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editorial

Hans Müller-Steinhagen: Up, Up and Away—A Global Career in Research, Education, Management, and Leadership

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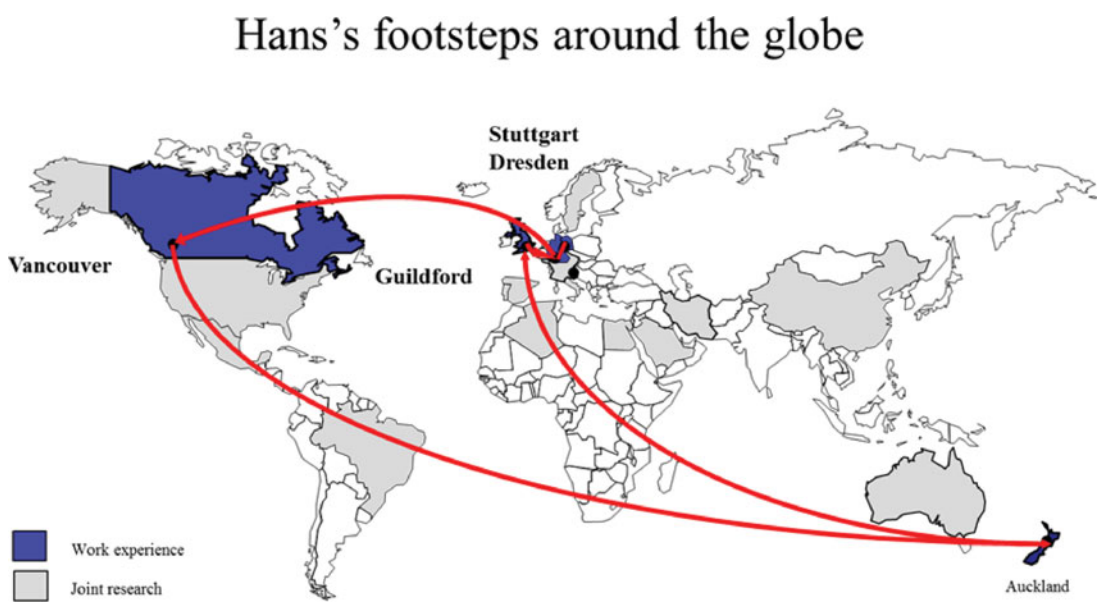
Outstanding scientific status can only be achieved through natural talent in combination with exceptional dedication and determination. Professor DEng, Dr.-Ing *habil*, Dr. h.c. Hans Müller-Steinhagen is a sterling example of such a unique personality. It gives us, as Guest Editors to this special issue of *Heat Transfer Engineering*, great pleasure to write this editorial to honour him, on the occasion of his 60th birthday on February 22, 2014. This is the celebration of a sharp-minded researcher, an avid writer, a savvy conference organizer, a highly successful manager and research leader as well as a dedicated, caring teacher and supervisor. He rose through the world of academia in an astounding and creative way that can serve as an inspiration to many young academics and graduate students.

Hans Müller-Steinhagen—or affectionately Hans as he is known to many of his colleagues, associates, students and friends - was born in Karlsruhe, Germany. After graduating with a Diploma of Engineering (the German equivalent of an MSc) from the University of Karlsruhe in 1980, he investigated the flow boiling of cryogenic liquids in the same University under the supervision of Professor Ernst-Ulrich Schlünder, to obtain his first doctoral degree in 1984. Feeling the need to 'stretch his legs', he then started a career that took him around the globe and established him as a global player with numerous international collaborative ventures.



First, he took up a position as research fellow at the University of British Columbia (Vancouver, Canada) where he worked on the topic of heat exchanger fouling for almost two years, supervised by Professors Norman Epstein and Paul Watkinson. Declining twelve attractive job offers from the German chemical industry in 1986, he moved almost 12000 miles to the University of Auckland (New Zealand) where he was appointed as a tenured Senior Lecturer and was then rapidly promoted to Associate Professor in Chemical and Materials Engineering. His ascent through the academic ranks did not go unnoticed. In 1993 he was offered a full professorship at the University of Surrey (UK) to chair the Department of Chemical and Process Engineering and subsequently to lead the School of Engineering. In 2000, he decided to return to his native country, Germany, to accept the combined appointment as Director of two prestigious institutes: the Institute of Technical Thermodynamics of the German Aerospace Centre (DLR) and the Institute for Thermodynamics and Thermal Engineering of the University of Stuttgart. While leading these institutes to ever increasing strength, he was in 2010 head-hunted to become Rector (highest authority in German universities, i.e. president) of Germany's largest university of technology, *Technische Universität Dresden*.

Over the past 35 years, Hans has made outstanding contributions in whatever position he held:

Let's begin with his research contributions, which are myriad and highly respected. His achievements are well known in many fields such as convective and boiling heat transfer, heat exchanger fouling and cleaning, solar thermal energy for buildings and power plants, heat storage, multi-phase fluid mechanics, fuel cells and energy systems analysis. For example, in the subject of heat exchanger fouling and cleaning, he is still the most cited researcher according to the ISI Web of Knowledge. He is also one of the founding fathers of the DESERTEC-concept to export solar electricity from North Africa to Europe, and was in charge of the successful development of the world's first fully fuel-cell powered aeroplane. To-date, Hans has successfully supervised 67 doctoral students, with another 18 still in the pipeline. He has authored or co-authored more than 650 journal papers, conference papers and proceedings, and five books. His research contributions have been recognized by many awards and prizes, among them the Kern award in 2009. In 1992, he became only the second recipient of an Engineering Doctorate DEng in New Zealand, and in 2012 the University of Brno (CZ) bestowed an honorary doctorate on him in recognition of his many achievements. Another prestigious honour was his election as a Fellow of the Royal Academy of Engineering (UK) in 1998. His research career and contributions to several fields of study have indeed been stellar.

Prof. Müller-Steinhagen is also a devoted teacher who has taught a wide range of undergraduate and postgraduate courses including heat and mass transfer, heat exchanger design, technical thermodynamics, and separation processes. Some of his classes in the University of Stuttgart were crowded with more than 900 students in attendance. He has received several awards for the high quality of his teaching. In Auckland he was ranked over several years as one of the top teachers in the Engineering School. Having said that, perhaps the most single drawback of his lectures was his terrible handwriting which probably required more effort than the taught subject itself! But that all changed when he could not read his doctors medical prescription that looked like his own 'hieroglyphics'. From then on his detailed, clearly printed notes and handouts, plus his erudite PowerPoint presentations, became the 'standard' for him in the business.

Along with his educational and research duties, Hans increasingly took up more extensive managerial responsibilities. This is something he clearly enjoys and is good at, thanks to his inspiring personality, penetrating mind, personal skills, vision,

and networking ability. But he was more than an excellent manager; he was a natural and inspiring leader, and these qualities have propelled him to the top in academia and research. After reorganising the Department of Chemical and Process Engineering and establishing the School of Engineering in the University of Surrey, he transformed the Institutes of Technical Thermodynamics (DLR) and Thermodynamics and Thermal Engineering (University of Stuttgart) into world-class organisations with international standing. By the time he left for Dresden, he had doubled the number of staff of the two institutes in Stuttgart to 250, and quadrupled the third-party income to more than 22 million Euro per year.

When Hans was appointed as Rector of *Technische Universität Dresden*, he was given the almost impossible task to move this traditional East-German university into the top academic ranks in Germany and to establish it firmly on the international scene. In comparison to his previous positions, it took him even less time to make a major impact. In June 2012, TU Dresden was selected to become one of only eleven 'German Universities of Excellence', a title that comes with very substantial prestige and additional funding. Since then "his" university is on a steep upward development path when it comes to staff and student numbers, third-party funding, journal publications and patent applications and rankings. He has also initiated a challenging building program to transform the campus.

It is not surprising that Prof. Müller-Steinhagen's many talents are also in high demand from organisations outside his direct employment. Increasingly, he became involved in policy and decision-making bodies for governments, industry, research organisations and academia, such as chair of the advisory board of the DESERTEC Industry Initiative and of IMDEA Energia; board member of EUREC, ENBW Foundation, Fuel Cell Alliance and ICHMT. He was a member of the Council of IChemE and of the Innovation Council of Baden-Württemberg, and was elected President of EUROTHERM for five years. In addition, he is serving on the advisory boards of about a dozen government research institutes, as well on the editorial boards of several international journals including *Heat Transfer Engineering*, and the organising committees of international conferences. Since 2001, he has chaired the main international conference on Heat Exchanger Fouling and Cleaning *seven* times. The number of companies Hans Müller-Steinhagen has been consulting with reads like a 'Who is Who' of the international process industry.

Even for a person who is accomplished in quick-thinking, multi-tasking and trustful delegation, the above successes cannot be achieved within anything close to normal working hours. A 60 to 80 hours working week has been the standard since we have known Hans, who has a reputation for sending e-mails to his co-workers and office staff during the small hours of the night. It is admirable that he nevertheless manages to enjoy a private life where he is a caring father, companionate, loving husband and a loyal friend. He spends some of his limited spare time in exhibitions, concerts and the opera, beer gardens, and loves hiking, skiing and diving. Hans is married to Renate who moved with him 19 times during the past 36 years. She is not just "the great woman that stands behind every great man," but while pursuing her own career path, has always been directly at his side to take a large share of their social and academic responsibilities. For example, she is the main author of a survey on heat exchanger fouling, which is highly cited in the scientific community. Together they have a son, Patrick, who looks like he is becoming a 'chip off the old block' in that he studied in Qatar and Pittsburgh, and has been competing in international debating contests with great success. He recently received his degree from Carnegie Mellon University.

We know that 'character makes the man'; and those who know Hans well will agree that he is person of great integrity, humility, sensitivity, and warmth. He has a wonderful sense of humour, loves a joke, yet he can focus with ardent and equal intent on both the smallest and greatest issues. He honours and encourages colleagues, works night and day. Although an amazing role model, he accepts us 'lesser mortals' for who we are! These exceptional personal qualities over-arch all that he has achieved as 'the troops' love to follow an inspiring leader.

This special issue of *Heat Transfer Engineering* contains numerous papers which have been dedicated to Hans Müller-Steinhagen's 60th birthday. As this journal is targeted at practical heat transfer engineering, the Guest Editors had to decline several requests from associates, colleagues and students whose expertise was beyond the scope of this journal, such as those relating to pure fluid mechanics, surface engineering, and so on. However, as Guest Editors we happily pass on to Hans the best wishes of all those included in this issue, as well as those who intended to submit articles that we were unable to consider. On behalf of his many colleagues, friends, and students from all around the globe, and the Chief Editor of HTE, Professor Afshin Ghajar, we wish him a very Happy Birthday, many more productive years, and most importantly good health and happiness with his family and friends.

Carry on Hans!

M. Reza Malayeri is the head of research group on fouling and cleaning in process industries at the Institute of Thermodynamics and Thermal Engineering (ITW), University of Stuttgart, Germany. His research work covers a wide range of topics related to heat and mass transfer, multi-phase flow, numerical modelling, enhanced heat transfer, heat exchanger fouling and mitigation and is the author of more than 100 articles. He is also a member of editorial board of several journals including *heat transfer engineering*.

Claudette D. Beyer is President & CEO of Heat Transfer Research, Inc. (HTRI). Her career includes positions in industry, government, and academia. Beyer has served on the boards of many organizations, including the National Council for Women in Higher Education, North Dakota Governor's Council on Human Resources, and the Society of Research Administrators International (SRA). In 2009, she was President of the Heat Transfer Society, UK.

Geoff G. Duffy is Professor Emeritus in Chemical Engineering at The University of Auckland in New Zealand. His research for over four decades has focussed on the fluid mechanics of flexible particles, mainly natural wood pulp fibres and synthetic filaments. The programme has included novel developments in heat exchanger applications to augment heat transfer or mitigate fouling. He has several inventions and awards, has published extensively, has consulted widely in the paper industry, and was the inaugural Director of the Pulp and Paper Research Organisation of NZ.

Norman Epstein is honorary professor in the Department of Chemical and Biological Engineering at the University of British Columbia in Vancouver, Canada. His research areas in the past 65 years have focussed on heat, mass and momentum transfer, on the fluid-particle dynamics of spouted beds, liquid-fluidized beds and three-phase fluidization, and on various aspects of heat exchanger fouling. He is a former editor of the *Canadian Journal of Chemical Engineering* and has published widely. Most recently he co-edited (with John Grace) Spouted and Spout-Fluid Beds (Cambridge University Press, 2011).

Erich Hahne is professor emeritus and a former Director of the Institute of Thermodynamics and Thermal Engineering, the University of Stuttgart, Germany from 1973 till 2000. He has been involved in research areas ranging from thermophysical properties via boiling heat transfer to solar engineering. He has authored and co-authored close to 400 journal and conference papers as well as several books. Professor Hahne is the recipient of several honorary doctorates and awards. He has been also long-standing editor or co-editor of important international journals, including the *International Journal of Heat and Mass Transfer* from 1966 till 2012 and the *International Communications in Heat and Mass Transfer* from 1974 till 2012 and the *Journal of Solar Energy*.

Ernst-Ulrich Schlünder is professor emeritus and former director of the Institute of Thermal Process Engineering, the University of Karlsruhe, Germany. His main fields of research include fundamentals of heat transfer, mass transfer and thermal separation processes, covering a wide variety of technical applications. He has extensively published in these research areas including several books. In recognition of his research, he received many awards and numerous honorary doctorates from different countries. He has been a member of editorial boards of several international journals and co-founder of *Heat Transfer Engineering*.

A. Paul Watkinson is Professor Emeritus in the Department of Chemical and Biological Engineering at the University of British Columbia, Canada. His research interests include fouling of heat exchangers and other processing equipment, rotary kilns, and gasification processes.