# Curriculum Vitae Christoph Ort

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## Content page

Academic Degrees ..... 2
Research Interests ..... 2
Professional Positions ..... 2
Competitive Grants, Special Recognitions and Awards ..... 3
Projects ..... 3
**Peer-Reviewed Journal Articles ..... 4**
Book Chapters and Other Publications ..... 6
Conference Contributions ..... 7
Teaching Experience ..... 9
Research Supervision and Academic Guests ..... 9
Advisory Board Member and Reviewing Activities ..... 9
Other Professional Activities ..... 10
Languages and Avocations ..... 12

## Academic Degrees

2006 **Ph.D. in Environmental Engineering**
*ETH, Swiss Federal Institute of Technology, Institute of Environmental Engineering and Eawag, Swiss Federal Institute of Aquatic Science and Technology, Institute of Environmental Engineering*
Thesis Short-term dynamics of micropollutants in sewer systems
Supervisor Prof. Dr Willi Gujer
Co-referees Prof. Dr Walter Giger and Prof. Dr Peter Vanrolleghem

1999 **M.Sc. (Dipl. Ing. ETH, Civil and Rural Engineering)**
*Swiss Federal Institute of Technology Zurich, ETH*
Thesis 1 Influence of spatial rainfall variability on the assessment of sewer systems
Supervisor Prof. Dr Willi Gujer (*Inst. for Hydrodynamics and Water Resources Management)*
Thesis 2 Modern cable car surveying with dynamic GPS measurements
Supervisor Prof. Dr Alessandro Carosio (*Institute of Geodesy and Photogrammetry)*

## Research Interests

Water-related urban pollutant fluxes; Wastewater-based epidemiology; Wet-weather discharges; Source control; Sewer processes (lab and full scale experiments); Modeling; Sampling and monitoring design; Source typing and tracking; Systems analysis (built and natural environment).

## Professional Positions

2016 - present **Group Leader**
*Swiss Federal Institute of Aquatic Science and Technology, Eawag, Switzerland*
*Urban Water Management*

2011 - 2015 **Tenure Track**
*Swiss Federal Institute of Aquatic Science and Technology, Eawag, Switzerland*
*Urban Water Management*

2008 - 2010 **Academic Research Fellow (Adjunct Fellow at AWMC/UQ since 2011, Honorary Fellow since 2013)**
*The University of Queensland, Brisbane, Australia,*
*Advanced Water Management Centre (AWMC)*

2006 - 2008 **Post-Doctoral Researcher**
*Swiss Federal Institute of Aquatic Science and Technology, Eawag, Switzerland*
*Environmental Engineering*

2002 - 2006 **Ph.D. Student and Research Assistant**
*Swiss Federal Institute of Aquatic Science and Technology, Eawag, Switzerland*
*Urban Water Engineering*

2000 - 2002 **Full-time Teaching Assistant, Co-Lecturer and Project-Coordinator**
*Swiss Federal Institute of Technology Zurich, ETH, Switzerland*
*Institute for Hydrodynamics and Water Resources Management*

1999 **Surveying Engineer (9 months)**
*SWR Engineering Ltd. Zurich, Switzerland*

1998 **Consulting (3 months)**
*Norwegian Church Aid, Addis Ababa, Ethiopia.*

1993 - 1994 **Internship (6 months)**
*SKS Engineering Ltd. Zurich*

## Personal Grants, Special Recognitions and Awards

2015 **EMCDDA Scientific Paper Award** in the category Population based and clinical epidemiology for "Challenges of surveying wastewater drug loads in small populations and generalizable aspects on optimizing monitoring design." **Ort C.***, Eppler J.M., Scheidegger A., Rieckermann J., Kinzig M. and Sörgel F. *(2014). Addiction* 109(3), 472-481. Link

2014 **Among best ES&T papers 2013** Third Runner-Up in category *Environmental Technology* for "A model to estimate the population contributing to the wastewater using samples collected on census day." O'Brien J.W., Thai P., **Ort C.**, Scheidegger A., Eaglesham G., Carter S., Lai F.Y. and Mueller J.F. *(2014). Environmental Science & Technology* 48(1), 517-525. Link

2013 **Shortlisted for td-award as one of three finalists** in recognition of an outstanding transdisciplinary project pushing the boundaries of transdisciplinary research. Collaborative efforts summarized in "drugNET-WWA - Illicit drug monitoring network using wastewater analysis". td-net, Swiss Inter- and Transdisciplinarity Day 2013, 21 October 2013, Bern, Switzerland. Link

2008 **Personal fellowship for prospective researcher** Swiss National Science Foundation Grant PBEZP2-122958 for postdoc at the Advanced Water Management Centre, The University of Queensland, Brisbane, Australia (2008-2010).

2005 **Winner of the first Poul Harremoës Award** Best Urban Drainage Paper presented by a young author. 10th International Conference on Urban Drainage, 21-26 August 2005, Copenhagen, Denmark.

## Projects

2016 - present **TransDrugS** "TRANSformation of illicit DRUGs in Sewers". State Secretariat for Education, Research and Innovation SERI, COST ES1307, C15.0092. CI, supervision of a postdoctoral student, CHF 176'000.

2015 - present **Understanding the fate and transport of selected biomarkers in sewers**. ARC Discovery DP150100645. PI, co-supervision of two postdoctoral students, AUD 377'100.

2015 - present **Estimating per capita use and release of chemicals by wastewater analysis**. ARC Linkage LP150100364. PI, AUD 1'029'000.

2014 - present **DIMES II** "Diffuse Micropollutant Emission from Urban Settlements". CI, supervision of a PhD student together with Prof. M. Maurer, CHF 319'400, co-funded by the Federal Office for the Environment FOEN and ETH Zurich.

2014 - present **COST Action SCORE** "Sewage analysis CORe group Europe", European collaboration on Sewage biomarker analysis for community health assessment.

2012 - present **SEWPROF** "A new paradigm in drug use and human health risk assessment: Sewage profiling at the community level". EU FP7, Marie Curie ITN Initial Training Network, Grant agreement no 317205. CI, 3 years, supervision of one PhD student, CHF 293'400.

2011 - 2012 **DIMES** "Diffuse Micropollutant Emission from Urban Settlements". CI, 1.5 years, supervision of a postdoc, CHF 201'000 funded by the Federal Office for the Environment (FOEN).

2011 **Assessing the transformation of cocaine and its metabolite benzoylecgonine in full scale.** American National Science Foundation, Catalyzing New International Collaborations Grant (PI, USD 23,256)

2010 - 2012 **Hospital wastewater.** Funding acquired for project and supervision of postdoctoral researcher (CI, 2 years, AUD 340'000)

2010 **Risk and Health in the context of storm water reuse.** CI, 8 months in the start-up phase of a 3-year project, AUD 657,000, sub-project of "Cities as Water Supply Catchments".

2008 - 2010 **Source control with focus on hospital wastewater and sampling.** CI, duration 3 years within the "Urban Water Security Research Alliance", AUD 300'000.

2006 - 2008 **Micropoll** "Modeling micropollutant mass fluxes from urban drainage in Swiss surface waters". PI, 2.5 years, CHF 300'000 a sub-project of "MicroPoll".

## Peer-Reviewed Journal Articles

*=corresponding author, underline=supervised PhD/Postdoc

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|---|---|
| J.48 | Humphries M.A., Bruno R., Lai F.Y., Thai P.K., Holland B.R., O'Brien J.W., **Ort C.** and Mueller J.F. *(in press)* Evaluation of monitoring schemes for wastewater-based epidemiology to identify drug use trends using cocaine, methamphetamine, MDMA and methadone. *Environmental Science & Technology*. |
| J.47 | Kuroda K., Itten R., Kovalova L., **Ort C.**, Weissbrodt D. and McArdell C.S. *(in press)* Hospital-use pharmaceuticals in Swiss waters modeled at high spatial resolution. *Environmental Science & Technology*. |
| J.46 | Been F., Bijlsma L., Benaglia L., Berset J.-D., Botero-Coy A.M., Castiglioni S., Kraus L., Zobel F., Schaub M.P., Bücheli A., Hernández F., Delémont O., Esseiva P. and **Ort C.*** *(in press)* Assessing geographical differences in illicit drug consumption - A comparison of results from epidemiological and wastewater data in Germany and Switzerland. *Drug and Alcohol Dependence*. |
| J.45 | O'Brien J.W., Thai P., Brandsma S.H., Leonards P.E.G., **Ort C.** and Mueller J.F. *(2015)* Wastewater analysis of census day samples to investigate per capita input of organophosphorus flame retardants and plasticizers into wastewater. *Chemosphere 138, 328-334.*. |
| J.44 | Lai F.Y., Anuj S., Bruno R., Carter S., Gartner, C., Hall W., Kirkbride P., Mueller J.F., O'Brien J., Prichard J., Thai P.K. and **Ort C.*** *(2015)* Systematic and day-to-day effects of chemical-derived population estimates on wastewater-based drug epidemiology. *Environmental Science & Technology* 49 (2), 999-1008. |
| J.43 | Logar, I., Brouwer R., Maurer M. and **Ort C.** *(2014)* Cost-benefit analysis of the Swiss national policy on reducing micropollutants in treated wastewater. *Environmental Science & Technology* 48 (21), 12500-12508. |
| J.42 | **Ort C.*,** Banta-Green C.J., Bijlsma L., Castiglioni S., Emke E., Gartner C., Kasprzyk-Hordern B., Reid M.J., Rieckermann J. and van Nuijs, A.L.N. *(2014)* Sewage-based epidemiology requires a truly transdisciplinary approach. *GAIA* 23 (3), 266-268. |
| J.41 | Van Dyken E., Thai P.K., Lai F.Y., **Ort C.**, Prichard J., Bruno R., Hall W., Kirkbride P. and Mueller J.F. *(2014)* Monitoring substance use in prisons: Assessing the potential value of wastewater analysis. *Science & Justice* 54 (5), 338-345. |
| J.40 | Brewer A.J., Banta-Green C.J., **Ort C.**, Robel A.E. and Field J.A. *(2014)* Wastewater testing compared to random urinalyses for the surveillance of illicit drug use in prisons. *Drug and Alcohol Review* |
| J.39 | Van Dyken E., Lai F.Y., Thai P.K., **Ort C.**, Bruno R., Hall W., Kirkbride P., Mueller J.F. and Prichard J. *(2014)* Challenges and opportunities in using wastewater analysis to measure drug use in a small prison facility. *Drug and Alcohol Review* |
| J.38 | Béen F., Rossi L., **Ort C.**, Delémont O. and Esseiva P. *(2014)* NH4-N as a tool to normalise illicit drug loads measured in wastewater samples. *Environmental Science & Technology* 48(14), 8162–8169. |
| J.37 | **Ort C.***, van Nuijs A.L.N., Berset J.-D., Bijlsma L., Castiglioni S., Covaci A., de Voogt P., Emke E., Fatta-Kassinos D., Griffiths P., Hernández F., González-Mariño I., Grabic R., Kasprzyk-Hordern B., Mastroianni N., Meierjohann A., Nefau T., Östman M., Pico Y., Racamonde I., Reid M., Slobodnik J., Terzic S., Thomaidis N., Thomas K.V. *(2014)* Spatial differences and temporal changes in illicit drug use in Europe quantified by wastewater analysis. *Addiction* 108(9), 1338-1352. |
| J.36 | O'Brien J.W., Thai P., **Ort C.**, Scheidegger A., Eaglesham G., Carter S., Lai F.Y. and Mueller J.F. *(2014)* A model to estimate the population contributing to the wastewater using samples collected on census day. *Environmental Science & Technology* 48(1), 517-525. **Among best ES&T papers 2013** Link |
| J.35 | **Ort C.***, Eppler J.M., Scheidegger A., Rieckermann J., Kinzig M. and Sörgel F. (*2014*) Challenges of surveying wastewater drug loads in small populations and generalizable aspects on optimizing monitoring design. *Addiction* 109(3), 472-481. **EMCDDA Scientific Paper Award 2015** Link |
| J.34 | Lai F.Y., Bruno R., Leung W.H., Thai P.K., **Ort C.**, Carter S., Lam P.K.S. and Mueller J.F. *(2013)* Estimating daily and diurnal variations of illicit drug use in Hong Kong: A pilot study of using wastewater analysis in an Asian metropolitan city. *Forensic Science International* 233(1–3), 126–132. |
| J.33 | Williams M, Kumar A., **Ort C.**, Lawrence M.G., Hambly A., Khan S.J. and Kookana R. *(2013)* The use of multiple tracers for tracking wastewater in freshwater systems. *Environmental Monitoring and Assessment* 185(11), 9321-9332. |
| J.32 | Lai F.Y., Thai P.K., Bruno R., Gartner C., Hall W., Kirkbride P., **Ort C.**, Prichard J., Carter S., O'Brien J.W., Kele B. and Mueller J.F. (*2013*) Using quantitative wastewater analysis to measure daily usage of conventional and emerging illicit drugs at an annual music festival. *Drug and Alcohol Review* 32(6), 594-602. |
| J.31 | Clouzot L., Cloutier F., Goel R., Love N.G., Melcer H., **Ort C.**, Patureau D., Plósz B.G., Pomiès M., Vanrolleghem P.A. and Choubert J.-M. *(2013)* Perspectives on modelling micropollutants in wastewater treatment plants. *Water Science & Technology* 68(2), 448-461. |

J.30 Castiglioni S., Bijlsma L., Covaci A., Emke E., Hernández F., Reid M., **Ort C.**, Thomas K.V., van Nuijs A.L.N., de Voogt P., Zuccato E. *(2013)* Evaluation of uncertainties associated with the determination of community drug consumption through the measurement of sewage biomarkers. *Environmental Science & Technology* 47(3), 1452–1460.

J.29 Lai F.Y., Bruno R., Hall W., Gartner C., **Ort C.**, Kirkbride P., Prichard J., Thai P.K., Carter S. and Mueller J.F. *(2013)* Profiles of illicit drug use during annual key holiday and control periods in Australia: Wastewater analysis in an urban, a semi-rural and a vacation area. *Addiction* 108(3), 556-565.

J.28 Kaegi R., Voegelin R., **Ort C.**, Sinnet B., Thalmann B., Krismer J., Hagendorfer H., Elumelu M. and Mueller E. *(2013)* Fate and Transformation of Silver Nanoparticles in Urban Wastewater Systems. *Water Research* 47(12), 3866-3877.

J.27 Plósz B.G., Benedetti L., Daigger G.T., Langford K.H., Larsen H. F., Monteith H., **Ort C.**, Seth R., Steyer J.-P. and Vanrolleghem P.A. *(2013)* Modelling micropollutant fate in wastewater collection and treatment systems: status and challenges. *Water Science & Technology* 67 (1), 1-15.

J.26 Brewer A.J., **Ort C.**, Banta-Green C.J., Berset J.-D. and Field J.A. *(2012)* Normalized Diurnal and Between-Day Trends in Illicit and Legal Drug Loads that Account for Changes in Population. *Environmental Science & Technology* 46(15), 8305−8314.

J.25 Thomas K.V., Bijlsma L., Castiglioni S., Covaci A., Emke E., Grabic R., Hernández F., Karolak S., Kasprzyk-Hordern B., Lindberg R.H., Lopez de Alba M., Meierjohann A., **Ort C.** , Pico Y., Quintana J.B., Reid M., Rieckermann J., Terzic S., van Nuijs A.L.N. and de Voogt, P. *(2012)* Comparing illicit drug use in 19 European cities through sewage analysis. *Science of the Total Environment* 432, 432–439.

J.24 Hall W., Prichard J., Kirkbride P., Bruno R., Thai P.K., Gartner C., Lai F.Y., **Ort C.** and Mueller J.F. *(2012)* An analysis of ethical issues in using wastewater analysis to monitor illicit drug use. *Addiction* 107(10), 1767–1773.

J.23 Le Corre K.S., **Ort C.***, Kateley D., Allen B., Escher B.E. and Keller J. *(2012)* Consumption-based approach for assessing the contribution of hospitals towards the load of pharmaceutical residues in municipal wastewater. *Environment International* 45(1), 99-111.

J.22 Gottschalk F., **Ort C.**, Scholz R.W. and Nowack B. *(2011)* Engineered nanomaterials in rivers - an exposure assessment at high spatial and temporal resolution for nano-TiO2, nano-ZnO and nano-Ag. *Environmental Pollution* 159(12), 3439-3445.

J.21 Lai F.Y., **Ort C.**, Gartner C., Carter S., Prichard J., Kirkbride P. and Mueller J.F. (*2011*) Refining the estimation of illicit drug consumptions from wastewater analysis: co-analysis of prescription pharmaceuticals and uncertainty assessment. *Water Research* 45(15), 4437-4448.

J.20 Rieckermann J., Anta J., Scheidegger A. and **Ort C**. *(2011)* Assessing wastewater micropollutant loads with Approximate Bayesian Computations. *Environmental Science & Technology* 45(10), 4399–4406.

J.19 Backe W.J., **Ort C.**, Brewer A.J. and Field J.A. (*2011)* Analysis of Androgenic Steroids in Environmental Waters by Large-volume Injection Liquid Chromatography Tandem Mass Spectrometry. *Analytical Chemistry* 83(7), 2622-2630.

J.18 Rossi L., Rumley L., **Ort C.**, Minkkinen P., Barry D.A. and Chèvre N. (*2011)* Sampling-helper: A web-based tool to assess the reliability of sampling strategies in sewers and receiving waters. *Water Science & Technology* 63(12), 2975–2982.

J.17 Zimmermann S. G., Wittenwiler M., Hollender J., Krauss M., **Ort C**., Siegrist H.R. and von Gunten U. *(2011)* Kinetic assessment and modeling of an ozonation step for full-scale municipal wastewater treatment: micropollutant oxidation, by-product formation and disinfection. *Water Research* 45(2), 605-617.

J.16 **Ort C.***, Lawrence M.G., Reungoat J. and Mueller J.F. (*2010*) Sampling for PPCPs in sewers: Comparison of Different Sampling Modes and Optimization Strategies. *Environmental Science & Technology* 44(16), 6289–6296.

J.15 **Ort C.***, Lawrence M.G., Rieckermann J. and Joss A. (*2010*) Monitoring Pharmaceuticals and Personal Care Products (PPCPs) and Illicit Drugs in Wastewater Systems: Are Your Conclusions Valid? A Critical Review. *Environmental Science & Technology* 44(16), 6024–6035.

J.14 **Ort C.***, Lawrence M.G., Reungoat J., Eaglesham G., Carter S. and Keller J. *(2010)* Determining the fraction of pharmaceutical residues in wastewater originating from a hospital. *Water Research* 44(2), 605-615.

J.13 Hollender J., Zimmermann S.G., Koepke S., Krauss M., McArdell C.S., **Ort C.**, Singer H., von Gunten U. and Siegrist H.R. *(2009)* Elimination of organic micropollutants in a municipal wastewater treatment plant upgraded with a full-scale post-ozonation followed by sand filtration. *Environmental Science & Technology* 43(20), 7862-7869.

J.12 Escher B.I., Bramaz N. and **Ort C.** *(2009)* Monitoring the treatment efficiency of a full scale ozonation on a sewage treatment plant with a mode-of-action based test battery. *Journal of Environmental Monitoring* 11(10), 1836-1846. **Featured JEM spotlight article with foreword by Prof. D.L. Sedlak, UC Berkeley. Artwork designed by Ort C. won the competition for the front cover of the 100th anniversary edition.**

J.11 Krauss M., Longrée P., Dorusch F., **Ort C.** and Hollender J. *(2009)* Occurrence and removal of N-nitrosamines in wastewater treatment plants. *Water Research* 43(17), 4381-4391.

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| J.10 | Lawrence M.G. and **Ort C.** *(2009)* Comment on: "Speciation Analysis of Gadolinium Chelates in Hospital Effluents and Wastewater Treatment Plant Sewage by a Novel HILIC/ICP-MS Method". *Environmental Science & Technology* 43(14), 5547-5548. |
| J.9 | Lawrence M.G., **Ort C.** and Keller J. *(2009)* Detection of anthropogenic gadolinium in treated wastewater in South East Queensland, Australia. *Water Research* 43(14), 3534-3540. |
| J.8 | **Ort C.*** and Siegrist H.R. *(2009)* Assessing wastewater dilution in small rivers with high resolution conductivity probes. *Water Science & Technology* 59(8), 1593-1601. |
| J.7 | Weissbrodt D., Kovalova L., Pazhepurackel V., **Ort C.**, Moser R., Hollender J., Siegrist H.R. and McArdell C.S. *(2009)* Mass flows of X-ray Contrast Media and Cytostatics in Hospital Wastewater. *Environmental Science & Technology* 43(13), 4810-4817. |
| J.6 | **Ort C.***, Hollender J., Schaerer M. and Siegrist H.R. *(2009)* Model-based evaluation of reduction strategies for micropollutants from wastewater treatment plants in complex river networks. *Environmental Science* & *Technology* 43(9), 3214-3220. |
| J.5 | **Ort C.*** and Gujer W. *(2008)* Sorption and high dynamics of micropollutants in sewers. *Water Science & Technology* 57(11), 1791-1797. |
| J.4 | Huset C., Chiaia A., Barofsky D., Jonkers N., Kohler H.P., **Ort C.**, Giger W. and Field J. (2008) Occurrence and Mass Flows of Fluorochemicals in the Glatt Valley Watershed, Switzerland. *Environmental Science & Technology* 42(17), 6369-6377. |
| J.3 | **Ort C.*** and Gujer W. (2006) Sampling for representative micropollutant loads in sewer systems. *Water Science & Technology* 54(6-7), 169-176. |
| J.2 | **Ort C.***, Schaffner C., Giger W. and Gujer W. *(2005)* Modeling Stochastic Load Variations in Sewer Systems. *Water Science & Technology* 52(5), 113-122. |
| J.1 | Rieckermann J., Neumann M.B., **Ort C.**, Huisman J.L. and Gujer W. *(2005)* Dispersion Coefficients of Sewers from Tracer Experiments. *Water Science & Technology* 52(5), 123-133. |

## Book Chapters

B1. **Ort C.** (2013) "Quality assurance in water sampling: Wastewater" in Quality assurance and quality control of environmental field sampling. Editors Zhang C., Mueller J.F. and Mortimer M.R., Future Science Group, London.

## Other Publications (selection)

O1. Castiglioni S., Bijlsma L., Covaci A., de Voogt P., Emke E., Harman C, Hernández F., Kasprzyk-Hordern B., **Ort C.**, van Nuijs A.L.N. and Zuccato E. Estimating community drug use through wastewater analysis. EMCDDA Insight Update.

O2. Kasprzyk-Hordern B., Bijlsma L., Castiglioni S., Covaci A., de Voogt P., Emke E., Hernandez F., **Ort C.**, Reid M., van Nuijs A. and Thomas K. (2014). Wastewater-based epidemiology for public health monitoring. Water and Sewerage Journal (4) 25.

O3. Kasprzyk-Hordern B., Bijlsma L., Castiglioni S., Covaci A., de Voogt P., Emke E., Hernández F., **Ort C.**, Reid M., van Nuijs A.L.N. and Thomas K. (2014) Wastewater profiling for monitoring drug use and essessing community health. Environmental Industry Magazine (33) 145-151.

O4. Strähl S., **Ort C.**, Siegrist H.R., Thomann M., Obrecht J. and Kurz E. (2013) Stickstoffelimination in Schweizer ARA - Weitere Entlastung der Oberflächengewässer. Aqua & Gas (5), 74-84.

O5. Staufer P. and **Ort C.** (2012) Diffuse Mikroverunreinigungs-Emissionen aus Siedlungen - Ergebnisse einer Situationsanalyse, Aqua & Gas (11), 42-50.

O6. Prichard J., Lai F.Y., Kirkbride P., Bruno R., **Ort C.**, Carter C., Hall W., Gartner C., Thai P.K. and Mueller J.F. *(2012)* Measuring drug use patterns in Queensland through wastewater analysis. *Trends & Issues in Crime and Criminal Justice* 442, 1-8.

O7. Staufer P. and **Ort C.** (2012) Mikroverunreinigungen aus diffusen Quellen - Faktenblatt „Diffuse Mikroverunreinigungs-Emissionen aus Siedlungen (DIMES)". Report for Swiss Federal Office for the Environment: http://www.eawag.ch/forschung/sww/schwerpunkte/urbane_einzugsgebiete/dimes/DIMES_Faktenblatt.pdf

O8. Le Corre K.S., **Ort C.** and Keller J. (2012) Pharmaceutical Residues in Municipal Wastewater: Are Hospital a Major Point Source? A project investigated the contribution of six hospitals in South-East Queensland. *WATER, the Australian Journal of the Water Association, 39 (4), 84-88.*

O9. Prichard J., **Ort C.**, Bruno R., Gartner C., Kirkbride P., Hall W., Yin Lai F., Carter S., Thai P., Mueller J.F. and Salinas A. (2010) Developing a Method for Site-specific Wastewater Analysis: Implications for Prisons and Other Agencies with an Interest in Illicit Drug Use. *Journal of Law, Information and Science* 20 (2), 15-27.

O10. Lampard J.L., Chapman H., Escher B.I., **Ort C.**, Gernjak W. (2010) Human Health Risk Assessment of stormwater for different end uses, *Literature Review Cities as Water Supply Catchments "Risk and Health"*.

O11. Hoag H. (2010) Sewer studies based on leaky science, *Nature News*. http://dx.doi.org/10.1038/news.2010.387

O12. Mukhopadhyay R. (2010) Better Sampling Needed in Wastewater Monitoring, *Chemical & Engineering News*. http://dx.doi.org/10.1021/CEN072210141352.

O13. Abegglen C., Escher B.I., Hollender J., Siegrist H.R., von Gunten U., Zimmermann S., Häner A. **Ort C.** and Schärer M. (2010) Ozonation of treated wastewater to eliminate organic micropollutants - Full scale pilot study Regensdorf (Switzerland) (in German), *Korrespondenz Abwasser, Abfall*, (57) 2.

O14. Gälli R., Schmid-Kleikemper J., **Ort C.**, Schärer M. (2009) Micropollutants in Surface Waters - Assessment and Reduction of the Pollution from Urban Drainage (in German). BAFU *Umwelt-Wissen*.

O15. Lawrence M., Reungoat J., Farré M.J., **Ort C.**, Gernjak W., Müller J. and Keller J. (2008) Do organic micropollutants pose a real risk in recycled water in South East Queensland? *IWA Water Recycling Specialist Newsletter, and AWMC Website*.

O16. Abegglen C., Escher B.I., Hollender J., Koepke S., **Ort C.**, Peter A., Siegrist H.R., von Gunten U. and Zimmermann S. (2009) Ozonation of Treated Wastewater - Final Report Pilot Study Regensdorf (in German). Eawag/BAFU (http://www.eawag.ch/media/20090616/regensdorf_sb.pdf).

O17. Abegglen C., Rosenstiel R., **Ort C.** and Schaerer M. (2009) Advanced Treatment for the Elimination of Organic Micropollutants in Municipal Wastewater Treatment Plants - Options and Costs (in German). *Korrespondenz Abwasser, Abfall* (56) 6.

O18. **Ort C.**, Siegrist H.R., Hollender J. and Escher B. (2008) Swiss project proves ozonation removes micropollutants. *World Water and Environmental Engineering* 31(5), 23-25.

O19. Stamm C., Alder A.C., Fenner K., Hollender J., Krauss M., McArdell C. S., **Ort C.** and Schneider M. *(2008)* Spatial and temporal patterns of pharmaceuticals in the aquatic environment: a review. *Geography Compass 2/*3, 920-955.

O20. **Ort** C., Siegrist H.R., Hollender J. and Escher B. (2007) Closing gaps in wastewater treatement. *Eawag, Annual report 2007,* 8-12.

O21. **Ort C.**, Siegrist H.R., Hosbach H., Morf L., Scheringer M. and Studer C. (2007) Micropollutants - National Mass Flux Modell (in German). *Gas Wasser Abwasser GWA, (Gas Water Wastewater)* 11/07, 853-859.

O22. Kracht O., **Ort C.,** Rieckermann J. and Gujer W. (2005) Leaky sewers and micropollutants require innovative solutions. *Department of Civil, Environmental and Geomatic Engineering ETH - Swiss Federal Institute of Technology, Zurich, Switzerland. Annual Report 2005.*

O23. **Ort C.** and Gujer W. (2005) Collecting representative Samples in Sewers (in German). *Association of Swiss Wastewater Professionals (VSA),* 562*,* 25-33.

O24. **Ort C.** (2004) Predicting down-the-drain household chemicals with GEONIS in ArcGIS (in German). *GEOCOM-News* 3/04.

O25. **Ort C.**, Schaffner C., Giger W. and Gujer W. (2004) Society's Fingerprint (in German). *Eawag, Annual Report 2004,* 20-21.

## **Conference Contributions** (selection of proceedings, presentations, posters and workshops)

C1. 13th International Conference on Urban Drainage, Sarawak, Malaysia, 7-12 September 2014.
*Presentation: Illicit Drug Use Estimated From Sewage Samples—an Emerging field and a Transdisciplinary Challenge (Ort C., Eppler J.M., Scheidegger A., Rieckermann J., Kinzig M. and Sörgel F.)*
*Presentation: In-sewer Transformation of Illicit Drugs in Wastewater (McCall A.K., Morgenroth E. and Ort C.)*

C2. 2nd GRF One Health Summit, Risks and Oportunities, 17-20 November 2013, Davos, Switzerland.
*Presentation: Sewage Analyses as an Early Detection System for Diseases and Indicator of Various Public Health Aspects with a Focus on Illicit Drugs (Ort C., Banta-Green C., Béen F., Bijlsma L., Castiglioni S., Emke E., Field J., Gartner C., Kasprzyk-Hordern B., Lai F.Y., Prichard J., Reid M., Kinzig M. and van Nuijs A.V.)*

C3. 1st International multidisciplinary conference on detecting illicit drugs in wastewater Testing the waters, 6-8 May 2013, Lisbon, Portugal.
***Invited presentation*** *How does the number of samples influence the estimation of an annual average? (Ort C., Eppler J.M., Scheidegger A. and Rieckermann J.)*
*Presentation: A calibrated model for estimating the number of contributing people to a wastewater treatment plant (O'Brien J.W., Thai P., Ort C., Scheidegger A., Eaglesham G., Carter S., Lai F.Y. and Mueller J.F.)*

C4. EMCDDA Workshop: The determination of illicit druguse in populations through wastewaterbiomarker analysis. 11/12 December 2012, Lisbon Portugal.
***4.1 Invited presentation*** *How accurately can we characterize a sewer system? (C.Ort)*

***4.2 Invited presentation*** *Comparing apples and pears* or bars, boxes and beans: Improving data visualization for 2012 monitoring campaign (C. Ort and van Nuijs A.V.)*

C5. 9th Urban Drainage Modeling IWA conference, 2-6 September 2012, Belgrade, Serbia.
*5.1 Presentation: Dynamic Substance Flow Analysis of Rain Driven Micropollutants (Staufer P. Mutzner L. and Ort C.)*

*5.2 Presentation: Optimize sampling for micropollutants in urban drainage systems with pump stations – a conceptual hydraulic model (Ort C. and Scheidegger A.)*

C6. Aqua Urbanica, IFAT, 8 May 2012, Munich, Germany
*Presentation: Schweizweite Bilanzierung der Einträge von Mikroverunreinigungen aus Mischwasserentlastungen. (Staufer P. and Ort C.)*

C7. 8th IWA International Conference on Water Reclamation & Reuse, 26-29 September 2011, Barcelona, Spain.
*Presentation: Determining key pharmaceuticals in wastewater primarily originating from hospital effluents – a consumption-based approach. (Le Corre K., Salter J., Kateley D., Allen B., Ort C. and Keller J.)*

C8. 12th International Conference on Urban Drainage, 11-16 September 2011, Porto Alegre, Brazil.
*Presentation: Micropollutants in urban drainage systems: inappropriate sampling can flush data quality down the drain. (Ort C., Lawrence M.G., Rieckermann J. and Joss A.)*

C9. APSAD, The Australasian Professional Society on Alcohol and other Drugs, 13-16 November 2011, Hobart, Tasmania, Australia.
*Presentation: Forensic epidemiology: Monitoring illicit drug use through wastewater analysis in South-East Queensland, Australia. (Lai F.Y., Ort C., Gartner C., Carter S., Prichard J., Kirkbride P. and Mueller J.F.)*

C10. 7th IWA Conference on Micropollutants and Ecohazards, 13-15 July 2011, Sydney, Australia
*Presentation: The overlooked importance of sampling: minimising uncertainty, maximising data quality. (Ort C., Lawrence M.G., Rieckermann, J., Joss, A.)*

C11. 7th IWA Conference on Micropollutants and Ecohazards, 13-15 July 2011, Sydney, Australia.
*Presentation: A multi-tracer approach for assessing the influence of wastewater effluents in freshwater systems. (Williams M., Kumar A., Lawrence M., Ort C., Hambly A., Khan S., Kookana R.)*

C12. SETAC Europe, 21st Annual Meeting, 15-19 May 2011, Milano, Italy.
*12.1 Poster: Diurnal Trends of Illicit Drugs and Creatinine (population surrogate) in Municipal Wastewater. (Brewer A.J., Banta-Green C.J., Ort C. and Field J.A.)*

*12.2 Presentation: Estimation of illicit drug consumption via wastewater analysis in South-East Queensland, Australia: uncertainty evaluation. (Lai F.Y., Ort C., Gartner C., Carter S., Prichard J., Kirkbride P. and Mueller J.F.)*

*12.3 Presentation: Use of legal and illegal drugs in communities: Methodological considerations for generating annual estimates of drug excretion based upon municipal wastewater sampling. (Banta-Green C.J., Brewer A.J., Ort C. and Field J.A.)*

*12.4 Presentation: The overlooked importance of sampling to advance wastewater analysis from a promising method to a useful and reliable tool for the estimation of illicit drug abuse (Ort C., Brewer A.J., Banta-Green C.J. and Field J.A.)*

*12. 5Presentation: Engineered nanomaterials in rivers – exposure scenarios for Switzerland at high spatial resolution for nano-TiO2, nano-ZnO and nano-Ag. (Gottschalk F., Ort C., Scholz R., Nowack B.)*

C13. OzWater`10, March 8-10 2010, Brisbane Australia.
*Presentation: Emerging contaminants: Monitoring dynamic (waste)water systems.*

C14. 7th IWA World Congress on Water Reclamation and Reuse, September 21-25 2009, Brisbane, Australia.
*Presentation: Are hospitals a major point source of pharmaceuticals in wastewater?*

C15. 10th IWA Conference on Instrumentation, Control and Automation ICA, June 14-17 2009, Cairns Australia
***Poster (awarded)** Collecting representative samples from pressurized sewer systems subject to high flow fluctuation.*

C16. 6th IWA/GRA Micropol & Ecohazard June 8-10 2009, San Francisco, USA *Presentation: Identifying persistent tracers of wastewater – pharmaceuticals in Swiss rivers*

C17. 5th IWA Leading-Edge Conference on Water and Wastewater Technologies LET, 1-4 June 2008 Zurich, Switzerland.
*Presentation: Modeling of Micropollutants & Strategies for their Reduction in Complex River Networks*.

C18. 6th International Conference on Pharmaceuticals and Endocrine Disrupting Chemicals: October 22/23 2007, Costa Mesa Ca, USA.
***Keynote** Strategies for Micropollutant Reduction in Large River Networks*

C19. CASIAU, Complexing Agents between Science, Industry and Users: March 13 2007, Mte. Verità, Switzerland.
***Invited presentation** Benzotriazole Massflows - from Dishwasher Detergents to Surface Waters.*

C20. IWA Young Researchers Conference on Emerging Pollutants and Emerging Technologies: October 27/28 2005, Aachen, Germany.
*Poster: Society's Fingerprint in Wastewater.*

C21. Center for Xenobiotic and Environmental Risk Research, 5th Annual meeting: December 2004, Zurich, Switzerland.
*Presentation: Forecasting short-term fluctuations of specific substances in sewer systems an essential prerequisite for taking representative samples.*

C22. Novatech, Sustainable Techniques and Strategies in Urban Water Management: June 2004, Lyon, France.
*Co-Author for presented paper: Legal Criteria, Variability and Uncertainty in the Design of CSO Detention.*

## Teaching Experience

2006 - 2007 Pharmaceuticals and Environment (ETH course number 535-0020-00L), 2006-2007, Swiss Federal Institute of Technology Zurich, ETH, *Co-Lecturer*

2005 Minimizing Sampling and Online Measurement Uncertainty (course for scientists and practitioners), Swiss Federal Institute of Aquatic Science and Technology, Eawag, *Organizer and Lecturer*

2000 - 2003 Urban drainage (Siedlungsentwässerung, ETH course number 102-0236-00), 2000-2003, Swiss Federal Institute of Technology Zurich, ETH, *Co-Lecturer*

## Research Supervision and *Academic Guests*

2015 *Ignasi Aymerich* Integrated modeling of pharmaceuticals. Catalan Institute for Water Research (ICRA).

*Pedram Ramin* Transformation of illicit drugs in sewers. Danish Technical University.

*Dr. Lubertus Bijlsma* (University Jaume I, Castellon, Spain), *Dr. Alexander van Nuijs* (University of Antwerp, Belgium). Investigating the ratio of cocaine to benzoylecgonine in wastewater.

2014 - present Mutzner, L. Diffuse Micropollutant Emissions from Urban Areas – combined and separate sewer overflows.

Fuoli, M. Facilitating plausibility checks and visual data presentation for meta information collected during EU drug monitoring. Occupational trainee from ZHAW.

Novic, A. Design of monitoring in rivers. PhD student, The University of Queensland.

2013 - present *O'Brien, J.* Evaluation of micropollutant loads in wastewater. PhD student, The University of Queensland.

McCall, A.K. Transformation of illicit drugs in sewers. *Ph.D. thesis (supervisor, advisor: Prof. E. Morgenroth (ETH/Eawag), co-supervisor: Dr. K.V. Thomas (Norwegian Institute for Water Research).*

2012 Sägesser D. Transformation of micropollutants in sewers - Development of a hydraulic model as basis for simulation studies (in German). *Bachelor thesis, Swiss Federal Institute of Technology Zurich, ETH.*

2011 Eppler J.M. Cocaine in the wastewater of Heroldsberg, Germany, *4$^{th}$ semester project work, D-UWIS, Swiss Federal Institute of Technology Zurich, ETH.*

Scrugli D. and Truong S. Effect of pumps on sampling error for cocaine loads in sewers, *5$^{th}$ semester project work, ZHAW School of engineering.*

2010 - 2013 Brewer A.J., Use of Human Urinary Biomarkers and applicability to Wastewater Epidemiology, *Ph.D. thesis (co-supervisor), Oregon State University,* main supervisor is Prof. Dr J.A. Field.

2010 - 2014 *Foon Yin Lai*, Occurrence and fate of illicit drugs in sewage treatment works. *Ph.D. thesis (co-supervisor), The University of Queensland (EnTox and AWMC*, main supervisor Prof. Dr J.F. Mueller).

2008 Lombard L. Overview on sources and inputs of micropollutants in water (in German). *Diploma thesis (Bachelor level), Swiss Federal Institute of Technology Zurich, ETH.*

2005 Twerenbold S. Dynamics of Ammonium in Sewers (in German). *Diploma thesis (Master level), Swiss Federal Institute of Technology Zurich, ETH.*

## Advisory Board Member and Reviewing Activities

2015 Snip, L., member of PhD committee (external expert, final exam), Danish Technical University, CAPEC-PROCESS, Lyngby/Copenhagen 8 June 2015.

2012 Béen F., *Ph.D. thesis (member of the jury, first year review), Institut de Police Scientifique, Ecole des Sciences Criminelles, Université de Lausanne.*

2011 - present **Co-founder and member of SCORE**: Sewage Analysis CORe group Europe. Strategic planning, coordination and execution of trans-national and -disciplinary research in the field of drug epidemiology through sewage analyses.

2011 **Advisory board member** for the European project ScorePP (Source Control Options for Reducing Emissions of Priority Pollutants", contract no. 037036).

2006 - present **Reviewer** for Applied Microbiology and Biotechnology, Chemosphere, Drug and Alcohol Dependence, Drug and Alcohol Review, Environmental Science and Technology, Environmental Health Perspective, Forensic Science International, Tobacco Control, Water Research, Water Science and Technology and Science of the Total Environment.

## Other Professional Activities (selection)

2016 ***Invited speaker*** „Use of Waste-Water Analysis to understand Drug Markets". UNODC/FDFA, 59th Session of the Commission on Narcotic Drugs. 15 March 2016, Vienna, Austria.

2015 ***Invited speaker*** "Möglichkeiten und Grenzen von abwasserbasierter Epidemiologie" Wissenschaftskolloquium, Institut für Sucht und Gesundheitsforschung. 7 December 2015, Zurich, Switzerland.

***Chair*** of Testing the Waters 2015, the second conference on wastewater-based epidemiology. 11-15 October 2015, Monte Verità, Ascona, Switzerland.

***Consulting*** Federal Ministry of Health (BMG) on the implementation of wasteswater-based epidemiology for Germany.

2014 ***Invited speaker*** "Stofftransport von Pharmaka – Bedeutung in der Kanalisation" Bochumer Workshop Siedlungswasserwirtschaft "Mikroschadstoffe und Krankheitserreger aus Abwasser entfernen" 18 September 2014 Bochum, Deutschland.

*Lecture* "Estimating Population Size in the context of sewage-based epidemiology" COST Action ES1307 training course, 17 September 2014, Milano, Italy.

***Swiss television*** broadcast on the interpretation of wastewater data related to the 2014 Street Parade in Zurich.

***Invited speaker*** "Wastewater-based epidemiology: Challenges and opportunities in an emerging, transdisciplinary field" Addiction Suisse, 23 May 2014, Lausanne Switzerland.

***Invited speaker*** *"Wastewater-based epidemiology - Challenges and opportunities in an emerging, transdisciplinary field". Universität Zürich, Institut für Rechtsmedizin, 17 April 2014, Zurich, Switzerland.*

***Invited speaker*** "Sampling strategies for environmental monitoring", Department of Geography, University of Zurich, 25 February 2014, Zurich, Switzerland.

*Co-organizer* WWTmod YWP workshop "Overcoming Barriers to Innovation in Process Modelling" C. Ort, H. Hauduc, K.V. Gernaey, P.A. Vanrolleghem, 30 March - 2 April 2014, Spa Belgium.

***External expert*** for Swiss Federal Office of Public Health "Suitability of different methods to assess illicit drug consumption"

***External expert*** for Safer Nightlife Switzerland "Data triangulation"

2013 *Co-organizer and presenter* Eawag-PEAK course "Diffuse Belastung von Oberflächengewässern mit Mikroverunreinigungen", 30/31 October 2013, Dübendorf, Switzerland.

*Contributing to framework* "Kontrolle Reinigungsleistung und Betriebsüberwachung" der Plattform „Verfahrenstechnik Mikroverunreinigungen", Association of Swiss Wastewater Professionals (VSA).

***Consulting*** Interface Politikstudien Forschung Beratung (Luzern) to compile a factsheet on wastewater analysis in the context of „Möglichkeiten und Grenzen einer evidenzbasierten Beurteilung des illegalen Drogenkonsums in der Schweiz" – a study by the Swiss Federal Office for Public Health (BAG)

***Invited speaker*** for Environmental Engineering Seminar Series at EPFL, "Learning from sewers - informational content of wastewater, methodological challenges and solutions Sewers are an example for NID", 28 May 2013, Lausanne, Switzerland.

***Member of the scientific and organizing committee*** of the 8th IWA Micropol and Ecohazard conference in Zurich, Switzerland, 16-20 June 2013.

***Organizer of expert workshop*** "Should Swiss Wastewater be analysed for drugs?" Participation only on invitation. 16 Participants from the following institutions: Swiss Federal Office for Public Health (BAG), Swiss Federal Police (fedpol), Eidgenössische Kommision für Drogenfragen, Université Lausanne (Insitute de Police Scientifique), Streetwork Zurich, Forensic Institute Zurich, Eawag (Envi-

ronmental Toxicology, Urban Water Management and Directorate) and University of Zurich (Institute of Forensic Medicine and Research Institute for Public Health and Addiction). 26 March 2013, Eawag, Dubendorf, Switzerland.

2012 ***Invited speaker*** "The determination of illicit drug consumption in populations through wastewater biomarker analysis", Workshop European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), Lisbon, 11/12 December 2012.

***Invited speaker*** PEAK course "Measuring - controlling - monitoring" Association of Swiss Wastewater Professionals (VSA), Emmeten, 31 October - 2 November 2012 and 5-7 December 2012.

*Co-organizer* "Quantification of sources and dynamics of micropollutants in urban sewer systems". Workshop 9th Urban Drainage Modeling IWA conference, 2-6 September 2012, Belgrade, Serbia.

Compiling sampling essentials to assist editors and reviewers of the journal Environmental Science & Technology in efficiently assessing submitted manuscripts related to wastewater studies (full scale sewer and influents of wastewater treatment plants), (invited).

***Invited speaker*** NORMAN network workshop on "Sampling and Analysis of Emerging Contaminants in the Aquatic Environment: Current and future challenges", Oslo, 1/2 March 2012.

Micropollutant modeling workshop at the 3rd IWA/WEF Wastewater Treatment Modeling Seminar WWTmod. Co-organizer. Quebec, Canada, February 2012.

2011 ***Invited speaker*** 20. Chemisches Kolloquium "Schadstoffdynamik in Flussgebieten - Ursachen, Wirkungen und Konsequenzen stofflicher Veränderungen in Raum und Zeit", Bundesanstalt für Gewässerkunde (BfG), Koblenz, Germany, 19/20 September 2011.

***Invited speaker*** Workshop on wastewater analysis as a tool for forensic applications UNIL/EPFL forensics, Lausanne, 10 August 2011.

***Consulting*** for micropollutant mass flux model to assess current situation and suggest a strategy to upgrade wastewater treatment plants. In collaboration with Ecotox Centre for the states of Baden-Württemberg (Germany), Northrhein-Westfalia (Germany) and the international organizations CIPAIS (Lago di Lugano) and CIPEL (Lac Léman).

***Invited speaker*** "Wastewater Analysis - a potential tool for monitoring illicit drugs", Workshop European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), Lisbon, 28 January 2011.

2010 *Co-organizer* Workshop at the 2nd IWA/WEF Wastewater Treatment Modeling Seminar WWTmod. Quebec, Canada, March 2010.

2009 *Convenor* of AWMC Friday Seminars with almost 100 internal and external speakers per year (2009-2010).

***Member of the scientific committee*** for the 7th IWA World Congress on Water Reclamation and Reuse. Brisbane, Australia, May to September 2009.

2008 ***Invited speaker*** "Micropollutant Mass Fluxes in Complex River Systems". Ruhrverband. Essen, Germany, 11 August 2008.

2007 *Reporting* to the Swiss Federal Office for the Environment as project leader of "Modeling Study Switzerland" within the large project "MicroPol" (2007-2008).

*Media event* "First full scale ozonation on communal sewage treatment plant to remove micropollutants". Co-organizer. Regensdorf, 9 July 2007.

***Invited speaker*** "Micropolluants - Vue d'ensemble dans les cours d'eau en Suisse par l'analyse SIG". Association romande pour la protection des eaux et de l'air (ARPEA). Fribourg, 13 June 2007.

***Invited speaker*** "Micropollutants - Current status of Swiss surface waters" and interview with national TV SF DRS. Annual meeting Association of Swiss Wastewater Professionals (VSA). Zurich, 7 April 2007.

2006 *Convenor* of weekly internal seminars for the Departments of Environmental and Urban Water Engineering. Eawag (2006 – 2008).

***Invited speaker*** "Strategy MicroPol". Fachorganisation für Entsorgung und Strassenunterhalt FES. Bern, October 20, 2006.

***Invited speaker*** "PPCPs as Down-the-Drain Chemicals in the Aquatic Environment". Annual meeting, Swiss Society of Cosmetic Chemists. Olten, 19 October 2006.

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| | *Co-Organizer* Meeting with leading national and international detergent manufacturers (representatives of R&D and environmental departments). Eawag, 7 September 2006. |
| | *Co-Organizer* Information exchange "Benzotriazole" with German Cosmetic, Toiletry, Perfumery and Detergent Association (IKW). Eawag, 13 July 2006. |
| 2005 | *Co-organizer* International information exchange "Uncertainty in Urban Drainage Modeling". Biomath, Gent University, November 2005. |
| | *Co-Organizer* 2nd Management Committee meeting in COST Action 636, "Xenobiotics in the Urban Water Cycle". Lyngby, 6-8 September 2005. |
| | *Co-Organizer* Uncertainty workshop. Eawag, 23-25 February 2005. |
| 2003 | *Co-organizer* International information exchange "Uncertainty in Urban Drainage Modeling". Presenting "Uncertainty and Variability of Combined Sewer Overflows". TU Dresden, Dresden, 17/18 March 2003. |

## Languages

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| **German** | Native language |
| **English** | Excellent written and oral skills (Grade B in Cambridge Certificate of Proficiency, Vancouver, 2000) |
| **French** | Advanced skills (orally fluent) |

## Avocations

**Mountain sports** also as an active guide for a division of the Swiss Alpine Club 2001-2008

**Photography** documentary and landscape, private and for outdoor magazines

**Aviation** private license for small aircrafts 1995-1999

**Youth work** YMCA, as member, group leader and organizer of various camps from 1982-1999