1145-68-1820 **Katie Rainey*** (krainey@spawar.navy.mil). *Functional Analysis of Deep Learning Classifiers.* Preliminary report.

Classification functions are central to most applications of machine learning. Recent advances in deep learning algorithms have shown impressive results on image recognition and other classification tasks, motivating researchers to apply such algorithms to all manner of problem domains. However, many practitioners fail to understand how the algorithms work, and in particular how they operate on a given dataset. In this talk I will discuss deep learning classifiers from the perspective of a mathematical function, to shed light on how the algorithms operate on data at a fundamental level. I will also discuss how understanding the domain and functional properties of a classifier is crucial to applying classifiers to defense applications, such as automatic detection of targets in overhead imagery. As advances in artificial intelligence find their way to more and more real-world applications, research into the underlying mathematical properties of algorithms is necessary to confidently deploy such systems in operational and safety-critical scenarios. (Received September 24, 2018)