**CV – Thomy Nilsson, Professor Emeritus (June 2023)**

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A Short “Biopic”  
Interest in consciousness began with: Nilsson TH (1963) Change in EEG Driving Frequency and Recognition of Change in Flicker Frequency. [B.Sc](http://B.Sc). Honors Thesis, Rensselaer Polytechnic Institute.  Subsequently a research assistant at Columbia University, I built a visual stimulator used in a series of experiments that discovered the P300 cortical evoked potential wave, which was the first brain response linked to a cognitive decision.  My Masters Thesis at the University of Alberta failed to find evidence of scanning in visual consciousness from aliasing effects in two flash interval difference-thresholds.   Instead the results demonstrated that visual temporal discrimination was limited by the distribution of conduction velocities in the optic nerve.  My mentor at the U of A, Thomas Nelson, was a former colleague of Howard Bartley, who had discovered the first relationship between cortical activity and the subjective perception of brightness.  Contrary to then current neuroanatomical emphasis in vision, Bartley championed the effects of neural dynamics in perception.  On that basis my dissertation discovered the changes in color of monochromatic light induced by different flash durations.    
The discovery of spatial frequency channels in vision by Campbell & Robson in 1968, led me to find the first evidence of temporal frequency channels.  Together these characteristics of the visual system imply that the visual system uses holographic processing to greatly expand its information handling capacity (Nilsson, 1975).  Still the sizes of neural pathways needed to bring a Fourier analyzed image to the visual cortex and share it with other brain areas for recognition do not seem adequate.  Over years I developed a neural network model which demonstrated how a two-dimensional array of inputs could be accurately transmitted with 1/16th the number of connections.  This received US patent  # 60/938,035 and led to: Nilsson TH (2010) An anatomical prerequisite for consciousness: Convergent-divergent transmission nets.  Association for Scientific Study of Consciousness, U. of Toronto.  Subsequently I applied this neural networking method to develop a model that explained some 20 years of research on visual memory.  Using different methods of measuring difference-thresholds, it consistently showed for color and shape that the neural basis of a memory that matched a pervious input must be very similar to the sensory response to that input. Even as memory faded over periods up to 24 seconds.  This direct subjective evidence is consistent with cortical responses studies which, of course, are only correlational!