

Prof. Dr. sc. nat. Christoph Weder

Curriculum Vitae, October 21, 2020

Personal Swiss and Irish Citizen; Born July 30, 1966; Married, 3 Children (ages 21, 24, 26)
Researcher IDs ORCID: 0000-0001-7183-1790; Google Scholar: Christoph Weder
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Work Address University of Fribourg
Adolphe Merkle Institute
Chemin des Verdiers 4
1700 Fribourg, Switzerland
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Core Research Expertise and Interests: Synthesis of Functional Polymers

Design, synthesis, processing, investigation of structure-property relationships, and application of functional polymers, notably stimuli-responsive polymers, supramolecular polymers, polymer nano-composites, bio-inspired polymers, and polymers with unusual optical and mechanical properties.

Academic Positions

2010 - present **Director**
Adolphe Merkle Institute (AMI), University of Fribourg, Switzerland

2009 - present **Professor of Polymer Chemistry and Materials**
Adolphe Merkle Institute, University of Fribourg, Switzerland

2010 - present **Adjunct Professor**
Dept. of Macromolecular Science and Engineering, Case Western Reserve University (CWRU), Cleveland OH, USA

2003 - present **Visiting Professor**
Petrochemical College, Chulalongkorn University, Bangkok, Thailand

2014 - 2020 **Director**
National Competence Center in Research (NCCR) Bio-Inspired Materials

2007 - 2010 **Professor (2008-2010: F. Alex Nason Professor)**
Dept. of Macromolecular Science and Engineering and Dept. of Chemistry CWRU

2001 - 2007 **Associate Professor**
Dept. of Macromolecular Science and Engineering and Dept. of Chemistry CWRU

2005 - 2008 **Research Scientist**
Louis Stokes Cleveland Department of Veterans Affairs Medical Center

1995 - 2000 **Senior Research Associate and Independent Lecturer** ("Privatdozent")
Department of Materials, ETH Zürich, Switzerland, Group of Prof. P. Smith

1994 - 1995 **Postdoctoral Research Fellow**
Dept. of Chemistry, MIT, Cambridge, USA, Advisor: Prof. M.S. Wrighton

1989 - 1994 **Research and Teaching Assistant**
Departments of Chemistry and Materials, ETH Zurich, Switzerland

Academic Education

- 1995 - 2000 **Habilitation**, Degree awarded: *Venia Legendi* for *Photofunctional Polymers*
Department of Materials, ETH Zürich, Switzerland, Group of Prof. P. Smith
Habilitation: “Polarizing Light with Polymers”
- 1990 - 1994 **Dissertation**, Degree awarded: Doctor of Natural Sciences (“Dr. sc. nat.”)
Department of Materials, ETH Zürich, Switzerland, Advisor: Prof. U.W. Suter
Thesis: “New Polyamides with Stable Nonlinear Optical Properties”
- 1990 - 1992 **Education as Chemistry Teacher**, Degree awarded: High School and College
Teacher License (“Fachausweis für das Höhere Lehramt”)
Institute for Behavioural Sciences, ETH Zürich, Switzerland
- 1985 - 1990 **Undergraduate Studies in Chemistry**, Degree awarded: Masters Degree in
Chemistry (“Dipl. Chem. ETH”), Thesis: “Synthesis of Cross-Linkable Aramids”
Department of Chemistry, ETH Zürich, Switzerland, Advisor: Prof. U.W. Suter

Pre-College Education

- 1980 - 1985 High School at Kantonsschule Enge, Zürich, Switzerland
Degree awarded: Baccalaureate (“Eidg. Matura Typ E, Wirtschaft”)
- 1972 - 1980 Elementary and Secondary Schools in Mühlheim a. Main, Germany (1972 -
1974) and Thalwil, Switzerland (1974 - 1980)

Military

- 1985 – 2004 Swiss Army Service in the rank of a soldier

Industrial Experiences

- 2010 - present **Member of Board of Directors**, Tech Transfer Fribourg
- 2000 - present **Consultant for Several Multinational Clients**
- 1994 - 2010 **Member of Board of Directors**, Gel Instrumente AG, Thalwil, Switzerland
- 1999 - 2002 **Founding Member of Board of Directors**, Omlidon Technologies LLC, Zurich,

Awards, Recognition, Named Lectureships

- 2019 Covestro Distinguished Lecturer, Texas A&M University
- 2017 Fellow of the Division of Polymer Chemistry of the American Chemical Society
- 2017 Member of the Swiss Academy of Engineering Sciences (SATW)
- 2011 ERC Advanced Grantee
- 2009 Bayer MaterialsScience Lecturer
- 2008 F. Alex Nason Professor of Engineering at Case Western Reserve University
- 2008 Case School of Engineering Research Award
- 2007, 2008, 2009 Nominee Bruce Jackson Award for Excellence in Undergraduate Mentoring
- 2005 US National Science Foundation Special Creativity Award
- 2002 DuPont Young Professor Award
- 2002 3M Non-Tenured Faculty Award
- 2001 DuPont Aid to Education Award
- 2000 Melville Lecturer, University of Cambridge
- 1994 Swiss National Science Foundation Research Fellowship

Publication Statistics

Author of ~275 peer-reviewed scientific articles, ~75 non-reviewed scientific articles or preprints, 18 book chapters. 29 journal covers. (Co)Editor of 2 books and 6 journal special issues. Co-inventor of 20 patent families. ~18'500/23'100 ISI/Google Scholar citations. H-index = 73/81 (ISI/Google Scholar).

Major scientific contributions

Established poly(*p*-phenylene ethynylene)s as semiconducting materials

Discovered a polarizing energy transfer process and introduced polarizers based on this mechanism

Introduced innovative concepts for mechanochromic and otherwise mechanoresponsive polymers

Conceived and realized sea-cucumber mimicking mechanically adaptive polymers

Contributed to the understanding of processing-structure-property relations of polymer nanocomposites with cellulose nanocrystals

Pioneered the use of (metallo)supramolecular polymers as stimuli-responsive materials

Established supramolecular polymers as light-healable materials and adhesives

Exploited polymer multilayer technology to create lasers and data storage systems

Demonstrated novel approaches for low-power upconversion in polymers

Technologies Developed or under Development

Shape memory polymers. Licensed by Covestro. Under development by Sonova AG.

Terabyte scale optical data storage media. Under development by Folio Photonics LLC.

Security feature for banknotes. Commercialized by Landqart AG.

Dielectric method to determine curing of reactive resins. Commercialized by Gel Instrumente AG.

Photochromic fishing lines. Commercialized by Pure Fishing Co.

Editorship, Guest Editorship

2011 - present Associate Editor *ACS Macro Letters*

2010 - present Co-Editor RSC Book Series *Polymer Chemistry*

2019 Guest Editor *Chimia* Special issue *NCCR Bio-Inspired Materials*

2018 Guest Editor *Small* Special issue *10th Anniversary of the AMI*

2016 Guest Editor *Chem. Soc. Rev.* Special issue *Bioinspired Surfaces and Materials*

2011 Guest Editor *J. Mater. Chem.* Special issue *Mechanically Responsive Polymers*

2009 Guest Editor *Chimia* Special issue *Swiss Scientists Abroad*

2006 Editor *Advances in Polymer Science* Special issue *Poly(arylene ethynylene)s*

2000 Editor *Macromolecular Symposia* Issue on *Polymers in Display Applications*

Editorial Advisory Boards

2020 – present Editorial Advisory Board *Materials Advances*

2019 – present Editorial Advisory Board *Materials Chemistry Frontiers*

2013 - present Editorial Advisory Board *Journal of Materials Chemistry C*

2011 - present Advisory Board *Polymer Bulletin*

2006 - present International Advisory Board *Macromolecular Chemistry and Physics*

2006 - present International Advisory Board *Macromolecular Rapid Communications*

2001 - present Editorial Board *Journal of Applied Polymer Science*

Editorial Advisory Boards (continued)

Terms completed *RSC Advances (2013-2016), Polymer Chemistry (2010-2012), ACS Applied Materials & Interfaces (2009-2014), Macromolecules (2007-2009), Journal of Materials Chemistry (2007-2012), Journal of Inorganic and Organometallic Polymers and Materials (2006-2012)*

Scientific Advisory Boards (last 5 years)

2020 - present Scientific Advisory Board *Freiburg Center for Interactive Materials and Bioinspired Technologies*

2020 - present Scientific Advisory Board *German Cluster of Excellence Living, Adaptive and Energy-Autonomous Materials Systems (livMatS)*

2014 - present External Advisory Board *CSEM*

2008 - present Advisory Board *International Symposium on Stimuli-Responsive Polymers*

Professional Leadership (last 5 years)

2017 - present Co-PI (Swiss Lead) PIRE (Partnerships for International Research and Education) Bio-Inspired Materials and Systems. This international collaboration involves ca. 20 PIs and 15 PhD students at Case Western Reserve University and the Universities of Chicago, San Diego and Delaware (all USA), and the AMI.

2014 - 2020 Director National Competence Center in Research (NCCR) Bio-Inspired Materials. Initiated, planned, and led this center with 16 research groups and >90 researchers at 4 Universities (U. Fribourg, U. Geneva, EPFL, ETHZ).

2014 - present Board of Directors Paul Rhyner Foundation

2013 - present Board of Directors Polymer and Colloid Division, Swiss Chemical Society

2013 - 2016 Expert of the Swiss Academy of Technical Sciences (SATW)

2010 - present Director Adolphe Merkle Institute. Built this department-like institute, which now has 4 research groups, 100 employees, and an annual budget of CHF 10 Mio.

Other Professional Affiliations

American Chemical Society (ACS), Division Member: POLY and PMSE; Materials Research Society (MRS); Swiss Chemical Society (SCS).

Co-Organizer / Member Scientific Organizing Committee (last 5 years)

Co-vice Chair/co-Chair GRC Bio-inspired Materials 2020/2022; Int. Conference on Organic and Polymer Synthesis (Guangzhou, China 2018); 10th International Conference on f-Element ICFE10 (2018), Soft matter interfaces: from biology to engineering applications (2017), Biointerfaces (2016).

Reviewer Scientific Journals (last 5 years)

ACS Appl. Int., Adv. Funct. Mater., Adv. Mater., Angew. Chem., Appl. Phys. Lett., Biomacromol., Chem. Eur. J., Chem. Asian. J., Chem. Comm., Chem. Mater., Chem. Soc. Rev., Eur. J. Org. Chem., J. Appl. Phys., J. Appl. Polym. Sci., J. Am. Chem. Soc., J. Chem. Phys., J. Mater. Chem., J. Mater. Sci., J. Polym. Sci. A & B, Langmuir, Macromol. Chem. Phys., Macromol. Rapid Commun., Macromolecules, Nature, Nature Chemistry, Nature Materials, Nature Nano, Polymer, Polymer Chemistry, RSC Advances, Science, Soft Matter, Synthesis, Synth. Met., and others.

Award Committees

2018 - present Swiss Industry Science Fund – Swiss Chemical Society (SISF-SCS) Industrial Science Awards Board

2013 - 2015 Anselme Payen Award Committee (ACS Cellulose and Renewable Mat.Div.)

Reviewer Funding Agencies (last 5 years)

A. von Humboldt Foundation, Bavarian Ministry of Science and Education, European Research Council, FNR Luxembourg, German Ministry of Science and Education, German Research Foundation, Petroleum Research Funds, Swiss National Science Foundation, U.S. Civilian Research & Development Foundation, US Army Research Office, US Department of Energy, US National Science Foundation, and others.

Current Collaborators (last 5 years)

M. Borkovec (Geneva), J. Brugger (EPFL), J. Capadona (CWRU), A. Corcuera (Basque U.), S. Dubas (Bangkok), A. Eceiza (Basque U.), S. Eichhorn (Exeter), A. Fink (Fribourg), J. Foster (Virginia Tech), K. Fromm (Fribourg), J. Gilman (NIST), E. Gimenez (U. Politecnica de Valencia), T. Kato (Tokyo), A. Kilbinger (Fribourg), N. Kimizuka (Kyushu), M. Lattuada (Fribourg), F. Meinardi (Milan), A. Monguzzi (Milan), T. Nakamura (Hokkaido), H. Otsuka (Tokyo Tech), E. Oveisi (EPFL), E. Reichmanis (Georgia Tech), B. Rothen-Rutishauser (Fribourg), S.J. Rowan (Chicago), R. Rujiravanit (Chulalongkorn U.), Y. Sagara (Hokkaido), D. Schiraldi (CWRU), Y. Simon (USM), K. Singer (CWRU), F. Stellacci (EPFL), A. Studart (ETHZ), A. Takahara (Kyushu), N. Tamaoki (Hokkaido), G. Voirin (CSEM), N. Yanai (Kyushu), T. Zimmermann (EMPA), C. Zorman (CWRU)

Advisor of Postdoctoral Researchers (42)

Dr. Jimaja Sethun “Responsive Polymersomes“ (2020-present)
Dr. Jessica Clough “Polymer Mechanochemistry” (2020-present)
Dr. James Hemmer “Supramolecular Polymers“ (2019-present)
Dr. Guillaume Moriceau “Photonic Pigments“ (2019-present)
Dr. Philip Scholten “Responsive Polymersomes“ (2019-present)
Dr. Feyza Karazu Kilic “Shape Memory Polymers“ (2018-present)
Dr. Visuta Engkagul “Stimuli-Responsive Composites“ (2018-present)
Dr. Justin Zoppe “Nanocellulose“ (2017-2017), now Omya AG
Dr. Anuja Shirole “Smart Adhesives“ (2017-2018), now Lund University
Dr. Carlo Perotto “Smart Adhesives“ (2016-2018), now Sonova AG
Dr. Shraddha Chhatre “Smart Adhesives“ (2016-2018), now CSIR - NCL, Pune
Dr. Anselmo del Prado Abellán “Smart Adhesives“ (2016-2018), now Univ. Madrid
Dr. Dafni Moatsou “Mechanically Adaptive Nanocomposites“ (2015-2017), now Senior Res. KIT
Dr. Stephen Schrettl “Polymer Mechanochemistry” (2015-2017), now Group Leader AMI
Dr. Ester Verde Sesto “Polymer Mechanochemistry” (2015-2016), now UPV/EHU
Dr. Alexander Hähnel “Polymer Mechanochemistry” (2014-2015), now Freudenberg New Technol.
Dr. Yoshimitsu Sagara “Polymer Mechanochemistry” (2013-2015), now Assoc. Prof. TIT
Dr. Lucas Montero “Supramolecular Polymers” (2013-2014), now Scientific Coordinator NCCR
Dr. Burcak Icli “Mechanochemistry in Polymers” (2012-2015), now Schoeller Allibert SA
Dr. Hua Zou “Mechanically Adaptive Nanocomposites“ (2012-2013), now Asst. Prof. USST
Dr. Animesh Saha “Smart Adhesives” (2012-2013), now BASF
Dr. Katharina Gries “Smart Adhesives” (2012-2014), now Metrohm AG
Dr. Rebecca Parkhurst “Polymer Mechanochemistry” (2012-2014), now US Govt. Accountab. Off.
Dr. Shuo Bai “Mechanically Adaptive Composites“ (2011-2012), now Shenyang National Laboratory

Advisor of Postdoctoral Researchers (continued)

Dr. Matt Roberts “Adaptive Nanocomposites“ (2011-2013), now Switch Materials Inc. Canada

Dr. Pratheep Annamalai “BioNanocomposites“ (2010-2012), now Prof. Univ. of Queensland

Dr. Sandeep Kumar “BioPolymer Nanocomposites“ (2010-2012), now DuPont de Nemours

Dr. Gina Fiore “Supramolecular Metallopolymers“ (2009-2011), now Nestlé Research

Dr. Yoan Simon “Stimuli-Responsive Polymers“ (2009-2011), now Asst. Prof. USM

Dr. Johan Foster “Cellulose nanocomposites“ (2009-2011), now Assoc. Prof. Virginia Tech.

Dr. Julie Mendez “BioPolymer Nanocomposites“ (2009-2010), now Asst. Prof. IUPUC

Dr. Markus Geuss “Photonic Crystals “ (2009-2011), now Professor HEFR

Dr. Lorraine Hsu “Bio-Inspired, Stimuli-Responsive Polymers“ (2009-2010), now PPG

Dr. Liming Tang “Polymers with Integrated Sensing Capabilities“(2006-2010), now DayGlo Co.

Dr. O. Van den Berg “Semiconducting Polymer Nanowires” (2006-2007), now Univ. Gent

Dr. M. Schroeter “Conducting Poly(*p*-phenyleneethynylene)s” (2005-2007), now Teamleader GKSS

Dr. Jeff Capadona “Bio-Inspired, Stimuli-Responsive Polymers” (2005-2008), now Prof. CWRU

Dr. Dan Knapton “Organic/Inorganic Hybrid Polymers” (2004-2006), now Lubrizol

Dr. Param Iyer “Organic/Inorganic Hybrid Polymers” (2003-2004, now Assoc. Prof. IIT

Dr. Quinghui Chu “Proton-Conducting Membranes” (2002-2004), now U. Akron

Dr. M. Schroers “Smart Materials with Controllable Stiffness” (2002-2003), now BASF

Dr. Anja Palmans “Light-Polarizing Polymers” (1999-2000), now Prof. TU Eindhoven

Host of Visiting Scientists (2)

Dr. Maki Kinami Toyobo Research Center, Shiga, Japan (2004-2006)

Dr. C. Löwe EMPA, Dübendorf, Switzerland (2001-2002)

Advisor of Ph.D. Students (55)

Ilaria Onori “Supramolecular Polymers” (2020-present)

Franziska Marxer “Supramolecular Polymers” (2019-present)

Derek Kielbala “Mechanochemistry in Polymers” (2018-present)

Livius Muff “Mechanically Morphing Polymers” (2018-present)

Hanna Traeger “Mechanochemistry in Polymers” (2018-present)

Chris Rader “Biopolymers for Packaging Applications” (2018-present)

Claudio Cappelletti “Metallosupramolecular Polymers” (2018-present)

Marco Mareliati “Supramolecular Polymers“ (2017-present)

Gwendoline Delepierre “Hairy Cellulose Nanocrystals” (2017-present)

Baptiste Monney “Mechanically Adaptive Polymers“ (2017-present)

Aristotelis Kamtsikakis “Nanocomposite Membranes” (2017-present)

Felipe Saenz “Optical Upconversion in Nanostructured Polymers” (2016-present)

Diana Hohl “Polymers for Debonding on Demand Applications” (2016-2020), now AMS AG

Sandra Wohlhauser “Single Component Nanocomposites” (2016-present)

Julien Sauteaux “Supramolecular Polymers“ (2015-present), Now Philip Morris

Anne-Cécile Ferahian “Supramolecular Polymers” (2015-2019), now BHF Biel

Advisor of Ph.D. Students (continued)

Laura Neumann “Mechanochemistry in Polymers” (2015-2019), now Cabb AG
Céline Calvino “Mechanochemistry in Polymers” (2014-2018), now Postdoc U. Chicago
Luis Olacoea “Metallosupramolecular Polymers” (2014-present)
Worarin Meesorn “Mechanically Adaptive Nanomaterials” (2014-2019), now ZHAW Winterthur
Marc Karman “Mechanochemistry in Polymers” (2014-2019), now Markem-Imaje
Jens Natterodt “Mechanically Adaptive Nanocomposites” (2013-2016), now Dow/Dupont
Anuja Shirole “Mechanically Adaptive Nanocomposites” (2013-2017), now University of Lund
Apiradee Nicharat “Processing of Cellulose Nanocomposites” (2013-present), Now SCS
Anna Lavrenova “Mechanochemistry in Polymers” (2012-2016), Now Evonik
Mathieu Ayer “Metallosupramolecular Assemblies” (2012-2017), now Rolex
David Thevenaz “Mechanochemistry in Polymers” (2012-2016), now Armasuisse
Janak Sapkota “Processing of Cellulose Nanocomposites” (2012-2016), now M.U. Leoben
Christian Heinzmann “Supramolecular Adhesives” (2012-2015), now Bachem AG
Dirk Balkenende “Metallosupramolecular Polymers” (2012-2016), now ERIKS Sealing & Polymer
Roberto Vadrucci “Optical Upconversion in Polymers” (2011-2015), now Endress AG
Silvana Müller “Cellulose Aerogels” (2011-2014), now Nolax AG
Sandra Camarero “Anisotropic Cellulose Nanocomposites” (2011-2015), now Postdoc U. Maastricht
Tobias Kuhnt “Controlled Release from modified Cellulose Nanofibers” (2011-2015)
Souleymane Coulibaly “Supramolecular Metallopolymers” (2011-2014)
Soo-Hyon Lee “Optical Upconversion” (2011-2014), now NYC Data Science Academy
Mehdi Jorfi “Mechanically Adaptive Nanocomposites” (2011-2014), now Harvard Medical School
Mahesh Biyani “Mechanically Adaptive Nanocomposites” (2011-2014), now Halliburton
Bastien Schyrr “New Polymer Based Sensors” (2010-2014), now Theranoptics
Sonia Kracht “Mechanochemistry in Polymers” (2009-2012), now U. Fribourg
Kadhir Shanmuganathan “Responsive Cortical Implants” (2006-2010), now Asst. Prof. CSIR-NCL
Brian Makowski “Dynamic Photonic Crystals” (2006-2011), now Sherwin Williams
Joe Lott “Functional Multilayer Polymer Films” (2006-2010), now Kodak
Mark Burnworth “Metallosupramolecular Polymers” (2005-2011), now Sherwin Williams
James Mendez “Charge Transport in Conjugated Polymers” (2005-2010), now Asst. Prof. IUPUC
Jill Kunzelman “Polymers with Integrated Sensing Capabilities” (2004-2009), now PolyOne
Brent Crenshaw “Polymer Chameleons” (2002-2006), now Bayer MaterialScience
Akshay Kokil “Conjugated Polymer Networks” (2001-2005), now U. Mass. Lowell
Sven Zimmermann “Orientation of Discotic Liquid Crystals” (U. Marburg 2004), now Novaled
Christoph Kocher “Anisotropic Functional Polymer Systems” (1999-2003), now Landqart
Moritz Ehrenstein “Polyamides with Long Alkane Segments” (1999-2003), now BASF
Andrea Montali “Light-Emitting Polymer Displays” (1996-1999), now Synthes
R. Chandrakanthi “Investigation of Pernigraniline” (1996-1999), now Professor U. Peradeniya
Daniel Steiger “Poly(*p*-phenylene alkylene)s” (1996-1999), now Ethicon Products

Research Advisor of Master Students (20)

Nicolas Stankovis “Upconverting Polymers” (2018-present)
Sandra Graterol “New Polymer Systems” (2015-2015), now AMI
Luis Miguel Olachea “Supramolecular Polymers” (2013-2014), now AMI
Mathieu Ayer “Supramolecular Polymers” (2011-2012), now Rolex
David Thevenaz “Optical Upconversion with Metal-Free Dyes” (2011-2012), now Armasuisse
Charles Sing “Polymeric Threshold Temperature Sensors“ (2008), now Asst. Prof. UIUC
James Kostka “Light-Emitting Polymers “ (2008-2010), now General Electric Co.
Claire Rademaker “Synthesis of Conjugated Polymer Networks“ (2005-2006), now US PTO
Eric Hittinger “Conjugated Polymer Networks” (2002-2003), now Asst. Prof. RIT
Ravi Tangirala “Photo-Patternable Nanomaterials” (2002-2003), now U. Mass. Amherst
Christian Huber “Conjugated Polymer Networks” (2001), now EMPA
Katharina Sigg “Optical Sealing of Polymers” (2001)
Christoph Kocher “Patterning of Functional Polymer Systems” (2000), now Landqart
Magnus Kristiansen “Proton-Conducting Membranes” (2000), now Prof. FHNW
Michael Eglin “Thermoplastic Processing of Photoluminescent Polarizers” (1999)
Simon Amhof “Polarizing Energy Transfer in Photoluminescent Polymers” (1998)
Claude Curti “Poly(*p*-phenylene ethynylene) Light-Emitting Diodes” (1998)
Florian Dötz “Synthesis of Novel Poly(*p*-phenylene ethynylene)s” (1997)
Moritz Ehrenstein “Poly(*p*-phenylene alkylene)s - a Class of Forgotten Polymers” (1997)
Christian Sarwa “Polarized Light Emission from Oriented Polymers” (1997)

Research (~60) and Academic (~30) Advisor of Undergraduate Students

