

## Elisabeth Marie-Louise Janssen

Research Group Leader | DEPARTMENT OF ENVIRONMENTAL CHEMISTRY

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### Research Focus: Environmental Chemistry and Effects of Biomolecules

- Natural Toxins, Peptide-based Pharmaceuticals, Extracellular Enzymes
- Environmental fate processes, Photochemistry, Oxidative Transformations
- Mass Spectrometry, Site-Specific Molecular Damage, Functional Changes

### Current appointments

<b>Deputy Head of Department</b> of Environmental Chemistry, Eawag (CH)	<b>04/2023-present</b>
<b>Research Group Leader</b> in Dept. of Environmental Chemistry, Eawag (CH)	<b>07/2016-present</b>
<b>Lecturer</b> in Dept. of Environmental Systems Science, ETH Zürich (CH)	<b>02/2012-present</b>
<b>Editorial Advisory Board Member</b> - Environmental Science & Technology	<b>2021-present</b>
<b>Vice president</b> Swiss Society of Mass Spectrometry (SGMS)	<b>2020-present</b>

### Past appointments

<b>Senior Scientist</b> Environmental Chemistry, ETH Zürich (CH)	2014-2016
<b>Postdoctoral Associate</b> Dept. of Environmental Systems Science, ETH Zürich (CH)	2012-2014
<b>Postdoctoral Associate</b> Dept. of Civil & Env. Engineering, Stanford University (USA, CA) and Natural History Museum London (UK)	2011

### Education

<b>P.D.</b>	<b>Private docent, ETH, Dept. Environmental Systems Sciences</b> Habilitation Thesis: Environmental Chemistry of Biomolecules	08/2022
<b>Ph.D.</b>	<b>Environmental Science and Engineering</b> Dept. of Civil & Environmental Engineering, Stanford University (USA, CA) Thesis Title: <i>Measurement and modeling of polychlorinated biphenyl availability from contaminated sediment and evaluation of ecosystem recovery.</i> Advisor: Prof. R.G. Luthy.	2007-2010
<b>M.Sc.</b>	<b>Environmental Science and Engineering</b> , Stanford University (USA, CA)	2006-2007
<b>B.Sc.</b>	<b>Water Sciences: Chemistry, Analytics, &amp; Microbiology</b> Universität Duisburg-Essen (Germany)	2002-2005

### Project Management and Research Grants

<b>2023-2024</b>	<b>InnoSuisse</b>   Role: Co-PI   Cyanotoxin BioSensor technology development	<b>206'831 CHF</b>
<b>2021-2026</b>	<b>SNF Sinergia</b>   Role: Co-PI   collaboration at Eawag and University Fribourg <i>Why do toxic cyanobacteria bloom? – A gene to ecosystem approach.</i>	<b>1'781'682 CHF</b>
<b>2022-2025</b>	<b>Research Grant</b>   WVZ & Eawag funding   CyanO <sub>3</sub>   Role: PI <i>Cyanopeptides during water treatment with ozone</i>	<b>510'900 CHF</b>
<b>2021-2024</b>	<b>Blue-Green-Biodiversity</b> ETH Board   CyanoLichen   Role: Co-PI with WSL <i>Blue-Green Cyanobacteria: Diversity, Toxins and alpine Tourism</i>	<b>480'000 CHF</b>
<b>2019-2021</b>	<b>Discretionary Fund by Eawag</b>   Natural Toxins   Role: PI <i>Analytical methods and occurrence of cyanopeptides beyond microcystins.</i>	<b>248'000 CHF</b>
<b>2017-2020</b>	<b>Marie Skłodowska-Curie Actions</b>   EU ITN #722493   Role: Co-PI <i>Natural Toxins and Drinking Water Quality: From Source to Tap. (NaToxAq)</i>	<b>325'000 EUR</b>
<b>2015-2019</b>	<b>Swiss National Science Foundation</b>   SNSF #200020-159809 571'739 CHF <i>Environmental photochemistry of amino acid-based biomolecules.</i> Role: Co-applicant with K. McNeill (ETH), advisor for 1 of 2 PhD students	
<b>2015-2019</b>	<b>Swiss National Science Foundation</b>   SNSF #200021-15198 <i>Electron transfer properties of photoexcited natural organic matter.</i> Role: Collaborator with K. McNeill (ETH), advisor for 1 of 2 PhD students	<b>524'692 CHF</b>

### Teaching and Supervision

<b>Ecotoxicology</b>	ETH Zürich (CH), M.Sc., 24hrs, No. 701-1312-00	<b>2013-present</b>
<b>Environmental Chemistry</b>	Univ. Zürich (CH), B.Sc., 2hrs, No CHE 104	2018-2021
<b>Environmental Organic Chemistry</b>	ETH Zürich (CH), M.Sc., 8hrs, No 701-1314-00	2017
<b>Env. Organic Chemistry</b>	ETH Zürich (CH), B.Sc., 18hrs	2014
<b>Chemistry II Tutorial</b>	ETH Zürich (CH), B.Sc., 10hrs	2014

**Doctoral student** (\* indicating students who already graduated successfully)

Juliana Oliveira	<i>Lichenomics – cyanobacterial toxins of lichen in the Alps</i>	<b>2022-2026</b>
Xuejian Wang	<i>Toxins and bioactive metabolites that define CyanoHABs</i>	<b>2022-2026</b>
Antonella Miglione	<i>LCMS suspect screening of Cyanotoxins (visiting from Uni. Naples, IT)</i>	<b>2023</b>
Mariana Torres	<i>Toxicity in Zebrafish of cyano-metabolites (visiting from USP, Brazil)</i>	<b>2021-2023</b>
Regiane S. Natumi*	<i>Production dynamics and fate processes of cyanobacterial peptides</i>	2017-2021
Daria Filatova*	<i>Natural Toxins across climate gradients (visiting student, 15 months)</i>	2019-2021
Christine M. Egli*	<i>Assessing the stability of aquatic extracellular enzymes</i>	2015-2019
Caroline A. Davis*	<i>Photochemical oxidation mechanisms of selected drugs</i>	2015-2019

**Postdoctoral Researcher**

Dr. Oliver Brandenburg	<i>Toxin-sensor based on Aptamer/CRISPRs technology</i>	<b>2022-2024</b>
Dr. Valentin Rougé	<i>CyanO<sub>3</sub>: Advanced treatment of emerging cyanotoxins</i>	<b>2022-2025</b>
Dr. Francesca Pittino	<i>Genetic diversity of cyanobacterial lichen in the Alps</i>	<b>2021-2023</b>
Dr. Chris Sarnowski	<i>Site-Specific damage in oxygensases (co-PI)</i>	2021-2022
Dr. Martin Jones	<i>Analytical methods in cyanobacterial metabolomics</i>	2019-2021

**Scientific Research staff**

Simon Wullschleger	<i>Toxins and bioactive metabolites that define CyanoHABs</i>	<b>2022-2024</b>
Anne Dax	<i>CyanO<sub>3</sub>: Advanced treatment of emerging cyanotoxins</i>	<b>2022-2024</b>

**M.Sc. and B.Sc. thesis student**

Andrea Ingold	M.Sc.	Biotransformation of cyanopeptides	2023
Christoph Dieziger	B.Sc.	Reaction kinetics of cyanopeptides (*publication #28)	2020
Elizabeth Kitching	M.Sc.	Analysis of abiotic transformation of micropollutants (co-advised)	2019
Julian Bosshard	M.Sc.	Cyanobacterial metabolites in Swiss surface waters	2019
Sandro Marcotullio	M.Sc.	Phototransformation of natural toxins (*publication #24)	2019
Simon Wullschleger	M.Sc.	Tracing site-specific modifications in extracellular enzymes	2018
Judith Riedo	M.Sc.	Biodegradability of veterinary antibiotics in surface waters	2017
Anne Dax	M.Sc.	Photochemical Stability of veterinary antibiotics in surface waters	2017
Evelyne Vonwyl	M.Sc.	Production, Identification and Stability of Cyanotoxins	2017
Alexandra Büchler	M.Sc.	Environmental photoinactivation kinetics of extracellular glucosidase	2016
Ladina Birolini	B.Sc.	Photochemical transformation of anti-inflammatory drugs	2016
Evelyn Mühlhofer	B.Sc.	Photochemical decay of veterinary drugs in aquaculture waters	2015
Remo Röthlin	B.Sc.	Photochemical reactivity of Diphenylamines	2015
Joanna Houska	B.Sc.	Envi. photoinactivation kinetics of extracellular aminopeptidase	2015
Emily Marron	M.Sc.	Photochemical degradation of pollutants (*publication #13)	2014
Hannah Bruderer	B.Sc.	Influence of UVB light and humic acids on alk. phosphatase activity	2012
Jaqueline Augusiak	M.Sc.	Polychlorinated Biphenyl accumulation in benthic invertebrates	2008

**Awards and Scholarships**

<b>Young Investigator Recognition by Environmental Science &amp; Technology, Virtual issue</b>	2019
<b>Outstanding Reviewer</b> for Environmental Science: Processes & Impacts	2017
<b>Best Poster Award:</b> Gordon Research Conference: Water	2014
<b>Best Poster Award:</b> SedNet Conference, Hamburg	2009
<b>Fellowship for Graduate Studies,</b> Stanford University	2006-2007
<b>DAAD Scholarship and Henkel (KGaA) Bachelor Award</b> and for B.Sc. Thesis	2005

## Services

Regular Peer-Reviewer: Environmental Science and Technology, Water Research — Environment Internl.  
Doctoral Dissertation Evaluator: Massimo Picardo, University Barcelona, Spain (2021) – Libor Jaša, Masaryk University, Czech Republic (2020) – Yi Cai, Aarhus University, Denmark (2019) ---- Research Proposal Reviewer: Czech Science Foundation (2021); AquaticPollutants Joint Transnational Call Europe (2020/2021); Natural Sciences and Engineering Research Council of Canada (2021/2022)

## List of Publications

*Corresponding authors are indicated with \*. Researchers advised by Elisabeth Janssen are underlined.*

### Peer-reviewed Journal Articles

32. Mariana de Almeida Torres, Martin R. Jones, Colette vom Berg, Ernani Pinto, Elisabeth M.-L. Janssen\*. Lethal and sublethal effects towards zebrafish larvae of microcystins and other cyanopeptides produced by cyanobacteria. *Aquatic Toxicology* (in press), **2023**, <https://doi.org/10.1016/j.aquatox.2023.106689>. OPEN ACCESS.
31. Carolin Seller, Laura Varga, Elizabeth Börgardts, Bernadette Vogler, Elisabeth Janssen, Heinz Singer, Kathrin Fenner\*, Mark Honti. Do biotransformation data from laboratory experiments reflect micropollutant degradation in a large river basin? *Water Research* (235) pp. 119908, **2023**, **open access**. <https://doi.org/10.1016/j.watres.2023.119908>
30. Francesca Pittino, Juliana Oliveira, Mariana DeAlmeida Torres, Sabine Fink, Elisabeth M.L. Janssen, Christoph Scheidegger\*. Cyanobacteria: Extreme Environments and Toxic Metabolites. , *CHIMIA*, 76, pp. 967–969, **2022**, **open access**. <https://doi.org/10.2533/chimia.2022.967>
29. Jones M. R., Janssen E.M.-L.\* Quantification of multi-class cyanopeptides in Swiss lakes with automated extraction, enrichment and analysis by online-SPE HPLC-HRMS/MS. *CHIMIA*, 76, No 1/2, **2022**, **open access**. <https://doi.org/10.2533/chimia.2022.1>
28. Natumi R.S., Dieziger Chr., Janssen E.M.-L.\* Cyanobacterial toxins and cyanopeptide transformation kinetics by singlet oxygen and pH-dependence in sunlit surface waters. *Environmental Science and Technology*, 55(22), pp. 15196–15205, **2021**, **open access**. <https://doi.org/10.1021/acs.est.1c04194>
27. van Santen J. A., Poynto E., Iskakova D., McMann E., Alsup T., Clark T., Fergusson C., Fewer D., Hughes, A., McCadden C., Parra Villalobos J., Soldatou S., Rudolf J, Janssen E.M.-L., Duncan K., Lington R.\* The Natural Products Atlas 2.0: a database of microbially-derived natural products. *Nucleic Acid Research*, gkab941, **2021**, **open access**. <https://doi.org/10.1093/nar/gkab941>
26. Jones M. R., Pinto E., Torres M. A., Dörr F., Mazur-Marzec H., Szubert K., Tartaglione L., Dell'Aversano C., Miles Ch. O., Beach D. G., McCarron P., Sivonen K., Fewer D. P., Jokela J., Janssen E. M.-L.\* CyanoMetDB, a comprehensive database of secondary metabolites from cyanobacteria. *Water Research* (196) 117017. **2021**, **open access**. <https://doi.org/10.1016/j.watres.2021.117017>
25. Filatova D., Jones M. R., Haley J., Núñez O., Farré M., Janssen E.M.-L.\* Cyanobacteria and their secondary metabolites in three freshwater reservoirs in the United Kingdom. *Environmental Sciences Europe*, 33 (29), **2021**, **open access**. <https://doi.org/10.1186/s12302-021-00472-4>
24. Natumi R.S., Marcotullio S., Janssen E.M.-L.\* Phototransformation kinetics of cyanobacterial toxins and secondary metabolites in surface waters. *Environmental Sciences Europe* 33(26), **2021**, **open access**. <https://doi.org/10.1186/s12302-021-00465-3>
23. Egli C.M., Stravs M.A., Janssen E.M.-L.\* Inactivation and site-specific oxidation of aquatic extracellular enzymes by singlet oxygen. *Environmental Science and Technology*, 54(22), pp. 14403-14412, **2020**. <https://doi.org/10.1021/acs.est.0c04696>.
22. Kiefer K., Bader T., Minas N., Sahli E., Wiget R., Janssen E.M.-L., von Gunten U., Hollender J.\* Chlorothalonil Transformation Products in Drinking Water Resources: Widespread and Challenging to abate. *Water Research*, 183, pp. 116066, **2020**. <https://doi.org/10.1016/j.watres.2020.116066>
21. Natumi R.S., Jones M., Janssen E.M.-L.\* Production dynamics of cyanobacterial peptides by *Microcystis aeruginosa* and *Dolichospermum flos-aquae*. *Environmental Science and Technology*, 54(19), pp. 6063-6072, **2020**, **open access**. <https://doi.org/10.1021/acs.est.9b07334>
20. Egli C.M., Natumi R.S., Jones M., Janssen E.M.-L.\* Inhibition of aquatic extracellular enzymes by cyanobacterial metabolites. *CHIMIA* 74(3), pp. 122-128, **2020** **open access**. <https://doi.org/10.2533/chimia.2020.122>

19. Davis C.A. and **Janssen E.M.-L.\*** Environmental Fate Processes of Antimicrobial Peptides Daptomycin, Bacitracin, and Polymyxins. *Environment International*, 134, 2020, **open access**. <https://doi.org/10.1016/j.envint.2019.105271>
18. **Janssen E. M.-L.\***. Cyanobacterial Peptides beyond Microcystins: A review on co-occurrence, toxicity, and challenges for risk assessment. *Water Research* 151, pp. 488-499, 2019 **open access**. [doi.org/10.1016/j.watres.2018.12.048](https://doi.org/10.1016/j.watres.2018.12.048)
17. Davis C.A., McNeill K.\*, **Janssen E.M.-L.\*** Non-singlet oxygen kinetic solvent isotope effect in aquatic photochemistry. *Environmental Science and Technology*, 17, pp. 9908-9916, 2018 **open access**. <https://doi.org/10.1021/acs.est.8b01512>
16. Egli C.M. and **Janssen E.M.-L.\*** Proteomics approach to trace site-specific damage in aquatic extracellular enzymes during photoinactivation. *Environmental Science and Technology*, 52 (14), pp. 7671-7679, 2018, **open access**. <https://doi.org/10.1021/acs.est.7b06439>
15. Schiessl K., **Janssen E.M.-L.**, Kreamer S., McNeill K., Ackermann M.\* Magnitude and Mechanism of Siderophore-Mediated Competition at Low Iron Solubility in the *Pseudomonas aeruginosa* Pyochelin System. *Frontiers of Microbiology*, 2017, **open access**. <https://doi.org/10.3389/fmicb.2017.01964>
14. Davis C.A., Erickson P.R., McNeill K.\*, **Janssen E.M.-L.\*** Environmental Photochemistry of Fenamate NSAIDs and their Radical Intermediates. *Environmental Science: Processes and Impacts*, 24;19(5), pp. 656-665, 2017. DOI: 10.1039/C7EM00079K.
13. **Janssen E.M.-L.**, Marron E., McNeill K.\* Aquatic photochemical kinetics of benzotriazole and structurally related compounds. *Environmental Science: Processes and Impacts*, 17, pp. 939-946, 2015. DOI: 10.1039/C5EM00045A.
12. **Janssen E.M.-L.** and McNeill K.\* Environmental photooxidation of extracellular phosphatase and the effects of dissolved organic matter. *Environmental Science and Technology*, 49 (2), pp. 889-896, 2015. <https://doi.org/10.1021/es504211x>
11. **Janssen E.M.-L.**, Erickson P.R., McNeill K.\* Dual roles of dissolved organic matter as sensitizer and quencher in the photooxidation of tryptophan. *Environmental Science and Technology*, 48(9), pp. 4916-24, 2014. <https://doi.org/10.1021/es500535a>
10. Lundeen R.A., **Janssen E.M.-L.**, Chu C., McNeill K.\* Environmental photochemistry of amino acids, peptides and proteins. *Chimia*, 68 (11), pp. 814-817, 2014 **review article**. <https://doi.org/10.2533/chimia.2014.812>
9. Thomas C., Lampert D., **Janssen E.M.-L.**, Luthy R.G., Reible D.\* Remedy performance monitoring at contaminated sediment sites using profiling solid phase microextraction (SPME) polydimethylsiloxane (PDMS) fibers. *Environmental Science: Processes and Impacts*, 16, pp. 445-452, 2014. DOI: [10.1039/C3EM00695F](https://doi.org/10.1039/C3EM00695F).
8. **Janssen E.M.-L.\***, Beckingham B. Biological response to activated carbon amendments in sediment remediation. *Environmental Science and Technology*, 7(14), pp. 4916-24-2863, 2013, **review article**. <https://doi.org/10.1021/es401142e>
7. **Janssen E.M.-L.**, Choi Y., Luthy R.G.\* Assessment of non-toxic, secondary effects of sorbent amendment to sediment on the deposit-feeding organism *Neanthes arenaceodentata*. *Environmental Science and Technology*, 46 (7), pp. 4134-4141, 2012. <https://doi.org/10.1021/es204066g>
6. **Janssen E.M.-L.**, Thompson J.K., Luoma S.N., Luthy R.G.\* PCB-induced changes of a benthic community and expected ecosystem recovery following in-situ sorbent amendment. *Environmental Toxicology and Chemistry*, 30(8), pp. 1819-26, 2011. <https://doi.org/10.1002/etc.574>
5. Oen A.M.P., **Janssen E.M.-L.**, Cornelissen G., Breedveld G., Eek E., Luthy R.G.\* In-situ measurement of PCB pore water concentration profiles in activated carbon-amended sediment using passive samplers. *Environmental Science and Technology*, 45 (9), pp 4053-4059, 2011. <https://doi.org/10.1021/es200174v>
4. **Janssen E. M.-L.**, Oen A.M.P., Luoma S. N., Luthy R. G.\* Assessment of field-related influences on polychlorinated biphenyl exposures and sorbent amendment using polychaete bioassays and passive sampler measurement. *Environmental Toxicology and Chemistry*, 30 (1), pp. 173-180, 2011. <https://doi.org/10.1021/es901632e>
3. **Janssen E.M.-L.**, Croteau M.-N., Luoma S.N., Luthy R.G.\* Measurement and modeling of polychlorinated biphenyl bioaccumulation from sediment for the marine polychaete *Neanthes*

- arenaceodentata* and response to sorbent amendment. *Environmental Science and Technology*, 44, pp. 2857-2863, **2010**. <https://doi.org/10.1021/es901632e>
2. Rhoads K.R., **Janssen** E.M.-L., Luthy R.G., Criddle C.S.\* Aerobic Biotransformation and Fate of N-Ethyl Perfluorooctane Sulfoneamidoethanol (N-EtFOSE) in Activated Sludge. *Environmental Science and Technology*, 42, pp. 2873–2878, **2008**. <https://doi.org/10.1021/es702866c>
  1. Susanto H., Arafat H., **Janssen** E.M.-L., Ulbricht M.\* Ultrafiltration of polysaccharide-protein mixtures: Elucidation of fouling mechanisms and fouling control by membrane surface modification. *Separation and Purification Technology*, 63 (3), pp. 558-565, **2008**. <https://doi.org/10.1016/j.seppur.2008.06.017>

### Book Chapters

Cho Y.-M., Werner D., **Janssen** E.M.-L., Luthy R.G. In Situ Treatment for Control of Hydrophobic Organic Contaminants Using Sorbent Amendment: Theoretical Assessments. Book Chapter in *“Processes, Assessment and Remediation of Contaminated Sediments”*. SERDP ESTCP Environmental Remediation Technology, Volume 6, pp. 305-323, **2014**. DOI 10.1007/978-1-4614-6726-7.