Kids Cancer Alliance

ADVANCES IN CHILD CANCER:

Big Data and Immunotherapeutics Symposium

Friday 31 August, 2018

Australian National Maritime Museum (ANMM) – Darling Harbour

PROGRAM

8:50 am

Symposium opening by Professor David Currow, CEO Cancer Institute NSW with introduction by Professor Glenn Marshall AM, Director of KCA.

Session 1:

Chaired by Professor Glenn Marshall AM, Director of KCA, Paediatric Haemotologist/ Oncologist, Kids Cancer Centre, Sydney Children's Hospital and Head of Translational Research and Molecular Carcinogenesis, Children's Cancer Institute

9:00 - 9:30

Dr Nic Waddell – *Group Leader Medical Genomics and co-ordinator of the Cancer Program, QIMR Berghofer Medical Research Institute, Brisbane*

Clinical application of whole genome sequencing

Dr Waddell is an experienced cancer genomics researcher who uses whole genome sequencing and transcriptomics to study a variety of cancers. Her research focuses on the identification of mutational processes underlying tumour development. Her work is focussed on the clinical applications of genomics including the use of whole genome analysis to implement individualised drug treatment.

9:30 - 10:30

Professor Jinghui Zhang – *Chair, Department of Computational Biology, Endowed Chair of Bioinformatics, St Jude Children's Research Hospital, Memphis, USA*

The Genomic and Neoepitope Landscape of Paediatric Cancers

Professor Jinghui Zhang is a computational biologist who is recognised worldwide for her expertise in developing novel algorithms and analysing BIG data to decipher sequence variation in disease processes, especially paediatric cancer. She has analysed genetic variation in the first-sequenced human genome and developed the DNA search algorithm BLAST. Since 2010 she has led the integrative analysis of paediatric cancer for the National Cancer Institute TARGET project and for St. Jude Children's Research Hospital – Washington Paediatric Cancer Genome Project, discovering driver mutations affecting key pathways in more than 20 paediatric cancers. She has created novel computational tools that have been adopted by researchers worldwide, leading to targetable kinase fusion and novel oncogenic fusion in paediatric cancer. Here she will present her work on paediatric pan-cancer analysis of germline cancer susceptibility genes, somatic alterations and neoepitope landscape.

10:30 - 11:00 **MORNING TEA**

Session 2:

Chaired by Dr Belinda Kramer, Group Co-Leader Cancer Gene Therapy Group, Children's Cancer Research Unit, Kids Research Westmead

11:00 - 11:30

Professor Mark Dawson – *Head of the Translational Haematology Program, Consultant Haematologist and Group Leader of Cancer Epigenetics Laboratory, Peter MacCallum Cancer Centre and Professor, Sir Peter MacCallum Department of Oncology & Centre for Cancer Research Melbourne University*

Cancer Epigenetics: Concepts, Challenges and Therapeutic Opportunities

Professor Dawson is a clinician-scientist studying epigenetic regulation in normal and malignant haematopoiesis. He is a fellow of the Royal Australasian College of Physicians and Royal College of Pathologists of Australasia. Following his PhD, at the University of Cambridge, he was awarded the inaugural Wellcome Trust Beit Prize Fellowship to pursue his research into epigenetic regulation of leukaemia stem cells. This research identified a new therapeutic strategy for acute myeloid leukaemia by targeting the BET bromodomain proteins that function as epigenetic readers, which helped set the platform for clinical trials with this first in class epigenetic therapy. He is the Senior Research Fellow for the Leukaemia Foundation of Australia and a Howard Hughes Medical Institute International Research Scholar.

11:30 - 12:30

Assistant Professor Carsten Krieg – *Departments of Microbiology & Immunology and Dermatology, College of Medicine, Medical University of South Carolina (MUSC), Charleston, USA*

How high throughput single cell mass cytometry changes our view on the immune world

Assistant Professor Krieg conducts research in cancer and innate immunity but his lab also has a vast experience on checkpoint inhibitor therapy and enhanced cytokine formulations, coined superkines. In his current project he used mass cytometry, a novel technology that used 6,000°C plasma to detect 50 parameters per cell using mass (rare metal) tagged antibodies. In a multi team effort, along with artificial intelligence and bioinformatics, two-dimensional mapping can read the results, creating an "Instagram" of a person's immune system. Krieg's recent studies in **Nature Medicine** and Lancet Oncology demonstrate that the technique can be used in the clinics to profile patients' immune systems to predict response to immunotherapy treatment and characterize the whole circulating immune compartment in trial patients.

12:30 - 1:00

Professor Phil Darcy – *NHMRC Principal Research Fellow and Group Leader of the Cancer Immunotherapy Laboratory, Peter MacCallum Cancer Centre, Melbourne and University of Melbourne*

Development of new strategies for enhancing CAR T cell therapy for epithelial malignancies

Professor Darcy is a tumor immunologist and internationally renowned expert on cancer immunotherapy. His work has focused on developing novel T-cell based immunotherapy approaches for cancer in preclinical mouse models and translating this into patients. Over the past 15 years he has shown that adoptive transfer of gene-engineered mouse and human T cells expressing chimeric antigen receptors (CARs) targeting solid cancer antigens could effectively eradicate cancer in mice. A Phase I clinical trial leading from this work was recently completed at the Peter MacCallum Cancer Centre in patients with acute myeloid leukaemia that represented a first in Australia using this approach with another CAR T cell trial currently underway in solid cancers. More recently his studies have involved combining gene-engineered T cells with other immune based therapies including checkpoint inhibitors which is showing tremendous promise in preclinical models and patients. Here he will discuss the development of CAR's against novel cancer antigens and results of new combination immunotherapies that increase the therapeutic activity of CAR T cells in solid cancer.

1:00 - 2:00 **LUNCH**

Session 3:

Chaired by Dr Jamie Fletcher, Project Leader, Experimental Therapeutics, Children's Cancer Institute

2:00 - 2:30

Ms Ariel Bogle – *Technology reporter at the Australian Broadcasting Corporation (ABC).*

The tightrope of big data, health and trust

Ms Bogle is an award-winning journalist who reports about technology at the ABC. Previously, she was technology editor at The Conversation and has work published in the New York Times, the Atlantic, Australian Financial Review and Slate.

She has reported extensively about online data collection and security issues, most recently concerning Facebook and My Health Record – as well as the rise of "Big Data" and the positives and pitfalls related to its collection and use in healthcare.

2:30 - 3:15

Assistant Professor Carsten Krieg – *Department of Microbiology and Immunology, College of Medicine, Medical University of South Carolina, USA*

Development of workflows for the high dimensional analysis of single cell proteome data

In expansion of the above talk Assistant Professor Krieg will focus how to design mass cytometry staining panels from flow data sets and use RNAseq bioinformatics packages to analyse high throughput single cell mass cytometry data.

3:15 - 3:45

Dr Qing Zhong – *Group Leader, Cancer Data Science Group, ProCan, Children's Medical Research Institute, Conjoint Senior Lecturer, University of Sydney*

Cancer Data Science for Mass Spectrometry-based Proteomics

Dr Qing Zhong is a data scientist with expertise in analysis of biological and medical data by machine learning techniques. He has a science doctorate from the Swiss Federal Institute of Technology (ETH) Zurich, and a decade of experience working in an interdisciplinary environment that involves collaboration between biologists, clinicians, and industry partners. His postdoctoral training was at the University of Zurich and its affiliated hospital, where he developed expertise in analysis of omics data, and designed and performed a proof-of-concept study, to test a clinical big data system for consolidating genomic, clinical and demographic information into a unified model for precision and data-driven medicine. He joined Children's Medical Research Institute (CMRI) in 2017 to head the Cancer Data Science group in ProCan, a flagship program at CMRI. Here, he will first give an overview of ProCan, which aims to generate and analyse a pan-cancer proteome database of tens of thousands of human cancers of all tumour types in the next 7 years. He will then discuss ProCan's ongoing mass spectrometry-based proteomics studies and explain what these projects will add to the landscape of precision cancer medicine

3:45 - 4:15 **AFTERNOON TEA**

Session 4:

Chaired by Dr Erdahl Teber, Team Leader, Bioinformatics Unit, Children's Medical Research Institute

4:15 - 4:45

Dr Shalin Naik – *Group Leader, Molecular Medicine Division, Immunology Division, The Walter & Eliza Hall Institute of Medical Research, and University of Melbourne.*

Clonal biology in health and disease

Dr Shalin H. Naik is an Immunologist, Stem Cell and Cancer biologist who specialises in understanding biology at the single cell and clonal-level – in particular, through the use of lineage tracing tools, such as cellular barcoding, as well as single cell RNA-seq. He is a renowned expert in Dendritic Cell development and function, in Haematopoietic Stem and Progenitor Cell Heterogeneity, and recently in cancer biology, including study into the clonal relationship of primary tumours to metastases, and their response to resection and chemotherapy. He will discuss tools, approaches and insights that single cell and clonal biology can offer in the area cancer biology and heterogeneity. Dr Naik is also an ABC television host and is in the running for a 2018 TV Week Logie Award.

4:45 - 5:30

Professor Jinghui Zhang – *Chair, Department of Computational Biology and St Jude Endowed Chair in Bioinformatics, St Jude Children's Research Hospital, Memphis, USA*

Clinical Genomic Profiling of Paediatric Cancer by "Total Sequencing" of Whole Genome, Whole Exome and Transcriptome

Further to Professor Zhang's morning session talk she will discuss the genomic data sharing on the St Jude Cloud platform and the development of the clinical sequencing infrastructure at St Jude.

5:30 - 6:00 **REFRESHMENTS & NETWORKING**

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