

Curriculum Vitae

Lorenz GUBLER

Dr. sc. techn.



Personal Information

Date of Birth Aug 14, 1971
Nationality Swiss
Working at PSI since November 2002

Employment History

Current Position

since 01/2012

Research Group Leader

*Paul Scherrer Institut, Villigen PSI (CH),
Head of Research Group 'Membranes & Electrochemical Cells'
in the Electrochemistry Laboratory (Prof. Dr. Thomas J. Schmidt)
head count: 10 (PhD students, engineers, technicians, students)
<http://www.psi.ch/lec/membranes-and-electrochemical-cells>*

Previous Positions

01/2004-12/2011

Research Associate & Project Leader

*Paul Scherrer Institut, Villigen PSI (CH)
Electrochemistry Laboratory (Dr. G.G. Scherer)*

02/2001-10/2002

Product Development Scientist

*Johnson Matthey Fuel Cells, Reading (United Kingdom)
Development of electrochemical components and diagnostics for fuel cells,
responsible for design of fiber-reinforced composite membrane, coordination
and supervision of fabrication and testing on the lab scale, scale-up to pilot
line*

06/1997 – 12/2000

Research & Teaching Assistant

*Paul Scherrer Institut, Villigen PSI & ETH Zürich (CH)
PhD Researcher, Electrochemistry Laboratory of PSI (Dr. G.G. Scherer)*

Academic Education

(2016)

Habilitation (submitted)

*Title: "Radiation Grafted Membranes for Polymer Electrolyte Fuel Cells"
ETH Zürich, Laboratory for Physical Chemistry (Prof. Dr. T.J. Schmidt)*

1997 – 2000

PhD Thesis

*Title: "Operating Polymer Electrolyte Fuel Cells with Reformed Fuel"
Paul Scherrer Institut, Electrochemistry Laboratory, & ETH Zürich (Prof. Dr.
A. Wokaun), final degree: *Dr. sc. techn.**

1996 – 1997

Master Thesis

*Title: "Elektrophoretische Abscheidung von ZrO₂-Schichten für
Festelektrolyt-Brennstoffzellen", ETH Zürich, Institute of Nonmetallic
Inorganic Materials (Prof. Dr. L.J. Gauckler)*

1996

Bachelor Thesis

*Title: "In Situ FTIR-ATR Spectroscopy Studies of the Formation of Adsorbed
and Chemically Reacted Films in the Boundary Lubrication Regime",
ETH Zürich, Laboratory for Surface Science and Technology (Prof. Dr. N.D.
Spencer)*

1991 – 1996

Undergraduate & graduate studies in Materials Science

*ETH Zürich, final degree: *Master of Science (MSc)* ("Dipl.-Ing. ETH")*

Research Projects as Leading Investigator

| Project Description | Funding | | Duration |
|-------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------|-----------|
| | Source | CHF ^a | |
| Degradation Mechanisms and Rapid Aging Testing of Fuel Cell Membranes (Co-PI) | ETH | 153k | 2006-2009 |
| Enhancing PEFC durability and reliability under application-relevant conditions (Co-PI) | SFOE | 760k | 2007-2010 |
| Understanding membrane degradation mechanisms under fuel cell operating conditions | SFOE | 323k | 2007-2014 |
| NanoTera 'Greenpower' (Connecting renewable energy to green mobility using hydrogen as energy carrier) (Co-PI) | SNF | 638k | 2009-2012 |
| Radiation grafted fuel cell membranes with improved stability | PSI | 225k | 2009-2013 |
| Antioxidant strategies for fuel cell membranes | SNF | 203k | 2010-2014 |
| S-Chain: Development of components for fuel cells (Co-PI) | Industry | (550k) | 2008-2015 |
| Novel materials and system designs for low cost, efficient and durable polymer electrolyte water electrolyzers (NOVEL) | FCH-JU ^b | 413k | 2013-2016 |
| Lithium conducting polymer electrolytes with polysulphide barrier properties | SNF | 239k | 2013-2016 |
| Structure-property correlations of ion-containing polymers for fuel cells based on small-angle scattering techniques (Co-PI) | PSI | 174k | 2013-2016 |
| Sinergia 'REPCOOL' (Redox flow electrochemistry for power delivery and cooling) (Co-PI) | SNF | 363k | 2013-2016 |
| HyForm: Formic acid - chemical storage of electrical energy and on-site hydrogen production for use in PEM fuel cells (Co-PI) | CCEM / CTI | 57k / 20k | 2014-2016 |
| Membranes for high-temperature polymer fuel cells | SNF | 194k | 2015-2017 |
| Understanding of degradation signatures in water electrolyzers operated with variable input | SFOE | 140k | 2015-2018 |
| Chemistry and Stability of Grafted Membranes for Redox Flow Batteries | SFOE | 257k | 2016-2019 |

^a research funds to own group / laboratory

^b Fuel Cells & Hydrogen – Joint Undertaking (EU-Project)

Supervision and Coaching

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| PhD students | 13 + 2 as co-supervisor |
| Master thesis students | 4 + 2 ^a |
| Bachelor thesis students | 3 + 3 ^a |
| Internship students | 18 + 11 ^a |

^a supervised by other person in the group

Awards

2001 ETH Medal for outstanding PhD thesis

Awards to team / group members

2015 Albert Albert *Poster award*
SCS (Swiss Chemical Society) Fall Meeting, Lausanne, Switzerland, Sep 4, 2015

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| 2015 | Maria Geormezi | <i>Poster award</i> 6 th International Conference on Fundamentals and Development of Fuel Cells, Toulouse, France, Feb 3-5, 2015 |
| 2014 | Albert Albert | <i>Poster award</i> 65 th Annual Meeting of the International Society of Electrochemistry, Lausanne, Switzerland, Aug 31 - Sep 5, 2014 |
| 2014 | Tom Engl | <i>Poster award</i> 3 rd International Seminar on Green Energy Conversion, Yamanashi, Japan, Aug 25-27, 2014 |
| 2012 | Kaewta Jetsrisuparb | <i>Graduate student award</i> in recognition of the outstanding paper contributed to Symposium F, Solid Proton Conductors (in honour of Professor G. Alberti), E-MRS 2012 Spring Meeting, Strasbourg, France, May 14-18, 2012 |
| 2011 | Yves Buchmüller | <i>Top 5 Poster</i> 12 th Tihany Symposium on Radiation Chemistry, Zalakaros, Hungary, Aug 27 - Sep 1, 2011 |

Governing Activities

Co-examiner of PhD Theses at ETH Zürich

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| 2016 | Joanna Conder |
| 2015 | Tom Engl |
| 2014 | Zhuoxiang Zhang |
| 2014 | Yves Buchmüller |
| 2013 | Kaewta Jetsrisuparb |
| 2011 | Nicolas Linse |
| 2010 | Frank Wallasch |

External PhD Committees

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| 2014 | Luis Felipe Rodrigues Castanheira, Université de Grenoble (invited by Dr. F. Maillard) |
| 2014 | Assma El Kaddouri, Université de Grenoble (invited by Prof. C. Bas) |
| 2013 | Étienne Labalme, Université de Montpellier II, France (invited by Dr. G. David) |
| 2009 | Feifei Ng, Université de Montpellier II, France (invited by Dr. D. Jones) |

Hosting of Visiting Researchers / Scholars

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| 2007 | Antonio Jose Martín Fernandez, Autonomy University of Madrid, Spain |
| 2008 | Dr. Tetsuya Yamaki, Japan Atomic Energy Agency (JAEA), Takasaki, Japan |
| 2013 | Dr. Davide De Focatiis, University of Nottingham, UK |
| 2015 | Prof. Dr. Mohamed M. Nasef, Universiti Teknologi Malaysia, Kuala Lumpur, Malaysia |

Selection Committees

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| 2015 | for the position of Research Scientist in the Section for Proton Conductors at DTU Energy, Denmark (invited by Prof. Jens Oluf Jensen) |
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Work as Reviewer

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| 2014 | Agence Nationale de Recherche (ANR), France |
| 2014 | National Science Foundation (NSF), USA |
| Numerous journals, including Chem. Rev., J. Phys. Chem., Energy Environ. Sci., ChemSusChem, Adv. Mater, Adv. Funct. Mater., Adv. Energy Mater. | |

Invited Conference Contributions

- 2017 “Addressing Transport Selectivity and Cycling Stability in Vanadium Redox-Flow Batteries using an Amphoteric Membrane”, Asilomar Conference on Polymers for Fuel Cells, Energy Storage, and Conversion, Pacific Grove CA, USA, Feb 26 – March 1
- 2016 “Membranes for Water Electrolysis - Target-Oriented Choice and Design of Materials”, Second International Workshop on Durability and Degradation Issues in PEM Electrolysis Cells and its Components, Fraunhofer ISE, Freiburg, Germany, February 16-17
- 2015 “Radiation Grafting: Tailored Ion-conducting Membranes for Electrochemical Applications”, Asilomar Conference on Advances in Polymers for Fuel Cells and Energy Devices, Pacific Grove CA, USA, Feb 8-11
- 2014 “Radiation Grafted Fuel Cell Membranes: Radical Attack and Mitigation Using Polymer-Bound Antioxidants”, 11th Meeting of the Ionizing Radiation and Polymers Symposium (IRaP 2014), Jeju Island, Korea, October 5- 9
- 2014 “Membrane Degradation, Radical Attack and Mitigation via Regenerative Radical Scavengers”, 11th Symposium on Fuel Cell and Battery Modeling and Experimental Validation (ModVal 11), Winterthur, Switzerland, March 17-19 (plenary talk)
- 2013 “Radiation Grafted Membranes for Fuel Cells: Strategies to Compete with PFSA Membranes”, 224th Meeting of the Electrochemical Society, B11 -Polymer Electrolyte Fuel Cells 13, Abstract #1271, San Francisco, USA, Oct 26 – Nov 1 (plenary talk)
- 2013 “Radiation Grafted Membranes: Strategies to Outperform and Outlast State-of-the-Art PFSA Materials”, Asilomar Conference on Advances in Materials for Proton Exchange Membrane Fuel Cell Systems, Pacific Grove CA, USA, Feb 17-20
- 2011 “Polymerelektrolyt Brennstoffzellen: Entwicklungsstand und materialwissenschaftliche Herausforderungen”, 9. Riesaer Brennstoffzellen – Workshop, Riesa, Germany, June 22
- 2009 “New Trends in Hydrocarbon Membrane Development”, Gordon Research Conference – Fuel Cells, Bryant University, Smithfield RI, USA, July 26-31
- 2008 “Trends for Fuel Cell Membrane Development”, 12th Aachener Membran Kolloquium, Aachen, Germany, Oct 29-30, proceedings pp. 281-288
- 2007 “Strategy for Aging Tests of Fuel Cell Membranes”, US DOE High Temperature Membrane Working Group Meeting (joint session with CARISMA), Washington DC, USA, Oct 10
- 2005 “Trends in Membrane Electrode Development for PEFC”, European Materials Research Society (E-MRS) 2005 Spring Meeting, Symposium L: Hydrogen and Fuel Cells, May 31 – June 3, L-V.01

Organization of Conferences

- 2015 Co-coordinator of Symposium 4 (‘Advances in Fuel Cells from Materials to Systems’) of the 66th Annual Meeting of the International Society of Electrochemistry, Taipei, Taiwan, Oct 4-9, 2015
- 2012 Co-organizer of the 9th *Symposium on Fuel Cell and Battery Modeling and Experimental Validation (ModVal 9)*, Sursee (CH), April 2-4, 2012

Outreach

- 2017 Summer Student Lecture, Title: “Electrochemical Devices for Energy Conversion and Storage”, Paul Scherrer Institut
- 2014 Summer Student Lecture, Title: “Fuel Cells in the Context of the Energy Transition”, Paul Scherrer Institut

- 2013 Hochrhein-Seminar für Mathematik und Naturwissenschaften, Title: "Die Brennstoffzelle: was ist der Stand der Technologie, wo drückt der Schuh?", education program for interested and capable pupils (www.hochrhein-seminar.de), Waldshut, Germany
- 2005 Evening Lecture to Technische Gesellschaft Zürich (TGZ), "Die Brennstoffzelle – was trägt sie bei zur Lösung der Energie-problematik ?", Zürich
- 2003 – Overview lectures and guided tours at PSI related to energy challenges and energy research topics at PSI to a very diverse general audience (e.g., high-school students, academic delegations, company excursionists, retirees, etc.)
- 1999, 2000, PSI Autumn School: co-organization of tutorials on energy topics and fuel cell experiments in the lab (1 full day) for high-school students
- 2000 Tutorial (1 h) on 'Hydrogen' at the Academic High School (Kantonsschule / Gymnasium) Wetzikon, Switzerland

Scientific Track Record

Google Scholar: scholar.google.ch/citations?user=i9w3tkYAAAAJ

Co-author of 55 peer-reviewed journal articles and 5 peer-reviewed book chapters

Co-inventor of 9 patents/patent applications

22 invited talks

Total no. of citations: 1558; h-index: 21

Professional affiliations: Materials Research Society (MRS), The Electrochemical Society (ECS), ETH (Materials) Alumni

Teaching

- 2015 – Contributions (2 lessons per year on 'Power-to-Gas') to Lecture "Energy Storage Systems", Prof. Dr. J. Worlitschek, Lucerne School of Engineering and Architecture
- 2012 – Contributions (7 lessons per year) to Lecture "Renewable Energy Technologies II", Prof. Dr. T.J. Schmidt, ETH Zürich
- 1995, 1996 Teaching assistant (3 semesters) in the lecture 'Mechanics' at ETH Zürich for 1st and 2nd semester engineering students

Invited Seminars & Colloquia

- 2015 Seminar at the Max Planck Institute (MPI) for Solid State Research, Department of Physical Chemistry of Solids, "Radiation Grafting: Tailoring of Ion-conducting Membranes for Electrochemical Applications", Stuttgart, Germany
- 2015 Seminar at University of Nottingham, Faculty of Engineering, "Ion-conducting Membranes for Energy Devices prepared by Radiation Grafting", Nottingham, UK
- 2015 Seminar at University of Surrey, Department of Chemistry, "Radiation Grafting: Tailoring of Ion-conducting Membranes for Electrochemical Applications", Guildford, UK
- 2014 Seminar at Donghua University, College of Environmental Science and Engineering, "Radiation Grafting: Tailoring of Ion-conducting Membranes for Electrochemical Applications", Shanghai, China
- 2013 Physical Chemistry Colloquium, ETH Zürich, "Radiation Grafting: Tailoring of Ion-Conducting Membranes for Electrochemical Applications"
- 2012 Seminar at the Adolphe Merkle Institute University of Fribourg, "Ion-containing Membranes for Fuel Cells", Marly
- 2010 IEA Advanced Fuel Cells Annex 25 Stationary Fuel Cells Meeting No. 2, "Polymer Electrolyte Fuel Cell Activities at PSI and in CH", Winterthur, Switzerland

- 2006 Seminar at EMPA Thun, "PSI Electrochemistry Laboratory: Contributions to Efficient Energy Storage and Conversion"
- 2005 Seminar at the National Research Council Canada, Institute for Fuel Cell Innovation, "Radiation Grafted Membranes for Low Temperature Fuel Cells", Vancouver, Canada
- 2000 Seminar at Imperial College, London, UK, on reformat operation of fuel cells