

NTI's newest senior researcher has gone all around the world before landing in Norway. Daniela Altgen (38 years) is originally from Germany and her wood technology education brought her via the US, through New Zealand and most recent to an educational position in Finland.

German small-town upbringing

Daniela grew up in the city Ulm in the south of Germany, between Munich and Stuttgart, most famous for Ulm Münster, the church with the tallest steeple in the world (161.53 meters).

The river Donau runs through the city, dividing it between two states with Baden-Württemberg on the northern bank and Bavaria on the southern bank.

Girl scout in the forest

As a youth, Daniela joined the scouts where she learned how to treat nature and got used to being in the forest. Nine years as a scout influenced her to the point where she pictured herself working with preservation when she grew up.

Although she had an idea of what she wanted to do with her life early on, both career choices and employment opportunities have fallen quite natural to Daniela, to the point of almost coincidental.

From forestry to wood biology

As Daniela originally wanted to go into natural preservation and work with the protection of forest, her choice fell on the University of Göttingen, as not many universities offered this line of education.

In 2004 she started a bachelor's degree in forestry, but when it came to the topic of natural preservation, Daniela realized this was quite theoretical with studying laws and paragraphs, which did not sound as appealing.

Having worked with restoring furniture during earlier summer holidays, she therefore changed to wood biology, which is where the interest in wood anatomy started, and her interest also expanded to wood technology.

First experience abroad

After having completed her bachelor's degree, Daniela continued with a master's degree in wood biology, including a student exchange at Orono University, a small university with wood science program in Maine, USA, where she worked on her master's thesis for 10 months.

She was supposed to study wood degradation, but after a few months shifted the topic to pit aspiration. Pits are small openings in the wooden cell wall with a valve structure, which allow continuous water transport in trees. Sometimes air can enter the system, for example if the sapwood gets wounded, which can interrupt the continuous water column. By shutting the valves closed - the so-called pit aspiration process - air is prevented from spreading. This mechanism is crucial for the tree but has a great influence on wood processing when it comes to impregnation processes.

Daniela explains that if you listen to a tree with a stethoscope in hot and dry periods, you can hear water columns break due to cavitation caused by increased negative pressures.

By staining the cell walls, structural changes in the cell wall structure during the aspiration process can be seen under a microscope.

Daniela explains that she enjoyed the laboratory and microscopic parts of the work, and besides the master thesis, she was also able to publish the work.

Better half in wood biology

While studying for her master's in Göttingen, Daniela also worked as a student worker at the wood

biology department. Alongside her worked another student at the wood biology, which is now her husband.

He originally started one year after Daniela, but due to the change of topic in her master's thesis, they completed their degrees almost together.

Natural progression to Ph.D.

Daniela enjoyed her job at the department, with nice colleagues and interesting tasks. Therefore she decided to continue with a Ph.D. and so the work with examining the effects on plasma treatments on particle boards started.

Plasma, the fourth stage of matter after solid, liquid and gas, is an ionized gas which is very reactive and aggressive. The plasma Daniela was working with oxidized the surface, and she examined to what level the surface oxidized, what components were most affected, whether it changed the hygroscopic properties, and whether it harmed or destroyed the wood surface by melting or burning it.

The goal of the thesis was to see what effect plasma would have on virgin and recycled wood particles used for particle board production, and if plasma could be used to homogenize the material and allow for a uniform distribution of adhesive.

– The beauty of plasma treatment is that it is a pure surface modification, so it only modifies the outer thinner layer of the surface, whereas other modifications treat and change larger parts of the wood, says Daniela.

Creative work with the paper

Daniela had to become creative to study the resin distribution within particle boards. She used X-ray tomography to visualize the distribution in 3D, and also fluorescent microscopy to study the spread of resin on particles.

During her work with the Ph.D., she connected with a research group in New Zealand and was offered to do some confocal microscopic work by a novel method using a stained UF resin. This was a month-long scientific mission from COST.

– In the end my thesis got pretty heavy with microscopy work. I was almost done with all the practical work when my son David was born, Daniela laughs, thinking back.

Family relocation

By this time, her husband had finished his Ph.D. on thermally modified wood in cooperation with Stora Enso in Finland, and when David was four months old the little family moved to Aalto.

Daniela continued writing her thesis while in maternity leave and during her new job at Aalto University, and while the new situation delayed the process, she submitted her thesis three years later.

Shift towards education

At Aalto, Daniela worked on many different topics in the beginning, like gluing properties, fire retardant in wood, using lignin for different products, and she was known as the “microscopy girl”, helping others with microscopy work.

She also worked with writing applications and applying for funding, and with this found an interest in graphic design and took courses to learn how to visualize science.

Her tasks naturally shifted more towards education, and she took pedagogy courses and helped start a YouTube channel for the university.

With the pandemic, Daniela also started working with online teaching, and was responsible for designing a platform and creating interactive elements.

– Working with design for education has helped me in thinking about the design of research or funding applications as well, and I find that a graphical design can help to form an idea. A clear visual help in telling a good story, Daniela explains.

Using all her capabilities

Then a new chapter began – Daniela's husband got a new job as a research scientist at the Norwegian Institute of Bioeconomy Research (NIBIO) in Ås and Daniela joined the team at NTI.

With Daniela on board, NTI will be making a targeted effort to build a strategic and knowledgeable organization that will position itself against large and exciting European research projects on wood-related issues.

We are aiming towards several large EU applications during this year and the next year and have already mapped out the calls to come and identified some that we will work actively with during the coming autumn and next spring.

Daniela will also get to use her experience and capabilities within online teaching, design and pedagogy in developing new platform and content for online courses at NTI. Stay tuned for more news to come on Daniela's projects!