

Dr.-Ing. Sema Karakurt-Fischer

Ambizione Group Leader
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Research interests and competences

Fate and transport of chemical and microbial pollutants in porous media and biofilm based systems, advanced (waste)water treatment, quarternary treatment, managed aquifer recharge, bankfiltration, adsorption, biodegradation, in-situ oxygen delivery, de facto reuse, water reuse, predictive metabolism, microbial community design, function and interactions.

Training and professional experience

Ambizione Group Leader Eawag, Process Engineering Department, CH	since Mar. 2025
Postdoctoral Researcher Eawag, Process Engineering Department, CH Mentors: Dr. Adriano Joss & Prof. Dr. Eberhard Morgenroth	2024 – 2025
Schmidt Science Postdoctoral Fellow Eawag, Environmental Microbiology & Chemistry Departments, CH Mentors: Dr. David R. Johnson & Prof. Dr. Kathrin Fenner	2022 – 2024
Maternity Leave	2021
Doctorate – Dr.-Ing. in Environmental Engineering , <i>summa cum laude</i> TU Munich, Chair of Urban Water Systems Engineering, , DE Mentors: Prof. Dr. Jörg E. Drewes & Dr. Uwe Hübner	Dec. 2020
Master – M.Sc. in Energy & Process Engineering TU Berlin, Faculty of Process Sciences, DE Mentor: Prof. Dr. Martin Jekel	Oct. 2016
Bachelor – B.Sc. in Chemical Engineering Ege University, Faculty of Chemical Engineering, TR Mentor: Prof. Dr. Mustafa Demircioglu	Sept. 2012
Bachelor – Erasmus student Cantabria University, Department of Chemical & Biomolecular Engineering, ES Mentor: Prof. Dr. Inmaculada Ortiz	2011 – 2012

Awards, fundings and honors

Ambizione, CH (950'000 CHF) <i>Career Funding</i>	2024
Schmidt Science Fellows, USA – UK (5'000 USD) <i>Discretionary funding</i>	2023
Schmidt Science Fellows, USA – UK (225'000 USD) <i>Postdoctoral funding for 25 months</i>	2021
Willy-Hager-Prize, Doctoral Degree Award, DE (6'000 €) <i>Acknowledges excellent process engineering solutions for our society in the field of water management</i>	2021

TU Munich Doctoral Degree Award, DE (1'500 €)	2021
Berlin Water Company, Master Thesis Award, DE (1'000 €)	2016
German Academic Scholarship Foundation Fellow, DE <i>Master studies funding for 3 years</i>	2013 – 2016

Community and scientific service

Member of Eawag Diversity Committee	2024 – present
Member of the organization committee 500 Women Scientists Zurich	2023 – 2024
Mentoring women and first-generation students in science	2019 – present
Reviewer for ACS Environmental Science and Technology Water	2022 – present
ACS Environmental Science and Technology	2020 – present
Member of water chemical society, specialized group within GDCh	2019 – present
Chair at BioRemid Conference, Muttentz, Switzerland	2023
Member of IWA water reuse young water professional specialist group	2019 – 2021
Organizer and session chair at 12th IWA Water Reuse Conference, Berlin, Germany	2019
Co-organization of two stakeholder meetings in Berlin, Germany as part of the BMBF - TrinkWave project <i>Focus: The status quo and the future of water management, water reuse</i> <i>Participants: Policy makers, environmental law scholars, interdisciplinary</i> <i>water research scientists, water companies, and DECHEMA</i>	2018 and 2019
Project Europe Initiative Fellow, Berlin, Germany <i>Diverse familial concepts and rights within the European LGBTIQ community</i>	2013 – 2014

Teaching and supervision

Course concept development and teaching

Sanitation in the global south, Master's level, TU Munich	2019 – 2020
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Teaching assistance

Practical course microbiology, Bachelor's level, ETH Zurich	2022
Engineered natural treatment systems, Master's level, TU Munich	2018 – 2019
Hydrochemistry lab, Master's level, TU Munich	2017 – 2019
Managed aquifer recharge workshop, Master's level, TU Munich	2018

PhD supervision: Nicolas Mueller (ongoing, Eawag)

Master thesis supervision: Max Ungert (2025, Eawag), Nicolas Pfeiffer (2023, Eawag), Alexandra Schmuck (2020, TU Munich), Emil Bein (2019, TU Munich), Mario Gramm (2019, TU Munich), Daniela Schweiger (2018, TU Munich), Dennis Goessl (2018, TU Munich), Jad Arbash (2018, TU Munich), Ludwig Schmid (2018, TU Munich), Sofia Ganthaler (2018, co-supervisor, TU Munich), and Joshua Gallegos (2017, co-supervisor, TU Munich)

Study project supervision: Alexandra Schmuck (2020, TU Munich), Gloria Tessaro (2020, TU Munich), Geronimo Etchechury (2019, TU Munich), Sarah Stanoyevic (2019, co-supervisor, TU Munich), and Jinny Chaohensiri (2017, co-supervisor, TU Munich)

Bachelor thesis supervision: Lisa Pöll (2020, co-supervisor, TU Munich), Daniel Nieß (2018, TU Munich) and George Schücking (2018, co-supervisor, TU Munich)

Research assistant supervision: Amr Souf (2019-2020, TU Munich), Anastasia Ruf (2017-2019, TU Munich), Katharina Sendlhofer (2018, co-supervisor, TU Munich), and Eric Ziemensdorf (2017, co-supervisor, TU Munich)

Selected oral presentations

Karakurt-Fischer*, S.; Joss, A.; Greskowiak, J.; Fenner, K.; McArdell, C.; Böhler, M. 2025. Looking Beyond Sorption: Mechanisms Behind Distinct Micropollutant Biodegradation in GAC filters. Jahrestagung GDCh Wasser, Germany.

Karakurt-Fischer*, S.; Fenner, K.; Hafner, J.; McArdell, C.; Böhler, M.; Joss, A. 2024. Elucidating and fostering the role of biotransformation in the abatement of micropollutants. The 19th IWA Leading Edge Technology Conference on Water and Wastewater Technologies, Germany. **Keynote talk.*

Karakurt-Fischer*, S.; Johnson, D.; Fenner, K.; Hafner, J., 2023. The path forward for enhanced pollutant degradation - rational assembly of synthetic bacterial communities. Gordon Research Seminar: Applied and Environmental Microbiology. United States. **Selected talk.*

Karakurt-Fischer*, S., 2022. Development and validation of a novel treatment concept for planned potable reuse based on sequential managed aquifer recharge technology for more sustainable water management. Jahrestagung GDCh Wasser, Germany. **Willy-Hager-Prize talk.*

Karakurt-Fischer*, S.; Robinson, S.; Johnson, D.; Fenner, K., 2022. Identifying potential blockbuster trifluoroacetate precursors. 3rd International Conference on Microbial Ecotoxicology, Ecotoxicomic, France.

Karakurt*, S.; Sanz-Prat, A.; Ergh, M.; Rien, C.; Selinka, H.C.; Hübner, U.; Drewes, J. E., 2019. Coupling high-rate infiltration trench technology with a plug-flow bioreactor (SMARTplus) for indirect potable reuse via groundwater recharge. 12th IWA International Water Reuse Conference, Germany.

Karakurt*, S.; Schmid, L.; Hübner, U.; Drewes, J. E., 2019. The status of de facto potable reuse – A national reconnaissance of Germany. 12th IWA International Water Reuse Conference, Germany.

Selected peer-reviewed publications

Karakurt-Fischer, S.*; Johnson, D.; Fenner, K.; Hafner, J., 2023. Making waves: Enhancing pollutant biodegradation via rational engineering of microbial consortia. Water Research 247:120756. <https://doi.org/10.1016/j.watres.2023.120756>

Karakurt-Fischer, S.; Rien, C.; Sanz-Prat, A.; Szwedzyk, R.; Hübner, U.; Drewes, J. E.; Selinka, H.C.*, 2021. Fate and transport of viruses within a high rate plug-flow biofilter designed for non-membrane based indirect potable reuse applications. Environmental Science & Technology Water 1 (5), 1229–1239. <https://doi.org/10.1021/acsestwater.0c00305>

Karakurt-Fischer, S.; Bein, E.; Drewes, J. E.; Hübner, U.*, 2020. Characterizing a novel in-situ oxygen introduction device for establishing controlled redox zonation within a high infiltration rate biofilter. Water Research 182:116039. <https://doi.org/10.1016/j.watres.2020.116039>

Karakurt-Fischer, S.; Sanz-Prat, A.; Greskowiak, J.; Ergh, M.; Gerdes, H.; Massmann, G.; Ederer, J.; Regnery, J.; Hübner, U.; Drewes, J. E.*, 2020. Developing a novel biofiltration treatment system by coupling high-rate infiltration trench technology with a plug-flow porous-media bioreactor. Science of the Total Environment 722:137890. <https://doi.org/10.1016/j.scitotenv.2020.137890>

Karakurt, S.; Schmid, L.; Hübner, U.; Drewes, J. E.*, 2019. Dynamics of wastewater effluent contributions in streams and impacts on drinking water supply via riverbank filtration in Germany – A national reconnaissance. Environmental Science & Technology 53 (11), 6154-6161. <https://pubs.acs.org/doi/abs/10.1021/acs.est.8b07216>

Hellauer, K.; **Karakurt, S.;** Sperlich, A.; Burke, V.; Massmann, G.; Hübner, U.; Drewes, J. E.*; 2018. Establishing Sequential Managed Aquifer Recharge Technology (SMART) for Enhanced Removal of Trace

Organic Chemicals: Experiences from field studies in Berlin, Germany. Journal of Hydrology 563, 1161–1168. <https://doi.org/10.1016/j.jhydrol.2017.09.044>

→ **Corresponding reports** for German Environmental Agency & European Commission DG Environment:

Drewes, J. E.; **Karakurt, S.**; Schmid, L.; Bachmaier, M.; Hübner, U.; Clausnitzer, V.; Timmermann, R.; Schätzl, P.; McCurdy, S., 2018. Dynamik der Klarwasseranteile in Oberflächengewässern und mögliche Herausforderungen für die Trinkwassergewinnung in Deutschland-UBA Abschlussbericht. <https://www.umweltbundesamt.de/publikationen/dynamik-der-klarwasseranteile-in>

Drewes, J. E.; Hübner, U.; Zhiteneva, V.; **Karakurt, S.**, 2017. Characterization of unplanned water reuse in the EU. Technical University of Munich (Prepared for the European Commission DG Environment). <https://data.europa.eu/doi/10.2779/597701>

References

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