

Justin Orazio ZOPPE

PERSONAL INFORMATION

Institutional address:

Adolphe Merkle Institute
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<http://ami.swiss/en/groups/polymer-chemistry-and-materials/>



Research Field: Materials Science & Engineering

Researcher ID: G-9021-2012

ORCID: 0000-0002-3599-9227

Date of birth: 24.1.1983

Nationality: American

Civil Status: Married, 2 children

EDUCATION

- 2011 PhD Forest Biomaterials, "Surface modification of nanocellulose substrates"
Defense Date: 23 March 2011
Dissertation: <https://repository.lib.ncsu.edu/handle/1840.16/6771>
Department of Forest Biomaterials (formerly Wood & Paper Science), North Carolina State University, USA
- 2005 Bachelor of Science, Chemistry, *cum laude*, with Honors, Mathematics minor
Department of Chemistry & Biochemistry, University of North Carolina at Wilmington, USA

PROFESSIONAL APPOINTMENTS

- 2017- Group Leader, Ambizione Fellow
Polymer Chemistry & Materials, Adolphe Merkle Institute, University of Fribourg, Switzerland
- 2014-2017 Scientist, EPFL Fellow co-funded by Marie Skłodowska-Curie
Polymers Laboratory, Institute of Materials, School of Engineering, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland
- 2013 Research Scientist
Oil & Mining Services, Clariant Produkte (Deutschland) GmbH, Germany
- 2011-2012 Postdoctoral Fellow
Polymer Technology, School of Chemical Technology, Aalto University, Finland
- 2006-2007 Analytical Chemist
Linde Industrial Gases, Research Triangle Park, NC, USA

CURRENT INSTITUTIONAL RESPONSIBILITIES

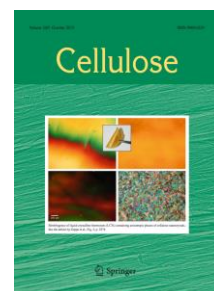
- Supervision of PhD students (Cellulose subgroup leader)
- Teaching (teaching assistant, lecturer) at undergraduate and Master's level
- Organization of subgroup meetings & individual meetings
- Coordination & upkeep of the institutional intranet
- Assisting with writing of grant proposals, reports, budgets for group projects
- Proof-reading scientific disseminations (papers, reports, theses, posters)
- Maintenance of laboratory equipment
- Organization & teaching of outreach programme (KidsUni)
- Co-organization of the Adolphe Merkle Institute seminar series

PUBLICATIONS

Refereed Journal Articles (17 published, 2 in preparation)

- 1) Graterol, S.; Delepierre, G.; Morandi, G.; Thielemans, W.; Weder, C.; **Zoppe, J. O.**; Grafting polymers from cellulose nanocrystals: synthesis, properties and applications, *Macromolecules* **2018**, *in preparation* (**invited Perspective article**).
- 2) Natterodt, J.C.; Meesorn, W.; **Zoppe, J.O.**; Weder, C.; Functionally graded polyurethane/cellulose nanocrystal composites, *in preparation*.
- 3) Natterodt, J.C.; Shirole, A.; Sapkota, J.; **Zoppe, J.O.**; Weder, C.; Polymer nanocomposites with cellulose nanocrystals made by co-precipitation, *Journal of Applied Polymer Science* **2017**, *134*, 45648.
- 4) **Zoppe, J. O.**; Dupire, A.; Lachat, T.; Lemal, P.; Rodriguez-Lorenzo, L.; Petri-Fink, A.; Weder, C.; Klok, H-A.; Cellulose nanocrystals with tethered polymer chains: chemically patchy versus uniform decoration, *ACS Macro Letters* **2017**, *6*, 892-897.
- 5) Natterodt, J.; Petri-Fink, A.; Weder, C.; **Zoppe, J. O.**; Cellulose nanocrystals: surface modification, applications and opportunities at interfaces. *CHIMIA* **2017**, *71*, 376-383.
- 6) **Zoppe, J. O.**; Cavusoglu Ataman, N.; Mocny, P.; Wang, J.; Moraes, J.; Klok, H-A.; Surface-initiated controlled radical polymerization: state-of-the-art, opportunities and challenges in surface and interface engineering with polymer brushes. *Chemical Reviews* **2017**, *117*, 1105–1318.
- 7) **Zoppe, J. O.**; Xu, X.; Känel, C.; Orsolini, P.; Siqueira, G.; Tingaut, P.; Zimmermann, T.; Klok, H-A.; Effect of surface charge on surface-initiated atom transfer radical polymerization from cellulose nanocrystals in aqueous media. *Biomacromolecules* **2016**, *17*, 1404–1413.
- 8) Wallenius, J.; Pahimanolis, N.; **Zoppe, J. O.**; Kilpeläinen, P.; Master, E.; Ilvesniemi, H.; Seppälä, J.; Eerikäinena, T.; Ojamo, H.; Continuous propionic acid production with *Propionibacterium acidipropionici* immobilized in novel xylan hydrogel matrix. *Bioresource Technology* **2015**, *197*, 1-6.
- 9) Kafle, K.; Lee, C. M.; Shin, H.; **Zoppe, J. O.**; Johnson, D. K.; Kim, S. H.; Park, S.; Effects of delignification on crystalline cellulose in lignocellulose biomass characterized by sum frequency generation spectroscopy and X-ray diffraction. *BioEnergy Research* **2015**, 1-9.

- 10) **Zoppe, J. O.**; Johansson, L-S; Seppälä, J.; Manipulation of cellulose nanocrystal surface sulfate groups toward biomimetic nanostructures in aqueous media. *Carbohydrate Polymers* **2015**, 126, 23-31.
- 11) Park, J.; Shin, H.; Yoo, S.; **Zoppe, J. O.**; Park, S.; Delignification of lignocellulosic biomass and its effect on subsequent enzymatic hydrolysis. *BioResources* **2015**, 10 (2), 2732-2743.
- 12) **Zoppe, J. O.**; Ruottinen, V.; Ruotsalainen, J.; Rönkkö, S.; Johansson, L-S; Järvinen, K.; Hinkkanen, A.; Seppälä, J.; Synthesis of cellulose nanocrystals carrying tyrosine sulfate mimetic ligands and inhibition of alphavirus infection. *Biomacromolecules* **2014**, 15 (4), 1534–1542.
- 13) **Zoppe, J. O.**; Grosset, L.; Seppälä, J.; Liquid crystalline thermosets based on anisotropic phases of cellulose nanocrystals. *Cellulose* **2013**, 20 (5), 2569-2582. (featured on issue cover)
- 14) **Zoppe, J. O.**; Venditti, R. A.; Rojas, O. J.; Pickering emulsions stabilized by cellulose nanocrystals grafted with thermo-responsive polymer brushes. *J. Colloid Interface Sci.* **2012**, 369 (1), 202-209.
- 15) **Zoppe, J. O.**; Österberg, M.; Venditti, R. A.; Laine, J.; Rojas, O. J.; Surface interaction forces of cellulose nanocrystals grafted with thermo-responsive polymer brushes. *Biomacromolecules* **2011**, 12 (7), 2788-2796.
- 16) **Zoppe, J. O.**; Habibi, Y.; Rojas, O. J.; Venditti, R. A.; Johansson, L-S.; Efimenko, K.; Österberg, M.; Laine, J.; Poly(N-isopropylacrylamide) brushes grafted from cellulose nanocrystals via surface-initiated single-electron transfer living radical polymerization. *Biomacromolecules* **2010**, 11 (10), 2683-2691.
- 17) Peresin, M. S.; Habibi, Y.; **Zoppe, J. O.**; Pawlak, J. J.; Rojas, O. J.; Nanofiber composites of polyvinyl alcohol and cellulose nanocrystals: manufacture and characterization. *Biomacromolecules* **2010**, 11 (3), 674-681.
- 18) **Zoppe, J. O.**; Peresin, M. S.; Habibi, Y.; Venditti, R. A.; Rojas, O. J.; Reinforcing poly(ϵ -caprolactone) nanofibers with cellulose nanocrystals. *ACS Appl. Mater. Interfaces* **2009**, 1 (9), 1996-2004.
- 19) **Zoppe, J. O.**; Parkinson, M. L.; Messina, M.; A variational solution of the time-dependent Schrödinger equation by a restricted superposition of frozen Gaussian wavepackets. *Chem. Phys. Lett.* **2005**, 407 (4-6), 308-314.



Book Chapters

- 1) **Zoppe, J. O.**; Larsson, P.; Cusola, O.; Surface modification of nanocellulosics and functionalities, in *Lignocellulosics: Valuable renewables for tailored functional materials and modern nanotechnology*, Editors: Filpponen, I., Peresin, M. S. and Nypelö, T., Elsevier **2017**, In press.
- 2) Peresin, M. S.; **Zoppe, J. O.**; Vallejos, M. E.; Habibi, Y.; Hubbe, M. A.; and Rojas, O. J.; Nano- and microfiber composites reinforced with cellulose nanocrystals, in *Cellulose Based Composites: New Green Nanomaterials*, Editors: Hinestroza, J. and Netravali, A., Wiley-VCH **April 2014**.

GRANTS & FELLOWSHIPS

- 2017- 600,000 CHF - Ambizione Fellowship, Swiss National Science Foundation (SNSF), Adolphe Merkle Institute, University of Fribourg, Switzerland
Grant no. PZ00P2_167900
- 2015-2017 68,000 EUR - EPFL Fellowship co-funded by Marie Skłodowska-Curie, Institute of Materials, School of Engineering, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland
Grant no. 291771
- 2007-2011 USDA National Needs Fellowship (NNF), Department of Forest Biomaterials, North Carolina State University, USA
Grant no. 2007-38420-17772
- 2005 Graduate Assistance in Areas of National Need (GAANN) Fellowship, Department of Chemistry & Biochemistry, Georgia Institute of Technology, USA

AWARDS & HONORS

- 2011 TAPPI International Conference on Nano for Renewable Materials Student Poster Competition, 1st Prize
- 2009 Eastman Chemical Company Graduate Student Award, 1st Prize, NC State University
- 2005 Honors in Theoretical Chemistry, University of North Carolina at Wilmington
- 2005 Hypercube Scholar Award, University of North Carolina at Wilmington

INVITED TALKS

- 2017 “Polysaccharide nanocrystals: colloidal building blocks prepared by a top-down approach for bottom-up engineering of complex structures,” Institute for Paper, Pulp and Fibre Technology, Graz University of Technology, Austria
- 2017 “Polysaccharide nanocrystals: colloidal building blocks prepared by a top-down approach for bottom-up engineering of complex structures,” Institute of Chemical Sciences & Engineering, École Polytechnique Fédérale de Lausanne (EPFL), Sion, Switzerland
- 2017 “Experiences of a COFUND Fellow,” Euresearch Horizon 2020 MSCA COFUND Information Event, Bern, Switzerland
- 2015 “Factors influencing copper-mediated polymerization initiated from surfaces in aqueous media,” Academy of Finland's Centre of Excellence in Molecular Engineering of Biosynthetic Hybrid Materials Research, Aalto University, Finland

CONFERENCE ACTIVITY

- 1) **Zoppe, J. O.**; Rojas, O. J.; Klok, H.-A.; Surface engineering of cellulose nanocrystals via controlled radical polymerization. *10th World Congress of Chemical Engineering, Joint Event – Nanocelluloses, October 1-5, 2017, Barcelona, Spain.*
- 2) **Zoppe, J. O.**; Polymer grafting from cellulose nanocrystals: new synthetic pathways, properties and applications. *5th EPNOE International Polysaccharide Conference 2017, August 20-24, 2017, Jena, Germany.*
- 3) **Zoppe, J. O.**; Dupire, A.; Klok, H.-A.; Effect of cellulose nanocrystal chirality on the stereochemistry of surface-tethered polymers. *Abstracts of Papers, 253rd ACS National Meeting & Exposition, San Francisco, CA, United States, April 2-6, 2017, CELL-328.*
- 4) **Zoppe, J. O.**; Johansson, L.-S.; Seppälä, J.; Klok, H.-A.; Tailoring the surface chemistry of cellulose nanocrystals in aqueous media: From small molecules to polymer brushes. *Abstracts of Papers, 251st ACS National Meeting & Exposition, San Diego, CA, United States, March 13-17, 2016, CELL-32.*
- 5) **Zoppe, J. O.**; Klok, H.-A.; Tailoring Interfacial Properties of Cellulose Nanocrystals via Surface-Initiated Controlled Radical Polymerization for Nanomedicine. *Kármán Conference, From Molecular Materials to Complex Adaptive Molecular Systems, Poster session, Vaals, Netherlands, October 11-15, 2015.*
- 6) **Zoppe, J. O.**; Siqueira, G.; Orsolini, P.; Tingaut, P.; Zimmermann, T.; Klok, H.-A.; Surface-initiated controlled radical polymerization from cellulose nanomaterials. *Swiss Chemical Society Fall Meeting, Lausanne, September 4, 2015.*
- 7) **Zoppe, J. O.**; Österberg, M.; Laine, J.; Rojas, O. J.; Surface interaction forces in nanocellulose systems. *89th ACS Colloid and Surface Science Symposium, Pittsburgh, PA, United States, June 15-17, 2015, COLL-296.*
- 8) **Zoppe, J. O.**; Xu, X.; Känel, C.; Klok, H.-A.; Surface-initiated controlled radical polymerization from cellulose nanocrystals in the presence of Cu⁰. *P²M Precision Polymer Materials, European Science Foundation Research Networking Program, Poster session, Lacanau, France, May 26-29, 2015.*
- 9) **Zoppe, J. O.**; Xu, X.; Klok, H.-A.; Effect of the electrical double layer on surface-initiated controlled radical polymerization from cellulose nanocrystals in aqueous media. *Abstracts of Papers, 249th ACS National Meeting & Exposition, Denver, CO, United States, March 22-26, 2015, POLY-89.*
- 10) **Zoppe, J. O.**; Ruottinen, V.; Ruotsalainen, J.; Rönkkö, S.; Johansson, L-S; Järvinen, K.; Hinkkanen, A.; Seppälä, J.; Inhibition of alphavirus infection with tyrosine sulfate mimetic cellulose nanocrystals. *Abstracts of Papers, 249th ACS National Meeting & Exposition, Denver, CO, United States, March 22-26, 2015, CELL-10.*
- 11) Zhang, Y.; **Zoppe, J. O.**; Rojas, O. J.; Surface modification of nanocellulose to engineer responsive materials. *Abstracts of Papers, 249th ACS National Meeting & Exposition, Denver, CO, United States, March 22-26, 2015, CELL-197.*

- 12) **Zoppe, J. O.**; Ruottinen, V.; Ruotsalainen, J.; Rönkkö, S.; Johansson, L-S; Järvinen, K.; Hinkkanen, A.; Seppälä, J.; Inhibition of alphavirus infection by multivalent cellulose nanocrystals, “tyrosine sulfate mimetics.” *2014 TAPPI International Conference on Nanotechnology for Renewable Materials, Vancouver, CA, June 23-26, 2014.*
- 13) Kafle, K.; Lee, C.; Shin, H.; **Zoppe, J. O.**; Johnson, D. K.; Kim, S. H.; Park, S.; Changes in cellulose crystalline structure in lignocellulosic biomass during delignification studied by sum frequency generation (SFG) spectroscopy and X-ray diffraction (XRD). *Abstracts of Papers, I3AIChE Annual Meeting, San Francisco, CA, United States, November 3-8, 2013.*
- 14) **Zoppe, J. O.**; Johansson, L.-S.; Seppälä, J.; Design and synthesis of multivalent cellulose nanocrystals carrying tyrosine sulfate mimetic ligands. *Abstracts of Papers, 243rd ACS National Meeting, San Diego, CA, United States, March 25-29, 2012.*
- 15) **Zoppe, J. O.**; Rojas, O. J.; Österberg, M.; Venditti, R. A.; Laine, J.; Surface interaction forces of cellulose nanocrystals grafted with thermo-responsive polymer brushes. *85th ACS Colloid and Surface Science Symposium, Montreal, QC, Canada, June 19-22, 2011, COLLSYMP-15.*
- 16) **Zoppe, J. O.**; Rojas, O. J.; Österberg, M.; Venditti, R. A.; Laine, J.; Thermo-responsive polymer brushes grafted from cellulose nanocrystals and their interfacial behavior. *2011 TAPPI International Conference on Nanotechnology for Renewable Materials, Arlington, VA, June 6-8, 2011.*
- 17) **Zoppe, J. O.**; Habibi, Y.; Rojas, O. J.; Venditti, R. A.; Johansson, L.-S.; Efimenko, K.; Österberg, M.; Laine, J.; Stimuli-responsive polymer brushes grafted from cellulose nanocrystals via SET-LRP: suspension and surface behavior. *2010 TAPPI International Conference on Nanotechnology for Renewable Materials, Espoo, Finland, September 27-29, 2010.*
- 18) **Zoppe, J. O.**; Habibi, Y.; Rojas, O. J.; Venditti, R. A.; Johansson, L.-S.; Efimenko, K.; Österberg, M.; Laine, J.; Cellulose nanocrystals grafted with poly(N-isopropylacrylamide) brushes via surface-initiated atom transfer radical polymerization. *47th Nordic Polymer Days Conference, Helsinki, Finland, May 24-26, 2010.*
- 19) Peresin, M.S.; **Zoppe, J.O.**; Habibi, Y.; Rojas, O.J.; Composite nano- and micro-fibers with cellulose nanocrystals. *TAPPI International Conference on Nanotechnology for the Forest Products Industry, Edmonton, Canada, June 23-26, 2009.*
- 20) Peresin, M. S.; **Zoppe, J.**; Habibi, Y.; Rojas, O. J., Electrospun nanocomposites of cellulose nanocrystals in poly(caprolactone) and poly(vinyl alcohol) for various applications. *Abstracts of Papers, 237th ACS National Meeting, Salt Lake City, UT, United States, March 22-26, 2009, CELL-179.*
- 21) **Zoppe, J.**; Habibi, Y.; Efimenko, K.; Genzer, J.; Rojas, O. J., ATRP modification of nanocellulose substrates. *Abstracts of Papers, 237th ACS National Meeting, Salt Lake City, UT, United States, March 22-26, 2009, CELL-046.*
- 22) **Zoppe, J.**; Peresin, M. S.; Habibi, Y.; Rojas, O. J., Nanocomposites of cellulose nanocrystals produced by electrospinning and their applications. *Abstracts of Papers, 237th ACS National Meeting, Salt Lake City, UT, United States, March 22-26, 2009, CELL-079.*
- 23) **Zoppe, J.**; Habibi, Y.; Rojas, O. J., ATRP modification of cellulose fibers and nanocrystals. *Abstracts of Papers, 235th ACS National Meeting, New Orleans, LA, United States, April 6-10, 2008, CELL-057.*

- 24) Spence, K. L.; Rojas, O. J.; Venditti, R. A.; **Zoppe, J.**, Natural surfactants in paper recycling. *Abstracts of Papers, 235th ACS National Meeting, New Orleans, LA, United States, April 6-10, 2008*, COLL-039.
- 25) Habibi, Y.; Turon, X.; Ahola, S.; Österberg, M.; **Zoppe, J.**; Rojas, O. J., Langmuir-Blodgett films of cellulose nanocrystals and their interfacial behavior. *Abstracts of Papers, 235th ACS National Meeting, New Orleans, LA, United States, April 6-10, 2008*, CELL-102.

CAMPUS / DEPARTMENTAL TALKS

- 2010 "Synthesis & surface interaction forces of thermoresponsive polymer brushes grafted from cellulose nanocrystals," Departmental Seminar, Department of Forest Biomaterials, North Carolina State University, USA

TEACHING EXPERIENCE

Supervision of Graduate / Undergraduate Students

- 2017- 4 Doctoral Students & 2 Visiting Doctoral Students
Adolphe Merkle Institute, University of Fribourg, Switzerland
- Gwendoline Delepierre (current)
"Symmetric and Asymmetric Twisted Nanorods with End-Tethered Polymer Chains"
 - Aristotelis Kamtsikakis (current)
"Leaf Cuticle-Inspired Membranes"
 - Worarin Meesorn (current)
"Stimuli-Responsive Polymer Nanocomposites with Cellulose Nanocrystals and Encapsulated Plasticizers"
 - Sandra Wohlhauser (current)
"One-Component Nanocomposites based on Hairy Nanorods"
- 2014-2016 5 Master's Students
Institute of Materials, School of Engineering, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland
- Alix Vaimiti Marie Dupire (Fall 2016)
"Reducing end group-initiated controlled radical polymerization from cellulose nanocrystals"
 - Clémence Maire-Laure Piquart (Spring 2016)
"Multivalent cellulose nanocrystals as viral entry inhibitors"
 - Théo Gaston Gérard Lachat (Spring 2016)
"Production and morphology characterization of cellulose nanocrystals"
 - Joan Jornod (Spring 2015)
"Cu⁰-catalyzed surface-initiated controlled radical polymerization of 2-hydroxyethyl methacrylate"

- Xingyu Xu (Fall 2014)
“Surface-initiated controlled radical polymerization from cellulose nanocrystals in aqueous media”

2012 I Undergraduate Summer Trainee Project
Department of Biotechnology & Chemical Technology, Aalto University, Finland

- Lucas Grosset (May-July)
“Liquid crystalline thermosets based on anisotropic phases of cellulose nanocrystals”

Courses

2017 Lecturer – “Preparation of Mechanochromic Polymers,” Master’s in Chemistry & Physics of Soft Materials, Fall 2017, Adolphe Merkle Institute, University of Fribourg - Switzerland

2015 Lecturer - “Dilute Solutions,” Physical Chemistry of Polymeric Materials, Spring 2015, Ecole Polytechnique Fédérale de Lausanne (EPFL) - Switzerland

2011 Lecturer - “How I have used surface analytical techniques in my research,” Surface Interactions of Biomaterials, Fall 2011, Aalto University- Espoo, Finland

2007 Teaching Assistant – Paper Properties Laboratory, Fall 2007, North Carolina State University, USA

2005 Teaching Assistant – General Chemistry Laboratory, Fall 2005, Georgia Institute of Technology, USA

SERVICE TO PROFESSION

Commissions of Trust

2015 Evaluator, The Research Foundation – Flanders, Belgium (FWO)

2011- Reviewer, 12 peer-reviewed journals covering polymer science/materials engineering fields, <https://publons.com/a/559170/>

Organization of Scientific Meetings

2018 Organizer – 255th ACS National Meeting, “Functional structures from wood-based materials,” March 18-22, 2018

2018 Organizer - 11th Young Faculty Meeting, Swiss Academy of Sciences (SCNAT), Platform Chemistry, June 2018

2017 Symposium Presider – 253rd ACS National Meeting, Functional Lignocellulosics & Nanotechnology, USA

2016 Symposium Presider – 251st ACS National Meeting, Functional Lignocellulosics & Nanotechnology, USA

- 2012-2013 Assistant Webinar Coordinator – TAPPI Nanotechnology Division’s Product Resources & Development Team
- 2010 ACS Cellulose & Renewable Materials Division Strategic Planning Session

Workshops

- 2015 NTN Innovative Surfaces™ Workshop - “New approaches to polymer modification for antimicrobial effects” – ETH Zürich, Switzerland
- 2015 NTN Innovative Surfaces™ Workshop - “Strategies to reduce catheter-associated urinary tract infections” – EMPA, St. Gallen, Switzerland

MEDIA COVERAGE

- 2014 Press release - “Nanocrystalline cellulose modified into an efficient viral inhibitor,” (http://chem.aalto.fi/en/current/current_archive/news/2014-04-15/)

RELATED PROFESSIONAL SKILLS / TRAINING

- 2017 Technology Transfer & Innovation Workshop, Adolphe Merkle Institute, Fribourg, Switzerland
- 2017 ERC Starting & Consolidator Grant Applicant Training, Euresearch, University of Fribourg, Switzerland
- 2016 H2020 Funding Opportunities Workshop, EPFL Research Office, Lausanne, Switzerland
- 2016 Research Data Management Bootcamp, EPFL Research Office, Lausanne, Switzerland
- 2016 H2020 Open Access & Open Research Data Training, EPFL Research Office, Lausanne, Switzerland
- 2016 Research Ethics & Integrity Training, EPFL Research Office, Lausanne, Switzerland

LANGUAGES

Language	Common European Framework of Reference for Languages (CEFR)
English	Native
Spanish	C1
German	B2
Catalan	B1

PROFESSIONAL MEMBERSHIPS / AFFILIATIONS

- 2016- Member, European Colloid & Interface Society (ECIS)
- 2016- Member, Materials Research Society (MRS)
- 2014- Member, Swiss Chemical Society (SCS), Division of Polymers, Colloids & Interfaces
- 2011- Professional Member, Technical Association of the Pulp & Paper Industry (TAPPI)
- 2007- Member, American Chemical Society (ACS), Cellulose & Renewable Materials Division, Division of Colloid & Surface Chemistry

MAJOR COLLABORATIONS

Alke Petri-Fink, Nanoparticle characterization, University of Fribourg, Switzerland

Seong H. Kim, Sum frequency generation spectroscopy (SFG), Department of Chemical Engineering, Pennsylvania State University, USA

David K. Johnson, Biomass conversion, Biosciences Center, National Renewable Energy Laboratory (NREL), USA

Leena-Sisko Johansson, X-ray photoelectron spectroscopy (XPS), Department of Forest Products Technology, Aalto University, Finland

Tanja Zimmermann, Functional lignocellulosic materials, Laboratory for Applied Wood Materials, EMPA, Switzerland