



POLITECHNIKA LUBELSKA
WYDZIAŁ INŻYNIERII ŚRODOWISKA



RAINER HORN

The Honorary Professor
of
the Lublin University of Technology

Lublin 2014

POLITECHNIKA LUBELSKA



Rainer Horn

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of
the Lublin University of Technology**



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**The resolution No. 2/2014/I
of Senate of the Lublin University of Technology
of 23 January, 2014**

***on the awarding Prof. Rainer Horn Ph.D.
the title of Honorary Professor at the Lublin University of Technology***

Pursuant to § 7a and § 23, act 2, point 5 of the Statute of the Lublin University of Technology, the Senate adopts as follows:

§ 1.

The Senate of the Lublin University of Technology awards the title of Honorary Professor to *Prof. Rainer Horn Ph.D.* for his outstanding scientific, didactic, and organizational achievements as well as his valuable contribution to the development of the scientific cooperation between the Faculty of Environmental Engineering of the Lublin University of Technology and the University of Kiel.

§ 2.

The resolution shall enter into force on the date of signing the document by the Rector of the Lublin University of Technology.

RECTOR
Lublin University of Technology
Prof. Piotr Kacejko
Prof. Piotr Kacejko

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.

The intensive scientific education in the Institute of Soil Science in Hannover, the very special student support of Prof. Hartge finally made him ask for a PhD program in this institute. 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 effect of pre-drying intensity on soil strength was quantified and the alteration of the isotropic or anisotropic mobility of swelling and shrinking soil volume allowed the quantification of pure swell - shrink processes in comparison with the effects of dynamic volume changes due to kneading under defined stresses, time and intensity. 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, which Prof. Hartge had analyzed over the years. In those days, the use of tensiometers was rare because they were very expensive. Therefore, it was the idea to derive from these data some regression equations based on readings in one depth (25cm), which was finally proved so that the equations and the explanations could be published.

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. Having finished 2 other reports about the effect of groundwater lowering on tree growth in the Tiergarten Park and another site in West Berlin, he was allowed to start with the experiments for his habilitation thesis. 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 had grown with 2 boys (Lutz July, 25th 1979 and Nils May, 6th, 1981) and the unemployment payment 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 as well as the effect of wheeling on stress distribution.

These topics formed the nuclei for his future research activities and continued until today. The scientific outcome of his research from 1982 to 1987 was documented in 27 reviewed papers, 11 book chapters, and reviewed reports.

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

The scientific outcome of the period 1988 – 1998 was documented in 70 reviewed papers, 27 book chapters, and reviewed reports.

Since 1. Oct. 1998 Professor for Soil Science (Chair C4) at the Institute for Plant Nutrition and Soil Science, Christian Albrecht University of Kiel

In 1998 he was appointed a C4 professor. 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. Continuous and active cooperation resulted not only in additional inspirations, critical discussions and the development of new approaches in the course of the running research or thereafter for future research approaches. 36 PhD theses were finalized until today within the last 15 years, 84 book chapters, and 215 papers written, which may be classified as an output of a creative and highly motivated research group. In addition 3 habilitation theses were successfully finalized. 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 with the Institute of Agrophysics and since Prof. Stepniewski became professor at the Lublin University of Technology, with his group. 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. Some of the published papers and book chapters are until today highly cited and may be defined as very essential also for future research approaches.

Meanwhile, since 1990, mostly annual lecturing both in Kiel (by Prof. W. Stepniewski) and 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. Prof. Smucker received the AvH Award which helped to finance his stays in Kiel in order to carry out intense research over years on the effect of particle or pore accessibility and availability within aggregates

for carbon sequestration. 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. The institutes and academies in Shenyang /Beijing, and Nanjing were visited. 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.

1987, 2003, 2009: Visiting Research Scientist CSIRO, Australia

2009 University of Queensland, Australia

1992, since 1998 annual visits and ongoing research also as visiting Research Scientist: Academia Sinica, Institute of Soil Science CAS Nanjing, China

1998: Visiting Research Scientist National Soil Dynamic Lab. Auburn, USA,

1994, 1995, 1999, 2000, since 2009 ongoing annually in various projects: Instituto Ciencias do Suelos, Valdivia, Chile

2004, 2005 University Santa Maria, Brasil

1988, since 2007 ongoing: Michigan State University, East Lansing, USA.

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. All these interactions and dependencies require well trained scientists, who should cooperate 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. In total 50 PhD students have graduated until now.

The continuous discussion with such outstanding colleagues and friends like Prof. Dr. Dr. h. c. K. H. Hartge and Prof. Dr. Dr. h. c. H.P. Blume certainly helped in finding his own way to develop science and to also create some interesting documents in soil science. Until now 21 books starting with Dr. Horn PhD Thesis have been published.

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, 13 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.

Witold Stępniewski

ACADEMIC CAREER AND SCIENTIFIC RESEARCH



Early Years of Scientific Activity

Rainer Horn, born May 7th, 1950 in Essen/Germany finished his school education at the Theodor Heuss Gymnasium in Kettwig 1968. He decided to study horticulture which had to be started in that time with a 1 year internship for horticulture. In autumn 1969 he inscribed at the Technical University in Hannover for horticulture and graduated with the diploma examination 4 years later 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.

The intensive scientific education in the Institute of Soil Science in Hannover, the very special student support of Prof. Hartge finally made him ask for a PhD program in this institute. With 2 years' time the schedule was extremely limited. 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 effect of predrying intensity on soil strength was quantified and the alteration of the isotropic or anisotropic mobility of swelling and shrinking soil volume allowed the quantification of pure swell-shrink processes in comparison with the effects of dynamic volume changes due to kneading under defined stresses, time and intensity. 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, which Prof. Hartge had analyzed over the years. In those days, the use of tensiometers was rare because they were very expensive. Therefore, the idea was to derive some regression equations from these data, based on readings in one depth (25cm), which was finally proved so that the equations and the explanations could be published.

Scientific assistant in the Institute of Ecology and Soil Science, Technical University Berlin/ West (1976-1981)

Immediately after he had defended his PhD, Prof. Schachtschabel asked about his future plans and just 2 days later Prof. Blume/TU Berlin offered him a job for a soil physics scientific assistantship which he successfully applied for. So he and his wife Irene moved to West-Berlin – on 1st September 1976. He started his training as scientific assistant at the Technical University on a contract for 3+2 years without any chance of prolongation. It was his duty to teach the students of landscape architecture in soil science. The very important soil processes in the landscape had to be documented and proofed under in situ conditions which required many excursions and practical training programs. Scientifically, he co-supervised during the first 2 years 2 PhD students who worked on the physicochemical processes in the Berliner Rieselfelder (waste water irrigation fields for West Berlin) and he himself quantified the water fluxes and the annual mass balances under these extreme conditions.

Having finished 2 other reports about the effect of groundwater lowering on tree growth in the Tiergarten Park and another site in West Berlin, he was allowed to start the experiments for his habilitation thesis. The research question was about the effect of aggregation on mechanical strength and consequences for hydraulic functions. In Lower Saxony, as well as in Berlin, together with his coworker R. Wemken he collected undisturbed soil profiles with different texture and aggregates within various soil horizons, mostly under long-term fallow but also under arable and forest management. Among others, he proved to what extent a new parameter – precompression stress – is sensitive enough to quantify the internal aggregation processes and its strength as a function of predrying and external stresses applied (like glaciation) and how far the stress induced changes in hydraulic properties like hydraulic conductivity or the capacity parameters like pore size distribution can also be related to this internal soil strength. Furthermore, he was able to quantify the aggregation processes concerning the internal soil strength for the various aggregate statuses adequately. During the three years' work for the experiments, he was occupied with additional writing of congress excursion guides, apart from defending his own habilitation thesis.

In addition, Prof. Blume, Dr. Alaily and Dr. Horn also prepared an international ecology congress in Berlin and the German Soil Science Meeting was held in Berlin in September 1981. The habilitation thesis was submitted in May 1981, followed by the final oral examination in November 1981.

6 months in Kiel (1982)

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 short 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 took over the chair of soil science in Kiel. Thus, he offered him a job as scientific assistant for 3 years at the Christian Albrechts University in Kiel. This offer caused a great stress release because Rainer Horn's family had grown with 2 boys (Lutz – July, 25th 1979 and Nils – May, 6th, 1981) and the unemployment payment would have ended in May 1982. Thus, he thankfully agreed and followed Prof. Blume to Kiel, where apart from teaching he started with the development of the soil physics laboratory and tested the equipment in various newly running projects. Surprisingly, after he had signed the contract in Kiel on the 1st April 1982, it was only 1 hour later that he received the info about the letter from Munich that offered him the position as C2 Professor for Soil Science at the University 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 on the 1st of September 1982.

1982 – 1987 Professor for Soil Science (C2) at the University of Bayreuth

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:

5. soil hydraulic processes in acid rain affected forest sites,
6. the effect of soil aggregation on inter- and intraaggregate hydraulic properties,
7. 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,
8. the preparation of soil strength maps based on predicted precompression stress values of arable soils in Bavaria as well as the effect of wheeling on stress distribution.

These topics formed the nuclei for his future research activities and continued until today. The project about soil strength variations was originally initiated by the Bavarian Government. The developed soil maps based on regression equations gave the first insight in the stress strain processes and consequences also for the stress induced changes in ecological properties like hydraulic conductivity, air conductivity, and pore size distribution.

Furthermore, his group developed new soil mechanical apparatus like the stress strain device, the frame shear test apparatus and the microtensiometers and did successful tests about their sensitivity. They are already applied worldwide.

The scientific outcome of his research from 1982 to 1987 was documented in 27 reviewed papers, 11 book chapters, and reviewed reports.

**1988- 1998 Professor for Soil Science and Soil Protection (C3),
at the Christian Albrechts University in Kiel**

In 1987, two C3 professorships (at Bonn and Kiel) were offered to him. After some detailed discussion he accepted the C3 position in Kiel as Professor for soil protection at the Christian Albrechts University at Kiel



Prof. Horn in Tallinn (1989)

in the Agricultural and Nutrition Sciences Faculty and started this job in January 1988. To enlarge the soil physical laboratory, containers were first chance solution. The transport of the newly developed equipment from Bayreuth to Kiel and the start in Kiel was facilitated by the new team. Together with the technical crew: like Mrs. Sabine Hamann, and Mrs. Regina Kayser, several PhD students, diploma students, and postdocs he concentrated on the following research topics:

1. Effect of soil tillage systems on soil strength, hydraulic properties and soil functions and their changes with time
2. Quantification of aggregate formation and its consequences for gas and nutrient fluxes, accessibility and availability
3. Soil strength in the fore dike area of the North Sea – effect of sheep trampling on soil protection and quantification of optimal grazing intensities (sheep/ha)
4. Quantification of physical properties of urban soils as the prerequisite for the development of corresponding datasets and nomograms.
5. Development of national or European soil strength maps in cooperation with many eastern and western EU countries.



Tallinn (1989)

6. Development of international cooperation with colleagues in countries all over the world

The scientific outcome of the research between 1988 and 1998 were documented in 70 reviewed papers, 27 book chapters, and reviewed reports.

Since 1 Oct. 1998 Professor for Soil Science (Chair C4) at the Institute for Plant Nutrition and Soil Science, Christian Albrechts University of Kiel

Based on a C4 Chair of Soil Science which the Rostock University offered to him in 1995 and which he rejected because of different reasons (an intense support of colleagues, discussions of the chancellor, dean, and rector of the University with the corresponding state ministry), he was allowed to apply for this position as C4 professor for Soil Science at the CAU, Kiel. He was successfully appointed a professor after an official tenure procedure and took over the position 1st October 1998 as the successor of Prof. Dr. H. P. Blume. Apart from teaching basic soil science, advanced soil physics, soil ecology and soil management, his research group quickly grew from 15 to 25 coworkers 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 in Inner Mongolia
3. mechanical strength analyses on various scales – from micro- to macro- and development of scale independent transfer parameters for extrapolation
4. micro- and macroscale transport processes in structured arable soils 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 – how far can they be classified for long term optimal body mineralisation and what kind of soil amelioration is applicable as a requirement for the reuse of these sites development of a cemetery soil use manual,
8. development of long-term impermeable waste deposit capping systems,



9. soil – plant root interactions – how far can hydraulic and gaseous fluxes as well as physic chemical processes be forecasted in arable soils
10. development of FEM model approaches for coupled processes
11. swell/ shrink processes in soils – how far can we quantify their functions.

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 German Research Foundation, EU, German Academic exchange programs, or Federal and state research scholarships. Continuous and active cooperation resulted not only in additional inspirations, critical discussions and the development of new approaches in the course of the running research or thereafter for future research approaches. 36 PhD theses were finalized until today within the last 15 years, 84 book chapters, and 215 papers written, which may be classified as an output of a creative and highly motivated research group. In addition 3 habilitation theses were successfully finalized. Three postdocs of him were appointed as professors and in addition 9 coworkers became lecturers in China, Australia and Chile. Within his remaining time as a professor, he intends to complete the originally defined topics concerning the possibility to quantify the boundary conditions for physical, chemical and biological soil strength.

National and international activities

Soon after having finished his habilitation 1981 in Berlin, Rainer Horn decided not only to 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. Science promotion is up to now an essential topic because scientists too often discuss among each other their very interesting results but the public has no chance to realize that outstanding work which is suboptimal for our future living conditions. To combine national with international organizations and colleagues allows a more effective science promotion. Certainly, it also helps his own students to get to know and to collaborate more effectively with colleagues from all over the world.

Prof. Horn's mayor professional activities can be therefore summed up as follows:
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)

International cooperations

After Prof. Dr. K. H. Hartge's visit in Lublin/Poland, invited by Professor Bohdan Dobrzański, member of the Polish Academy of Sciences, and also first Head of the Institute of Agrophysics of the Polish Academy of Sciences (1968-1979), Prof. Dr. R. Horn was invited as a young professor in 1984 and visited together with Prof. Dr. W. Blum/Vienna the Polish Academy of Sciences in Warsaw and 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 with the Institute of Agrophysics and since Prof. Stepniewski became professor at the Lublin University of Technology, Environmental Engineering Faculty, Department of Water Supply and Waste Water Disposal,

also with his excellent group. Prof. Stepniewski's repeated research stays in the Bayreuth and Kiel Universities can be defined as the nucleus for new research approaches which resulted in very interesting insights into flux processes in aggregates as such processes were quantified during collaborative studies, among others, with newly developed gas electrodes and redox probes. Furthermore, this very effective cooperation also resulted in the development of new waste capping systems and includes the quantification of fluxes in non-rigid systems. Some of the published papers and book chapters are until today highly cited and may be defined as very essential also for future research approaches. Among others the following papers could be cited:

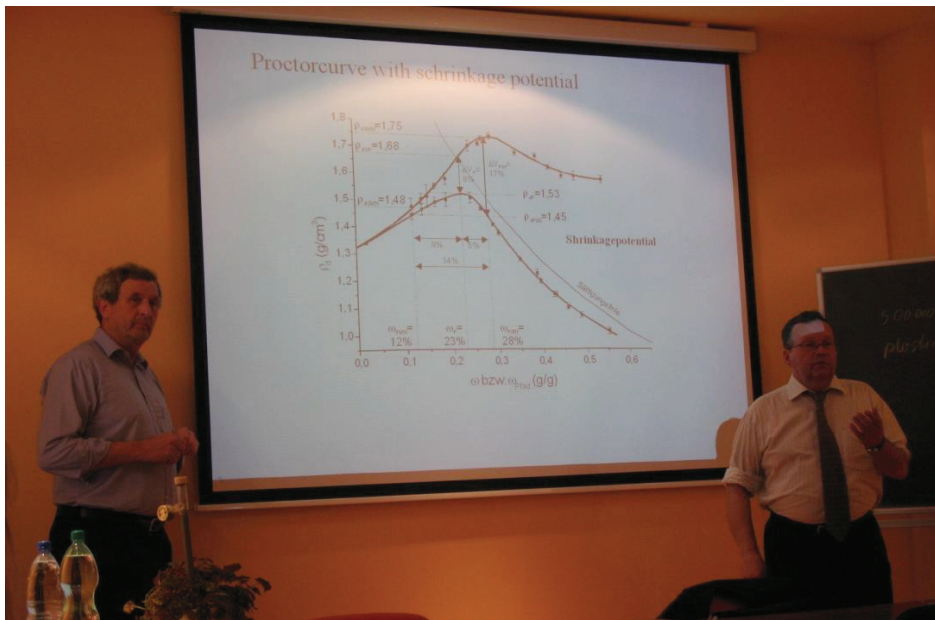
- 1) Wysocka, A., W. Stepniewski, R. Horn 2007: Swelling shrinkage properties and hydraulic conductivity of a compacted coal mine rock likely to be used for landfill capping. *Internat. Agrophysics* 21, 405–408
- 2) Horn, R., Stepniewski, W. 2004: Modification of mineral liner to improve its long - term stability. *Internat. Agrophysics* 18, 317–325
- 3) Stepniewski, W., R. Horn, S. Martyniuk 2002: Managing soil biological properties for environmental protection. *Agriculture, Ecosystems and Environment* 88, 175–181



Prof. Stepniewski expresses gratitude for acceptance of 100 students of LUT in Kiel (1998)

- 4) Horn, R., W. Stepniewski, T. Włodarczyk, G. Walensik, E. F. Eckhardt 1994: Soil aeration and denitrification losses in artificial aggregates. *Internat. Agrophysics* 8,65–74
- 5) Wisniewska, M., W. Stepniewski, R. Horn 2008: Effect of mineralogical composition and compaction conditions on sealing properties of selected mineral materials likely to be used for landfill construction. 159–167. in: Pawłowska und Pawłowski (eds.) *Management of Pollutant Emission from Landfills and Sludge*. *Talor und Francis Group London*, ISBN: 978-0-415-43337-2

Meanwhile, since 1990, mostly annual lecturing both in Kiel (by Prof. W. Stepniewski) and Prof. Horn in Lublin also helped to motivate young students to draw benefits from international student exchange programs paid by Erasmus and to 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.



Prof. Horn and Prof. Stepniewski during a lecture at the Lublin University of Technology

The benefits of a sabbatical abroad were explained first time to Prof. Horn by Prof. Dr. R. Herrmann/Bayreuth when he returned from New Zealand to Bayreuth. Based on the invitation of Dr. W. Greacen / CSIRO Adelaide to spend his sabbatical in the CSIRO/Canberra and Adelaide, he also decided to personally draw benefits out of longer research stays for research advances and for lecturing. In 1987, he spent his first sabbatical (together with his family) in Canberra with Dr. P. Blackwell, and for modelling later on in Adelaide where he got to know Dr. Brian Richards as colleague with whom they became real friends. Together with Dr. Richards the Kiel group still carries out joined experiments and the modelling of coupled mechanical and hydraulic processes is still ongoing and very successful. Dr. B. Richards is one of the most experienced modeler for FEM with coupled processes who later on received the Humboldt Award and spent several months over the decades in Kiel.

A 3rd group must be mentioned, headed by Prof. Dr. A. Smucker/Michigan State University, USA who in 1989 also started a detailed aggregate research and with whom the Kiel group formed a very strong and still ongoing research link. Prof. Smucker received the AvH Award which helped to finance his stays in Kiel in order to carry out intense research over years on the effect of particle or pore accessibility and availability within aggregates for carbon sequestration. 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 2009 and promoted the research possibilities in the Kiel Institute. Thus, also such side effect must be connected with international links.

A 4th group was soon linked to Kiel based on a short visit to China in 1992. The institutes and academies in Shenyang /Beijing, and Nanjing were visited. 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 and also resulted in back and forth scientists' exchanges partly sponsored by the Alexander von Humboldt, the Max Planck foundations, the German Academic Research Exchange or the German Research Foundation. The most advanced postdocs were Dr. Bin Zhang, Dr. Xinhua Peng; the latter spent more than 4 years as postdoc in Kiel and became an excellent Professor in the Institute for Soil Science, CAS Nanjing.



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

1987, 2003, 2009: Visiting Research Scientist CSIRO, Australia

2009 University of Queensland, Australia

1992, since 1998 annual visits and ongoing research also as visiting Research Scientist: Academia Sinica, Institute of Soil Science CAS Nanjing, China

1998: Visiting Research Scientist National Soil Dynamic Lab. Auburn, USA,

1994, 1995, 1999, 2000, since 2009 ongoing annually in various projects: Instituto Ciencias do Suelos, Valdivia, Chile

2004, 2005 University Santa Maria, Brasil

1988, since 2007 ongoing: Michigan State University, East Lansing, USA

Further active research cooperations with various institutes all over the world





Professors: Bieganski, Horn, Cao and Sępniewski in Nanjing



XXXIV CONGRESSO BRASILEIRO DE CIÊNCIA DO SOLO
28 de julho a 2 de agosto de 2013 | Costão do Santinho Resort | Florianópolis | SC



Formation of a soil physical school

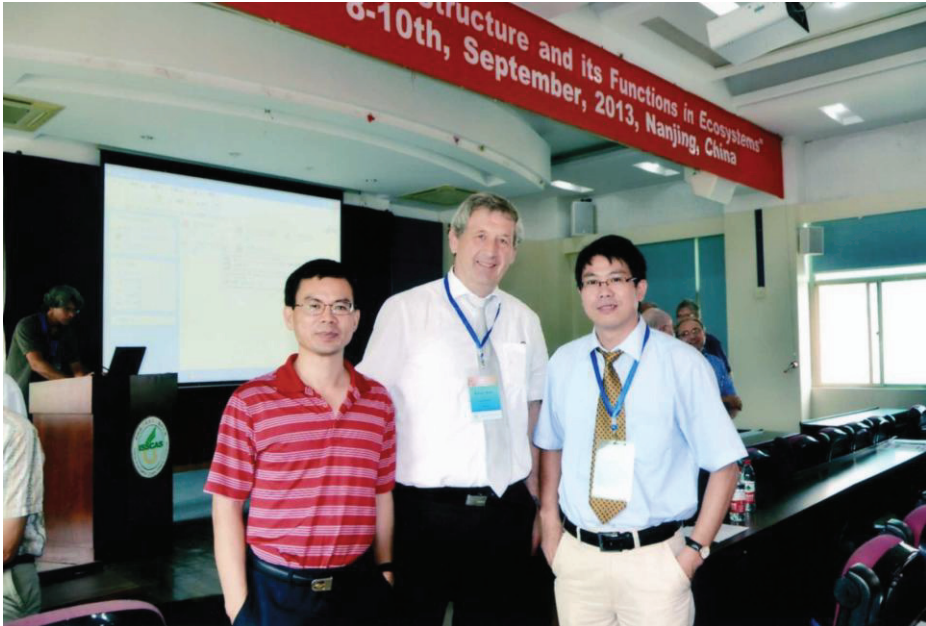
The continuous education of young scientists in soil science is one of the most urgent needs because of highly needed maintenance of soils for future generations with respect to food production, perfect filter and buffer properties and functions, groundwater and drinking water reservoir, archive functions, and considering the future problems concerning growing population density, global change effects, and soil degradation worldwide. All these interactions and dependencies require well trained scientists, who should cooperate worldwide as the most effective way to develop optimized land use systems and management strategies.

His most helpful discussions he had with his major mentor Prof. Dr. K. H. Hartge – just appointed as Professor for Soil Science in Bayreuth – were about: how to organize soil science research and how intensely 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 to also develop new equipment based on these experiments and defined needs for further detailed studies.





An interesting lecture attracts an unusual audience (photo by W. Stępniewski)

Preparation of textbooks

The support of Prof. Dr. Dr. h. c. K.H. Hartge as his first and most creative mentor resulted very early in the invited review of Prof. Hartge's first soil physics textbook in German (in 1978), while Rainer Horn worked as a scientific assistant in Berlin. The "secret" work was very enjoyable and also interesting for him. This reviewing task was certainly helpful for him too, because already during his early days in Bayreuth Prof. Hartge offered him the coauthorship for all his textbooks which from thereon appeared as **Hartge/Horn**. After Prof. Hartge's retirement he also handed over the soil physics chapter in the most popular soil science **textbook Scheffer Schachtschabel**. His major idea was the continuity in writing soil physical aspects for student education on the long run as his vision of soil science education was outstanding. Irrespective of his selflessness, he always offered help, his final moments for discussions, new ideas and very friendly support.

Another great encouragement was given to Prof. Horn by Prof. Dr. Dr. h. c. Blume who always supports students and scientists not only by his outstanding knowledge and ideas but also by his helpfulness. He encouraged him just after he had taken over the C3 Professorship (department chair for Soil Protection) in Kiel to join the authors groups for: the soil protection book, the Handbook of Soil Science (both in German), and at present also the English translation of the former book.

The continuous discussion with such outstanding colleagues and friends certainly helped in finding the own way to develop science and to also create some interesting documents in soil science. Until now 21 books starting with Dr. Horn PhD Thesis are published. The plans for future activities include the continuation of writing following editions of the German textbooks and together with Prof. Blume the development of a new textbook about soils and their documentation on stamps.

Besides a rich scientific, academic and publishing activity, Prof. Dr. Rainer Horn has an impressive experience in an academic management. He acted as treasurer of the faculty for 14 years, vice-dean for 4 years. Since June 2012, he is the dean of the Faculty of Agric and Nutritional Sciences of the Christian-Albrechts University in Kiel.

International awards

For his achievements and activities, prof. Horn was given the following awards:

- Fellow award 2005 – American Soil Science Society;
- Fellow award 2006 – American Society of Agronomy;
- Honorary Member of the Romanian National Society of Soil Sciences and the Academy of Agricultural and Forestry Sciences “Gheorghe Ionescu-Sisesti”;
- Doctor Honoris Causa 2012 – at the Ion Ionescu de la Brad University of Agricultural Sciences and Veterinary Medicine of Iași, Romania.



US,

the Rector and the Senate of the University of Agricultural Sciences and Veterinary Medicine from Iași, dedicated to the memory of Ion Ionescu de la Brad,

according to the academic custom and tradition of the country laws to be elected as doctor honoris causa those who have distinguished themselves through outstanding and original research studies in the field of letters and science, we have chosen and decreed by the Senate decision the learned and illustrious man

RAINER HORN

renowed expert in soil science and recognized for his work in agricultural sciences,

Doctor Honoris Causa

and take care that this title is strengthened by our university seal and our signature

Given in Iași, today, December 14th of 2012

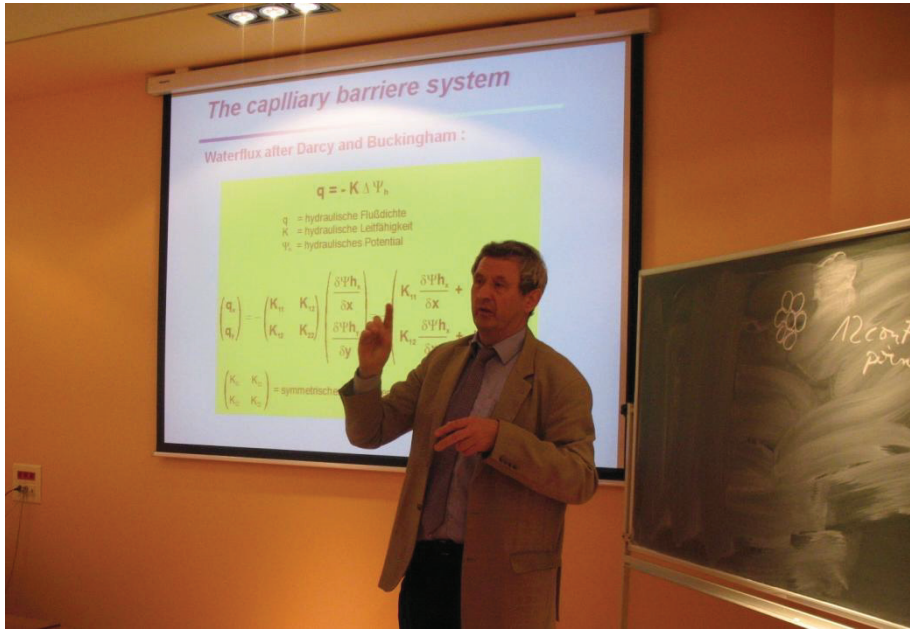


Nr. 27 din 14.12. 2012

Rector,
Ph.D. Prof. Vasile Vintu



LIST OF PUBLICATIONS



Reviewed papers

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- (1) Mordhorst, A, S. Peth, R. Horn 2014. Influence of mechanical loading on static and dynamic CO₂ efflux on differently textured and managed Luvisols. *Geoderma* 219-220, 1-13
- (2) Sebastian K. Pagenkemper, Daniel Uteau Puschmann, Stephan Peth, and Rainer Horn 2014: Investigation of time dependent development of soil structure and formation of macropore networks as affected by various precrop species. *International Soil and Water Conservation Research* in press
- (3) Rainer Duttmann, Malte Schwanebeck, Michael Nolde, and Rainer Horn 2014 Predicting Soil Compaction Risks Related to Field Traffic during Silage Maize Harvest *SSSAJ* in press.
- (4) Paul D. Hallett, Thomas Baumgartl, Jonathan P. K. Seville, Rainer Horn, and Anthony R. Dexter, Tensile Strain-Rate Dependency of Pore Water Pressure and Failure Strength of Soil, *Vadose Zone Journal* in press. doi:10.2136/vzj2013.06.0098.
- (5) T. Seehusen, H. Riley, R. Riggert, H. Fleige, T. Børresen, R. Horn & A. Zink 2014:Traffic-induced soil compaction during manure spreading in spring in South-East Norway *Acta Agriculturae Scandinavica, Section B - Soil & Plant Science* DOI: 10.1080/09064710.2014.902097

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- (14) Manfred Bölter, Julia Krümmelbein, Rainer Horn, Rolf Möller, Annette Scheltz 2013: Soil microbes and soil respiration of Mongolian steppe soils under grazing stress. *Journal of Environmental Science and Engineering* 04/2012; 54(2):181–195.
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GROWING UP AND FAMILY LIFE

Childhood and adolescence

Rainer Horn, born May 7th, 1950 as the 2nd child of Adolf and Lotte Horn grew up in a quiet and well arranged family first in Essen and since 1956 in the own home in Kettwig.

Already in his early days, Rainer liked to build bridges, prepared the beds in the garden for plant growth, digging soil pits for hide-and-seek, and he played in the sand (not only during the vacation at the North Sea) and mud in order to perhaps already test the sensitivity of mineral soils as well as of sand buildings during flooding.



In those days he tested also the effect of continuous transportation of coal for heating which resulted in longterm stress applications to the ground which maybe the nucleus for the later main research interests in the scientific experiments about stress strain processes in soils.

Together with the parents and his sister, they all spent many weekends rowing at the Baldeney Sea in Essen, which later on became Rainer's greatest "professional" hobby starting at the age of 12 years.

After the family had moved in the newly built house in Kettwig, in September 1956, Rainer first visited the primary school "Fröbelschule" until 1960, and thereafter changed to the "Theodor Heuss Gymnasium" in Kettwig, where he obtained his university entrance diploma in 1968.

His love for gardening as well as the idea of dealing with living organisms resulted in the selection of Horticulture as academic studies at the Technical University in Hannover, which required in those days still 1 year internship to be fulfilled beforehand. Hence, he worked in the "Stadtgärtnerei Essen" nursery of the city Essen (1968-1969) before he inscribed in Hannover. The study in Hannover in those days was very well defined, only sixteen students had begun this subject in 1969. Thus, the intensity of learning was easy and effective, the student groups within each subsubject very small and the support given by the professors was therefore exceptionally good. The link between lectures, seminars and exercises as well as excursions helped to understand the whole background. Thus, it was not surprising that this school like study could be well finalized within the given time of 8 semesters with the diploma.

PhD time

Having finished the diploma, he was accepted as a PhD student of Prof. Hartge and finalized it in 1976 with the dissertation. The daily working hours were rather long and like Prof. Hartge meant, the Sunday afternoon would be free but Monday to Saturday would be working days in order to finalize the thesis in time. In 1970, Irene Deckert started her study of landscape architecture in Hannover and because the preparations of the faculty carnival festival had always to be organized by the 1st and 3rd semester, a friendship began which finally resulted in the wedding in 1974 and persists since then over 40 years.

After his PhD exams, Irene and Rainer moved to Berlin, where Rainer was offered a postdoc position at the Technical University Berlin in the Institute of Ecology- Soil Science. 2 sons: Lutz (1979) and Nils (1981) were born in Berlin and grew up mostly in Bayreuth/Hardt (1982 – 1991) and since 1991 in Ottendorf.



They both finalized with the university entrance diploma in Kiel and after having passed their civil services for 13 months each, Lutz started his economy study at the University of Bayreuth and finalized it with the Diploma. Since then he works in the KPMG Wirtschaftsprüfungsgesellschaft Frankfurt, at present as Senior Manager, Corporate Finance. In 2013 he married his wife Annke (born Hecker), who also studied economics in Bayreuth.

Nils started his medicine study first in Kiel, changed to Hamburg and finally to Heidelberg, where he received his doctor diploma. Both sons finished their PhD in December 2012 successfully.

Irene

Irene had finished her studies in landscape architecture in Hannover and worked in the district administration for landscape topics in West Berlin before she stopped working when Lutz was born. Since then, she became the calming influence or steady center for the family. Besides all requirements and activities within the growing and more active family her interests in the small remaining free time were photo documentation and painting, which she enjoys nowadays even more. A small collection of her paintings is added.



Rainer, Lutz, Nils and Rainer's father: Adolf Horn, 1983

Sport activities

Since 1964, Rainer joined the Kettwiger Rowing Club and after hard training exercises throughout the whole years, his partner and he himself became successful from 1967 onwards in double scull also in the German youth rowing championships. This continuous training intensity also resulted in 1969 in the skiff final (single rowing) of the German Championship and the nomination for the country competition with France in August 1969. There he met the rowing crews from Angaria Hannover, as well as those from the Berlin Rowing Club, which facilitated his study stay in Hannover later on (within the Academic Rowing Club Angaria, where he also lived) and also during his postdoc time in Berlin in the Berlin Rowing Club (for the “veteran” rowing in the eight oars with coxwain.)

Aside the daily visiting of the lectures etc at the Hannover University, the sportive life within the Rowing Club was intensified and finally reached the maximum of up to twice a day in order to become best trained for 1972. Already in 1970, Rainer together with Gerd Seidl won the German Championship for the Junior double scull (Eichkranzrennen) as well as he joined various championship races and finals with the coxed or coxless four as well as the eight.





Double scull 1970



German championship 1971

In Berlin he continued rowing (certainly not as intensely as in the past) but the successful crew of the Berlin Rowing Club accepted him as a new crew member. So, he enjoyed rowing for relaxation as well as training for rowing competitions all over Europe, which ended mostly successfully.



Veteran World championship contests 1977 – 1981

Family's support

The acceptance of all this scientific work, visits of conferences, time consuming discussions and countless administrative work would have not been possible without the continuous support of his wife Irene and their 2 boys: Lutz (1979) and Nils (1981). Prof. Horn owes them many thanks. He hopes that he could pay back at least a small proportion due to the family deprivation by the sabbaticals in Australia, and USA as well as during various tours to conferences in the world together with them. However, most of all he drew enormous benefits from the good discussions at home especially on land use and ecological problems.



Prof. Horn with wife Irene and sons: Lutz and Nils

Mrs. Horn's paintings





LIST OF PHD STUDENTS

No.	Name	Title of the thesis
1.	Ould Baba, Hamoudy Dr.	Bodenphysikalische und -mechanische Untersuchungen zur Bestimmung der Bodenstrukturentwicklung unter besonderer Berücksichtigung der Interaktionen zwischen auflastabhängiger Entwicklung der Porenwasserdrücke und Bodenkriechvorgänge
2.	Baumgarten, Wibke Dr.	Microstructural Changes In Soils – Rheological Investigations In Soil Mechanics. Kumulat. Dissertation. Soil microstructural stability as influenced by physicochemical parameters and its environmental relevance on multiple scales. Habilitation.
3.	Baumgartl, Thomas Dr.	Spannungsverteilung in unterschiedlich texturierten Böden und ihre Bedeutung für die Bodenstabilität. Dissertation. Kopplung von mechanischen und hydraulischen Bodenzustandsfunktionen zur Bestimmung und Modellierung von Zugspannungen und Volumenänderungen in porösen Medien. Habilitation
4.	Becker-Fazekas, Orsolya Dr.	Bedeutung von Bodensrtuktur und Wasserspannung als stabilisierende Kenngrößen gegen intensive mechanische Belastungen in einer Parabraunerde aus Löss unter Pflug- und Mulchsaat
5.	Bolte, Kristine Dr.	Untersuchungen zur feuchteabhängigen Dynamik des bodenspezifischen Erosionswiderstandes bei Bewindung unter Windkanalbedingungen
6.	da Veiga, Milton Dr.	Propriedades de um Nitossolo Vermelho Após Nove Anos de Uso de Sistemas de Manejo E Efeito Sobre Culturas
7.	Dec, Dorota Dr.	Thermal Properties in Luvisols under Conventional and Conservation Tillage Treatment
8.	Dörner Fernández, José Miguel Dr.	Anisotropie von Bodenstrukturen und Porenfunktionen in Böden und deren Auswirkungen auf Transportprozesse im gesättigten und ungesättigten Zustand

9.	Dürr, Stefan Dr.	Auswirkungen von Bodengefügeänderungen auf das Pflanzenwachstum und den Ertrag besonderer Berücksichtigung des Bodenwasserhaushaltes
10.	Fleige, Heiner Dr.	Ökonomische und ökologische Bewertung der Bodenerosion am Beispiel einer Jungmoränenlandschaft Ostholsteins
11.	Gan, Lei Dr.	Effects of different grazing intensities on soil water and thermal regimes under <i>Leymus chinensis</i> and <i>Stipa grandis</i> vegetation types in Inner Mongolia grassland, China
12.	Gebhardt, Stephan Dr.	Wasserhaushalt und Funktionen der Böden im Grundwasserabsenkbereich des Wasserwerkes Wacken in Schleswig-Holstein
13.	Gräsle, Werner Dr.	Numerische Simulation mechanischer, hydraulischer und gekoppelter Prozesse in Böden unter Verwendung der Finite Elemente Methode
14.	Gunzelmann, Michael Dr.	Die Quantifizierung und Simulation des Wasserhaushalts von Einzelaggregaten und strukturierten Gesamtböden unter besonderer Berücksichtigung der Wasserspannungs-/Wasserleitfähigkeitsbeziehung von Einzelaggregaten
15.	Hantschel, Ralph Dr.	Wasser- und Elementbilanz von geschädigten, gedüngten Fichtenökosystemen im Fichtelgebirge unter Berücksichtigung von physikalischer und chemischer Bodenheterogenität
16.	Hartmann, Angelika Dr.	Die Bedeutung der Bodenstruktur und der hydraulischen Bodeneigenschaften für die Kationenaustausch- und –transportprozesse am Beispiel zweier Parabraunerden
17.	Hartmann, Peter Dr.	Bodenphysikalische Eigenschaften, Benetzbarkeiten und Wasserhaushalt von Waldböden unter Flugascheeinfluss
18.	Holthusen, Dörthe Dr.	Fertilization induced changes in soil stability at the microscale revealed by rheometry
19.	Janßen, Imke Dr.	Landnutzungsabhängige Dynamik hydraulischer und mechanischer Bodenstrukturfunktionen in Nassreisböden.
20.	Joneck, Michael Dr.	Untersuchungen zur Wasser- und Stoffdynamik in einem hängigen Einzugsgebiet des Rotmains.

21.	Junge, Thorsten Dr.	Zur Bedeutung des Porenwasserdruckes für die Zugfestigkeit von Böden
22.	Junkersfeld, Lydia Dr.	Dynamik der Wasserhaushaltsparameter von Aggregaten und Gesamtböden einer pseudovergleyten Parabraunerde aus Geschiebemergel
23.	Krümmelbein, Julia Dr.	Influence of various grazing intensities on soil stability and water balance of a steppe soil in Inner Mongolia, P.R. China
24.	Kühner, Stefan Dr.	Simultane Messung von Spannungen und Bodenbewegungen bei statischen und dynamischen Belastungen zur Abschätzung der dadurch induzierten Bodenbeanspruchung
25.	Lammers, Ulrike Dr.	Untersuchungen zum mehrdimensionalen Wassertransport unter besonderer Berücksichtigung der Anisotropie der hydraulischen Leitfähigkeit
26.	Lebert, Matthias Dr.	Beurteilung und Vorhersage der mechanischen Belastbarkeit von Ackerböden
27.	Moralez Sanchez, M. Dr.	Auswirkungen eingepflanzter Mikroorganismen auf Gefügestabilität verschiedener Marschböden
28.	Mordhorst, Anneka Dr.	Soil Structure-Carbon Relations of Differently Textured and Managed Arable Soils Subjected to Mechanical Loading
29.	Nahrwold, Frank Dr.	Bodenerosionsstudien und Möglichkeit der Reliefmodellierung zur Reduzierung des Abtrags
30.	Nissen, Bernd Dr.	Vorhersage der mechanischen Belastbarkeit von repräsentativen Ackerböden der Bundesrepublik Deutschland – bodenphysikalischer Ansatz
31.	Pagenkemper, Sebastian Dr.	Investigation of plant root and earthworm induced effects on properties and functions of pore networks with non-invasive X-ray computed tomography

32.	Peth, Stephan Dr.	Bodenphysikalische Untersuchungen zur Trittbelastung von Böden bei der Rentierweidewirtschaft an borealen Wald- und subarktisch-alpinen Tundrenstandorten -Auswirkungen auf thermische, hydraulische und mechanische Bodeneigenschaften. Dissertation. Dynamics and architecture of soil pore spaces as a function of mechanical and hydraulic stresses - from pore to pedon scale. Habilitation.
33.	Rasa, Kimmo Dr.	Physical properties of the boreal play soil
34.	Reszkowska, Agnieszka Dr	Grazing effects on soil mechanical strength and physical functions in Inner Mongolia, China
35.	Richter, Frank-Helge Dr.	Vergesellschaftung und Eigenschaften von Böden unterschiedlicher geomorpher Einheiten einer Jungmoränenlandschaft des Ostholsteinischen Hügellandes
36.	Seguel, Oscar Dr.	Structure properties and pore dynamics in aggregate beds due to wetting-drying cycles
37.	Semmel, Harald Dr.	Das Druckfortpflanzungsverhalten unterschiedlich belasteter Ackerböden, ihre mechanische Belastbarkeit und bodenphysikalisch-ökologische Eigenschaften
38.	Taubner, Heidi Dr.	Stoffdynamik unterschiedlicher immisionsbelasteter Böden - Vergleichende Untersuchungen an Gesamtböden und Aggregaten
39.	Thienemann, Jörg Dr.	Zur Bedeutung von Wassergehalt und Struktur für die mechanische Stabilität und hydraulische Dichtigkeit von mineralischen Deponieabdichtungen aus Geschiebemergel
40.	Trükmann, Katrin Dr.	Quantifizierung der Stabilisierungseffekte von Pflanzenwurzeln als Möglichkeit zur Reduzierung der mechanischen Bodendeformation im Grünland
41.	Türk, Thomas Dr.	Die Wasser- und Stoffdynamik in zwei unterschiedlich geschädigten Fichtenstandorten im Fichtelgebirge
42.	Uhlig, Christian Dr.	Airborne heavy metal pollution and its impacts on <i>Empetrum nigrum</i> and <i>Vaccinium myrtillus</i>

43.	Urbanek, Emilia Dr., geb. Jasinska	Management effects on carbon distribution in soil aggregates and its consequences on water repellency and mechanical strength
44.	Uteau Puschmann, Daniel Dr.	Aeration as influenced by soil structure dynamics – a contribution to improve the acquisition of nutrients from the subsoil
45.	Voßbrink, Jörg Dr.	Bodenspannungen und Deformationen in Waldböden durch Waldmaschinen
46.	Wiermann, Conrad Dr.	Auswirkungen differenzierter Bodenbearbeitungen auf die Bodenstabilität und das Regenerationsvermögen lößbürtiger Ackerstandorte
47.	Zausig, Jörg Dr.	Wasser- und Sauerstoffhaushalt sowie Redoxverhältnisse einzelner Bodenaggregate eines Pelosol-Gleys und eines Braunen Auenbodnes
48.	Zhao, Ying Dr.	Grazing effects on hydraulic, thermal and mechanical soil properties at multiple scales – a case study in Inner Mongolia grassland
49.	Zimmermann, Iris Dr.	Entwicklung einer umweltgerechten Erdbestattungspraxis im Hinblick auf die Folgewirkungen auf Böden, Grundwasser und Atmosphäre
50.	Zink, Alexander Dr.	Bodenstabilität und Auswirkungen dynamischer Lasteinträge auf physikalische Eigenschaften von Ackerböden unter konservierender und konventioneller Bodenbearbeitung



Dr. Baumgarten, W. 2010



**Dr. Baumgartl, T.
2002**



Dr. Becker-Fazekas, O. 2005



Dr. Bolte, K. 2008



Dr. Doerner, J. 2005



Dr. Dec, D. 2006



Dr. Fleige, H. 2000



Dr. Gan, Lei 2012



Dr. Gebhardt, S. 2007



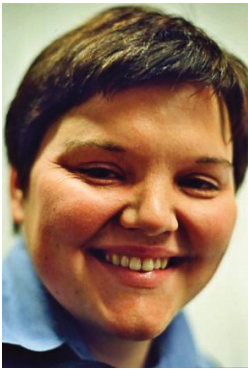
Dr. Holthusen, D. 2010,



Hartmann, A. 1999



Dr. Janßen, I. 2008



Dr. Jasińska, E. 2006



Dr. Junkersfeld, L. 1995



**Dr. Krümmelbein, J.
2007**



**Dr. Morales Sanchez, M.
1993**



Dr. Lammers, U.



**Dr. Mordhorst, A.
2013**



Dr. Nahrwold, F. 2004



**Dr. Müller-Lupp, W.
2001**



**Dr. Ould Baba, H.
2013**



Dr. Pagenkemper, S. 2013



Dr. Peng Xinhua 2004



Dr. Peth, S. 2010



Dr. Puschmann, U. 2013



**Dr. Reszkowska, A.
2010**



Dr. Richter, F., 2004



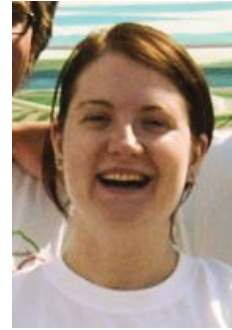
Dr. Semmel, H. 1993



**Dr. Uhlig,
C. 2001**



**Dr. Türk,
T. 1992**



**Dr. Trükmann, K.
2010**



Dr. Zhao, Y. 2008



Dr. Vossbrink, J, 2005



Dr. Wetzel, H. 1998



Dr. Zimmermann I. 2012



Dr. Zink, A. 2009

Photos on pages 114–117 by Jens Rostek

CONGATULATION LETTERS



**WYDZIAŁ INŻYNIERII ŚRODOWISKA
POLITECHNIKA LUBELSKA**



**FACULTY OF ENVIRONMENTAL ENGINEERING
LUBLIN UNIVERSITY OF TECHNOLOGY**

prof. Pl. dr hab. inż. Janusz Ozoniek
Dziekan / Dean

February 3, 2014 r.

Ś/26.../2014

Dear Professor Horn,

I am happy to inform you that by the resolution of the Senate of the Lublin University of Technology passed on January 23, 2014 Professor Rainer Horn receives the title of Honorary Professor of the Lublin University of Technology on the account of outstanding academic, educational and organizational achievements and valuable contribution to the development of scientific cooperation between the Lublin University of Technology and Christian-Albrechts University of Kiel.

Kind regards,

DZIEKAN
Wydziału Inżynierii Środowiska
J. Ozoniek
prof. dr hab. inż. Janusz Ozoniek



Prof. Dr. Januz Ozonek
Faculty of Environmental Engineering
Lublin University of Technology
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Tel: +48 81538 47 88
Fax: +48 81 538 4757
wis@wis.pollub.pl

4 March, 2014

Congratulation letter to Honorary Professor Rainer Horn

Dear Prof. Ozonek,

This is a letter to congratulate Prof. Rainer Horn awarded as an Honorary Professor of Lublin University of Technology.

Prof. Rainer Horn has been an outstanding world leading soil scientist. He has not only been leading the development of soil physics, soil mechanics and soil degradation science, but also pushing forward the development of the academic societies across the world, including Poland and China. His devotion, passion and patience are always encouraging many of us as students and colleagues who have got his enthusiastic help at a certain stage of our professional careers. Therefore, I am pleased to see his great contribution is recognized here in Lublin again as in many other places in the world. I wish Prof. Rainer Horn would continue his valuable cooperation with Lublin University of Technology.

All the best
Yours Sincerely,

Prof. Bin Zhang
Institute of Agricultural Resources and Regional Planning
Chinese Academy of Agricultural Sciences

*Address: No. 12, Zhongguancun South Street, Beijing 100081, P.R. China
Tel: +86-10-82109640, Fax: +86-10-82106225*

J. ROGER-ESTRADE

Paris, March 6, 2014

Pr. Rainer Horn
Institute of Plant Nutrition and Soil Science
Christian Albrechts University at Kiel
24118 Kiel, Germany

Dear Rainer,

I'm delighted to offer you my warmest congratulations for receiving the Title of Honor Professor of the Polytechnica University at Lublin.

You deserve a thousand times this Title, for at least three reasons.

First of all, because of your tireless efforts to serve science. Your contribution to the study of soils, this so essential resource for Mankind, was (and will continue to be) remarkable. Your work inspired many researches in France, and I owe you a great part of the few things I understand in soil physics.

Secondly, because of your commitment to our community. Through activities such as the organization of the ISTRO conference at Kiel or the editorial job for the Soil and Tillage Research Journal, you spent many time in service to others.

Thirdly, because of your personality. Those who were your PhD students, the several ISTRO members I know, all are unanimous to acknowledge how a friendly and charismatic person you are.

It takes the commitment of great people to achieve great results... and you achieve great results, with what we call in France "la classe". I wish you many years of continued success, in and off Soil Science...

Sincerely,



Jean Roger-Estrade
Professor of Agronomy
Head of the AgroParisTech department
"Agronomy, Forestry,
Water and Environmental Sciences and Technology"



**UNIVERSITY
OF ABERDEEN**

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United Kingdom

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Email: paul.hallett@abdn.ac.uk

url: www.abdn.ac.uk/ibes

28 February 2014

Prof. Dr. Rainer Horn
Institut für Pflanzenernährung und Bodenkunde,
Christian-Albrechts-Universität zu Kiel
24118 Kiel
Germany

RE: Honorary Professor, Lublin University of Technology

Dear Rainer,

I was very pleased to just hear the news that the Lublin University of Technology has awarded you an Honorary Professorship. This is a very well deserved accolade that reflects an incredible output of high quality science combined with a strong desire to build soil science on the international stage. With Prof. Stępniewski at the Lublin University of Technology, your groundbreaking research understanding how soil structure regulates biogeochemical processes had a major impact in emphasising the importance of soil physical properties to almost everything that happens in soil. The papers remain gems of information for my research activities.

Congratulations on receiving such a prestigious award. You have been a very strong mentor, supporter and collaborator over my research career, so it brings me great happiness to see you rewarded so appropriately.

Yours sincerely,

Paul Hallett
Professor of Soil Physics

Prof Dr hc Rainer Horn
Christian-Albrechts-Universität zu Kiel
Kiel
Germany

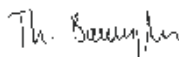
10 March 2014

Dear Rainer,

I am delighted to learn that you will be awarded the title of Honorary Professor of the Lublin University of Technology. This award justly recognises your contribution to science and education in your fields of specialisation and your influence on soil science worldwide. Moreover, your long-standing and fruitful cooperation with the Lublin University of Technology will be deservedly acknowledged with this honour.

I wish the collaboration between the members of the Lublin University of Technology and you, dear Rainer, continuing success in the future.

Yours sincerely,



Thomas Baumgartl
Deputy Director CMLR



INSTYTUT AGROFIZYKI
im. Bohdana Dobrzańskiego
POLSKIEJ AKADEMII NAUK

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Tel.: (081) 74-450-61, Fax: (081) 74-450-67
E-mail: sekretariat@ipan.lublin.pl <http://www.ipan.lublin.pl>

Lublin, 6th May, 2014

Prof. Piotr Kacejko
Ph.D., D. Sc. (Eng.)
Rector of Lublin University of Technology

Your Magnificence, Rector of Lublin University of Technology

Our contacts with Professor Rainer Horn are dated since 1984 when he visited together with prof. W.E.H. Blum from Austria the Institute of Agrophysics PAS in Lublin. Then he worked at the University in Bayerouth and his name together with prof. K.H. Hartge from Hannover was on the list of prominent soil physicists.

He closely cooperates with the Institute of Agrophysics of the Polish Academy of Sciences in Lublin where his extend expertise in soil physics and related areas is extensively used in development of agrophysics which became an important discipline for modern agriculture and natural environment. For 30 years of our cooperation he was very engaged in promoting agrophysics in the world through co-organizing and participation in numerous conferences and editing and publishing agrophysical books and other publications. Under his supervision many young scientists of the Institute of Agrophysics had an opportunity to gain the new knowledge about soil physics in modern laboratories of the Kiel University.

Rainer is active as a member of the Editorial Board of the journal International Agrophysics. More recently our cooperation was related with the Encyclopedia of Agrophysics (Springer 2011) that was inspired with his several contributions on soil compaction and environment.

We wish you all the best for your personal and scientific future.

prof. Jan Gliński and prof. Jerzy Lipiec

MICHIGAN STATE
UNIVERSITY

April 28, 2014

Prof. Dr. Rainer Horn
Director, Institute of Soil Sciences
Christian-Albrechts University
Kiel, Germany

Dear Professor, Dr. Rainer Horn,

It is a truly a pleasure to congratulate you as you receive the highest distinction by the Senate of Lublin University of Technology as they grant you their most distinguished award:

Honorable Professor of Lublin University of Technology

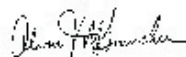
This award recognizes your many visits to Lublin to present lectures, seminars, advise and recruit graduate students as well as establish research programs with many excellent faculty at Lublin University of Technology. They have observed, recognized and been the recipients of your excellent academic, educational and organizational capacities which are enjoyed globally by many of us who have been associated with your personal and professional contributions to humanity.

Your expansion of the many physical and more recently biophysical properties and dynamics of the most limited natural resource the world depends upon, SOILS, have been and continue to be highly appreciated by the global soil science community.

Your work with Dr. Witold Stepniewski and his colleagues has been a premier example of international collaboration with multiple disciplinary research and education. It has also been a pleasure to personally observe the several doctoral students from Lublin University of Technology in your research team, at Kiel during our sabbatical with you a few years ago.

May your life continue to exemplify these and many more attributes God has given you as you continue to contribute to the growing number of soil scientists.

Sincerely,



Alvin J.M. Smucker, Ph.D.
Professor of Soil Physics



**College of
Agriculture and
Natural
Resources**

**Department of
Plant, Soil and
Microbial Sciences**

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Universidad Austral de Chile

Facultad de Ciencias Agrarias
Instituto de Ingeniería Agraria y Suelos

Prof Dr hc Rainer Horn
Christian-Albrechts-Universität zu Kiel
Kiel, Germany

Valdivia, Chile 06.05.2014

Dear Rainer,

We are very happy and delighted to know that you will be awarded the title of Honorary Professor of the Lublin University of Technology.

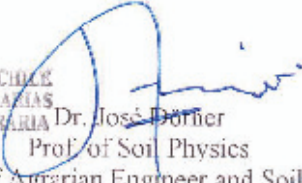
This award not only justly recognises your contribution to soil science but also your influence on many soil scientist worldwide. The recognition made by the Lublin University of Technology is just an example of the fruitful cooperation you have made with this Institution and Prof. Dr. Stełpniewski.

Please receive the congratulations of our Institute, Soil Scientist Colleagues (Dr. Dorota Dec, Dr. Susana Valle, Dr. Dante Pinochet, Dr. Oscar Thiers, and Dr(c) Alfredo Erlwein) and many Students that you have met during your visits to Valdivia/Chile. We consider that you are a good friend of "Chilean Soil Scientist"!!!

Personally, I have to mention that you have been a great supporter and mentor during my career and I'm very happy for this recognition to your soil scientist career.

Yours sincerely,

UNIVERSIDAD AUSTRAL DE CHILE
FACULTAD DE CIENCIAS AGRARIAS
INSTITUTO INGENIERIA AGRARIA
Y SUELOS



Dr. José Dörner
Prof. of Soil Physics

Institute of Agrarian Engineer and Soil Science
Vice-Dean

Faculty of Agricultural Science
Austral University of Chile

Independencia 541 - Casilla 567 - Valdivia - Chile
Fono 56-63-221430 - Fax 56-63-221239 - e-mail: suelos@unh.cl

The JOHN PAUL II CATHOLIC UNIVERSITY of LUBLIN
Department of Biotechnology and Environmental Sciences
Faculty of BIOCHEMISTRY and ENVIRONMENTAL CHEMISTRY
Ul. Konstantynów II,
✉ 20-708 Lublin (Poland), ☎ 0048-81-475 94 56

Prof. Dr. Zofia Stępniewska

May 03.2014

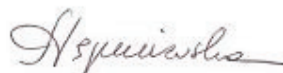
Dear Prof. R. Horn,

My best congratulations on the occasion of awarding you the title of Honorary Professor of the Lublin University of Technology!

This is a very high honor underlining your international scientific contribution as well as your merits for the Lublin University of Technology.

During your frequent stays in Poland we had an opportunity to build effective personal relationships and nice scientific interest between our Universities. It was also fruitful for students exchange within Socrates Erasmus Program and in preparation of a common scientific project.

My warmest congratulations and best regards,





Swansea, 6th of May 2014
Dr Emilia Urbanek
Royal Society Reserach Fellow at Swansea University
College of Science, Department of Geography
SA2 8PP, Swansea, United Kingdom

Dear Prof. Rainer Horn
Leader of the Institute for Plant Nutrition and Soil Science
Christian-Albrechts-Universität zu Kiel, Germany

Re: Honorary Professor, Lublin University of Technology

Dear Prof Horn

I was delighted to hear the news that the Lublin University of Technology has awarded you an Honorary Professorship. I strongly believe that you fully deserve the award given your close research and teaching collaboration with the university staff especially Prof. Witold Stepniewski. As a result of that collaboration I was able to study and work in your laboratory, first during the Socrates Erasmus Exchange Programme during my master studies and later, as a PhD student under your supervision.

I would like to congratulate you on that occasion and also thank you for your encouragement and support you have given me over all these years. Owing to your fantastic teaching and mentoring skills I have developed a great interest in soil science and started to appreciate the important role of soil in the environment. You've been always a great example for me how to move forward with my reserach and scientific career. I hope that your professorship at the Lublin University of Technology will inspire more people to become researchers and scientists.

My sincere congratulations and best wishes

Emilia Urbanek (Jasińska)

A handwritten signature in black ink, appearing to read 'E. Urbanek'.

Prof. Dr. Rainer Horn
Institut für Pflanzenernährung und Bodenkunde
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Germany

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Germany
www.zalf.de

Date: 28.03.2014

Congratulation: Honorary professorship at Lublin University

Lieber Rainer,
Dear Rainer:

With great pleasure, I heard that you have been awarded an Honorary Professorship of the Lublin University of Technology and I would like to send my wholehearted congratulation to you for this exceptional honor.

I have always been impressed by your enthusiasm, wealth of ideas, seemingly unlimited power, stimulating friendliness, and extraordinary productivity.

For over two decades, we have met many times during meetings, workshops, and collaborative research. From this, I think that the aspect of soil structure dynamics has been gaining its necessary attention largely because of your persistent upholding of the awareness on the non-rigidity of the soil pore system.

I was always impressed by the stimulating research environment in your institute especially by your engagement for the promotion of students and young scientist. Your engagement represents the old principle of the unity between research and teaching in the best order.

For the scientific community, I like to point out your great long-term activity as the President of the Deutsche Bodenkundliche Gesellschaft (DBG, German Soil Science Society), as head of Kommission I Soil Physics, and as member of the board. Here, you have been also aiming at stimulating projects and increasing visibility and recognition of young academics. The present honor also manifests your close cooperation with the international soil science community, and your promotion of foreign scientists not only from Poland but also from China and Chile among other countries.

I hope you will be able to continue your great work for many years in best health.

Yours Sincerely,



Horst H. Gerke
Senior Soil Scientist at the ZALF Müncheberg



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