David Hamilton, Ph.D.

Biography: Dr. David J. Hamilton received his PhD in Neuroscience from George Mason University (GMU) in 2016. His dissertation research (Dr. Giorgio Ascoli lab) focused on morphologically defined hippocampal neuron types to facilitate biologically realistic computational modeling. Dr. Hamilton has extensive R&D experience in AI/ML applied to Finance & Defense. Specific projects include Intelligence Community analytic prediction, Cyber Threat Analysis Platform R&D, US Treasury cyber defense, credit card fraud detection, Mult*INT fusion/analysis, LIDAR signal characterization, and passive/active sonar signal detection/classification. Companies for which he worked include Northrop Grumman (2004-present), CardSystems/NeuralTech (1994-2004), Raytheon (1980-1994), and AAI (1977-1980). Earlier in his career, Dr. Hamilton received his MSEE from Loyola College, Maryland, and his BSEE from PSU. He is well published, holds memberships in Society for Neuroscience, AAAS, IEEE, and continues to maintain his association with GMU as an Affiliate Faculty.

Title: Biologically Inspired Engineering Solutions for Finance and Defense

Abstract: Dr. Hamilton describes an evolutionary journey of biologically inspired engineering solutions leveraging Neuroscience and Machine Learning (ML) techniques for both the Financial and Defense industries. Beginning with classical Artificial Intelligence (AI) methodologies such as Expert Systems and Neural Networks, he elucidates his thought migration toward more biologically analogous computational approaches. Having applied ML to "real world" problems throughout most of his career, Dr. Hamilton is informed by the practicalities of logistical constraints not typically encountered in pure research settings. His talk will cover to old development, comparative performance, production considerations, security issues, current research, and future plans, all in the context of industrial solutions. It is Dr. Hamilton's firm belief that we can effectively leverage the size, weight, and power efficiencies that nature has provided through evolution. These resilient highly conserved computational architectures provide us with an engineering "road map" to the development of improved capabilities going forward.