



Kris Villez

Curriculum Vitae

Current position

2017–present **Group Leader in Sensors and Automation (Tenured)**, *Eawag (Swiss Federal Institute for Aquatic Science and Technology, ETH domain)*, Dübendorf, Switzerland

Previous positions

2018–2019 **Lecturer**, *ETH Zürich*, Zürich, Switzerland

2012–2017 **Group Leader in Sensors and Automation (Tenure-track)**, *Eawag*, Dübendorf, Switzerland

2008–2012 **Postdoctoral Research Associate**, *Purdue University*, West Lafayette, IN, USA

2008–2008 **Postdoctoral Trainee**, *Université Laval*, Québec, QC, Canada

Education

2007 **Ph.D. in Applied Biological Sciences**, *Ghent University*, Ghent, Belgium

Multivariate and qualitative data analysis for monitoring, diagnosis and control of sequencing batch reactors for wastewater treatment

2003 **M.Sc. in Bio-Engineering**, *Ghent University*, Ghent, Belgium

Simulation and experimental study of the SHARON process for coupling with an Anammox unit

2000 **B.Sc. in Bio-Engineering**, *Ghent University*, Ghent, Belgium

Awards and recognition

2019 **Plenary Talk**, *10th IWA Symposium on Systems Analysis and Integrated Assessment (Watermatex2019) – Engineering during times of creative chaos: Avoiding pitfalls for machine learning in the water sector*

2016 **IWA Fellow**, *International Water Association*, Nominated for the period 2016–2020

2016 **Conference Chair**, *Elected to organize the 2nd IWA/WEF Water Resource Recovery Modelling Seminar (WRRmod2020)*

2015 **Program Award**, *Best oral presentation at the 9th IWA Symposium on Systems Analysis and Integrated Assessment (Watermatex2015)*

2013 **Canton Zug's Innovation Award**, *Awarded to Rittmeyer AG (Baar, Switzerland) for the development of the Ritune software in a collaborative project with Eawag*

2013 **Poster Award (runner-up)**, *at the 11th IWA conference on Instrumentation, Control and Automation (ICA2013)*

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Awarded projects

- 2019–2022 **MetaCO**, *Task group on meta-data collection and organization in wastewater treatment and wastewater resource recovery systems*
Coordinator; Funding: International Water Association, The Netherlands; 7'500 CHF
- 2018–2020 **ADASen**, *Anomaly detection for adaptive sensor management*
Principal Investigator; Funding: Eawag, Switzerland; 276'000 CHF
- 2018–2019 **OptProRheno2018**, *Optimal operation of the Basel drainage network and wastewater treatment plant*
Co-Principal Investigator; Funding: ProRheno, Switzerland; 60'000 CHF
- 2018–2018 **SoDAN extension**, *Soft-sensing, diagnosis, and automation for nutrient recovery*
Principal Investigator; Funding: Swiss National Science Foundation (SNSF), Switzerland; 66'000 CHF
- 2014–2017 **SoDAN**, *Soft-sensing, diagnosis, and automation for nutrient recovery*
Principal Investigator; Funding: Swiss National Science Foundation (SNSF), Switzerland; 220'000 CHF
- 2014–2017 **DyRPA**, *Dynamic control and process monitoring in wastewater treatment*
Co-Principal Investigator; Funding: Verband Schweizer Abwasser- und Gewässerschutzfachleute (VSA, Swiss Water Association), Switzerland; 6'000 CHF
- 2015–2016 **EMISSUN**, *Efficient model identification for soft-sensing of urine nitrification*
Principal Investigator; Funding: Eawag, Switzerland; 120'000 CHF
- 2015–2016 **VUNA 2.0**, *VUNA reactor 2.0: Technical improvements for commercialization*
Co-Principal Investigator; Funding: Eawag, Switzerland; 196'000 CHF
- 2014–2015 **Chemometrics for wastewater treatment**, *Industrial application study*
Principal Investigator; Funding: S::CAN Messtechnik GmbH, Austria; 5'500 CHF
- 2013–2015 **MAC-Nut**, *Model-based adaptive control for nutrient conversion*
Principal Investigator; Funding: Eawag, Switzerland; 110'000 CHF
- 2012–2014 **InnoWWTP**, *Innovative methods for wastewater treatment plant optimization*
Principal Investigator; Funding: InnoSuisse (Swiss Commission for Technology and Innovation), Switzerland; 182'500 CHF
- 2011–2012 **ReMAC**, *Development of resilient monitoring and control systems*
Proposal Author; Funding: Idaho National Laboratory (INL), USA; 90'000 CHF
- 2003–2007 **Ph.D. project**, *Computer integrated process management for sustainable biological wastewater treatment systems*
Proposal Author; Funding: Institute for Encouragement of Innovation by means of Science and Technology in Flanders (IWT, Belgium); 75'000 CHF

Supervision (2012–present)

- Postdoc **Stefania Russo**, *PI, 2018–present*
Alma Masic, *PI, 2013–2016*
- Ph.D. **Christian Thürlimann**, *PI, 2015–2019*
Mariane Schneider, *co-PI, 2016–present*
Lisa Mears, *research visit host, 2014*

- M.Sc. **Dissertations (PI): 6**, *Xierzhati Aniwa, Annina Brupbacher, Elisabeth Grimon, Wenjin Hao, Angelika Hess, Guangyu Li, Ana T. L. Santos, Benjamin Stucki, Urs Schönenberger, Christian Züger*
- Dissertations (co-PI): 5**, *Viviane Furrer, Gabriel Kämpf, Simon Kramer, Arnold Mauchle, Rasmus Noerregård, Eleonora Sprenger*
- Projects: 4**, *Katja Briner, Anna Kalinina, Stephanie Wietlisbach, Qie Wu*
- B.Sc. **Projects: 4**, *Dominik Boller, Florian Howald, Simon Kramer, Martin Vogt*
- Assistant **Simon Kramer, PI, 2018**
- Kito Ohmura, PI, 2017–2018**
- Christian Thürlimann, PI, 2012–2014**

Teaching (2012-present)

University lectures

- 2018 **Systems analysis and mathematical modeling in urban water management**, Lectures: 14h, People: 40, ETHZ, Switzerland
- 2017 **Workshop principal component analysis**, Lectures: 2h, People: 20, ICRA: Catalan Institute for Water Research, Spain – European Industrial Doctorate (EID) project Treatrec – Advanced Technology Course 4
- 2013 **Selected topics in data filtering and gross error detection**, Lectures: 2h, People: 30, Ghent University, Belgium – International Training Network (ITN) project SANITAS – Training week 1
- 2013 **Selected topics in data mining**, Lectures: 4h, People: 30, University of Girona, Spain – Crash course in multivariate data analysis, artificial intelligence methods, and machine learning

In-house workshops

- 2019 **Anomaly detection in sensor networks workshop**, Lectures: 5h, People: 15
- 2019 **Workshop regression with high-dimensional inputs**, Lectures: 8h, People: 20
- 2018 **Workshop process data analytics**, Lectures: 6h, People: 15
- 2017 **Workshop principal component analysis**, Lectures: 8h, People: 12
- 2016 **Workshop principal component analysis**, Lectures: 4h, People: 8

Received training

- 2018 **Project management, Methodology & Tools**, BWI Management
- Workshop for PhD supervisors, My role and responsibilities - giving feedback and addressing dysfunctions**, Toivanen
- PLC programming**, WAGO
- 2016 **Leadership workshop, Team management**, Eawag, Switzerland
- 2010 **Preparing Future Faculty, Developing skills for a successful academic career**, Purdue University, USA

- 2010 **College teaching workshops II**, *Expanding and application of educational skills*, Purdue University, USA
- 2009 **College teaching workshops I**, *Adoption and application of basic teaching skills*, Purdue University, USA

Leadership & community

PhD committee member

- 2019 **Mariane Schneider**, *Quantifying the performance of on-site wastewater treatment systems with soft-sensing*, PhD thesis, ETH Zürich, Department of Civil, Environmental and Geomatic Engineering, Switzerland
- 2019 **Christian Thürlimann**, *Soft-sensing, automation, and diagnosis for nitrification*, PhD thesis, ETH Zürich, Department of Civil, Environmental and Geomatic Engineering, Switzerland
- 2017 **Oscar Samuelsson**, *Fault detection in water resource recovery facilities*, Licentiate thesis, Uppsala University, Department of Environmental Engineering, Denmark
- 2015 **Borja Valverde Pérez**, *Wastewater resource recovery via the enhanced biological phosphorus removal and recovery (EBP2R) process coupled with green microalgae cultivation*, PhD thesis, Technical University of Denmark (DTU), Department of Environmental Engineering, Denmark
- 2012 **Isaac Monroy Chora**, *An investigation on automatic systems for fault diagnosis in chemical processes*, PhD thesis, Polytechnic University of Catalonia (UPC), Barcelona School of Industrial Engineering (ETSEIB), Spain

Management

- 2016–present **International Water Association (IWA)**, *IWA Fellow*
- 2017–present **International Water Association (IWA) – Instrumentation Control and Automation Specialist Group (ICA)**, *Vice-Chair*
- 2014–present **Verband Schweizer Abwasser- und Gewässerschutzfachleute (VSA, Swiss Water Association) – Ordner Messtechnik in der Siedlungsentwässerung (Handbook instrumentation in urban water drainage)**, *Committee member, Contributor*
- 2015–2018 **International Water Association (IWA) – Modelling and Integrated Assessment Specialist Group (MIA)**, *Liaison Officer*
- 2013–2017 **International Water Association (IWA) – Instrumentation Control and Automation Specialist Group (ICA)**, *Liaison Officer*
- 2010–2011 **National Postdoctoral Association (NPA) – Resource Development Committee**, *Committee member*
- 2009–2010 **Purdue Postdoctoral Association (PPDA)**, *Founder, Co-President*
- 2000–2003 **Student Home Boudewijn – Student Council**, *Member*
- 1996–1998 **St.-Jozefcollege (high school) – Environmental club De Mieren (The Ants)**, *Co-president*

Membership

- IWA **International Water Association**, 2004–2009, 2012–present
- AIChE **American Institute for Chemical Engineering**, 2009–2012
- iEMSs **International Environmental Modelling & Software Society**, 2006–present
- Organization of international conferences, symposia, and workshops**
- Chair **WRRmod2020**, 7th IWA/WEF Water Resource Recovery Modelling Seminar
- Scientific committee **Watermatex2019**, 10th IWA Symposium on Modelling and Integrated Assessment
- WRRmod2018**, 1st IWA/WEF Wastewater Resource Recovery Modelling Seminar
- ICA2017**, 12th IWA conference on Instrumentation Control and Automation
- IT&Water2016**, 2nd IWA New Developments in IT & Water Conference
- AIChE Annual Meeting 2012/2013/2014**
- AutMoNet2011**, 4th International IWA Conference on Automation in Water Quality Monitoring
- Organizing committee **CAPS2014/2018**, 2nd/4th Informal workshop on Chemometrics for Aquatic Processes and Systems
- AutMoNet2007**, 3rd International IWA Conference on Automation in Water Quality Monitoring
- Workshop organizer **WWCE2018**, Principles of Data Management - How Collected Data Can Be Useful and Reliable, IWA World Water Congress & Exhibition 2018
- WWCE2018**, Principles of Online Data Validation - An introduction, IWA World Water Congress & Exhibition 2018
- ICA2017**, Spectrophotometry for monitoring of the urban water cycle, at the 12th IWA conference on Instrumentation Control and Automation
- SETAC Europe 2017**, Looking across organisational boundaries: exchanging ideas on mechanistic modelling between SETAC and IWA, SETAC Europe 27th Annual Meeting
- WEFTEC2017**, High quality data: Better decisions, improved treatment, Water Environment Federation Technical Exhibition & Conference
- Session organizer **IFAC2017**, Process Modelling, Monitoring, and Automation for Wastewater Treatment, at the 20th World Congress of the International Federation of Automatic Control
- DYCOPS-CAB2016**, Modeling, Optimization and Control in Biological Waste/water Treatment, 11th IFAC Symposium on Dynamics and Control of Process Systems, including Biosystems
- Session (co-)chair **Watermatex2015**, 9th IWA Symposium on Systems Analysis and Integrated Assessment
- IT&Water2015**, 2nd New Developments in IT & Water Conference
- AIChE Annual Meeting 2012/2013/2014**
- SafeProcess2009**, 7th IFAC Symposium on Fault Detection, Supervision and Safety of Technical Processes

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- Reviewer **DYCOPS2019**, *12th IFAC Symposium on Dynamics and Control of Process Systems, including Biosystems*
- IYWP2017**, *8th IWA International Young Water Professionals Conference*
- IT&Water2015**, *2nd New Developments in IT & Water Conference*
- IFAC2014**, *19th World Congress of the International Federation of Automatic Control*
- ISRCS2009/2010/2011/2012**, *International Symposium on Resilient Control Systems*
- STIC2009/2011**, *STIC et Environnement*
- iEMSS2010**, *International Congress on Environmental Modelling and Software*
- SysTol'2010**, *International Conference on Control and Fault-Tolerant Systems*
- WWTmod2010**, *2nd IWA/WEF Wastewater Treatment Modelling Seminar*
- ICA2009**, *10th IWA conference on Instrumentation Control and Automation*
- Institutional service**
- 2018–present **DataScience@Eawag Seminar Series**
- 2018–2019 **Department head deputy**
- 2013–present **Eawag Seminar Series**
- 2015–2017 **Eawag Symposium**
- Peer review of scientific proposals**
- 2018 **University of Wisconsin-Milwaukee (UWM) Research Foundation, USA**
- 2016 **Vinnova, Sweden**
- 2015 **European Cooperation in Science and Technology (COST), European Union**
- 2012 **Industrieel Onderzoeksfonds (IOF, Industrial Research Fund), Flanders, Belgium**
- Peer review of books**
- 2018 **Cambridge University Press, India**
- Peer review of articles (numbers per journal, 2015–present)**
- 24 Water Science and Technology
- 11 Journal of Process Control
- 10 Water Research
- 6 Computers and Chemical Engineering; Industrial & Engineering Chemistry Research
- 5 Control Engineering Practice
- 4 Environmental Modelling & Software
- 3 AIChE Journal; Chemical Engineering Science; Journal of Environmental Engineering
- 2 Analytical and Bioanalytical Chemistry; Biochemical Engineering Journal; Engineering Applications of Artificial Intelligence; Environmental Science: Water Research & Technology; IEEE Transactions on Automation Science and Engineering; Mathematical and Computer Modelling of Dynamical Systems

- 1 Applied Sciences; Bioresource Technology; Canadian Journal of Chemical Engineering; Desalination and Water Treatment; Environmental Earth Sciences; Environmental Science & Technology; Expert Systems With Applications; Journal of Water Process Engineering; Sensors; Soft Computing; IEEE Transactions on Industrial Informatics; Waste and Biomass Valorization

Additional skills

Languages

Native	Dutch	
Advanced	English	<i>Con conversationally fluent, near perfect writing</i>
Intermediate	German	<i>Con conversationally fluent, intermediate writing skills</i>
	French	<i>Con conversationally fluent, basic writing skills</i>

Computation & IT

Expert	Matlab, Octave, Python (including pandas, scikit-learn, tensorflow)
Proficient	Git, PLC programming (WAGO), PostgreSQL, SIMBA#, SUMO
Skilled	Berkeley Madonna, LabView, R