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Profile

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Early Career Researcher Profile: Tsu-Wei Chen

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ABSTRACT

Tsu-Wei Chen is a professor at Humboldt University in Berlin, Germany. He is also a grantee of Emmy Noether Programme of German Research Foundation (DFG). He earned his BSc at National Taiwan University in Horticultural Science. He has worked on functional-structural plant models (FSPMs) since 2009, beginning with his MSc and PhD degrees from Leibniz Universität Hannover. His research focuses on up-scaling the environmental effects on leaf photosynthesis to canopy level using FSPMs and systems analyses.

•CAN YOU TELL US ABOUT YOUR UNDERGRADUATE EDUCATION AND HOW YOU DEVELOPED AN INTEREST IN PLANT MODELLING?

I was fascinated by the beauty and diversity of plants when I was a child. It was very clear to me that I would like to study plant science or horticultural science and I did it at National Taiwan University between 2002 and 2007. But during my BSc study, I was actually a flutist, conductor and composer and spent probably more than 40 h per week with orchestra and wind ensembles. I was not brave enough to pursue a career as a musician and my grade point average in plant science was good enough. I decided to keep working with plants and playing music as hobby. It was a difficult decision for me.

My interest in plant modelling was raised by the course '*Principles of Systems Modelling*' during graduate school in Hannover and I realized modelling is exactly what I like. The course was taught by Katrin Kahlen and Hartmut Stützel, and Katrin taught me how to model the 3D architecture of plants using Lindenmayer Systems. They both later became my PhD supervisors. I found modelling quite similar to composing music. Both require basic skills and creativity to produce something new. I also appreciate that Hartmut gave me the opportunity, as an MSc student, to attend two international conferences (FSPM2010 in UC Davis and a modelling workshop in 2011 in SupAgro Montpellier). Experiences from those conferences confirmed that plant modelling is what I like. I discovered the diversity of models, from cellular biophysics to cropping systems. I realized that if you understand something, you are able to create a model for it. How the model can be refined or expanded is completely open. I find modelling a personal way to depict my understanding of a system.

•HOW WAS YOUR TRANSITION TO GRADUATE SCHOOL IN A NEW COUNTRY?

The student life in Hannover was very different from Taiwan. There were no welcoming events for new students and there were much less interactions between fellow students. The first year was terrible. I was registered in a German MSc programme, I spoke broken German, and no one knew me or wanted to do group projects with a newcomer. Getting known from fellow students made my life in the second year easier.

What was important to me at that time was social contacts and activities. I joined the self-administration team of the student dormitory, I sang in a German choir and played flute in the university orchestra. If you are student in Germany, you can get tickets for opera and symphonic concert for 8–15 Euros, including top orchestras like the Vienna Philharmonic and Berliner Philharmonic. I went to concert halls or opera houses probably 100 times every year. Now that I'm no longer a student, it is 5–10 times more expensive.

•AT WHAT POINT DID YOU START APPLYING FOR FACULTY POSITIONS?

At the end of my PhD study, I ask my supervisor Hartmut Stützel about the prerequisites of applying for a faculty position. Hartmut told me only three words: Veröffentlichungen, Forschungsanträge und Lehrerfahrungen (publications, grants and teaching experience). My current position at Humboldt University of Berlin was my first application. When the position was announced in December 2019, 4 years after getting my PhD, I thought it was too early for me. At that time, my publication list was ok but not long enough. I had only two grants from the German Research Foundation (DFG) and my teaching experience was limited (2–4 h per week). I tried my best, and I was lucky and got the current position.

•WHAT ARE THE MAIN PRESSURES EXPERIENCED BY EARLY-CAREER RESEARCHERS AND HOW HAVE YOU DEALT WITH THEM?

Everything related to being competitive for a tenure-track position is a source of pressure. Early-career researchers need a lot of administrative support to reduce their burden. Fortunately, Leibniz University Hannover has a very professional and supportive team of secretaries. They do all the administration work, such as finding and filling out forms, so I can focus on science. I would like to stress that support in administration should not be the privilege of established scientist. Early-career researchers also need them.

Being well-prepared is how I deal with the typical pressures of early-career researchers: preparing papers and grants.

When I plan an experiment, I draft as many as graphs and tables as I can produce from the data set on paper sheets, and I have a rough idea to which journal the results could be submitted. This doesn't guarantee successes in experimentation and publication, but it makes me feel more confident and less stressed.

Usually, I spend more than 1 year to prepare a grant proposal. It sounds too long to be realistic, but it is not impossible. I always have 3–7 grant ideas in my mind at the same time, think about them every day for several minutes, and after a few months something will be ripe for being written down. In this process, I have enough time to be self-critical and this normally improves the quality and completeness of the main idea.

Having the feeling that I am well-prepared for the future reduces my pressures. Of course, short-term stresses are unavoidable. In this case, I go swimming and play piano in the evening.

•YOU CO-ORGANIZED THE 9TH INTERNATIONAL CONFERENCE ON FUNCTIONAL-STRUCTURAL PLANT MODELS (FSPM2020) DURING THE COVID-19 PANDEMIC. WHAT DID YOU LEARN AS YOU TRANSITIONED THE MEETING FROM IN-PERSON TO VIRTUAL?

FSPM2020 was the first conference that I co-organized. I learnt that there are much more technical and organizational details to be checked and discussed than I thought. Then I learned that the details that are important for an in-person conference are completely different from that for a virtual conference. I think everyone is still learning how to do this effectively, especially if more conferences go virtual or hybrid in the future. I learnt that personal contact is still very important. Experiencing Berliner Philharmonic in their concert hall is different from seeing them on TV.

•WHAT'S YOUR FAVORITE SCIENCE BOOK?

I read my last science book in school. It has been more than 20 years and it was Edward Osborne Wilson's *Naturalist* (1994). Wilson's excursions fascinated me so much that I hoped to see and to touch every plant species in the world. The herbarium of National Taiwan University (herbarium code TAI) was a wonderful place for me during my BSc study and I also collected plants specimen in the wild for TAI (Fig. 1). I did my civil service in the Taipei Botanical Garden. Now, I keep visiting botanical gardens all the time and discover plant species previously unknown to me, like Wilson in his book. The beauty and diversity of plants still inspire me until today.

Figure 1. A specimen of *Fimbristylis nutans*, collected by Tsu-Wei Chen and preserved in the herbarium of National Taiwan University (source: https://tai2.ntu.edu.tw/, TAI number 257384, with kind permission of Herbarium of National Taiwan University).