

Professor Barbara Elisabeth Lothenbach

Foreign Member of the Lithuanian Academy of Sciences since 2025

Head Group Cement Chemistry and Thermodynamics, Laboratory Concrete & Asphalt, Switzerland. Associate Professor, Institute of Geology, University of Berne, Switzerland. Adjunct Professor, Concrete Group, Department of Structural Engineering, NTNU, Trondheim, Norway.

Professional experience

Since 2019	Associate Professor (Privatdozentin) at the Institute of Geology, Mineralogy,
	University of Berne, Switzerland.
2019	Habilitation at University of Berne, Switzerland.
Since 2017	Adjunct Professor (Professor II), International Chair at the Concrete Group,
	Department of Structural Engineering, NTNU Trondheim, Norway.
2009	4 months sabbatical at NIST, USA.
Since 2002	Laboratory Concrete and Construction Chemistry, Empa Dübendorf, Switzerland;
	Distinguished Senior Scientist / Head Thermodynamic Modelling Group Topics:
	thermodynamic modelling, hydration of cements, pore solutions, alternative
	cements, thermogravimetric analysis.
1996–2002	Project leader and consultant scientist for nuclear wastes at BMG Engineering Ltd,
	Schlieren, Switzerland: transport and retention of heavy metals and radionuclides
	in bentonite and cementitious liners, database development, waste management,
	representation of Switzerland 2000-2002 in UN's PRTR working group.
1993–1996	PhD student and research assistant at the Institute of Terrestrial Ecology, Soil
	Protection, Swiss Federal Institute of Technology (ETH) Zürich, Switzerland:
	heavy metal sorption on clay minerals; aluminium-modified clay minerals;
	remediation of contaminated soils.
1990–1991	Research assistant for conservation and environmental management projects at the
	University of Tasmania, Australia and at the Department of Parks, Wildlife and
	Heritage, Hobart, Tasmania, Australia: Protection of endemic plants and
	environmental management systems.

1987–1988	Consultant for noise prevention at BMP Dr. Pelli + Co., Zürich, Switzerland.
Education	
1993–1996	PhD at the Laboratory of Soil Science, ETH Zürich, Switzerland: "Gentle soil remediation: immobilisation of heavy metals by aluminum and montmorillonite compounds".
1987–1992	Study of Environmental Science at ETH Zürich; focus area: inorganic chemistry and soil science; diploma in Environmental Science 1992.
1986–1987	Study of Biology at ETH Zürich: Pre-Diploma in Biology, 1987.

Main research interests

Geochemical modelling and thermodynamic databases.

Mechanisms of ion binding on C-S-H and other solids.

Cement interaction with the environment (sulphate attack, rocks, ...).

Kinetic: influence of dissolved ions, composition of solids.

Main areas of experience

Thermodynamic modelling.

Solid/water interactions.

Hydration of cements: Portland cements, blended and alternative cements.

Interaction of cementitious materials with superplasticizers and ions.

Transport and retention of metals in bentonite and cementitious liners.

Characterisation of solid (XRD, TGA, NMR) and liquid (IC, ICP-OES) phases.

Database development.

Waste management.

Environmental fate of heavy metal and pollutants.

H-index: Google Scholar: 106, Scopus: 97; Web of Science: 91.

Honours and awards:

- 2024: "Distinguished Scientist in Physical Chemistry & Materials Science" awarded at the 2nd Central and Eastern European Conference on Physical Chemistry & Materials Science (CEEC-PCMS2) in Vilnius, September 2024.
- 2024: William Bonfield Award for "Cement hydration mechanisms through time a review " for the best review paper published in Journal of Materials Science in 2023. Awarded in 2024.
- 2024: Cement and Concrete Research Le Chatelier Medal for the paper: Solubility and speciation of *iron in cementitious systems (CCR 2022).* Awarded in 2024.
- 2024: Cement and Concrete Research Le Chatelier Distinguished Papers award for: *Stability of hydrotalcite (Mg-Al double layer hydroxide) in presence of different anions (CCR 2022).* Awarded in 2024.
- 2023: "Swedish Concrete Award" of the Swedish Concrete Association for outstanding research contribution, Stockholm, Sweden. November 16th 2023.
- 2022: "RILEM Fellow" at RILEM fall meeting 2022.
- 2022: Della Roy Lecture at 12th Advances in Cement-Based Materials conference: Cements 2022, Irvine, California, July 11, 2022.

2022: SNSF Advanced Grant Magnesium Carbonate Cements.

- 2022: Cement and Concrete Research Le Chatelier Distinguished Papers award for: Atomistic structure of alkali-silica reaction products refined from X-ray diffraction and micro X-ray absorption data (CCR 2020). Awarded in 2022.
- 2022: Cement and Concrete Research Le Chatelier Medal for the paper: *Cemdata 18: A chemical thermodynamic database for hydrated Portland cements and alkali activated materials (CCR 2019).* Awarded in 2022.
- 2020: Materials and Structures outstanding papers award for: Understanding the carbonation of concrete with supplementary cementitious materials: a critical review by RILEM TC 281-CCC.
- 2019: Advances in Cement Research Prize for the best paper in journal for: *Further insights into calcium sulfoaluminate cement expansion*.
- 2019: XINGDA Lecture Award, Beijing University, Beijing, China.
- 2016: "Distinguished Senior Researcher" award by Empa in recognitioon of outstanding research, the title has been awarded only six times so far.
- 2016: Materials and Structures outstanding papers award for: *The pore solution of blended cements: a review*.

Institutional responsibilities

2018 to date	Ombudsperson Scientific Integrity, Empa Switzerland.
2017–2018	Ombudsperson Mobbing and Sexual Harassment, Empa Switzerland.
2006–2014	Member of the Research Commission (FOKO), Empa Switzerland.
2003 to date	Jury member in more than 40 PhD Committees, in Switzerland and in Europe.

Reviewing activities

2019	Member of the expert panel for the Scientific Evaluation of Karlsruhe Institute of
	Technology (KIT), Germany.
2018 to date	Member of the editorial board of npj Materials Degradation.
2017	Member of the expert panel for PSI-Fellow II programme, PSI, Switzerland.
2014 to date	Member of the editorial board of Advances in Cement Research.
2009 to date	Member of the editorial board of Cement & Concrete Research.

Membership in national and international committees

Coordinator since 2002 of "CEMNET": A joining of Swiss researchers in the field of cement and concrete; organisation of regular meetings and international workshops. Member of the research networks "Nanocem" (2003-2021) and "Innovandi" (since 2020). Member of RILEM and several RILEM Technical Committees.

International conferences/workshops (co-)organised

- 2024 Hydration and microstructure characterization of cementitious materials, DTU Denmark.
- 2023 Mechanisms and modelling of waste/cement interactions 6, Prague, Czech Republic.
- 2023 Calcium sulfoaluminate cements, Rom, Italy.
- 2022 Reactive transport in porous materials Current trends and challenges (online), ETH Zürich, Switzerland.

- 2021 ASR Webinar (online), Empa, Switzerland.
- 2021 ERICA-CASH II final conference (online), Heidelberg, Germany.
- 2019 Mechanisms and modelling of waste/cement interactions 5, Karlsruhe, Germany.
- 2018 Hydration and microstructure characterization of cementitious materials, NTNU Norway.
- 2018 Calcium sulfoaluminate cements, Murten, Switzerland.
- 2018 Calcium silicate hydrates containing aluminium: C-A-S-H, Dübendorf, Switzerland.
- 2016 Mechanisms and modelling of waste/cement interactions 4, Murten, Switzerland.
- 2015 Pre congress course Cement Hydration, Beijing Univ Technology, China.
- 2015 Pre congress course Microstructural Characterization, Tsinghua Univ, Beijing, China.
- 2014 Calcium silicate hydrates containing aluminium: C-A-S-H, Dübendorf, Switzerland.
- 2014 Meeting of RILEM TC SCM, Dübendorf, Switzerland.
- 2013 Mechanisms and modelling of waste/cement interactions 3, Ghent, Belgium.
- 2012 GDCh Jahrestagung, Dübendorf, Switzerland.
- 2011 Blended and alternative cements, Dübendorf, Switzerland.
- 2008 Mechanisms and modelling of waste/cement interactions 2, Le Croisic, France.
- 2007 Cement research at large facilities, PSI Villigen, Switzerland.
- 2006 Cement-organic interaction, Dübendorf, Switzerland.
- 2005 Mechanisms and modelling of waste/cement interactions, Meiringen, Switzerland.
- 2003 Porosity of cementitious materials, Dübendorf, Switzerland.

Teaching experience

Doctoral courses, lectures at master and doctoral level at Empa, University of Berne, NTNU, EPFL, ETHZ and courses for the nea Thermochemical Database (TDB) Project.

Supervision of graduate students and postdoctoral fellows

- Presently: main supervision of 3 Postdocs, 7 PhD students at Empa, co-supervision 12 external PhD.
- 2003 to date Number of Postdoc: 14 (at Empa) + 11 (external) / PhD: 21 (at Empa) + 40 (external) / Master Students: several.

Teaching and organisation of international workshops on thermodynamic modelling:

- 2025 9th GEMS workshop + NTNU doctoral course, Dübendorf, Switzerland.
- 2023 8th GEMS workshop + NTNU doctoral course, Dübendorf, Switzerland.
- 2020 7th GEMS workshop (online course), Tsinghua University, Beijing.
- 2019 6th GEMS workshop + NTNU doctoral course, Dübendorf, Switzerland.
- 2017 5th GEMS workshop, Dübendorf, Switzerland.
- 2014 4th GEMS workshop, Dübendorf, Switzerland.
- 2012 Thermodynamic Modelling in Cementitious Systems, Sao Paulo, Brasil.
- 2010 3rd GEMS workshop, Dübendorf, Switzerland.
- 2008 2nd GEMS workshop, Dübendorf, Switzerland.
- 2007 Thermodynamics workshop, Dübendorf, Switzerland.

2025