



# Dr. Jan P. F. Lagerwall

ResearcherID: A-2090-2009

ORCID: 0000-0001-9753-1147

Scopus ID 6602191293

ResarchGate: Jan\_Lagerwall

University of Luxembourg

Physics & Materials Science Research Unit

[www.lcsoftmatter.com](http://www.lcsoftmatter.com)

## Profile

Internationally active soft matter physicist with strong interest also in materials science, physical chemistry and—very much so—cross-disciplinary activities. The driving force is a deep fascination and enthusiasm for the scientific beauty of the field as well as the diverse application possibilities. Experience from multiple world-class academic research & teaching environments in five countries on three continents. Long-term core expertise in liquid crystals—thermotropic and lyotropic—expanded with activities in electrospinning, microfluidics and colloids, leading modern liquid crystal science to new directions, with wearable technology, soft robotics and bioderived performance materials being our main applied long-term objectives. Active in relationship building and networking, with a record of organizing and leading international multi-expertise scientific teams. Efficient in delivering complex information to diverse audiences thanks to enthusiasm and good skills in written and spoken communication, with support of multiple digital media as well as hands-on experiments and demonstrations.

## Qualifications

M.Sc. (Engineering physics)	04/11/1 997	Chalmers University of Technology, Department of Microwave Technology, Göteborg, Sweden Thesis: <i>Optical Implementation of Neural Networks for Pattern Recognition.</i>
Techn. Lic. (Materials science)	02/18/2 000	Chalmers University of Technology, Department of Microelectronics and Nanosciences / Department of Physics, Göteborg, Sweden Thesis: <i>Phase Characterization of Polar Liquid Crystals Using Dielectric Spectroscopy</i>
Ph.D. (Materials science)	05/08/2 002	Chalmers University of Technology, Department of Microelectronics and Nanosciences / Department of Physics, Göteborg, Sweden Thesis: <i>Structures and Properties of the Chiral Smectic C Liquid Crystal Phases —Ferro- and Antiferroelectricity in Soft Matter.</i>
Docent (Physics)	04/05/2 007	Chalmers University of Technology, Department of Physics, Göteborg, Sweden Docent lecture title: <i>Liquid crystals in modern soft matter physics research</i>
Dr. Habil. (Physical Chemistry)	12/14/2 010	Martin-Luther-Universität Halle-Wittenberg, Faculty of Natural Sciences II, Institute of Chemistry, Halle, Germany Habilitation thesis title: <i>Three Facets of Modern Liquid Crystal Science</i>

## Academic experience

04/2015-03/2020	PI of ERC Consolidator grant “ <b>INTERACT</b> ”	Luxembourg
since 03/2014	Professor, University of Luxembourg, Physics & Materials Science Research Unit	Luxembourg
04/2013 - 02/2014	Associate professor, Seoul National University, Graduate School of Convergence Science & Technology	Suwon, Korea
09/2010 - 03/2013	Assistant professor, Seoul National University, Graduate School of Convergence Science & Technology	Suwon, Korea
09/2007 - 08/2010	Research group leader, Institute of Chemistry - Physical Chemistry, Martin Luther University Halle-Wittenberg	Halle, Germany
07/2003 - 08/2007	Post-doc, University of Stuttgart, Institute of Physical Chemistry (group of Prof. F. Giesselmann)	Stuttgart, Germany
05/2007	Visiting researcher, University of Washington, Department of Chemistry (group of Prof. Y. Xia)	Seattle (WA), USA
01-05/2003	Post-doc, Technical University Berlin, Institute of Physical and Theoretical Chemistry (group of Prof. G. Heppke)	Berlin, Germany
10-12/2002	Post-doc, University of Colorado, Physics Department (group of Prof. N. A. Clark)	Boulder (CO), USA
10/1997 - 09/2002	Doctoral student, Chalmers University of Technology, Physics Department (advisor: Prof. B. Stebler)	Göteborg, Sweden
08-11/2001	Visiting researcher, Technical University Clausthal, Institute of Physical Chemistry (group of Prof. P. Zugenmaier)	Clausthal-Zellerfeld, Germany

## Education

08/1986 - 06/1989	Scientific high school education, Göteborgs Högre Samskola	Göteborg, Sweden
09/1991 - 04/1997	Master studies, Chalmers University of Technology	Göteborg, Sweden
09/1994 - 06/1995	Courses at humanistic faculties, Göteborgs universitet (philosophy, religion and history of economics)	Göteborg, Sweden
10/1997 - 05/2002	Doctoral studies, Chalmers University of Technology	Göteborg, Sweden

## Skills, knowledge and qualities

- Thorough expertise in modern experimental research in liquid crystals, polymers and colloids;
- Deep understanding in the physics/physical chemistry of thermotropic & lyotropic liquid crystals;
- Broad knowledge base thanks to an M.Sc. in physics, Ph.D. in materials science and long-term post-doctoral research in chemistry, always with an interest in cross-disciplinary topics;
- Up-to-date overview of current developments in materials/soft matter research and technology;
- Rich in initiative and innovative power, confirmed through multiple research grants and fellowships;
- Inspiring teacher and advisor, recognized for outstanding presentation, speaking and writing skills;
- Fluent in English, German and Swedish, near fluent in French, and communicating in Italian;
- Actively uses modern computing tools and the web for reaching the highest efficiency in conducting and presenting research.

## Main academic accomplishments (with the support of my research group)

- First experimental realization of liquid crystal elastomers with negative order parameter ground state;
- Fractionation of cellulose nanocrystal suspensions based on liquid crystal–isotropic phase separation, resulting in greatly expanded equilibrium cholesteric phase behavior, and clarification of the gel–equilibrium balance;
- Elucidation of the photonic cross communication between short-pitch cholesteric shells or drops and recognition of the potential of the generated patterns in authentication;
- First realizations of polymerized or polymer-stabilized liquid crystal shells, for curved elastomeric actuators (functioning as micropumps) or for rendering liquid crystal shells and their internal structures permanent;
- First production of liquid crystal-functionalized electrospun non-woven fiber mats and demonstration of their application potential in VOC sensing and photonic crystal fibers;
- First production of smectic liquid crystalline shells via microfluidics and analysis of the internal structures, defect arrangements and the effects of phase transitions;
- Delivered teaching in physics and chemistry with top evaluations and pedagogical awards;
- Main organizer of the events [TEDxUniversityofLuxembourg](#) 2018 and [TEDxSNUSuwon](#) 2013, and many other activities in public outreach.

## Publications & presentations

- 91 peer-reviewed scientific journal articles, 9 book chapters, 1 edited book, 1 patent, 2 book reviews, 2 popular science articles, 4 theses
- h-index: 31 (ISI); total number of citations: 3419 (ISI)
- 54 invited oral conference presentations (presenting author), seven invited tutorial/public lectures

Five representative journal articles:

- ▶ Liquid Crystal Elastomer Shell Actuators with Negative Order Parameter  
Venkata Subba Rao Jampani, Ross. H. Volpe, Kevin Regungo de Sousa, Joana Ferreira Machado, Christopher M. Yakacki **J.P.F.L.**, *Sci. Advances*, **5**, 4, eaaw2476 (2019)
- ▶ Fractionation of cellulose nanocrystals: enhancing liquid crystal ordering without promoting gelation  
Camila Honorato-Rios, Claudius Lehr, Christina Schütz, Roland Sanctuary, Mikhail A. Osipov Jörg Baller, **J.P.F.L.**, *NPG Asia Materials*, **10**, 455-465 (2018)
- ▶ Cholesteric liquid crystal shells as enabling material for information-rich design and architecture  
M. Schwartz, G. Lenzini, Y. Geng, P. Rønne, P. Ryan, **J.P.F.L.**, *Adv. Mater.*, **30**, 30, p. 1707382 (2018), [open access](#)
- ▶ Taming Liquid Crystal Self-Assembly: The Multifaceted Response of Nematic and Smectic Shells to Polymerization  
J. Noh, B. Henx, **J.P.F.L.**, *Adv. Mater.*, DOI 10.1002/adma.201603158 (2016)
- ▶ Nematic-smectic transition under confinement in liquid crystalline colloidal shells  
H.-L. Liang, S. Schymura, P. Rudquist and **J.P.F.L.**, *Phys. Rev. Lett.*, **106**, 24, 247801 (2011)