

# Dr. Sijtze Buwalda

✉ [sijtze.buwalda@minesparis.psl.eu](mailto:sijtze.buwalda@minesparis.psl.eu)

Nationality: Dutch

Residence: Nice, France

Date of birth: August 21, 1981

Languages: Dutch (mother tongue), English (C2),

French (C1), German (C1)



*CV current as of October 2023*

## CURRENT POSITION

---

### **12/2018 – present: Chargé de recherche / Assistant research professor**

Biobased Polymers and Composites (BIO) group, Center for Materials Forming (CEMEF), MINES Paris, PSL Research University, Sophia Antipolis, France.

Research interests:

- Bio-based polymers, aerogels and hydrogels for biomedical applications
- Bio-based composites, including fiber- and particle-containing hydrogels
- 3D bioprinting

## PREVIOUS POSITIONS

---

### **06/2015 – 05/2018: Postdoctoral researcher**

Department of Artificial Biopolymers, Institute of Biomolecules Max Mousseron (IBMM), University of Montpellier, France.

*06/2017 – 05/2018: Surface modification of polyether ether ketone (PEEK) with anti-fouling and anti-bacterial polymers.*

Implants based on poly(ether ether ketone) (PEEK) are currently overtaking many other orthopaedic materials such as titanium alloys. Nevertheless, as with any other implant material, PEEK is not free of bacterial contamination. In this project a strategy was developed for the prevention of PEEK implant infection by grafting a combination of anti-fouling polymer and bactericidal polymer onto PEEK via aryl-azide UV photoinsertion. This project was in collaboration with the AO Research Institute in Davos, Switzerland.

Output: 1 article

*06/2015 – 05/2017: Self-funded Marie Skłodowska-Curie Individual Fellowship ‘L<sub>x</sub> micelles: coordination chemistry in doubly stabilized micelles for the targeted delivery of cytostatic drugs in cancer therapy’.*

Premature drug release from micelles remains a major challenge in nanomedicine. The platinum based, coordinative L<sub>x</sub> linker was introduced in the core of bioresorbable PEG-P(HPMA) based micelles to facilitate (1) coordinative crosslinking between the polymers constituting the micelle and (2) stable coordination between a drug molecule and the polymers constituting the micelle. The project included the synthesis and characterization of monomers, polymers and micelles as well as *in vitro* release and cell experiments.

Output: 6 articles

### **01/2014 – 02/2015: Postdoctoral researcher**

Department of Bifunctional Ligands and Biodegradable Polymers, Laboratory of Fundamental and Applied Heterochemistry, Paul Sabatier University, Toulouse, France.

This project, which was carried out in collaboration with the industrial partner Graftys SA, focused on the development of biodegradable polymers via organo-catalyzed polymerization for the enhancement of the mechanical properties of bone cements. The project included the synthesis and characterization of various classes of polymers such as PEG-PLA based amphiphilic block copolymers and natural-synthetic hybrid polymers, as well as their functional evaluation in calcium phosphate bone cements.

Output: 1 article

### **03/2012 – 12/2013: Postdoctoral researcher**

Department of Pharmaceutics, Utrecht Institute for Pharmaceutical Sciences, Utrecht University, The Netherlands.

The L<sub>x</sub> linker is a molecule which exploits platinum coordination chemistry to couple 2 (macro)molecules of biological interest. Many cytotoxic drugs and antibodies contain suitable coordination sites such as nitrogen or sulphur atoms, allowing their straightforward coupling via the L<sub>x</sub> linker without the need of laborious chemical derivatization, which may affect their biological activity. The project, which was carried out with the industrial partner LinXis Pharmaceuticals, covered various stages in the development of target-cell directed antibody-drug conjugates (ADCs) such as doxorubicin-L<sub>x</sub>-cetuximab, including their synthesis, characterization and functional evaluation.

Output: 3 articles, 1 patent

## **EDUCATION**

---

### **Doctorate**

Department of Polymer Chemistry and Biomaterials, Faculty of Science and Technology, University of Twente, Enschede, The Netherlands.

Completion date: 08/12/2011

Supervisor: Prof. Dr. J. Feijen

Title of doctoral thesis: Hydrogels based on amphiphilic PEG star block copolymers.

Most physically and chemically crosslinked hydrogels that have been applied as controlled drug delivery systems are based on linear amphiphilic PEG copolymers. However, star block copolymers offer various advantages over linear polymers such as a higher concentration of end groups. The aim of the research was to design and prepare physically or chemically crosslinked injectable hydrogels from PEG-PLA star block copolymers. Amphiphilic block copolymers with varying molecular weight, hydrophobic block length and hydrophilic/hydrophobic ratio were synthesized and characterized for their thermal properties and aggregation behaviour in aqueous solution. Furthermore the mechanical properties, gelation mechanism and the hydrogel degradation mechanism were studied in detail. Lastly, their potential application as systems for the controlled delivery of biologically active agents was evaluated.

Output: 8 articles

### **Master**

Department of Polymer Chemistry and Biomaterials, Faculty of Science and Technology, University of Twente, Enschede, The Netherlands.

Main subject: biomedical polymers (study: chemical engineering, major in biomedical material science)

Completion date: 25/04/2007

Internship: DSM Composite Resins R&D, Zwolle, the Netherlands (6 months, 10/2004 – 03/2005).

Title of master thesis: Biodegradable chemically crosslinked PEG-PLLA hydrogels for drug delivery.

## PROJECTS & GRANTS

---

### **2021 – 2025: PARISTECH/China Scholarship Council (CSC) PhD program (1 PhD student)**

3D printing of gels and aerogels for biomedical applications. Co-applicant.

### **2021 – 2024: ANR Jeunes Chercheurs/Jeunes Chercheuses grant (ANR JCJC, 215 k€)**

PhD project '3D-AER-HYAL: 3D printing of hyaluronic acid aerogels as on-demand removable wound dressings'. Individual grant from the 'Young Researcher' scheme of the French National Research Agency. Applicant and co-supervisor.

### **2020: Young Talents France-China Program (French and Chinese Ministries responsible for scientific research)**

Personal travel grant for 6 weeks of research at Soochow University. Topic: Bio-based aerogels for controlled drug delivery. *Grant not used because of COVID-19 travel restrictions.*

### **2020: Van Gogh Program (Campus France - Partnerships Hubert Curien)**

Inter-academic exchange with Utrecht University. Topic: Functional aerogels for wound dressings and tissue engineering (AEROMED). Co-applicant.

### **10/2019 – 09/2022: CNRS program 'Thèse Transverse/Transversal Doctorate' (1 PhD student)**

PhD project '3D printing of biobased polymer aerogels for biomedical applications'. Co-applicant and co-supervisor.

### **06/2015 – 05/2017: Marie Skłodowska-Curie Individual Fellowship (175 k€)**

Research project 'L<sub>x</sub> micelles: coordination chemistry in doubly stabilized micelles for the targeted delivery of cytostatic drugs in cancer therapy'. This project proposal was entirely designed and written by myself.

## PUBLICATIONS

---

- 31 articles in international peer-reviewed scientific journals, 1 patent
- h-index 19

## SUPERVISION OF STUDENTS & TEACHING ACTIVITIES

---

### *Supervision*

- Co-supervision of 1 postdoctoral researcher
- Co-supervision of 4 PhD students
- Supervision of 8 other students (Master, Erasmus, Bachelor, ...)

### *Teaching*

- 2022 – present: Teacher – Polymers and polymer materials: Fundamentals, MINES Paris, PSL University, France.
- 2021 – present: Organizer and teacher – ATHENS (Advanced Technology Higher Education Network) course 'Design, Processing and Functionality of Polymeric Materials' at MINES Paris in Sophia Antipolis.
- 2020 – present: Teacher – Science and Engineering of Materials for Health, MINES Paris, PSL University, France.
- 2013: Work group teacher – Information resources in the Pharmaceutical Sciences, University of Utrecht, The Netherlands.
- 2008 – 2010: Work group teacher – Chemistry and Biomaterials, University of Twente, Enschede, The Netherlands.

## CONFERENCES

---

### *Organisation*

- Organization/chairman of the conference 'Advanced Functional Polymers for Medicine 2022' (55 participants) which was held in Sophia-Antipolis, France in June 2022.
- Co-organization of the conference 'Advanced Functional Polymers for Medicine 2018' (~100 participants) which was held in Montpellier, France in May 2018.

### *Contributions*

- 20 oral and >20 poster contributions at national and international conferences.

## INSTITUTIONAL RESPONSIBILITIES

---

- 2019 – present: Deputy group leader, Biobased Polymers and Composites group, Center for Materials Forming, MINES Paris.
- 2019 – present: Responsible for the two chemical laboratories at the Center for Materials Forming of MINES Paris in terms of maintenance of equipment, providing proper and safe working conditions as well as training of personnel to work in a safe and responsible manner.
- 2012 – 2013: Board Member of the discipline group Biopharmacy and Pharmaceutical Technology (post-doc representative), Department of Pharmaceutics, Utrecht Institute for Pharmaceutical Sciences, University of Utrecht, The Netherlands.
- 2009 – 2011: Board Member of the discipline group Polymer Chemistry and Biomaterials (PhD student representative), University of Twente, Enschede, The Netherlands.

## MISCELLANEOUS SCIENTIFIC ACTIVITIES

---

- 2018 – present: Reviewer of grant proposals for various national research organizations (French National Research Agency, Dutch Organization for Scientific Research, Iceland Research Fund, ...).
- 2007 – present: Reviewer for various international peer-reviewed journals (Acta Biomaterialia, Biomacromolecules, International Journal of Pharmaceutics, Journal of Colloid and Interface Science, Journal of Controlled Release, MRS Advances, ACS Macro Letters, ...).
- 2018 – 2022: Member of the Board of Early Career Researchers for the journal Multifunctional Materials published by IOP science (United Kingdom).

## MEMBERSHIPS OF SCIENTIFIC SOCIETIES

---

- 2019 – present: Member, Controlled Release Society (CRS), BeNeLux & France Local Chapter.
- 2019 – present: Member, French Society for the Study and Application of Polymers (GFP).
- 2007 – 2011: Member, Netherlands Society for Biomaterials and Tissue Engineering (NBTE).

## MAJOR COLLABORATIONS

---

- Prof. Dr. Tina Vermonden, Department of Pharmaceutics, Utrecht Institute for Pharmaceutical Sciences, University of Utrecht, The Netherlands. Topic: Bio-based hydrogels and aerogels for biomedical applications.
- Prof. Dr. B. Nottelet, Department of Polymers for Health and Biomaterials, Institute of Biomolecules Max Mousseron, University of Montpellier, France. Topic: Chitosan and hyaluronic acid aerogels for biomedical applications.
- Prof. Dr. O. Rojas, Bioproducts Institute, The University of British Columbia, Vancouver, Canada. Topic: Nanochitin-biopolymer composites for biomedical applications.
- Prof. Dr. R. Luxenhofer, Department of Chemistry, University of Helsinki, Finland. Topic: 3D printing of polysaccharide hydrogels and aerogels.
- Dr. Claudia Forte, Institute for Chemical and Physical Processes, National Research Council, Pisa, Italy. Topic: Nuclear Magnetic Resonance spectroscopy for determination of the aggregation behaviour of micelle-forming amphiphilic block copolymers.