Chronic wounds represent a significant clinical burden in the US, directly impacting the quality of life for patients. It is estimated that the treatment of diabetic foot ulcers (DFUs) alone costs at least 17 billion dollars per year. Moreover, more than 70,000 limb amputations are performed per year as a result of chronic DFUs that are unresponsive to treatment leading to high costs for hospitalization and increased morbidity and mortality. Currently, diagnosis is only possible using standard culture-based methods in 20-50% of DFUs. Lack of diagnosis leaves clinicians with no choice but to use empirically based antibiotic regimens that can be ineffective and contribute to the rise of antibiotic resistance (as seen in the rise of MRSA and carbapenem superbugs) with serious worldwide health implications. Developing strategies for faster diagnosis, directed treatment of microbial infection, and rapid wound healing is critical for effective patient care. Moreover, directed phage-based therapies may provide an alternative to antibiotic treatment, and may be essential in DFU where complex communities of bacteria form biofilms that are inaccessible to systemic antibiotic treatments. In this talk, I describe recent advances in our lab in big data analytics to study the complete microbial repertoire of the skin microbiome and the role phages may play in targeted wound therapy and diagnostics.