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## Biophysicist in Profile

### Hans Reiner Polder

“The secrets of life can be solved by measurements, modeling, and formulas,” Hans Reiner Polder maintains. The founder and CEO of npi electronic GmbH, a manufacturing company that builds electrophysiology instruments designed for use in physiological and pharmacological basic research in the life sciences, was born in Sighisoara, a multiethnic Romanian village initially settled by the Saxons of Transylvania, a people known for their craftsmanship. Polder spent the first decade of his life under a Communist regime. To escape such suppression, Polder, his parents, and his younger brother immigrated to Tamm, Germany, where the family still lives today.

Polder’s father, an engineer and later an electronics and physics teacher, encouraged Polder’s interest in electronics. “I built radio sets,” Polder says. “This was something special, because one had access to foreign radio stations as a source of information.” A teenager in Romania, he won the MINITECHNICUS Award at a nationwide competition for designing an electronic keyboard instrument to be used as a music-teaching tool. Later, his talent with electronics met his innate teaching ability, which nicely complemented his desire to share his knowledge with anyone who wanted to learn. This combination of traits set the tone for his future career.

After graduating from high school in Ludwigsburg, Germany, Polder began his degree in electrical engineering and then medical electronics and cybernetics at Technical University Munich. “We had a lecture by *Wolf Singer*, ‘Neurophysiology for electrical engineers,’” Polder recalls, “and this led my attention to electrophysiology and biophysics.” Meanwhile, he interned at the Max Planck Institute of Psychiatry in the Department of Neurophysiology. “*Hans Dieter Lux* and his team were very interested to promote new developments in the field of electrophysiological instrumentation,” Polder says. “*Uwe Heinemann*, *Arthur Konnerth*, and *Dieter Swandulla* were experimenting with single electrode and voltage clamp techniques, so I got the chance to complete my degree with a masters thesis about the single electrode voltage clamp technique.” This experience had a profound impact on his later career: Immediately after graduation, Polder started npi electronic. His wife, Hannelore, is now the CEO/CFO.

Polder’s biggest career challenge, he says, is “to make npi electronic not only a supplier but a scientific partner involved in solving the problems scientists have in their daily research.” It’s an ambitious goal, but one that keeps him motivated. Fortunately, the Biophysical Society can help. “Very important is the *Biophysical Journal* and the Annual Meeting as a source of state-of-the-art scientific information and a chance to meet other biophysicists and get new ideas,” says Polder. He

brings these ideas to his company, truly joining the hands of hard science and industry. “For me it is the link between two worlds, life science phenomena and electronics. This is very fascinating and always challenging.”

“Reiner is not just a manufacturer but has a deep understanding of the underlying science,” says *Andreas Draguhn*, Director of the Department of General Physiology at Heidelberg University, and Polder’s collaborator and friend. “He has more knowledge about methods in cellular electrophysiology than anybody else I know.... He is willing and able to share this knowledge with everybody, including young researchers.”

Exhibiting this philosophy, Polder began working with *Michael Hoerner* of the University of Goettingen to create a summer course in Kota Bharu, Malaysia, to teach students about electrophysiology. To accomplish this goal, they teamed up with the German Academic Exchange Service and the Universiti Sains Malaysia, School of Medical Sciences. “He is disciplined and persistent, and a positive thinker,” *Jafri Malin Abdullah*, Chair of the Department of Neurosciences at the Universiti Sains Malaysia, School of Medical Sciences, and co-developer of the Summer School, says of Polder. “He is always adaptable and a supporter of our objectives to establish a world-class lab even though he knew in his heart that it would take a few years to establish this and make it sustainable.”

Even after establishing the Summer School Fundamentals of Electrophysiology in 2005, Polder continues to passionately recruit guest instructors each year—which, given that the school cannot pay visiting faculty European rates to teach the course, can be a challenge. Polder, however, is always up to it. “I love the way his eyes roll when trouble is brewing,” Abdullah says. “When or after we get these problems settled, his great German smile that follows his moustache enlightens our spirits.”

Polder himself also guest instructs the Summer School students. To educate the next generation of scientists and industry professionals,

he draws on his own understanding that there is a context to which everything belongs. “Go back to the roots,” he advises. “Many problems can be solved by adequate modeling and often bioelectric phenomena can be understood by using simplified equivalent circuits.” His lectures are moving, Draguhn asserts; he experienced Polder’s “charismatic” teaching style when he himself was a student. “He gave me the most profound lecture in electrophysiological techniques that I had ever heard...I actually felt dizzy afterwards.”

*Bernd Sutor*, another of Polder’s collaborators and a student at the Max Planck Institute of Psychiatry back when Polder was interning there, lauds Polder’s calm diligence in conveying his knowledge to others. “He tried to explain to me the theoretical background of the time-share-principle of his amplifier,” Sutor says. “Certainly, he got the feeling that it was not worth the time, but with great patience, he answered all my questions.”

As Draguhn puts it, Polder taught him “to believe in solid measurements, based on precise knowledge of the recording instruments, and to be intellectually independent from short-lived fashions in science.” Polder plans to continue teaching these fundamentals to generations of scientists to come by organizing more courses, symposia, and workshops. As to his plans for

npi electronic?

“The trend [in biophysics] is going toward high resolution imaging techniques,” he says. “I hope to be able, together with my excellent team at npi, to design microelectrode-based instruments that can

cope with these new challenges.” Based on his track record, he’ll do that, and more.



Polder with the 2009 Summer School Class in Malaysia where he teaches electrophysiology.