Adrianus T. de Hoop is the founder of the Laboratory of Electromagnetic Research at Delft University. He pioneered a modification of the Cogniard technique for calculating impulsive wave propagation in layered media, now known as the Cognaird–de Hoop technique, a standard in the industry to analyze time-domain wave propagation. In addition to de Hoop's many technical recognitions, Her Majesty the Queen of the Netherlands appointed him Knight in the Order of the Netherlands Lion.

Honorary Membership for Adrianus T. de Hoop

by Jacob T. Fokkema

Adrian de Hoop received his M.Sc. degree in electrical engineering with the distinction cum laude from Delft University of Technology, the Netherlands, in 1950. In 1956–1957, he enjoyed a one-year research assistantship at the Institute of Geophysics of the University of California–Los Angeles on the invitation of its director, Louis B. Slichter. Adrian carried out research on elastodynamic wave propagation and scattering in the Seismic Scattering Project, funded by a consortium of U. S. oil companies under the supervision of Leon Knopoff.

Adrian's research focused on the modification of Cagniard's method — the 2D version and application to pulsed plane-wave scattering by a semi-infinite crack. He combined the analysis with the Wiener-Hopf technique/Weinstein factorization method. In February 1957 during a joint seminar of Caltech/UCLA on seismic wave propagation, he presented for the first time the modified Cagniard technique, with Charles Hewitt Dix in the audience. After the presentation, Dix said to Adrian, "I am in the course of translating Cagniard's book into English. Maybe I had better stop the enterprise!"

In 1958 at Delft University of Technology, Adrian successfully defended his Ph.D. dissertation, "Representation theorems for the displacement in an elastic solid and their application to elastodynamic diffraction theory." For this effort, he was awarded a Ph.D. degree with the distinction cum laude.

In 1960, Adrian's 3D version of the modified Cagniard technique was launched in Applied Scientific Research, Section B, 8, no. 1, 349–356, with the title "A modification of Cagniard's method for solving seismic pulse problems." In the same year, Adrian was appointed full professor in electromagnetic theory and applied mathematics at Delft University of Technology. He held that position until 1996, when he was appointed Lorentz Chair Emeritus Professor in recognition of his scientific contributions. He still holds that position.

In 1970, Adrian founded at Delft the Laboratory of Electromagnetic Research, which has developed into a world-class center for electromagnetics, with a huge impact on the world's electromagnetic community and on electromagnetic research and education in the Netherlands.

In 1971, the scientific community recognized Adrian's important contribution to the Cagniard technique by denoting it from that moment on the Cagniard–de Hoop technique (in R. Burridge, 1971, "Lamb's problem for an anisotropic half-space": Quarterly Journal of Mechanics and Applied Mathematics, 24, no. 1, 81–98).

I entered the scene at a perfect moment when I met Professor de Hoop as a student in 1971.

According to Ernst Mach, the goal science has set itself is the simplest and most economical abstract expression of facts. This means it is the task of professors to teach their theories in the most compact but comprehensive form. In fact, they should teach students in one semester a subject that cost the professors themselves 10 years of understanding. Then we make progress, at least when the students understand the message.

This is the way Professor de Hoop taught us the essence of wave propagation. He developed a unifying theory of wave propagation in electromagnetics, acoustics, and elastodynamics with emphasis on common, fundamental properties such as the field/source reciprocity theorems of Lord Rayleigh, Betti, and Lorentz. His teaching centered around those reciprocity theorems leading to the formulation of the direct and inverse scattering problem. The beauty of it lies in the simplicity of the mathematical formulation. The problem is not solved, but it is well formulated and ready to be applied in practice.

Adrian always had a clear view of the application of results to problems in electromagnetic diagnostics and in geophysical prospecting met in practice. This made him a welcome guest as visiting scientist in the Laboratory of Schlumberger-Doll Research. He shares his insight with us in his seminal Handbook of Radiation and Scattering of Waves (1995).

We return to Mach's dictum of the need of succinct expression of facts. James Clerk Maxwell formulated his electromagnetic theory at a time when people believed that all physical phenomena resulted from mechanical action. Now we see that Maxwell's mechanical ether model of spinning cells was a crucial bridge between old and new ideas. It was built from old concepts but paved the way to new concepts — from mechanical conception of Faraday's notion of the field to the modern view of the field concept as interaction carrier of electromagnetic action.

Considering the present standard notation of Maxwell's equations, we see the progress in formulation and hence in the describing power of the theory. Adrian follows this path in his continuing quest for the most efficient wavefield description. He has outlined his latest ideas in "Electromagnetic field theory in (N + 1)-space-time: A modern time-domain tensor/array introduction," 2013, Proceedings of the IEEE, 101, no. 2, 434–450.

Several times, Adrian has stood in the limelight of success. He has always shared that success with his students. Through them, the methodology of de Hoop's "School of Wavefield Research" has found its place in academia as well as in industry.