

Elisabeth Marie-Louise Janssen

Research Group Leader | DEPARTMENT OF ENVIRONMENTAL CHEMISTRY

EAWAG, Swiss Federal Institute of Aquatic Science and Technology | Überlandstrasse 133, 8600 Dübendorf, Switzerland (CH) | T: +41 58 765 54 28 | Email: elisabeth.janssen@eawag.ch

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

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

Past appointments

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

Education

| | | |
|--------------|---|------------|
| P.D. | Private docent, ETH, Dept. Environmental Systems Sciences Habilitation Thesis: Environmental Chemistry of Biomolecules | since 2022 |
| Ph.D. | Environmental Science and Engineering 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 |
| M.Sc. | Environmental Science and Engineering , Stanford University (USA, CA) | 2006-2007 |
| B.Sc. | Water Sciences: Chemistry, Analytics, & Microbiology Universität Duisburg-Essen (Germany) | 2002-2005 |

Project Management and Research Grants

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

Teaching and Supervision

| | | |
|--------------------------------|--|---------------------|
| Advanced Ecotoxicology | ETH Zürich (CH), M.Sc., 24hrs, No. 701-1312-00 | 2013-present |
| Environmental Chemistry | Univ. Zürich (CH), B.Sc., 2hrs, No CHE 104 | 2018-2021 |

| | | |
|--|--|------|
| Environmental Organic Chemistry | ETH Zürich (CH), M.Sc., 8hrs, No 701-1314-00 | 2017 |
| Env. Organic Chemistry | ETH Zürich (CH), B.Sc., 18hrs | 2014 |
| Chemistry II Tutorial | 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> | 2022-2026 |
| Xuejian Wang | <i>Toxins and bioactive metabolites that define CyanoHABs</i> | 2022-2026 |
| Mariana Torres | <i>Toxicity in Zebrafish of cyano-metabolites (visiting student, 12 month)</i> | 2021-2022 |
| 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. Valentin Rougé | <i>CyanO₃: Advanced treatment of emerging cyanotoxins</i> | 2022-2025 |
| Dr. Francesca Pittino | <i>Genetic diversity of cyanobacterial lichen in the Alps</i> | 2021-2023 |
| 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> | 2022-2024 |
| Anne Dax | <i>CyanO₃: Advanced treatment of emerging cyanotoxins</i> | 2022-2024 |

M.Sc. and B.Sc. thesis student

| | | | |
|--------------------|-------|---|------|
| 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 Röhlin | 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

| | |
|--|-----------|
| Young Investigator Recognition by Environmental Science & Technology, Virtual issue | 2019 |
| Outstanding Reviewer for Environmental Science: Processes & Impacts | 2017 |
| Best Poster Award: Gordon Research Conference: Water | 2014 |
| Best Poster Award: SedNet Conference, Hamburg | 2009 |
| Fellowship for Graduate Studies, Stanford University | 2006-2007 |
| DAAD Scholarship and Henkel (KGaA) Bachelor Award 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

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., Alsop T., Clark T., Fergusson C., Fewer D., Hughes, A., McCadden C., Parra Villalobos J., Soldatou S., Rudolf J, Janssen E.M.-L., Duncan K., Linington 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
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](https://doi.org/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](https://doi.org/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.