

J. Leo van Hemmen Biography

August 5, 2021. Patrick Charbonneau

Jan Leonard van Hemmen (1947-) was born in Groningen, Netherlands, son of Jan van Hemmen, a senior official of the ministry of agriculture, and Lia Boersma. His patronym refers to what is now a neighborhood of Haren, just south-east of the city of Groningen.

Van Hemmen attended the Willem Lodewijk Gymnasium (Dutch equivalent of the British grammar school) and then the Rijksuniversiteit Groningen, where he obtained a MSc (1965-1972) for a solid-state physics thesis entitled “Analysis of the Knight shift in liquid alkali alloys” under the supervision of Willem J. Caspers and Adrianus J. Dekker, and a PhD (1976) for a mathematical physics thesis entitled “Dynamics and ergodicity of the infinite harmonic crystal” under the supervision of Nicolaas Marinus Hugenholtz (Physics) and Erik Gerard Frederik Thomas (Mathematics). He spent a year (1976-1977) as postdoc at the Institut des Hautes Etudes Scientifiques in Bures-sur-Yvette, just outside Paris, France, so as to work with Joel Lebowitz, who was then visiting, before joining the Mathematics Department at Duke University as an assistant professor (1977-1978). In 1978 he rejoined as scientific assistant the then brand-new DFG-funded SFB 123 (now Collaborative Research Centre, CRC) at the University of Heidelberg. After obtaining his habilitation there in 1983, for what is now called the van Hemmen spin-glass model, he became Privat-Dozent. In 1990, he took up a chair of theoretical biophysics at the Technische Universität München, where he turned emeritus in 2015.

Van Hemmen was trained as a mathematical physicist in the Dutch equilibrium dynamics tradition of statistical mechanics. He learned about spin glasses from Richard Palmer at Duke. Their joint, mathematically careful, analysis of replica symmetry provided important guidance toward the formulation of its breaking. At Heidelberg, van Hemmen later organized (with Ingo Morgenstern) two landmarks, the *Heidelberg Colloquium on Spin Glasses* (1983) and the *Heidelberg Colloquium on Glassy Dynamics* (1986). His research interests subsequently drifted toward natural neuronal networks and the theoretical biophysics of neuronal information processing in the first stages of perception. Under his guidance Spike-Timing-Dependent Plasticity (STDP, 1996) was discovered, now a standard notion in neurobiology and, amongst other things, meant to explain the extremely high precision of the barn owl’s auditory map, its origin.

Van Hemmen became a fellow of the American Physical Society (1999) “for theoretically resolving learning in spatio-temporal neuronal activity with specific application to the barn owl’s sound localization,” and notably served as editor-in-chief of the Springer journal *Biological Cybernetics* (2006-2017).