Selected research topics in Biomedical Engineering: Novel Phenotyping and Diagnostic Tools

Location: Conference room 106, Biozentrum, Klingelbergstrasse 70, Basel

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Toward rapid diagnosis of respiratory infections: translating 'omics to the clinic

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Abstract

The diagnosis of most infectious diseases still uses or is based on technologies from the time of Louis Pasteur! To be fair, nucleic acid amplification technologies are revolutionizing some diagnostic areas, however, many patients will not benefit, and so we must find constructive alternatives. Here, I will present our efforts to deploy metabolomics and transcriptomics to diagnose respiratory infections quickly and accurately. I will share our progress on pre-clinical applications of breath analysis for tuberculosis profiling for animal health monitoring, antibiotic testing, and vaccine development, as well as our early work translating the same into clinics in South Africa in combination with efforts to enhance diagnosis effectiveness using blood transcriptional profiling. If there is time, I will also share to-date progress on applications in challenging infection etiologies, such as, infections: within the cystic fibrosis patient population, as well as, infections caused by influenza, MDR Enterobacteriaceae, and *Burkholderia pseudomallei*.

Curriculum:

Dr. Hill is an Associate Professor at Dartmouth. Her team focuses on determining cross-sectional and individualized biomarker suites for infectious diseases, particularly those of the respiratory tract. Her team has matured the breath-based biomarker approach through the development and optimization of chemical data acquisition and data analysis pipeline for untargeted metabolites in clinical populations. Her team has also developed an architecture for the integration and exploitation of in-lab and publically-available transcriptional profiles across major platforms. Her team is in the process of clinical validation of biomarkers for a number of infectious etiologies in addition to working with others to miniaturize and/or commercialize current benchtop systems for direct clinical translation.

Dr. Hill grew up in Australia. She is trained in engineering, microbiology, and chemistry at Rensselaer and Yale. She loves all microorganisms, so please do not ask her to choose a favorite. When she is not doing science, Jane likes to garden, play tennis, write creatively, wander around Roman ruins, or make art.