

LAUDATION

Laudation on the occasion of conferring the title of the Honorary Professor of the Lublin University of Technology to Prof. Dr. Dr. h. c. Rainer Horn

Distinguished Professor Horn,
Honorary Professors of the Lublin University of Technology,
Honorable Guests,
Magnificence Rector,
Members of the Senate,

It is my privilege and pleasure to introduce to you the profile of Prof. Dr. Dr. h. c. Rainer HORN, director of the Institute of Plant Nutrition and Soil Science and Dean of the Faculty of Agricultural and Nutritional Sciences of the Christian Albrecht University in Kiel, Germany.

Rainer Horn, born May 7th, 1950 in Essen/Germany finished his school education at the Theodor Heuss Gymnasium in Kettwig 1968. In autumn 1969 he inscribed at the Technical University in Hannover for horticulture and graduated with the diploma examination in 1973. His main interests were soil sciences, plant nutrition, phytopathology and ornamental plant sciences. He decided to specialize in soil sciences because of the interesting lectures of Prof. Dr. P. Schachtschabel and Prof. Dr. K. H. Hartge and had written his diploma thesis in Soil Physics about water infiltration and methods to demonstrate these processes in practical training courses.

Immediately after that Prof. Hartge made him ask for a PhD program. Thus, he started with his experiments on swelling and shrinkage and strength changes of clay soils and developed not only a simple shear box with an option to quantify stress induced water uptake and also caused changes in shear strength parameters: angle of internal friction and

cohesion. The thesis was successfully defended July 6th, 1976. In between, Prof. Hartge had successfully requested a further postdoc research grant for 1 year from the German Research Foundation, which allowed Dr. Horn to analyze the many hundreds of data records about depth depletion of hydraulic properties under various land use systems and soils.

Immediately after he had defended his PhD, Prof. Blume/TU Berlin offered him a job for a soil physics scientific assistantship. So he and his wife Irene moved to West- Berlin – on 1st September 1976. It was his duty to teach the students of landscape architecture in soil science. Scientifically, he co-supervised during the first 2 years two PhD students and he himself quantified the water fluxes and the annual mass balances. The research question was the effect of aggregation on mechanical strength and consequences of aggregation for hydraulic properties. Among others he proved to what extent a new parameter: pre-compression stress is sensitive enough to quantify the internal aggregation processes. The habilitation thesis was submitted in May 1981 and defended in November 1981.

Then there was the information that the deadline for a vacant soil science professorship in Bayreuth finished the next day after his final habilitation defense which resulted in a rapid preparation of all documents, getting the certificate of the successful habilitation and the postal submission in time. Shortly thereafter followed the invitation for an oral lecture in Bayreuth but although the decision of the internal commission in Bayreuth was positive, the final decision of the Ministry in Munich arrived in delay.

In those days, Prof. Blume offered him a job as scientific assistant for 3 years at the Christian Albrecht University in Kiel. This offer caused a great stress release because Rainer Horn's family with 2 boys, lived on the unemployment payment which would have ended in May 1982. So he thankfully agreed and followed Prof. Blume to Kiel. Surprisingly, one hour only after he had signed the contract in Kiel he received the info

about the letter from Munich that offered him the position as C2 Professor for Soil Science at the University of Bayreuth. After a short discussion with his family and Prof. Blume he decided to spend the summer semester in Kiel and to start in Bayreuth September, 1st 1982.

The development of a new soil physics laboratory and forming an effectively working group of students gave a chance of a very quick start with new research projects. Within less than one semester, 6 diploma students carried out their diploma theses' experiments and thereafter 3 of them became his first PhD students.

The main research topics in those days were:

1. soil hydraulic processes in acid rain affected forest sites,
2. the effect of soil aggregation on inter- and intra-aggregate hydraulic properties,
3. the effect of root growth on structure formation which were either measured in the Negev desert in Avdat/Israel or in the surroundings of Bayreuth,
4. The preparation of soil strength maps based on predicted pre – compression stress values of arable soils in Bavaria.

These topics formed the nuclei for his future research activities and continued until today.

In 1987 he accepted the C3 position in Kiel as Professor for soil protection at the Christian Albrecht University at Kiel in the Agricultural and Nutrition Sciences Faculty and started this job in January 1988. He and his group concentrated on such issues as:

- the effect of tillage systems on hydro-mechanical soil properties,
- the effect of aggregation on gas and nutrient fluxes,
- soil strength in the fore dike area of the North Sea,
- quantification of physical properties of urban soils,
- development of national or European soil strength maps in cooperation with many eastern and western EU countries,
- development of international cooperation with colleagues

in countries all over the world

In 1998 he was appointed a C4 professor in Kiel. His research group quickly grew from 15 to 25 co-workers who worked among others on:

1. soil mechanical processes in structured arable, forest and grassland soils under various climatic and land use systems,
2. effect of trampling on changes in soil strength, altered anisotropic flux processes under arctic (Finland) and tropical semiarid and arid land (Inner Mongolia in China),
3. mechanical strength analyses on various scales – from micro- to macro- and development of scale independent transfer parameters for extrapolation
4. micro- and macro-scale transport processes under various tillage systems
5. development of dynamic hydraulic and pneumatic flux pore system models based on retention curve and X Ray CT data analyses
6. the analysis of groundwater pumping effects on hydraulic properties of mineralized peaty and clayey soils,
7. cemetery soils
8. development of long-term impermeable waste deposit capping systems,
9. soil- plant root interactions
10. development of FEM model approaches for coupled processes
11. swell/ shrink processes in soils.

Coworkers, postdocs, many visiting scientists from all over the world, Bachelor and Master students cooperated in the various projects which were financially supported by several Foundations, like the DFG, EU, DAAD and Federal and state research scholarships. Three postdocs of him were appointed as professors and in addition 9 coworkers became lecturers in China, Australia and Chile.

Soon after having finished his habilitation Rainer Horn decided to not only specialize in soil physics and soil protection but also to try to support

national and later on also international organizations in various aspects. Some of the main activities are listed below:

Chair Division S-1 (Soil Physics) of Soil Science Society of Germany, 1990 – 1996

Chair Commission I (Soil Physics) of the International Soil Science Society, ISSS 1994 – 1998

Chair Commission A Soil Structure of the International Soil Tillage Research Organization (ISTRO) 1994 – 2000

Vice President of ISTRO (2000-2003)

President of ISTRO 2003 – 2006

Chair Working Group PT (International Soil Science Society) Pedotechnique, 1990 –1994;

Chair Working Group SM (International Union of Soil Science) Environmental Soil Mechanics 1998 -

Chair Commission 3.4 (Soil Technology and Soil Management), IUSS (2002 – 2006)

Chair Division 3 IUSS (2010-2014)

President of the German Soil Science Society (2008-2011)

President Elect of the International Union Soil Science (IUSS) (2013 – 2014) thereafter President and Past President (until 2018)

In 1984 Prof. Dr. R. Horn was invited as a young professor to visit the Institute of Agrophysics in Lublin for 1 week. This stay can be defined as the start of a long-lasting and still ongoing research cooperation initially with the Institute of Agrophysics and later on with Lublin University of Technology. The mutual exchange of the visits resulted in very interesting insights into flux processes in aggregates as such processes were quantified during collaborative studies, amongst others, with newly developed gas electrodes and redox probes. Furthermore, this very effective cooperation also resulted in the development of new landfill waste capping systems and includes the quantification of fluxes in non-rigid systems.

Meanwhile, since 1990, mostly annual lecturing of Prof. Horn in Lublin helped to also motivate young students to draw benefits from international student exchange programs paid by Erasmus and to also define the next steps in their careers. This cooperation is presumably the longest cooperation with active research exchanges ever seen. It is the hope of both sides, that this exchange both with respect to lecturing but also research topics will proceed in the future.

The second direction of scientific cooperation was Australia. In 1987, Prof. Horn spent his first sabbatical (together with his family) in Canberra with Dr. P. Blackwell. Together with Dr. B. Richards, who is one of the most experienced modelers for FEM with coupled processes, the Kiel group still carries out joined experiments and the modelling of coupled mechanical and hydraulic processes.

A 3rd group that must be mentioned is headed by Prof. Dr. A. Smucker/ Michigan State University, USA who in 1989 also started with detailed aggregate research. Based on his remarks about new technological approaches to visualize pores by CT technics (in 1989) and later by the Synchrotron Beam line systems (in Argonne-Chicago/USA) the Kiel Group successfully requested a X-Ray CT, which was granted by the German Research Foundation in 2009 and promoted the research in Kiel.

A 4th group was soon linked to Kiel based on a short visit to China in 1992. (Beijing, and Nanjing). In the following decades an intense cooperation with the most recognized Institute of Soil Science of the Chinese Academy of Sciences became the nucleus for uncounted international papers. The most advanced postdocs were Dr. Bin Zhang and Dr. Xinhua Peng; the latter spent over 4 years as postdoc in Kiel and became an excellent Professor in the Institute for Soil Science, CAS Nanjing.

Thus, over time uncounted visits in various countries followed and resulted in a worldwide scientific link between colleagues and friends.

The continuous education of young scientists in soil science is one of the most urgent needs because of highly needed maintenance of soils for future generations with respect to food production, perfect filter and buffer properties and functions, groundwater and drinking water reservoir, archive functions, and considering the future problems concerning growing population density, global change effects, and soil degradation worldwide. His most helpful discussions he had with his major mentor Prof. Dr. K. H. Hartge were about: how to organize soil science research and how intense the “free time” for research can be spent? Prof. Hartge finally convinced him to try to form a new “soil physics school” in Germany and to support the new undergraduate and graduate students but also postdoc coworkers with as many ideas as possible, to spend as much time as needed controlling the running experiments, discussing data, supporting them writing articles, and also to develop a new equipment based on these experiments and defined needs for further detailed studies.

The scientific achievements of Professor Horn can be summed up by 328 reviewed papers, 113 book chapters, 21 written books, by 50 promoted doctors and over 200 conference papers. From our university point of view two promoted doctors, 15 common publications, several Master theses and student exchange should be mentioned. More than 20% of his coworkers are foreigners working from 3 months to 4 years in his institute. In total, Prof. Horn coordinated more than 70 research projects.

To these figures we should add education and administrative management of a famous European university (14 years as a treasurer of the faculty, 4 years as a vice-dean and currently as a dean of the faculty). As the ultimate recognition of his merits and achievements in soil science, professor Rainer Horn was elected a new president of International Union of Soil Science (IUSS) gathering over 60 000 professionals from all over the world. As the Elected President in the years 2013 – 2014, the President in the years 2014 -2016 and Past President in the years 2016 – 2018, during this 6 years period Professor Horn is holding the highest position

possible in the field of soil science.

Honorable Guests!

I have presented a distinguished scientist with irrefutable scientific merits in the field of experimental studies, and in the field of development of scientific cooperation which resulted in a creation of a scientific school far exceeding the limits of Germany and of Europe, as well as in the fields of dissemination of scientific information among professionals and in popular form for wide public and decision makers by intense editorial activity. Let me finish this presentation with the statement that we feel proud and privileged that prof. Horn became the Honorary Professor of the Lublin University of Technology.