Dr. Wasundara Fernando *was born in Ginigathena, which is a very small town in Sri Lanka. She completed her high school education at Devi Balika Vidyalaya, Colombo, and obtained her BSc (special degree in Pharmacy) from University of Colombo in 2008. She moved to Canada in 2012 for her graduate studies and obtained her MSc and PhD degrees from Dalhousie University. Dr. Fernando's doctoral research focused on investigating the potential of food biomolecules to fight breast cancer. In recognition of the quality of her doctoral thesis, she was awarded the 2019 Dalhousie University Graduate Studies in Pathology Prize. Currently, Dr. Fernando works as a postdoctoral scholar at Dalhousie University as a Dr. David H. Hubel postdoctoral fellowship awardee. Her current research is aimed at targeting the metabolic profiles of breast cancer stem cells to improve the efficacy of immunotherapy. Outside her research, she enjoys music, poetry, painting and astronomy.*

Theme Seminar

A Journey: from a Chemist to a Cancer Biologist

Ann Sanoji Samarakkody

Postdoctoral Research Fellow, Department of Pediatric Hematology-Oncology, Boston Children's Hospital and Dana Farber Cancer Institute, Harvard Medical School, Boston MA, USA

Cells in an organism are under constant exposure to extrinsic and intrinsic stressors. Molecular mechanisms are in place to dampen the detrimental effects on the cell at the level of cellular pathways and also at the level of gene expression. Ribonucleic Acid (RNA) Polymerase II is the enzyme that synthesizes messenger Ribonucleic Acid (mRNA) in eukaryotes, as the first step of gene expression. Pausing of RNA Polymerase II is widely implicated in regulating gene expression during development. An orchestration by a wide variety of transcription factors determines the output of transcription. Using both molecular and genome-wide approaches, I have shown that Polymerase II pausing is a signature that can be acquired during gene activation. My work further showed that gene activation can occur through pause release in a signal-specific manner.

To explore molecular mechanisms in dysregulation in transcription, my work continued in a laboratory focused on hematologic malignancies, focusing on *RUNX1*, an essential transcription factor in blood development. *RUNX1* mutations are a frequent occurrence in Myelodysplastic Syndrome (MDS) and leukemia. Germline loss-of-function mutations in *RUNX1* leads to Familial Platelet Disorder with propensity to develop Acute Myeloid Leukemia (FPD/AML). These heterozygous mutations lead to low platelet numbers, improper platelet structure and function and increased risk of developing leukemia later in life. Previous work by others have shown that introducing wild type *RUNX1* into patient derived iPSCs can alleviate the disease phenotype in FPD/AML models. Our efforts are focused towards identifying means to enhance the function of the wild type protein.

Src family kinases (SFK) reduce the activity of *RUNX1* by phosphorylation. Known SFK inhibitors (SFKi) such as PP2 and Dasatinib have been previously shown to increase activity of *RUNX1*. I have shown that these SFKis can drive the expression of many *RUNX1* downstream target genes. Using patient derived iPSC models, we show that the treatment with PP2 and Dassatinib can rescue some of the FPD/AML disease phenotypes including hematopoietic progenitor cell numbers. To identify additional compounds that can enhance *RUNX1* activity, we have performed a high-throughput small molecule screen of libraries of compounds using a luciferase-based model. Based on the data that I have generated, currently a clinical trial is being formulated together with NIH. I anticipate that these small molecule inhibitors can alleviate platelet dysfunction and dampen leukemic predisposition in patients that carry *RUNX1* heterozygous germline mutations.

Dr. Samarakkody *is currently a postdoctoral research fellow at the prestigious Boston Children's Hospital and Harvard Medical School, Boston, USA. Dr. Samarakkody is a proud graduate of College of Chemical Sciences and was a part of the final IChem batch that studied the first two years in Kandy. She first started her research work with Prof. Priyani Paranagama at University of Kelaniya. Dr. Samarakkody then worked as a research assistant at University of Peradeniya under the mentorship of Professor Chandani Perera and Professor Needra Karunarathne. In 2017 she graduated with a PhD in Anatomy and Cell Biology from the school of Medicine and Health Sciences at University of North Dakota, USA.*

Theme Seminar

Multiplexed Assays for point-of-care diagnostic applications

Angelo Gunasekera

Senior Director, R&D Chembio Diagnostic Systems Inc, New York, USA

Bacterial and viral disease outbreaks have always been a threat to global public health, making affordable, rapid and accurate diagnostics highly important tools to slow down the spread of pathogens and decrease the mortality rate. In this quest, the development of cost-effective and easy-to-use diagnostic devices that enable rapid and accurate detection is essential to reduce the time and costs associated with healthcare services. Therefore, the development and the application of Point-of-Care (POC) assays that overcome limitations in regular lateral flow (LF) assays are essential for better assay performance and patient outcomes. Dual-Path-Platform (DPP), a unique POC flow assay developed at Chembio Diagnostics has been used in the successful development of many FDA approved POC devices. This talk will cover the development of multiplexed diagnostic devices to detect various diseases that include, but not limited to, COVID-19, Ebola, Flu, Dengue, Malaria, Melioidosis and Leptospirosis. In addition, I will discuss the use of POC assay for the development of companion diagnostic tests for therapeutic drug monitoring.

Dr. Angelo Gunasekera *Ph.D. is currently a Senior Director of R&D at Chembio Diagnostics and maintains ties with SUNY Stony Brook University as an Associate Professor in Chemistry & project member of the Institute of Chemical Biology & Drug Discovery (ICB&DD). Before joining Chembio, Angelo held leadership positions in drug discovery research for nearly 15 years at OSI Pharmaceuticals (New York) and Abbott Laboratories (Illinois). Angelo earned his BSc Hons in Chemistry at the University of Colombo and Ph.D. in Biophysics at Rutgers University in New Jersey. He also completed his postdoctoral work at Princeton University and the University of California.*