1126-68-386   **Scott Dean**, 4555 Overlook Avenue SW, Washington, DC 20375, **Seongwon Kim**, 4555 Overlook Avenue SW, Washington, DC 20375, **Dasha Leary**, 4555 Overlook Avenue SW, Washington, DC 20375, and **Trey Morris***, 4555 Overlook Avenue SW, Washington, DC 20375. *Identifying Protein Promoter Sequences using Character-Level CNNs and LSTMs.*

In an effort to reduce expensive bench-top investigations, deep learning frameworks were explored to identify promoter sequences in novel bacteria of interest to Navy. Character-level convolutional neural networks (CNNs) and long short-term memory (LSTM) recurrent neural networks were trained on known promoter sequences from well-characterized bacteria, including Escherichia coli and Bacillus subtilisand then used to predict sequences in a novel bacteria from the genera Lactobacillus, Vibrio, and Marinobacter. Overcoming problems of over-fitting and attempts at generalizing the networks utility beyond training data are discussed. A proposal for testing predicted sequences in the laboratory is outlined along with methods of fine-tuning the model with deep reinforcement learning depending upon positive or negative results of laboratory verification. (Received January 17, 2017)