TREE-RING RESEARCH, *Vol. 78(2), 2022, pp. 156–162*
DOI: https://doi.org/10.3959/2022-3

Bridging People, Countries and Continents to Promote Dendrochronology

IN MEMORIAM

Dieter Eckstein

1939–2021

Left photo: Dieter Eckstein, students and colleagues, EuroDendro 2003 in Obergurgl, Austria (*T. Ważny*)

On November 10, 2021, we lost our colleague, mentor and friend Dieter Eckstein. He passed at the age of 82 in Reinbek near Hamburg, Germany, where he lived and worked during most of his scientific career.

Dieter was Professor of wood biology at the University of Hamburg, Dean of the Wood Biology Department, and later Director of the world leading Institute for Wood Biology and Wood Protection (Federal Research Centre for Forestry and Forest Products in Germany). During his path from student to Director of a world-leading wood research institute he visited numerous places around the world, connected to many fellow colleagues, and educated many students who are now working across the world, with many of them carrying on the "Eckstein spirit".

His work as dendrochronologist started in Northern Europe. Here he was one of the promotors of dendrochronology (Eckstein and Schweingruber 2009) in various applications from dating a Rembrandt painting, reconstructing historic timber trade (dendroprovenancing), understanding mechanisms of forest decline, applying urban dendrochronology, promoting tropical dendrochronology, to developing quantitative wood anatomy and xylogenesis.

In the early days of European dendrochronology he visited North America to collaborate with colleagues there, and he served as president of the Tree-Ring Society from 1974 to 1994. In Europe, Dieter was the driving force behind the EuroDendro conferences and the associated network. Here we want to look back at the career of a supremely amiable man by not only focusing on his scientific merits but also on his personality. To do so, we asked North American and Asian fellow dendrochronologists to contribute by reflecting on their connection to Dieter Eckstein.

NO DROUGHT – NO RINGS

As child of a forester's family, Dieter inherited the affinity to forest, trees and wood. After his study of wood sciences at Hamburg University he started the adventure of working with tree rings in the 1970s. Back then, it actually was an adventure as hardly anybody believed that dendrochronology would work with trees growing in a maritime climate: "No drought – no rings", right? This was the idea based on the findings of A.E. Douglass who detected distinct annual rings and matched ring-width patterns in trees growing under a strongly moisture-limiting seasonal climate in the Southwestern United States (Douglass 1914).

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However, PhD student Dieter Eckstein (Eckstein 1969) proved - spectacular at that time – dendrochronology actually works for oak growing under a maritime climate. Even more spectacular, the oaks he dated were more than 1000 years old and originated from the strategically important Danish Viking settlement and harbour Hedeby (known in German as Haithabu) now located in Northern Germany (Eckstein 1976). Once the power of dendrochronology was proved, Dieter established the Dendrochronological laboratory at Hamburg University.

Prof. Dr. Peter Kuniholm, University of Arizona & Cornell University (Professor Emeritus)

I first met Dieter when I gave a lecture in Hamburg in 1976 when I was still working on my dissertation. He was the "young man" of the department at that time under Professors Liese and Bauch. He very kindly gave me a number of his publications including his dissertation. The Gleichläufigkeitswert which he used to help confirm the proper placement of chronologies, and which many of us still use, was for a time known as "Eckstein's W." Sir David Wilson the former Director of the British Museum called Dieter's dating of the building activity at Haithabu one of the most important pieces of work in Viking studies.

In 1983 Dieter organized a symposium in Hamburg on dendrochronology in Europe, to which he invited me, the proceedings of which were published in Mitteilungen der Bundesforschungsanstalt für Forst und Holzwirtschaft (University of Hamburg) 141 (1983). Other attendees were Professor Leone Fasani and Dottsa. Alessandra Aspes from Verona who were so impressed by the potential of dendrochronology for Italy that they went home and established the Istituto Italiano di Dendrocronologia along with the journal ***Dendrochronologia****. Volume 73 of this journal is now in progress at Elsevier.*

Bauch's and Eckstein's highly significant work on dating panel paintings was carried on for another generation by Peter Klein and Sigrid Wrobel.

THE HAMBURG LAB – DENDRO-DATING AND MUCH MORE

Supported by Sigrid Wrobel and other colleagues and students, Dieter Eckstein started to build tree-ring chronologies for dendro-dating in archaeology, art- and building history for Northern Germany (Bauch and Eckstein 1970; Eckstein *et al.* 1986) and the Netherlands (Eckstein *et al.* 1975). The precise dating results of historical buildings and early-historical archaeological sites have revo-

Peter Kuniholm and Dieter Eckstein, Eurodendro Antalya, 2015 *(K. Čufar)*

lutionized historical sciences and made Dieter Eckstein one of the pioneers of European dendroarchaeology. A remarkable effort was application of dendrochronology in the study of works of art, and especially the discovery that much of the timber used in art historical objects – including panel paintings of Rembrandt and Rubens, originated from the Baltic area, which was proved thanks to the first thousand-year chronology of oak from Poland (Eckstein *et al.* 1986). This then evolved into a new branch of dendrochronology called dendroprovenancing.

But from his background as wood biologist and interest in forestry, Dieter and his team also applied tree-ring research to investigate forest decline caused by pollution in the 1980s and 1990s (Eckstein and Sass 1988; Sander *et al.* 1995) as well as effects of pollution on trees in urban context (Petersen and Eckstein 1988). Always interested in the mechanism behind growth reaction of trees, he initiated and supervised studies on dendrochronology of roots (Krause and Eckstein 1993), developing time-series of needle traces (Sander and Eckstein 2001) and understanding dynamics of tree-ring formation (xylogenensis) (Schmitt *et al.* 2000; Seo *et al.* 2008; Liang *et al.* 2009). In 1979 he published a study on vessel-size variation in oak (Eckstein and Frisse 1979), a topic on which he continued working in temperate areas (Sass and Eckstein 1995; García-González and Eckstein 2003) but then expanded to the tropics. Tropical dendrochronology – this was a topic close to his heart, because it is demanding with respect to wood anatomy, tree physiology and

xylogenesis (Eckstein *et al*. 1995; Pumijumnong *et al*. 1995; Sass *et al.* 1995)! Working on this and all the other topics was only possible through close collaboration with colleagues and students from all over the world. Never a dull moment at the Hamburg Lab!

Prof. Dr. Cornelia Krause, University of Quebec, Chicoutimi, Canada

Equity, diversity and inclusion are very common topics in the last five years in North America. Professor Dieter Eckstein has adapted these concepts during his whole life. Back in 1983, he was recruiting bachelor students to help with coring wood in old buildings and with dendrochronogical labwork. He chose two female students (Ute Sass-Klaassen and Cornelia Krause) and one male student. His co-workers were shocked, because they thought that females did not have the physical strength to accomplish tough dendro work. At the end, both students graduated, got their PhD and followed a scientific career. Dieter was like a father to his students and even saved them in critical situations. In 1986, Dieter, Sigrid Wrobel, Thomas Bartholin and young master's student Cornelia went by car to an international conference in Poland. During the return trip, the master's student was involved in a car accident and the police wanted to keep her in jail. Dieter Eckstein used his diplomatic skills and succeeded to get the whole group out of Poland.

Our sacred daily coffee break at 10 o'clock, when the entire dendro group spent time together, made everyone feel included within the group – the working atmosphere was terrific.

Dieter supervised many MSc and PhD students, but I also remember him as an excellent professor for bachelor students: he made us enthusiastic for wood biology, and the practicals were so motivating. Currently I successfully apply 'his formula' in my own classes.

Fieldweek Switzerland 1987: Picnic with giants (left to right: Hal Fritts, Fritz Schweingruber, Dieter Eckstein, Cornelia Krause (*C. Krause*)

Prof. Dr. Nathsuda Pumijumnong, Faculty of Environment and Resource Studies, Mahidol University, Thailand

Since 1991, I have studied at the faculty of wood biology, Bergdorf, Hamburg, and have stayed at the house number "63 Husumer Strasse Reinbek", the house of Dieter and Ursula. From then until now, both of them are like my second parents.

In the role of "Doctor father", Dieter has been a contributor to the dendrochronology in Southeast Asia and has revealed that the tree-ring width is suitable for conducting research in Southeast Asia. After I got my PhD, Dieter also supported me in writing our articles. Dieter and Ursula have been to Thailand many times, until the last time I visited Dieter in 2017. Dieter has educated me, and I have passed this on to new generations. This is amazing, and I appreciate you, Dieter, being an everlasting giver.

Dieter Eckstein, Ursula and Nathsuda Pumijumnong in Thailand, 2012 (*N. Pumijumnong*)

NO NETWORKS OF CHRONOLOGIES WITHOUT NETWORKS OF PEOPLE

Dieter's work was driven by curiosity: trying new approaches and promoting in-depth understanding of tree functioning (Eckstein 2004, 2013; Liang and Eckstein 2006; Fonti *et al*. 2010; Gurskaya *et al*. 2012; Seo *et al*. 2020), extending tree-ring networks to alpine shrubs (Liang and Eckstein 2009; Liang *et al*. 2015) and alpine treeline shifts (Liang *et al*. 2011, 2014). Besides this, his dedication to science was also linked to interest in people and different cultures. He enjoyed traveling, and he was always in for tough fieldwork and relaxing small talk afterwards.

Establishing and maintaining scientific networks forms a red line in the career of Dieter

Eckstein. Already in the early days of dendrochronology he was keen to meet and discuss with colleagues across Europe, but also in the United States and Russia. His active participation in bringing together scientists from both sides of the "Iron Curtain" (meeting in Albena, Bulgaria, 1985, followed by *Task Force Meeting on Methodology of Dendrochronology: East/West Approaches* in Cracow, Poland, 1986, and in Irkutsk, USSR, 1987) resulted in the monograph ***Methods of Dendrochronology*** (Cook and Kairiukstis 1990), which was co-authored by several scientists from around the world. Proper platforms for networking were and still are conferences, workshops, and fieldwork campaigns, and ultimately, establishing formal and informal networks, where dendrochronologists are organized to exchange knowledge, data and socialize!

In 1974 Dieter attended the first International Workshop on Dendroclimatology in Tucson organized by Hal Fritts, which brought new energy to the Tree-Ring Society. The Society was reorganized and expanded with Dieter elected the new President in 1974, a position he held until 1994. An international Advisory Committee to the Tree-Ring Society was also formed in 1974, on which Dieter served until 1993. Dieter was also supportive of the Association for Tree-Ring Research (ATR) and their annual Tree Rings in Archaeology, Climatology and Ecology (TRACE) meetings in Europe.

From the beginning of the 1990s he initiated and headed the informal European Working Group on Dendrochronology – host of the since-then regularly organized EuroDendro meetings. This model of ideas spread to the other continents, where it took the form of AmeriDendro and AsiaDendro conferences. After his official retirement in 2004, Dieter organized the Dendroprovenancing working group that brought together dendrochronologists from countries supplying Western Europe with timber and recipients of eastern European timber (Poland, Lithuania, Latvia, Estonia, Belarus, and Norway, Denmark, Great Britain, The Netherlands, Belgium, Germany). The main idea was to resolve the questions of historical timber trade between East and West – an ongoing quest.

Prof. Jeffrey S. Dean, University of Arizona, Laboratory of Tree-Ring Research (LTRR), Tucson, USA (Emeritus).

I met Dieter in April of 1974 when he along with 30 other scholars from a dozen countries assembled at the Laboratory of Tree-Ring Research of the University of Arizona for an International Workshop on Dendroclimatology. Organized by Harold C. Fritts, the Workshop was designed, among other things, to acquaint important members of the dendrochronological community with one another and to develop common goals, procedures, and standards for the burgeoning practice of dendroclimatology. Dieter was an enthusiastic participant in these efforts and was instrumental in furthering the goals of the Workshop both during and after its deliberations. Notable accomplishments of the meeting include establishing a collective basis for future dendroclimatic research, laying the foundations for what would become the International Tree-Ring Data Base, and transforming the somewhat parochial Tree-Ring Society into an international organization that represents dendrochronology around the globe.

My contact with Dieter did not end with the Dendroclimatic Workshop. As long-term officers of the reformulated Tree-Ring Society we frequently consulted on Society policies and operations as well as current developments in the fields.

As an archaeologist, I am particularly interested in and appreciative of Dieter's interests in and manifest contributions to the many aspects of dendroarchaeology. I remain in awe of his pioneering work at Haithabu (Hedeby) and his continuing work along these lines. We had many fruitful discussions of issues concerning the relationships between tree-ring dates and other kinds of archaeological data.

Dendrochronology has lost a giant who will be missed and honored as long as dendrochronology exists as a viable discipline.

Dieter Eckstein with Malcolm Hughes (left) and Bill Robinson (right) International Dendroclimatology Workshop Grand Canyon field trip, April 1974 (*LTRR*)

Prof. Dr. Yu Liu, Head of Tree-Ring Laboratory, IEECAS, Director of Institute of Earth Environment, Chinese Academy of Sciences, Xi'an, China

I was shocked and saddened to hear about Dieter's death. I lost a kind old friend, and the tree-ring community lost an outstanding dendrochronologist. Although I didn't have much contact with Dieter, I was deeply impressed by his kindness, hospitality and sense of humor. Many things flash before my eyes, some of which seemed to have happened only yesterday.

In 1998, I met Dieter for the first time at the first Southeast-Asia Dendro-conference held in Chiang Mai, Thailand. I remembered I said to him "I've heard about you for a long time. You look very young". "Was I so ugly when I was young?" he replied humorously, which instantly narrowed the distance between us. We sat next to each other at dinner and he suggested that I strengthen Chinese dendroarchaeological research. In 2006, he came to Xi'an and visited our lab after attending the 7th International Conference on Dendrochronology in Beijing. He was very interested in our tree-ring samples collected from the Tibetan Plateau, and he reminded me of the importance and feasibility of dendroarchaeological research in China. He invited me to visit his lab in Hamburg. I accepted and I visited his lab in 2007. Dieter himself picked me up at Hamburg railway station. He showed me around his huge "timber Museum" and showed me his very famous violin, too. Before leaving, he gave me a miniature and portable microscope, saying that "this gadget is very useful for you to measure the tree-ring width of archaeological wood". I have tried it on ancient and archeological and historical material and it works perfectly. Although since then we have not established a close cooperative relationship because of the differences in our research interests, I was deeply moved by Dieter's enthusiasm for dendrochronology and his concern and guidance for Chinese dendroarchaeology. My Chinese colleagues and I will remember Dieter's great contribution to Chinese dendrochronology. May Dieter rest in peace.

Full of stories about wood, Yu Liu and Dieter Eckstein, 2007 *(Yu Liu)*

Presenting the famous violin. Yu Liu, Eryuan Liang, and Dieter Eckstein, 2007 *(Yu Liu)*

THE ECKSTEIN SPIRIT

For Dieter, socializing, working with friends, bridging cultures by eliminating political, economic, and mental divisions among people and last but not least, bridging generations by teaching and mentoring young people, was an important – no actually the most important – driver in his career.

Large parts of his networks he built up by hosting, educating and collaborating with (young) scientists from Poland, Estonia, Latvia, Lithuania, Slovenia, Hungary, Romania as well Italy, Spain, and Austria (*e.g.* Wazny and Eckstein 1991; Richter *et al.*1991; Čufar *et al.* 2008; Läänelaid *et al.* 2015). He invited Richard Holmes to get linked with the Digital Program Library (DPL); during his year in Hamburg Richard further improved his famous COFECHA program (Holmes 1983), still used by many dendrochronologists.

Later, from 1990 on, he also welcomed guests from Asia, Turkey, Iran, India, Thailand, China, Korea, and Japan (*e.g.* Liang and Eckstein 2006; Yonenobu and Eckstein 2006; Bhattacharyya *et al.* 2007; Pumijumnong *et al.* 2009; Liang *et al.* 2015; Oladi *et al.* 2017). He contributed greatly to the development of teak dendrochronology and tropical dendrochronology in general, and he maintained close relationships with dendrochronology laboratories in almost all European countries, the USA, Russia, and around the world. All these colleagues visited Dieter's private house and the exquisite kitchen of his wife Ursula; many of them even stayed in his private home.

Dr. Jeong-Wook Seo, Department of Wood & Paper Science, Chungbuk National University, Republic of Korea

Dieter Eckstein is not only my doctoral supervisor but also my role model in my scientific endeavors as well as my life as a human. If someone were to ask me, "what was the most memorable moment of my doctoral course?", it was my early morning meeting with Dieter Eckstein for the purpose of discussing the research papers I had read. During my first meeting with him regarding my doctoral degree in Hamburg in 2001, he said "if my office door is open and I am alone in the room, you can come in anytime". Therefore, I visited Dieter Eckstein at around 7:30 am at least twice per week and he shared his knowledge related to my questions from the research papers I had read. If the discussion during the morning meeting was not sufficient, he would visit me several times a day, when he had time, and gave me other research papers or books in order to provide me with a better understanding of the questions. I participated in such meetings for seven years! Dieter Eckstein explained what the supervisor must do for students. During these morning meetings, Dieter Eckstein not only tried to answer my questions, he also tried to inspire me to come up with new research ideas. In addition, he taught me how to develop a new research idea. Later on I discovered that the morning time is very important to him for preparation of his official daily activities. He showed me how to use my time with a focus on students, researchers, and people in need of help. I respect Dieter Eckstein because his conduct is the same with students and scientists worldwide!

PhD defense (afterparty) Dieter and Jeong-Wook, 2008 (*K. Čufar*)

Prof Dr. Eryuan Liang, Director, CAS Key Laboratory of Alpine Ecology, Institute of Tibetan Plateau Research, Chinese Academy of Sciences, Beijing, China

I was selected as a Humboldt Research Fellowship in 2004 and spent my happy work time together with Dieter from Oct. 2004 to Dec. 2005, Nov. 2006–Apr. 2007, Nov. 2008–Mar. 2009 at the University of Hamburg. In his early stage of our association, Dieter introduced me to focus on dendroecology with a systematic approach. Dieter and I together published 16 papers between 2006 and 2015, including two publications in ***New Phytologist*** *and one in* ***Ecology****. These works together with my interactions with Dieter brought me to a new future.*

Dieter was a gentleman and he always treated his guests as family members. Each morning, he came to my office and had a discussion of the ongoing work. I had a very strong impression that he printed the manuscript after one day work in office, and continued working on it during the night and weekend. Once he said that when he enjoyed reading a manuscript, it was then ready for submission.

Dieter always kept his door open during his office time, and welcomed the students and colleagues to join him in discussions. Since I became a supervisor, I have done the same as Dieter. On the weekend, Dieter drove me to visit a Danish Viking settlement and harbour Hedeby (Haithabu) now located in Northern Germany, buildings dated by him. I am surprised by his pioneer work on dendroprovenancing. Dieter often invited my family to have lunch or dinner at his home or some restaurants. I strongly felt that he took students as his family members. When I returned to China, we continued discussions and communications.

There are so many good memories with Dieter. He will be together with us forever.

Discovering Rome with a perfect guide after Eurodendro in Viterbo (2005): Dieter Eckstein and Eryuan Liang (*T. Ważny*)

With his strong personal engagement Dieter Eckstein created life-long strong connections with his PhD students and many colleagues across the world. Most of them carry and spread the "Eckstein spirit" which conveys Dieter's legacy far beyond his merits as teacher and scientist, editor and reviewer and promotor of young scientists across the world.

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