

## Dr.-Ing. Sema Karakurt-Fischer

Postdoctoral researcher

Process Engineering Department, Eawag

ORCID: [0009-0007-9387-1188](https://orcid.org/0009-0007-9387-1188)

Tel: +41 78 236 7667 | Email: [sema.karakurtfischer@eawag.ch](mailto:sema.karakurtfischer@eawag.ch); [sema.karakurt@outlook.de](mailto:sema.karakurt@outlook.de)

Address: Beckhammer 19, 8057, Zürich, Switzerland

### Research interests and competences

Microbial and chemical pollution mitigation, advanced (waste)water treatment, managed aquifer recharge, adsorption, biodegradation, biological process optimization, in-situ oxygen delivery, de facto reuse, water reuse, predictive metabolism, microbial community design, function and interactions.

### Training and professional experience

<b>Postdoctoral Researcher</b> Eawag, CH, Process Engineering Department Mentors: Prof. Dr. Eberhard Morgenroth & Dr. Adriano Joss	2024 – present
<b>Schmidt Science Postdoctoral Fellow</b> Eawag, CH, Environmental Microbiology Department Mentors: Dr. David R. Johnson & Prof. Dr. Kathrin Fenner	2022 – 2023
<b>Maternity Leave</b>	2021
<b>Doctorate – Dr.-Ing. in Environmental Engineering</b> , <i>summa cum laude</i> TU Munich, DE, Chair of Urban Water Systems Engineering Mentors: Prof. Dr. Jörg E. Drewes & Dr. Uwe Hübner	Dec. 2020
<b>Master – M.Sc. in Energy &amp; Process Engineering</b> TU Berlin, DE, Faculty of Process Sciences Mentor: Prof. Dr. Martin Jekel	Oct. 2016
<b>Bachelor – B.Sc. in Chemical Engineering</b> Ege University, TR, Faculty of Chemical Engineering Mentor: Prof. Dr. Mustafa Demircioglu	Sept. 2012
<b>Bachelor – Erasmus student</b> Cantabria University, ES, Department of Chemical & Biomolecular Engineering Mentor: Prof. Dr. Inmaculada Ortiz	2011 – 2012

### Awards, fundings and honors

Schmidt Science Fellows, USA – UK <i>Discretionary funding (5'000 USD)</i>	2023
Schmidt Science Fellows, USA – UK <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 the organization committee 500 Women Scientists Zurich	2023 – present
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, Muttenz, 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	2018 and 2019
<i>Focus: The status quo and the future of water management, water reuse</i>	
<i>Participants: Policy makers, environmental law scholars, interdisciplinary water research scientists, water companies, and DECHEMA</i>	
Project Europe Initiative Fellow, Berlin, Germany	2013 – 2014
<i>Diverse familial concepts and rights within the European LGBTIQ community</i>	

## 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

**Master thesis supervision:** 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.;** 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. 3<sup>rd</sup> 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. 12<sup>th</sup> 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. 12<sup>th</sup> 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.; Szewzyk, 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

**Prof. Dr. Eberhard Morgenroth**

Eawag, Process Engineering Department | +41 58 765 5539 | [eberhard.morgenroth@eawag.ch](mailto:eberhard.morgenroth@eawag.ch)

**Prof. Dr. Kathrin Fenner**

Eawag, Environmental Chemistry Department | +41 58 765 5085 | [kathrin.fenner@eawag.ch](mailto:kathrin.fenner@eawag.ch)

**Dr. David R. Johnson**

Eawag, Environmental Microbiology Department | +41 58 765 5520 | [david.johnson@eawag.ch](mailto:david.johnson@eawag.ch)

**Prof. Dr.-Ing. Jörg E. Drewes**

TU Munich, Chair of Urban Water Systems Engineering | +49 89 289 13713 | [jdrewes@tum.de](mailto:jdrewes@tum.de)

**Prof. Dr.-Ing. Martin Jekel (emeritus)**

TU Berlin, Chair of Water Quality Engineering | +49 30 314 25058/-23339 | [martin.jekel@tu-berlin.de](mailto:martin.jekel@tu-berlin.de)

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