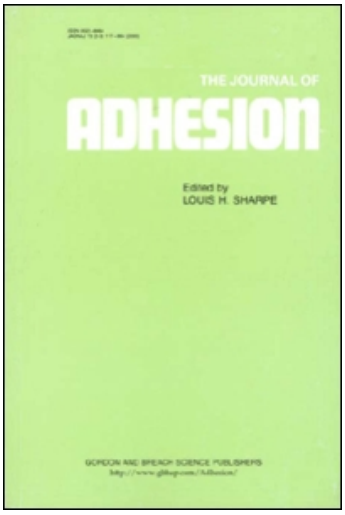

The Journal of Adhesion
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713453635

FOREWORD

Online publication date: 10 August 2010

To cite this Article (2004) 'FOREWORD', The Journal of Adhesion, 80: 6, 465 — 466
To link to this Article: DOI: 10.1080/00218460490477099
URL: http://dx.doi.org/10.1080/00218460490477099

The Journal of Adhesion, 80: 465–466, 2004

ISSN: 0021-8464 print/1545-5823 online
DOI: 10.1080/00218460490477099

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Taylor & Francis Group

FOREWORD

Adhesion in many systems is strongly influenced by wettability, contact angles, and surface tensions. August Wilhelm Neumann, the recipient of the 2004 Adhesion Society Award of Excellence, has been at the forefront of these and other aspects of surface thermodynamics for over forty years. Having published more than 320 papers in refereed technical journals and dozens of book chapters since 1960, few people have had as much impact on the field of surface thermodynamics. He is internationally recognized as the leading expert on the measurement of contact angles and liquid surface tension, and on their use in determining the surface tension of solids. Moreover, he has pioneered the development of many novel experimental and analytical techniques based on thermodynamic models for a wide variety of physical phenomena.

Professor Neumann received his Ph.D. from the University of Mainz in 1962 and worked for seven years at the Fraunhofer Institute for the Physics and Chemistry of Interfaces. He then spent two years in Buffalo working with Professor R. J. Good as a National Science Foundation Senior Foreign Scientist. In 1972 he received his Habilitation from the University of Stuttgart. Since 1971 he has been at the University of Toronto in the Department of Mechanical Engineering, retiring in 1999 but continuing to supervise a large number of students and a very active research program. To date, Professor Neumann has supervised 23 Ph.D.s, 47 masters, and 20 postdoctoral fellows and visiting scientists.

Among his earlier awards are the Bikerman Lectureship (Case Western Reserve University), the International Adhesion Symposium Award (Yokohama, 1994), the Wolfgang Ostwald Research Prize (German Colloid Society, 1999), the Faculty Teaching Award (University of Toronto, Engineering, 1994) and the Northrop Frye Award (University of Toronto, for linking teaching and research, 1996). The latter two awards reflect the devotion Professor Neumann has always

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shown his students, both in the lab and in the classroom. Speaking personally, I completed both my master's and doctorate under his supervision, and I found Professor Neumann to be an inspiring scientist whose exceptional commitment to his work generates an enthusiastic response from his students. He combines remarkable insight with hard work and a very high degree of personal integrity. A keen sense of the power and elegance of thermodynamics has helped him to maintain a focus and to painstakingly develop his own rigorous base of theories and experimental observations.

Among the most significant theoretical contributions to come from his group are the generalized theory of capillarity, its extensions to the theory of line tensions, and the establishment of the conditions under which contact angles are thermodynamically significant. He was one of the first to recognize that accurate contact angles can be obtained only by taking extreme care in surface and liquid preparation and in the measurement itself. This led to new experimental techniques of unprecedented accuracy for contact angle measurements, such as capillary rise and axisymmetric drop shape analysis. The latter method has also evolved into a versatile and extremely sensitive tool for the measurement of liquid–fluid interfacial tensions, and is providing unique data on the dynamic activity of lung surfactants. In fact, biomedical applications of his work have been of major interest to Professor Neumann for many years, and he has maintained several long standing collaborations with medical researchers in Canada and Europe.

Professor Neumann is well known for his work on interpreting contact angles to yield solid surface tensions. His approach has been used to provide quantitative explanations for many physical phenomena such as, for example, cell and particle adhesion, sedimentation, particle repulsion at advancing solidification fronts, and bacterial engulfment by cells. A related development, the new phase rule for solid–liquid–fluid systems, has provided a better understanding of the thermodynamic degrees of freedom to specify such systems.

Over the course of his long and exceptionally productive career, Professor Wilhelm Neumann has made many important contributions to our understanding of wetting, spreading, and adhesion. The articles in this special issue of *The Journal of Adhesion* reflect some of the breadth of his work and its applications.

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