**Project Title:** Proteomics of non-small cell lung cancer: biomarker discovery using cutting-edge mass spectrometry  
**Code:** NCS12

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**Project Type:** Laboratory Based  
**Project Category:** Cancer, Technology, Respiratory  
**Project Keywords:**  
1. Lung cancer  
2. Proteomics  
3. Mass spectrometry  
4. Biomarker

**Project Description:**

Lung cancer is the second most common cancer in men and women and a leading cause of cancer-related deaths worldwide. Non-small cell lung cancer (NSCLC) is the most common subtype accounting for roughly 80% of cases and, if untreated, patients have a 1-year survival of around 15%.

The discovery of diagnostic cancer biomarkers, specific molecules that help to distinguish between normal and cancerous conditions, may potentially be used to develop an effective earlier-stage diagnostic screening tool for lung cancer. Furthermore, due to the significant variation in response and survival of NSCLC patients receiving treatment, there is an urgent need to identify new biomarkers associated with patient prognosis to assist in the guidance of patient care.

The large-scale study of proteins, known as proteomics, is emerging as a powerful tool for identifying new cancer biomarkers. The primary aim of this Summer School project is to comprehensively profile the human NSCLC proteome (in plasma, surgical specimens and exhaled breath) using latest-generation mass spectrometry for clinically relevant protein biomarkers.

Research would be primarily conducted at the Kolling Institute (RNSH campus) in close collaboration with respiratory physicians and oncologists, with some travel required to the Australian Proteome Analysis Facility (Macquarie University, North Ryde). A 2015 Summer School Student involved in this project would get experience in processing clinical samples straight from surgery for proteomics analysis, optimising sample processing (similar to [1,2]), designing and performing experiments, as well as interpreting data.