GSGGB

HORIZONS IN CANCER STEM CELL RESEARCH

MARCH 31ST | MEDICAL SCIENCES BUILDING
UNIVERSITY OF TORONTO, CA

www.gsggb.org

1 King's College Circle

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HORIZONS IN CANCER STEM CELL RESEARCH

PROGRAM SCHEDULE

8:00 - 8:30 AM	**REGISTRATION**
8:30 - 8:45 AM	**OPENING REMARKS**
9:00 - 9:45 AM	**Dr. James Rutka** *Why do brain tumors grow and invade*
9:45 - 10:30 AM	**Dr. Trevor Pugh** *M&Ms: Monitoring Multiple Myeloma Mutations and Microenvironment in Marrow, Microdroplets, and PlasMa*
10:30 - 10:45 AM	**Break**
10:45 - 11:30 AM	**Dr. Rama Khokha** *TBD*
11:30 - 12:15 PM	**Dr. James Dennis** *Sooner or later everything old is New again*
12:15 - 1:15 PM	**LUNCH & POSTER PRESENTATION**
1:15 - 2 PM	**Dr. Uri Tabori** *Cancer and hypermutation: Translating basic discoveries to saving lives.*
2 - 2:45 PM	**Dr. Paul Boutros** *Why are some cancers aggressive?*
2:45 - 3 PM	**Break**
3 - 3:45 PM	**Dr. Sean Egan** *Using the mouse mammary gland as a model for malignant breast cancer in humans*
3:45 - 4 PM	**Closing Ceremony** *Poster Presentation Winners*

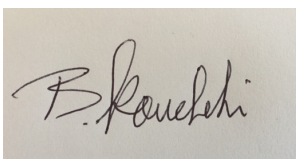
INTRODUCTION

The Global Society for Genetics and Genome Biology (GSGGB) welcomes you to our first annual conference:
Horizons in Cancer Stem Cells Research. Founded in 2016, GSGGB is an undergraduate student-run organization based at the University of Toronto, which aims to educate students from all academic backgrounds
about devastating genetic disorders. Our major goal
is to inspire high school and undergraduate university students interested in science to explore the fascinating world of scientific research. Further, through various fundraising initiatives, GSGGB strives to raise money for research on rare genetic disorders.

The aim of our conference this year is to shed light on the pioneering work in cancer research done in Toronto, with an emphasis on cancer stem cells. By bringing together world-renowned experts in various sub-fields of cancer research ranging from cancer genomics, stem cell biology, cancer predisposition syndromes, cell signalling, and metastasis, we hope to illuminate the remarkable complexities of one of the biggest killers of mankind: cancer. Ground-breaking innovations in targeting the dormant drivers of tumorigenesis-cancer stem cells will be elucidated upon. We truly believe that today's conference will inspire many of you to explore your passions and curiosities by advancing humanity through scientific innovation.

We are pleased to have each and every one of you here with us today and sincerely hope that you will have an exciting, educational and inspiring experience.

Lazar Joksimovic
Co-Founder of GSUT



Robert Koucheki
Co-Founder of GSUT

DR. JAMES RUTKA

WHY DO BRAIN TUMORS GROW AND INVADE

JAMES RUTKA IS A CANADIAN NEUROSURGEON AND THE RS MCLAUGHLIN PROFESSOR AND CHAIR OF THE DEPARTMENT OF SURGERY IN THE FACULTY OF MEDICINE AT THE UNIVERSITY OF TORONTO. HE SUBSPECIALIZES IN PEDIATRIC NEUROSURGERY AT THE HOSPITAL FOR SICK CHILDREN (SICK KIDS) AND IS A SENIOR SCIENTIST IN THE RESEARCH INSTITUTE AT SICK KIDS.

HIS MAIN CLINICAL INTERESTS INCLUDE THE NEUROSURGICAL TREATMENT OF CHILDREN WITH BRAIN TUMOURS AND EPILEPSY. HIS RESEARCH INTERESTS LIE IN THE MOLECULAR BIOLOGY OF HUMAN BRAIN TUMOURS – SPECIFICALLY IN THE DETERMINATION OF THE MECHANISMS BY WHICH BRAIN TUMOURS GROW AND INVADE. HE IS THE DIRECTOR OF THE ARTHUR AND SONIA LABATT BRAIN TUMOUR RESEARCH CENTRE AT SICK KIDS, AND EDITOR-IN-CHIEF OF THE JOURNAL OF NEUROSURGERY.

DR. TREVOR PUGH

M&MS: MONITORING MULTIPLE MYELOMA MUTATIONS AND MICROENVIRONMENT IN MARROW, MICRODROPLETS, AND PLASMA

DR. TREVOR PUGH, PHD, FACMG IS A CANCER GENOMICS RESEARCHER, BOARD-CERTIFIED MOLECULAR GENETICIST, AND HOLDER OF THE CANADA RESEARCH CHAIR IN TRANSLATIONAL GENOMICS. HIS RESEARCH PROGRAM IS FOCUSED ON UNDERSTANDING THE CLINICAL IMPLICATIONS OF CLONAL SHIFTS IN CANCER AND NON-CANCEROUS CELL POPULATIONS IN TUMOURS DURING TREATMENT, MOST RECENTLY USING CELL-FREE DNA SEQUENCING, SINGLE CELL RNA-SEQ ANALYSIS, AND IMMUNE REPERTOIRE PROFILING. HE IS APPOINTED AS SCIENTIST AT THE PRINCESS MARGARET CANCER CENTRE AND ASSISTANT PROFESSOR IN THE UNIVERSITY OF TORONTO DEPARTMENT OF MEDICAL BIOPHYSICS. HE IS SCIENTIFIC DIRECTOR OF THE PRINCESS MARGARET GENOMICS CENTRE AND DIRECTOR OF THE TRANSLATIONAL GENOMICS LABORATORY, A JOINT INITIATIVE WITH THE ONTARIO INSTITUTE FOR CANCER RESEARCH TO ENABLE CLINICALLY-ORIENTED GENOMICS PROJECTS. DR. PUGH SERVES ON ADVISORY COMMITTEES FOR CANCER CARE ONTARIO, CANADIAN CLINICAL TRIALS GROUP, HPC4HEALTH, NEUROFIBROMATOSIS RESEARCH INITIATIVE, AND THE BC CANCER AGENCY PERSONALIZED ONCOGENOMICS PROGRAM. HE HAS PARTICIPATED IN MULTIPLE LARGE-SCALE GENOMICS AND DATA-SHARING PROGRAMS INCLUDING AACR GENIE, THE CANCER GENOME ATLAS, NCI TARGET, AND THE TERRY FOX CANADIAN COMPREHENSIVE CANCER CENTRE NETWORK. MOST RECENTLY, HE WAS AWARDED A TERRY FOX NEW INVESTIGATOR AWARD AND A PHILLIP A. SHARP INNOVATION IN COLLABORATION AWARD.

DR. RAMA KHOKHA

TBD

DR. KHOKHA IS ONE OF THE SENIOR SCIENTISTS AT THE PRINCESS MARGARET CANCER CENTER. SHE IS A PROFESSOR IN THE DEPARTMENTS OF MEDICAL BIOPHYSICS, AND LABORATORY MEDICINE AND PATHOBIOLOGY AT UNIVERSITY OF TORONTO. AFTER RECEIVING HER MSC DEGREE FROM UNIVERSITY OF DELHI, INDIA, AND COMPLETING A PHD IN BIOCHEMISTRY FORM UNIVERSITY OF WESTERN ONTARIO, SHE WENT ON TO BECOME A POSTDOCTORATE FELLOW AT CANCER RESEARCH LABS IN LONDON, ONTARIO, AND A VON HUMBOLDT FELLOW AT EUROPEAN MOLECULAR BIOLOGY LABS. AFTER STARTING HER OWN INDEPENDENT PROGRAM AT THE LONDON REGIONAL CANCER CENTER IN 1990, SHE JOINED ONTARIO CANCER INSTITUTE IN 1996. SHE HAS RECEIVED MANY AWARDS INCLUDING CANADIAN INSTITUTE OF CANCER RESEARCH STUDENTSHIP, AND IS A CANADIAN INSTITUTES OF CANCER RESEARCH SCHOLAR. HER MAJOR CONTRIBUTIONS HAVE BEEN TO AREAS SUCH AS, ADULT STEM CELL NICHES & TUMOR MICROENVIRONMENT, ADULT STEM CELLS AND TISSUE HOMEOSTASIS, STROMAL MICROENVIRONMENT, AND CANCER GENE DISCOVERY.

DR. JAMES DENNIS

SOONER OR LATER EVERYTHING OLD IS NEW AGAIN

DR. DENNIS BEGAN HIS CAREER AS AN ASSISTANT PROFESSOR AT QUEENS UNIVERSITY. THEN, AS FOUNDING MEMBER OF LUNENFELD-TENENBAUM RESEARCH INSTITUTE, HE MOVED TO MT. SINAI HOSPITAL. DR. DENNIS IS A CANADA RESEARCH CHAIR IN GLYCOBIOLOGY, A FELLOW OF THE ROYAL SOCIETY CANADA, AND HAS BEEN AWARDED THE FRIESEN-RYGIEL AND LLOYD FOGLER PRIZES. DR. DENNIS WAS A CO-FOUNDER OF A CANADIAN BIOTECHNOLOGY COMPANY, GLYCODESIGN. HIS PRIMARY RESEARCH FOCUS IS ON THE STRUCTURE AND FUNCTIONS OF PROTEIN ASN (N)-GLYCOSYLATION IN DEVELOPMENT AND DISEASE USING GENETIC AND BIOCHEMICAL METHODS WITH MICE. IN ADDITION, DR. JAMES DENNIS IS SHEDDING LIGHT ON HOW MOLECULAR EVENTS IN TUMOURS OVERCOME THE NORMAL GROWTH AND CHECKPOINT CONTROLS TO ALLOW TUMOUR CELLS TO GROW AND SPREAD THROUGHOUT THE BODY. HIS STUDY OF MOLECULAR NETWORKS WILL LEAD TO NEW DRUG COMBINATIONS THAT TAKE INTO ACCOUNT REDUNDANCIES AND RENDER TUMOUR CELLS SELECTIVELY SUSCEPTIBLE.

DR. URI TABORI

CANCER AND HYPERMUTATION: TRANSLATING BASIC DISCOVERIES TO SAVING LIVES.

DR. URI TABORI MAINTAINS AN ACTIVE CLINICAL PRACTICE IN THE TREATMENT OF CHILDREN WITH CANCER. HIS LAB IS A TRANSLATIONAL LAB AIMING AT TRANSFORMING BASIC BIOLOGY AND CLINICAL OBSERVATIONS TO IMPROVE PROGNOSTIFICATION AND TO FIND NOVEL TREATMENTS FOR CHILDREN WITH BRAIN TUMOURS. HIS LAB FOCUSES ON MECHANISMS THAT CONTROL TUMOUR PROGRESSION AND RESISTANCE TO THERAPY. WE FOCUS ON TUMOURS THAT HAVE LOW AND HIGH GRADE COMPONENTS SUCH AS PSEDIATRIC GLIOMAS AND NEUROBLASTOMA. USING THESE MODELS WE PLAN TO UNDERSTAND HOW TUMOURS STOP PROGRESSING, AND EXPAND OUR KNOWLEDGE OF THE SPECIFIC PATHWAYS THAT CONTROL THIS UNIQUE BEHAVIOR. ADDITIONALLY, HE IS INVESTIGATING HOW THESE MECHANISMS AND OTHERS CONFER TUMOUR RADIORESISTANCE ON ONE HAND AND HOST SENSITIVITY TO SUCH TOXIC THERAPIES. HE AND HIS TEAM IN LAB ARE ALSO INVOLVED IN A GROUP EFFORT EXPLORING THE RECIPROCAL INTERACTION OF CANCER GENETICS AND THE GENETICS OF CANCER. WE ARE UNDERTAKING THIS EXPLORATION BY EXPLORING THE ROLE OF GERMLINE AND SOMATIC MUTATIONS IN TP53 AND OTHER GENES IN CHILDHOOD GLIOMAGENESIS.

DR. PAUL BOUTROS

WHY ARE SOME CANCERS AGGRESSIVE?

DR. BOUTROS FINISHED HIS UNDERGRA EDUCATION AT UNIVERSITY OF WATERL RECEIVED HIS PHD FROM ONTARIO CANCER INSTITUTE. DURING HIS STUDIES HE HAS RECEIVED MANY AWARDS SUCH AS, CIHR/NEXT GENERATION FIRST PRIZE AND THE INVITROGEN CANADA YOUNG INVESTIGATOR SILVER AWARD. DR. BOUTROS IS AN INVESTIGATOR II OF OICR, AN ASSOCIATE PROFESSOR, PHARMACOLOGY AND TOXICOLOGY, AND MEDICAL BIOPHYSICS UNIVERSITY OF TORONTO, CO-LEAD AT CANADIAN PROSTATE CANCER GENOME NETWORK, AND LEAD AT ICGC-TCGA DREAM SOMATIC MUTATION CALLING CHALLENGE. DR. PAUL BOUTROS' TEAM USES BIOLOGICAL BIG DATA TO CREATE NEW BIOMARKERS THAT PERSONALIZE THERAPY FOR INDIVIDUAL PATIENTS. THESE ALGORITHMS ARE IMPLEMENTED IN OPEN-SOURCE SOFTWARE AND THE TEAM WORKS WITH CLINICAL PARTNERS AROUND THE WORLD TO VALIDATE THEIR NOVEL COMPUTATIONAL TECHNIQUES AND TO MOVE NEW DIAGNOSTIC TESTS TOWARD CLINICAL PRACTICE.

DR. SEAN EGAN

USING THE MOUSE MAMMARY GLAND AS A MODEL FOR MALIGNANT BREAST CANCER IN HUMANS

DR. EGAN GOT HIS B.SC. AND PHD DEGREES AT THE UNIVERSITY OF MANITOBA. HE DID A POSTDOCTORAL FELLOWSHIP AT THE WHITEHEAD INSTITUTE/MIT AND THEN SPENT A YEAR STUDYING IN LONDON, ENGLAND AT THE IMPERIAL CANCER RESEARCH FUND/LONDON RESEARCH INSTITUTE BEFORE JOINING SICKKIDS IN 1993. HE HAS FOCUSED ON IDENTIFYING THE NETWORK OF MUTATIONS THAT COOPERATE TO INDUCE CANCER IN CELLS FROM SEVERAL ORGANS. THIS IS BEING DONE TO DETERMINE HOW SPECIFIC CANCER GENE NETWORKS DRIVE SPECIFIC PATHOLOGICAL SUBTYPES OF CANCER, AND HOW THESE NETWORKS CAUSE TUMOURS TO SPREAD THROUGHOUT THE BODY. ULTIMATELY, ONCE IDENTIFIED, HE CAN USE INFORMATION ABOUT THESE NETWORKS TO DESIGN COMBINATION THERAPIES, WHICH SHOULD BE MORE EFFECTIVE THAN SINGLE AGENT THERAPY. THE EGAN LAB USES ANIMAL MODELS TO STUDY DEVELOPMENT OF THE MAMMARY GLAND AND LUNG AS WELL AS CANCER IN BOTH TISSUES. FOR EXAMPLE, WE USE GENE TARGETING TO DESIGN MODELS FOR BREAST CANCER WHICH CAN BE PROBED TO DEFINE COOPERATIVE SIGNALING NETWORKS INVOLVED IN TRANSFORMATION AND METASTASIS, AND THAT CAN BE TARGETED IN THE CLINIC.

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THANK YOU FOR ATTENDING THIS YEAR'S CONFERENCE.

WE HOPE TO SEE YOU NEXT YEAR FOR OUR CONFERENCE ENTITLED **GENOME EDITING: SNIPPING AWAY HUMAN DISEASE.**

LIKED WHAT WE ARE DOING?
WOULD YOU LIKE TO HELP PLAN OUR NEXT EVENT OR CONFERENCE?
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