2019

Teaching

- **Process Systems Engineering** („Systemverfahrenstechnik“, Otto von Guericke University Magdeburg): Assistant lecturer, Summer terms 2020-2023
- **Simulation Engineering** („Simulationstechnik“, Otto von Guericke University Magdeburg): Assistant lecturer, Winter terms 2015-2019.

Public outreach

- **Solvent design for biorefineries:** <https://www.youtube.com/watch?v=TMxajGoXtqE>
- **Microalgal biorefineries:** https://www.youtube.com/watch?v=Ax2s-U_QzuY&t=16s