



## 1 Full name and date

Sixta Herbert (male)

CV date September 2019, updated May 2021

## 2 Date and place of birth, nationality, current residence

Date and place of birth: 27-03-1954, Vöcklabruck, Austria  
Citizenship: Austrian  
Current residence: Servinkuja 2E, 02150 Espoo, Finland

## 3 Education and degrees awarded

1995 Habilitation [Graz University of Technology, Institute of Wood, Pulp and Fiber Technology](#), Austria Chemistry and Technology of Chemical Pulping. Chemistry and technology of novel dissolving pulp production  
1982 Ph.D. [University of Innsbruck, Institute of Physical Chemistry](#), Austria, Physical Chemistry: heterogeneous catalysis. *Interaction of CO<sub>2</sub>, H<sub>2</sub> and saturated hydrocarbons with Pt-, Ru-, Cu- and Ru/Cu-Catalysts*  
1979 M.Sc. [University of Innsbruck, Institute of Physical Chemistry](#), Austria, Physical Chemistry: solid-state physics

## 4 Other education and training, qualifications and skills

- High school teacher for Physics and Chemistry, graduated from Innsbruck University in 1979  
- Pedagogical studies, Innsbruck University in 1979

## 5 Languages

German (mother tongue) – English (average) – French (High School knowledge)

## 6 Current positions

Since 4/2022 Professor emeritus Aalto University  
2021-3/2022 [Professor](#) in Biorefineries [Aalto University](#) (Aalto), Espoo, Finland  
2017-2020 *Department Head* of Bioproducts and Biosystems, Aalto University, Espoo, Finland  
2014-2016 *Department Head* of Forest Products Technology, Aalto University, Espoo, Finland  
2009-3/2022 [Professor](#) in Biorefineries [Aalto University](#) (Aalto), Espoo, Finland  
2007-2009 Professor in Chemical Pulping, Technical University of Helsinki  
1996- *Associate Professor* in Wood, Cellulose and Pulp Chemistry, Graz University of Technology (GUT), Austria (Habilitation at GUT, 1995)

## 7 Previous work experience

2007-2012 *Director of Strategic Process Innovation*, [Lenzing AG](#), Austria  
2007-2009 *Professor* in Chemical Pulping. Aalto University (Aalto), Espoo, Finland.  
1996-2007 *Research Director Process Innovation*, Lenzing AG, Austria  
1992-1996 Head of a big Pulp Project, “Bacell”, Lenzing AG, Austria  
1986-1992 Head of the department of Biotechnology Research, Lenzing AG, Austria  
1982-1986 Vice head of the Environmental department, Lenzing AG, Austria  
1979-1982 *Research Assistant*, Institute of Physical Chemistry, University of Innsbruck, Austria

## 8 Research funding, leadership and supervision

### Large projects at Aalto:

[Academy of Finland](#), SRC 2019 (IMPRES) Sustainable textile systems: Co-creating resource-wise business for Finland in global textile networks (FINIX), 1.6.2019 – 31.08.2022.

[Academy of Finland](#), Water-free, Low-Cost Click Modification and Oxidative Regeneration of (Nano)Celluloses, 01.09.2017 - 31.08.2021

Tekes, [New business from research ideas](#), Ioncell-F, a novel man-made cellulosic fiber, 2017-2019

Tekes [Smart, Green and Sustainable Growth](#), Technical development of Ioncell-F with special emphasis on the solvent recycling (SolvRec), 2017-2020

H2020 NMP [Trash-2-Cash](#) project, 2015-2018

FIBIC [ACel](#) Advanced Cellulose to Novel Products (SHOK Tekes industry)

Tekes [DWOc](#) Design Driven Value Chains in the World of Cellulose

FIBIC [FuBio](#) Products from Dissolved Cellulose (SHOK Tekes industry)

FIBIC [FuBio JR2](#) FuBio Joint Research 2 (SHOK Tekes industry)

FIBIC [Effibre](#) Kroxy

[LiLo](#) High Impact Lignin-Cellulose-Composites for Logistics 2011-13, Tekes funding 348.000 EUR

[WoBaMa](#) Biorefineries for Wood Based Materials and Fuels, 2012-14, Tekes funding 258.000 EUR (+ continuation)

[BioRefine](#)-programme project *Comparative evaluation of different hemicelluloses isolation processes integrated with alkaline cooking* – [HemiEx](#), 2007–2012, Tekes funding 895.000 EUR

Several industry funded research project connected, for example to [IONCELL-F](#)

### Projects at Lenzing:

Lenzing-internal responsibility on EU STREP-Project Aerocell, 2004-08.

Lenzing coordinator of the Wood Competence Centre KPLUS of the Wood Chemistry part: 2000- ongoing

Lenzing coordinator of the Christian Doppler Laboratory on Cellulose reactivity, 1998-2004.

Lenzing-internal coordination of the EU research programs: FAIR 98-3855 - New Dissolving Pulps, 1998-01;

Countless Lenzing projects funded by the Austrian Research Promotion Agency (FFG): <https://www.ffg.at/en> (similar to Tekes)

### Supervision of doctoral dissertations

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|--|-----------------------------|
| • <i>Graz University of Technology</i> | 11 PhD completed            |
| • <i>Aalto University</i>              | 16 completed, 6 PhD pending |

### Completed PhD theses at Aalto University:

- 2015 Lidia Testova: [Isolation of birch xylan as a part of pulping-based biorefinery](#) (Aalto)
- 2015 Vahid Jafari: [Extended delignification of high kappa softwood pulp in a flow-through reactor](#) (Aalto),
- 2016/1 Kaarlo Nieminen: [Towards a comprehensive model for cooking processes](#),
- 2016/5 Markus Paananen: [High-yield pulping of Scots Pine under strongly alkaline conditions](#).
- 2016/6 Anne Michud: [Development of a novel process for the production of man-made cellulosic fibres from ionic liquid solutions](#).
- 2016/10 Lasse Tolonen: [Subcritical and Supercritical Water as a Cellulose Solvent](#)
- 2017/6 Lauri Hauru: [Lignocellulose Solutions in Ionic Liquids](#)
- 2017/9 Annariikka Roselli: [Extraction of Hemicelluloses from a Kraft Paper Pulp with an Ionic Liquid/Water Mixture](#)
- 2017/10 Rudine Antes: [Effect of Modified Cooking on Eucalyptus globulus and Eucalyptus nitens](#)
- 2018/10 Yibo Ma: [Fibre spinning from various low refined, recycled lignocelluloses using ionic liquid](#)
- 2018/11 Quang Lê Huy: [Wood biorefinery concept based on  \$\gamma\$ -valerolactone/water fractionation](#)
- 2018/12 Xiang You: [Kinetics studies and mass balances of sulfur dioxide-ethanol-water fractionation of sugarcane straw](#)
- 2019/09 Shirin Asaadi: [Dry-Jet Wet Spinning of Technical and Textile Filament Fibers from a Solution of Wood Pulp and Waste Cotton in an Ionic Liquid](#)
- 2019/12 Gerardo Gomez: [Valorization of Low Concentration Sugar Side-Streams from Dissolving Pulp Production](#)  
<https://aaltodoc.aalto.fi/handle/123456789/41396>
- 2020/06 Simone Haslinger: [Towards a Closed Loop Economy in Textile Industry: Separation, Dyeing and Re-Spinning of Cellulose Rich Textile Waste](#): <https://aaltodoc.aalto.fi/handle/123456789/44216>
- 2020/09 Jean Buffiere: [Low-molecular-weight nanocellulose produced using supercritical water treatment](#):  
<https://aaltodoc.aalto.fi/handle/123456789/46494>

17. 2021/04 Sherif Elsayed: Recycling and Spinning of Superbase-Based Ionic Liquid Solutions in the Lyocell Process: Potential and Limitations [Recycling and Spinning of Superbase-Based Ionic Liquid Solutions in the Lyocell Process: Potential and Limitations](#)
18. 2021/04 Sherif Elsayed: Recycling and spinning of superbase-based ionic liquid solutions in the Lyocell process: potential and limitations
19. 2022/05 Kaniz Moriam: Modification of loncell spinning technology to increase the fiber toughness and create a water repellent surface: <http://urn.fi/URN:ISBN:978-952-64-0766-1>

## 9 Merits in teaching and pedagogical competence

Pedagogical competence, please see point 4  
Responsible teacher in several courses at Aalto University

## 10 Awards, prizes and honours

- 2022 Aalto University Research Impact Award
- 2022 Markus Wallenberg Prize to sustainable concept for wood-based textile fibres.
- 2018 DIA Innovation Award 2018
- 2016 Knight, First Class, of the Order of the White Rose of Finland
- 2016 Global Change Award, 10-02-2016
- 2015 Winner of the European Paper Recycling Award 2015
- 2006 Mitscherlich Medaille from Zellcheming, Germany, for merits in dissolving pulp technology

## 11 Other scientific or academic merits

### Opponent

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- >20 PhD theses at KTH, Chalmers, Karlstad, Hamburg, Sophia Antipolis, Graz University of Technology, University of Innsbruck, University of Natural Resources and Life Sciences, Vienna, Tampere and Imperial College.
- Most recent pre-examinations: Benjamin Naier (Nov/16) University of Innsbruck, Gino Bentivoglio (5/17) University of Innsbruck, Josua Oberlerchner (6/17), University of Life Sciences and Natural Resources, Vienna. Peter Schulze (April/18), Otto-von-Guericke University Magdeburg, Max-Planck-Institute Magdeburg. Lucile Druel (April 19), Université de recherché Paris Science et Lettres. Marlen Verges (10/19), Universität Stuttgart, Fakultät 4, Energie-, Verfahrens- und Biotechnik, Amir Abidi (5/20), University of Jyväskylä.

### Scientific expert position

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- Founding member of the scientific-technical advisory board of the Technical University Munich (TUM) for the campus Straubing for *Biotechnology and Sustainability*. Appointed by the President of the TUM, Professor Herrmann: May 8<sup>th</sup>, 2019 – May 7<sup>th</sup> 2022.
- Industrial board member in the priority research program on cellulose and cellulose derivatives with focus on molecular and supramolecular structures between 1996 and 2002 funded by the Deutsche Forschungsgemeinschaft (DFG).
- Advisory Board or expert in Research Projects:
 

a. Zellcheming expert committee of Cellulose and Cellulose Chemistry	1990-
b. Fachagentur Nachwachsende Rohstoffe, FNR, Germany	1990-1998
c. Wallenberg Wood Science Center	2009-2015
d. Advisory board TUMCS, campus Straubing	2019 -
- Member of the Editorial Board
 

a. Cellulose	2002-
b. Nordic Pulp and Paper	2010-
c. Holzforschung	2011-
d. Lenzing Berichte	2011-
e. Polysaccharides	2017-

## Memberships in tenure committees

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### Tenure track positions (2011-2018)

Aalto University (2011-2018): Textile Chemistry and Engineering; Biobased Materials; Aqueous based Systems; Biochemistry; Biomaterial Science; Industrial Chemistry; Catalysis; Plant Design; Synthetic Organic Chemistry; Bioproduct Chemistry

Graz University of Technology (GUT): Professorship for Biobased materials technology (2015)

University of Life Science and Natural Resources (Boku), Vienna:

- Professorship for Biobased Fibre Material (2011)

Technical University of Munich (TUMCS), Straubing: Professorship Biobased Composite Materials (BCM): Evaluation Report (12/2019)

### Habilitation committees

- Falk Liebner in the field of *Chemistry of Biomaterials* (Boku, Vienna, 2015)
- Nikolaus Schwaiger in the field of *Environmental Engineering* (GUT, 2016)

### Invited /Keynote/plenary lectures

- Numerous invitations for keynotes since the 1990s; number not available. Only the 2017 figures are available with an acceptable effort:
- 26.01.2017: *Challenges and opportunities of Lyocell fiber processes*. Invited talk on the occasion of the 8<sup>th</sup> Biopolymer colloquium, Golm, at the AIP Fraunhofer Institute
- 27.01.2017: *Fractionation and valorization of biomass*. Invited talks at the MPI Magdeburg, Germany
- 8.03.2017: *Are ionic liquids suitable for the Lyocell spinning process?* Keynote at the COST FP1205 conference in Stockholm.
- 15.03.2017: *Novel high strength cellulose fibers*. Invited talk at the Royal Society International Scientific Seminar, Chicheley Hall, Chicheley, Buckinghamshire.
- 22.08.2017: *A versatile man-made fibre process for the recycling of cellulose based waste textiles*: Plenary lecture on the occasion of the 5<sup>th</sup> EPNOE conference, Jena, Germany.

## 12 Societal impact of research

Numerous mentions in media on various subjects, however, predominantly on IONCELL-F:

A list of articles is accessible [here](#).

Participation in the semifinal of Helsinki Challenge, [here](#).

I have published 306 papers in peer-reviewed journals with 8567 citations and an *h*-index of 51 in Scopus and 12 244 citations and an *h*-index of 58 in Google Scholar

(<http://scholar.google.com/citations?user=7JGBDowAAAAJ&hl=de>). I have also the ISI Web of Science ResearcherID profile [A-8071-2013](#) with 7357 citations from 323 publications (*h* = 47).

See also: [Herbert Sixta — Aalto University's research portal](#)

## 13 Research Interests

I have 30 years of experience in industrial research on pulp and cellulose chemistry. The scope of my research was extended to biorefineries after my research career started at Aalto University in 2007. The focus of my work lies in the further development of existing and the development of new methods for the fractionation of lignocellulose and the valorisation of the separated biopolymers. The further processing of the cellulose fraction into dissolving pulps and further into regenerated fibres with the newly developed Ioncell® process constitutes the most important part of my work. I am increasingly focusing on the reuse of textiles as a source of cellulose for recycling into new textile fibres. Both in biomass fractionation and the Ioncell® process, novel green solvents such as ionic liquids, gamma-valerolactone and other cyclic lactones play an important role in my research agenda. The hemicellulose fraction of lignocelluloses is mainly isolated as a sugar component after fractionation and further processed either to food additives such as xylose, xylitol or xylo-

oligosaccharides or by heterogeneously catalysed reactions to furans and further to diols. For isolated lignin fractions, especially after sulphur-free fractionation processes, I am particularly interested in the use of the aromatic structure of lignin for the production of short-chain phenolic substances by means of catalyzed hydrothermal process steps.

#### **14 Positions of trust in society and other societal merits**

With my 30 years at Industry, I had the privilege to accompany projects from the basic research to the industrial application phase; the most prominent one was the development of the VISCBC process for a new pulp mill in Brazil, in Salvador. The name of the company was Bacell (now BraCell) where my research staff developed the cooking process (Prehydrolysis-Kraft using the VISCBC technology) and the TCF bleaching sequence from lab over a small pilot scale to industrial use: 1991-1997; 1997 start-up of the mill; now the pulp mill is globally the most economic site for the production of the highest-grade dissolving pulps (>500 kt/a).