



UNIVERSITY OF TORONTO  
FACULTY OF MEDICINE

# **SURGICAL SCIENCE IN THE DIVISION OF GENERAL SURGERY (2014-15)**



**October 2014**

**RESEARCH SUPERVISORS (ALPHABETICAL)**

Dr. Najma Ahmed, Surgeon Educator  
Dr. Nancy Baxter, Surgeon Scientist  
Dr. Mark S. Cattral, Surgeon Scientist  
Dr. Priscilla Chiu, Surgeon Scientist  
Dr. Tulin Cil, Surgeon Investigator  
Dr. Sean Cleary, Surgeon Investigator  
Dr. Natalie Coburn, Surgeon Investigator  
Dr. Marc de Perrot, Surgeon Scientist  
Dr. Alexandra Easson, Surgeon Investigator  
Dr. Anna Gagliardi, Non-Clinician Scientist  
Dr. Steven Gallinger, Surgeon Scientist  
Dr. J. Ted Gerstle, Surgeon Educator  
Dr. Anand Ghanekar, Surgeon Scientist  
Dr. Rebecca Gladdy, Surgeon Scientist  
Dr. Anand Govindarajan, Surgeon Investigator  
Dr. Teodor Grantcharov, Surgeon Scientist  
Dr. Robert Gryfe, Surgeon Scientist  
Dr. Sharifa Himidan, Surgeon Educator  
Dr. Claire Holloway, Surgeon Investigator  
Dr. David Hwang, Clinician Investigator  
Dr. Timothy Jackson, Surgeon Investigator  
Dr. Paul Karanicolas, Surgeon Scientist  
Dr. Erin Kennedy, Surgeon Investigator  
Dr. Andras Kapus, Non-Clinician Scientist  
Dr. Shaf Keshavjee, Surgeon Scientist  
Dr. Jacob Langer, Surgeon Educator  
Dr. Calvin Law, Surgeon Investigator  
Dr. Mingyao Liu, Non-Clinician Scientist  
Dr. Nicole Look Hong, Surgeon Investigator  
Dr. John Marshall, Surgeon Scientist  
Dr. Andrea McCart, Surgeon Scientist  
Dr. Ian McGilvray, Surgeon Scientist  
Dr. Robin McLeod, Surgeon Investigator

## **SURGICAL SCIENCE IN THE DIVISION OF GENERAL SURGERY (2013-14)**

Dr. Carol-anne Moulton, Surgeon Scientist  
Dr. Avery Nathens, Surgeon Scientist  
Dr. Allan Okrainec, Surgeon Investigator  
Dr. Agostino Pierro, Surgeon Scientist  
Dr. Fayez Quereshy, Surgeon Investigator  
Dr. Michael Reedijk, Surgeon Scientist  
Dr. Joao Rezende-Neto, Surgeon Scientist  
Dr. Sandro Rizoli, Surgeon Investigator  
Dr. Ori Rotstein, Surgeon Scientist  
Dr. Markus Selzner, Surgeon Scientist  
Dr. Jory Simpson, Surgeon Investigator  
Dr. Carol Swallow, Surgeon Investigator  
Dr. David Urbach, Surgeon Scientist  
Dr. Thomas K. Waddell, Surgeon Scientist  
Dr. Paul Wales, Surgeon Investigator  
Dr. Alice Wei, Surgeon Investigator  
Dr. Frances Wright, Surgeon Investigator  
Dr. Kazuhiro Yasufuku, Surgeon Investigator

### **SSTP RESIDENTS (ALPHABETICAL)**

David Berger-Richardson  
James Byrne  
Ashton Connor  
Maryam Elmi  
Andras B. Fecso  
Daniel Kagedan  
Karineh Kazazian  
Marisa Louridas  
Stephanie Mason  
Dorotea Mutabdzic  
Chethan Sathya  
Natashia Seemann  
Peter Szasz

### **RECENT SSTP ALUMNI (ALPHABETICAL)**

Eisar Al-Sukhni  
Andrea Covelli

**SURGICAL SCIENCE IN THE DIVISION OF GENERAL SURGERY (2013-14)**

Charles De Mestral

Barbara Haas

Marvin Hsiao

Debbie Li

Lakho Sandhu

Vanessa Palter

Megha Suri

Jon Yeung

Boris Zevin

Francis Zih

Nathan Zilbert

**COMPENDIUM EDITORS**

2010 - Lakho Sandhu

2012 - Boris Zevin

2013 - Nathan Zilbert

2014 - Ashton Connor, Karineh Kazazian, Natashia Seemann

**RESEARCH SUPERVISORS (BY INTEREST)**

**BASIC SCIENCE**

Dr. Mark Cattral, Surgeon Scientist  
Dr. Priscilla Chiu, Surgeon Scientist  
Dr. Sean Cleary, Surgeon Investigator  
Dr. Marc de Perrot, Surgeon Scientist  
Dr. David Hwang, Clinician Scientist  
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Dr. Kazuhiro Yasufuku, Surgeon Investigator

**CLINICAL EPIDEMIOLOGY/HEALTH SERVICES**

Dr. Nancy Baxter, Surgeon Scientist  
Dr. Tulin Cil, Surgeon Investigator  
Dr. Natalie Coburn, Surgeon Investigator  
Dr. Alexandra Easson, Surgeon Investigator  
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Dr. David Urbach, Surgeon Scientist  
Dr. Paul Wales, Surgeon Investigator  
Dr. Alice Wei, Surgeon Investigator

## **SURGICAL SCIENCE IN THE DIVISION OF GENERAL SURGERY (2013-14)**

Dr. Frances Wright, Surgeon Investigator

### **EDUCATION**

Dr. Najma Ahmed, Surgeon Educator

Dr. Ted Gerstle, Surgeon Educator

Dr. Teodor Grantcharov, Surgeon Scientist

Dr. Carol-anne Moulton, Surgeon Scientist

Dr. Allan Okrainec, Surgeon Investigator

Dr. Helen MacRae, Surgeon Scientist

### **TECHNOLOGY INNOVATION**

Dr. Sharifa Himidan, Surgeon Educator

## **SSTP RESIDENTS (BY INTEREST)**

### **BASIC SCIENCE**

David Berger-Richardson

Ashton Connor

Karineh Kazazian

### **CLINICAL EPIDEMIOLOGY/HEALTH SERVICES**

James Byrne

Maryam Elmi

Daniel Kagedan

Stephanie Mason

Chethan Sathya

### **EDUCATION**

Andras B. Fecso

Marisa Louridas

Dorotea Mutabdzic

Natashia Seemann

Peter Szasz

### Abbreviations

ICES – Institute of Clinical and Evaluative Sciences; IHPME – Institute of Health, Policy, Management & Evaluation

IMS – Institute of Medical Sciences; OISE - Ontario Institute for Studies in Education; PDF – Postdoctoral Fellow

## RESEARCH SUPERVISORS

### Dr. Najma Ahmed, Surgeon Educator

[ahmedn@smh.ca](mailto:ahmedn@smh.ca)

St. Michael's Hospital, Member of the Institute of Medical Science

#### Main Area of Interest

Dr. Ahmed's area of scholarship and research is in the area of curricular innovation in post graduate surgical education, career satisfaction and advancement in General Surgery as well as issues concerning resident duty hours, optimizing resident workflow and wellness in efforts to optimize trainees' educational experience.

### Dr. Nancy Baxter, Surgeon Scientist

[baxtern@smh.ca](mailto:baxtern@smh.ca)

Li Ka Shing Knowledge Institute, St. Michael's Hospital; Institute for Clinical Evaluative Sciences (ICES); Associate Professor, Department of Surgery and Institute for Health Policy, Management and Evaluation (IHPME); Full Member, Institute of Medical Science

#### Main Area of Interest

Health Services Research and Non-experimental Design

#### Students under Supervision

Sergio Acuna, MSc Candidate (IHPME); Joshua Ramjist, MSc Candidate (IMS)

#### Current Research

- 1) *Population-based Study of Cancer Incidence and Mortality in Patients with Solid Organ Transplants*  
In this CIHR funded study we will evaluate trends in incidence and mortality for cancer occurring in patients after Solid Organ Transplants in Canada and compare this to the general population. An in-depth chart review study (chart reviews will be conducted by trained research assistants and not residents) of transplant patients who develop cancer and matched controls will be conducted to determine differences in presentation, treatment or co-morbid conditions that may account for the worse outcome in this group of patients. Residents involved in this project will learn about health services research, how to use large administrative databases and will gain confidence in the conduct of retrospective cohort studies.
- 2) *Missed Cancers after Colonoscopy*  
A significant number of colorectal cancers develop in a short time frame after a normal colonoscopy. We are performing research to evaluate why cancers are missed or develop so quickly. We are evaluating this using large population based databases but are also performing a chart review study for 1000 patients (500 with missed cancers and 500 with detected cancers). We are obtaining pathological materials for these patients to determine if cancers developing through certain molecular pathways are more likely to present as a missed cancer. Residents involved in the project would learn how to use large administrative database and become involved in quality assessment at the population level. Residents would have the opportunity to be involved in studying molecular biology in conjunction with Dr. Steve Gallinger.

3) *Pan-Canadian Colorectal Cancer Consortium*

Individuals with a family history of colorectal cancer (CRC) are at increased risk for this disease. Having a first-degree relative (FDR) with CRC approximately doubles risk, which increases further with the number of relatives affected, particularly if they are diagnosed at younger ages. Lynch Syndrome (LS), also known as Hereditary Non-Polyposis Colorectal Cancer (HNPCC), is the most common form of hereditary CRC and is caused by mutations in one of five different genes. Screening for LS in CRC patients can be done relatively easily by immunohistochemistry (IHC) of the mismatch repair (MMR) proteins using a patient's CRC surgical specimen. Despite recent advances in our understanding of genetic predisposition to CRC, a large fraction of high-risk Canadian LS families are not being identified and are, therefore, unknowingly missing an important opportunity for CRC prevention, early detection and potential novel therapeutics. The major goals of this study are to establish a molecular-based approach to translational cancer care that will improve the outcome of colorectal cancer patients. Patients are being recruited across 3 centres in Toronto including Mount Sinai Hospital, St. Michael's Hospital and Sunnybrook Health Sciences Centre. Residents would have the opportunity to be involved in conjunction with Dr. Steve Gallinger.

4) *Initiative to Maximize Progress in Adolescent Cancer Therapy (IMPACT)*

Adolescents with cancer have experienced slower improvements in their chance of survival compared to children or older adults. There has been little research in Canada to explore what factors influence cancer survival in adolescents, and whether the location of their treatment (a pediatric hospital, an adult cancer centre or a community hospital) affects survival. Through a chart abstraction study and administrative data available at ICES, we are creating a database of all adolescents (aged 15-18 years) diagnosed and treated with leukemias, lymphomas, sarcomas and testicular cancer treated in all pediatric and adult hospitals in Ontario between 1992 and 2010. We will describe disease characteristics of adolescents treated at pediatric versus adult centres and determine whether adolescents treated at pediatric hospitals have a different probability of survival than adolescents treated at adult hospitals. We will also explore the reasons for any differences we find. The results of this study will inform physicians who treat adolescents and have significant implications for policymakers concerned with optimizing outcomes for young Canadians with cancer. Residents will have the opportunity to be involved with planning and conducting analyses using the IMPACT cohort.



5) *Improving the Quality of Oncofertility Decision Making Among Young Women at Risk of Infertility During Cancer Survivorship*

Infertility can be a devastating side effect of cancer treatment. Alkylating chemotherapeutic agents, radiation therapy of the CNS and/or ovaries and pelvic or genitourinary surgery, used to treat childhood, adolescent and young adult cancers, can adversely affect reproductive organs which alter pubertal development and fertility. Impaired fertility among females and adverse pregnancy outcomes are major concerns for the increasing population of survivors of adolescent and young adult cancer. It has been argued that at the time of diagnosis, people with cancer should be provided with accurate information about the potential risk of impaired fertility after treatment for cancer irrespective of whether local facilities for gamete cryopreservation exist. However, the immediate emphasis is often on treatment and cure, with little time available to discuss future fertility or opinions for fertility preservation.

Additionally little is known about how best to address premature ovarian failure with cancer survivors. We are conducting a number of projects in this topic; residents will have the opportunity to be involved with the following:

a. *Qualitative study of health care providers attitudes toward fertility preservation among young women with cancer*

The objectives of this are to acquire pilot data on the opinions and beliefs of HCPs on oncofertility and fertility preservation among young women with cancer and identify barriers for HCPs to discussing fertility preservation with young women with cancer.

b. *Qualitative study of patients how have experienced oncofertility choices during cancer treatments.*

The objective is to understand decisional needs and experiences of women at risk of cancer treatment related infertility and provider attitudes, barriers and facilitators to DM for women in Canada. Residents will have the opportunity to learn qualitative methodology and interview techniques.

**Dr. Mark S. Cattral, Surgeon Scientist**

[mark.cattral@uhn.ca](mailto:mark.cattral@uhn.ca)

Toronto General Hospital (Office: 11c-1232; Lab: MARS 2-701j)

**Main Area of Interest**

Dendritic cell (DC) biology, Transplantation, Cancer immunology

**Students under Supervision**

One Ph.D. student, two PDFs

**Current Research**

1) *Regulation of dendritic ontogeny*

DC comprise a heterogeneous population of cells specialized in antigen capture, processing, and presentation. Our laboratory's discovery of the immediate precursors of DC (pre-cDC) provided unique opportunities to define the ontogeny and function of DC. We are currently investigating the molecular regulation of DC differentiation during inflammatory processes.

2) *Optimizing cancer immunotherapy*

Cellular immunotherapy offers great potential for long-term cure and survival for cancer. This treatment is based on the premise that cytotoxic T lymphocytes (CTLs), derived from vaccination or adoptive transfer, can migrate into the cancer and destroy cancer cells after recognizing cancer antigen-derived peptides presented by cell surface major histocompatibility (MHC) molecules. Although the success rates of immunotherapy continues to improve and there are examples of spectacular responses, this

therapy is not consistently effective and many patients derive little or no benefit. We reported recently that DC and pre-cDC are recruited to tumors where they interact with CTL and regulate the magnitude and efficacy of anti-tumor CTL responses. We are currently investigating several strategies to optimize intra-tumour DC function to improve the success of immunotherapy.

### **Dr. Priscilla Chiu, Surgeon Scientist**

[priscilla.chiu@sickkids.ca](mailto:priscilla.chiu@sickkids.ca)

The Hospital for Sick Children Research Institute

#### **Main Areas of Interest**

Basic science research – developmental and stem cell biology, T cell development, thymic development, T cell-based malignancies

Clinical research – surgical and long-term health outcomes in diaphragmatic hernia and tracheal repair patients

#### **Students under Supervision**

Aunshu Goyal, medical student, Paul Zamiara

#### **Current Research**

##### *1) T cell-based malignancies*

Using a xenograft model for human T-lymphoblastic leukemia (T-ALL), we have defined markers that allow us to isolate the engrafting subset of leukemia cells that are uniquely able to initiate and propagate the leukemia. These results provide the first evidence for a cancer stem cell basis to human T-ALL.

Further experiments are in progress to elucidate the signaling pathways critical for leukemia-initiating cell (LIC) activity and to determine treatments that target the LIC in T-ALL, as current therapies may not target this subset and result in disease relapse that have contributed to poor T-ALL outcomes.

##### *2) Human thymic development*

Most of what is known about thymus development comes from murine studies. However, humans are born with a far more advanced and mature T cell immunity due to the earlier organogenesis and function of the human thymus during fetal development. One critical cellular population within the thymus for normal T cell development is the thymic epithelial cells (TEC) that comprise a component of the thymic stroma. These TEC are responsible for interactions with maturing T cells to regulate self-tolerance and self-MHC recognition. Our work is to focus on the identity and development of TEC to further our understanding the regenerative potential of these cells, as diseases caused by dysregulated TEC development (benign and malignant conditions such as DiGeorge syndrome, T cell-based autoimmunity, age-related immunodepression, thymic epithelial tumors) remain poorly understood.

### **Dr. Tulin Cil, Surgeon Investigator**

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Princess Margaret & Women's College Hospitals

#### **Main Areas of Interest**

Surgical Education

#### **Students under Supervision**

Albert Fung, MSc candidate (Biomedical Communications)

### **Current Research**

1) *The Sensitive Physical Exam*

Using video vignettes depicting clinical breast exams, we will be assessing the knowledge, skills and attitudes regarding sensitive physical exam skills among undergraduate medical students. Residents involved in this project will have the opportunity to learn mixed methods research skills including survey development, interviewing and statistical analysis of outcome measures.

2) *Visual Imagery in the Acquisition of Surgical Skills*

This is a mixed methods study looking at how surgical skills may be learned using innovative practices that are integral to other motor skills learning. Visual imagery and mental rehearsal have been used in sport and musical training for some time. This study will explore if and how surgeons can use these practices in acquiring their skill sets.

### **Dr. Sean Cleary, Surgeon Investigator**

[sean.cleary@uhn.ca](mailto:sean.cleary@uhn.ca)

UHN, Prosserman Center, Lunenfeld-Tanenbaum Research Institute

### **Main Areas of Interest**

Genetic Epidemiology, Liver and Pancreas cancer

### **Current Research**

1) *Molecular Pathogenesis of Hepatocellular Carcinoma*

Through studying a prospective registry of HCC patients with tumour and blood samples, our goal is to examine the role of DNA methylation and folate metabolism in the pathogenesis of HCC. Resident research projects could involve the study of methylation patterns in HCC and/or the influence of folate metabolism markers on tumour methylation.

2) *Genetic Epidemiology of Pancreatic Cancer*

Our aim is to study the influence of gene-environment interactions in the pathogenesis of pancreatic cancer. We are currently undertaking a study to examine the interaction of vitamin D levels and genetic variants in vitamin D-related genes as in modifying risk for pancreatic cancer.

### **Dr. Natalie Coburn, Surgeon Investigator**

[natalie.coburn@sunnybrook.ca](mailto:natalie.coburn@sunnybrook.ca)

Sunnybrook Health Sciences Centre, ICES

### **Main Area of Interest**

Health Services Research

### **Students Under Supervision**

Alyson Mahar, MSc (PhD Candidate, Queens); Dan Kagedan, MD; Maryam Elmi, MD

### **Current Research**

1) *Gastric Cancer Outcomes*

Following completion of a RAND/UCLA international expert panel to determine optimal processes of care in the peri-operative course of gastric cancer patients, we conducted a chart review of all gastric cancer patients care for in Ontario FY2005-2007. We are currently in the process of analyzing this data.

The primary outcomes will be a comparison of survival for patients with guideline adherence versus those without and a cost-effectiveness analysis examining MAGIC vs McDonald adjuvant therapy, and laparoscopic vs open curative resection. We are also completing a costing analysis for pancreas cancer in Ontario.

### **Dr. Marc de Perrot, Surgeon Scientist**

[marc.deperrot@uhn.ca](mailto:marc.deperrot@uhn.ca)

Toronto General Hospital, Toronto Medical Discovery Tower

#### **Main Area of Interest**

Malignant pleural mesothelioma (MPM)

#### **Students under Supervision**

Tetsuzo Tagawa, PDF

#### **Current Research**

- 1) Malignant pleural mesothelioma (MPM) is a highly aggressive cancer with poor prognosis. However, current treatments only achieve very limited effect. Our overall goal is to improve the outcome of this disease through surgery followed by conventional chemotherapy and immunotherapy. This approach could open a new avenue in cancer treatment that could rapidly translate into clinical practice.
- 2) Pulmonary hypertension is a form of lung disease that leads to progressive right heart failure. The mechanisms of pulmonary hypertension and its treatment remains not well understood. We detected a gene expression profiling associated with the development of pulmonary hypertension. We are currently evaluating the specific roles of these genes in the development of pulmonary hypertension in animal models.

### **Dr. Alexandra Easson, Surgeon Investigator**

[alexandra.easson@uhn.ca](mailto:alexandra.easson@uhn.ca)

Princess Margaret Hospital & Mount Sinai Hospital

#### **Main Area of Interest**

Health services research- symptom measurement and surgical decision-making, Breast cancer, Surgical palliative care education

#### **Current Research**

- 1) Pattern and timing of palliative surgical interventions in colorectal cancer
- 2) Development of an educational palliative app for surgeons
- 3) Exploring the use of autofluorescence in the surgical management of breast cancer

**Dr. Anna Gagliardi, Non-Clinician Scientist**

[anna.gagliardi@uhnresearch.ca](mailto:anna.gagliardi@uhnresearch.ca)

Toronto General Research Institute, University Health Network

**Main Area of Interest**

Knowledge translation/implementation science with the aim to develop, implement and evaluate tools and interventions that improve the organization, delivery and outcomes of care.

**Students under Supervision**

Stephanie Hylmar, MSc candidate (IHPME); Emily Pearsall, PhD candidate (IHPME); Flavia Abdallah, PDF (UHN)

**Current Research**

1) *Guideline implementation*

Funded by the Canadian Institutes for Health Research, this series of studies investigates the impact and feasibility of approaches for promoting guideline use (syntheses of evidence on best practice), including improvements to the format and content of the products themselves such that they are easier to apply or accommodate, and development among organizations seeking to improve quality of care such that they more effectively implement those products. This work is undertaken in collaboration with an international group of guideline developers, implementers and researchers.

2) *Establishing priorities for research on implementation of quality improvement/patient safety tools and practices*

Funded by the Canadian Institutes of Health Research, this study will engage international experts in prioritizing and planning ongoing research on mechanisms for monitoring the safety of surgical devices, including assistive and implantable devices.

3) *Development and validation of a framework to guide the reporting, review and use of qualitative health research*

This series of studies will identify the publication rate of qualitative studies in top-ranked medical, health services and nursing journals; and examine how the reporting, publication rate, views about, and use of qualitative research in health care decision making could be improved.

**Dr. Steven Gallinger, Surgeon Scientist**

[steven.gallinger@uhn.ca](mailto:steven.gallinger@uhn.ca)

Lunenfeld Tanenbaum Research Institute, Mount Sinai Hospital, Toronto General Hospital

**Main Area of Interest**

GI Cancer Genetics

**Students under Supervision**

Ashton Connor, SSTP resident

**Current Research**

1) *Identification of the Familial Pancreas Cancer Gene(s)*

We are using our large infrastructure of family history, epidemiologic data, and germline DNA to identify novel genetic and genomic candidates. Both copy number variants and high penetrant germline

mutations are being analysed in subjects identified in Toronto and in samples assembled by the NIH funded Pancreas Cancer Genetic Epidemiology consortium (PACGENE).

- 2) *Genetic variants in Hereditary and Sporadic Colorectal Cancer*  
We are using both GWAS data of 1,200 cases and 1,200 controls to study the ‘common disease/common variant’ etiology hypothesis, and deep sequencing to identify rare highly penetrant variants. Clinicopathologic associations are also being investigated, as well as molecular somatic predictors of chemoresponsiveness.

## **Dr. J. Ted Gerstle, Surgeon Educator**

[ted.gerstle@sickkids.ca](mailto:ted.gerstle@sickkids.ca)

SickKids Hospital

### **Main Area of Interest**

Surgical Education

### **Students under Supervision**

Justin Wee, Masters Student, IBBME

### **Current Research**

- 1) *Validation of the Pediatric Laparoscopic Surgery (PLS) Simulator* (joint project with Georges Azzie)  
The advent of minimal access surgery (MAS) has renewed the challenge of how best to teach and measure operative skills. Ever-growing constraints on training in surgery exist everywhere, including reduced trainee work hours, increased operating room costs, focus on medical error and ethics surrounding learning basic skills on patients. In response to this, more and more of the training is taking place outside the operating room. In the realm of MAS, this has triggered the development of simulators, which provide the opportunity to learn and practice skills, which can be transferred to the operating room. While many adult simulators exist, there is only one validated model. There have been no pediatric counterparts. We have designed and built a Pediatric Laparoscopic Surgery (PLS) simulator and are carrying out validation. Once fully validated, this model has the potential to become the simulator for pediatric surgery, including teaching, training and assessment of basic MAS skills at an international level.
- 2) *Motion Analysis in Minimal Access Surgery* (joint project with Georges Azzie)  
“Expertise”, regardless of the field, is difficult if not impossible to define. In sports, motion analysis has been one focus of study. In surgery, no data exists regarding differences in motion between novices, intermediates and experts. We have developed equipment (software and hardware) and a methodology to track, measure and compare the movement of instruments in a laparoscopic simulator. Our current model allows us to track and measure movement in the “X”, “Y” and “Z” axes, with a resolution a 0.03 mm and a sample rate of 30 Hz and as well as “roticulation” (pronation/supination) with a resolution of 0.07 degrees and a sample rate of 15 Hz. We can also track range of motion, acceleration/deceleration and “stop/start” movements. We are able to compare computer-generated data to real-time video recordings of arbitrarily defined candidate groups (based on levels of experience). Examples of metrics that have been developed include Geometry of Path Length (the shape of the paths generated by the instruments for each task), Fluidity of Movement (the “smoothness” of the paths generate by the instruments for each task) and Volume of Motion (the volume of space in which each instruments moves for each task). While methods for tracking motion have been described in the literature, no one has even begun to measure and log such data, much less apply it. This project puts us at the cutting edge of this technology. We hope to define parameters related to motion that will help define levels of expertise and assist with surgical education.

This will translate into a novel methodology for teaching and assessing surgical skills. Eventually, we hope to establish concurrent validity: that is, skills taught and assessed through analysis of motion do translate into better intra-operative performance and better surgical outcomes.

3) *Effective Visual Force Feedback for Minimal Access Surgery (MAS) Training*

The project's goal is to design and implement the most effective method of visualizing the forces exerted during MAS procedures. Various visual force feedback displays will be created and integrated into force feedback platforms and into MAS tools that have been modified with force sensors.

**Dr. Anand Ghanekar, Surgeon Scientist**

[anand.ghanekar@uhn.ca](mailto:anand.ghanekar@uhn.ca)

Toronto General Hospital Research Institute

**Main Area of Interest**

Role of Stem Cells in Diseases of the Liver

My laboratory is located in the MaRS complex and has active collaborations with senior investigators in transplantation (G. Levy), stem cell biology (G. Keller), and cancer biology (J. Dick). We utilize state-of-the-art techniques in molecular and cellular biology, as well as small animal models.

**Students under Supervision**

There are currently 3 postdoctoral fellows and 1 technician participating in the research described below. My laboratory provides excellent opportunities for surgical residents interested in basic/translational research.

**Current Research**

1) *Elucidating the role of cancer stem cells in the pathogenesis of human hepatocellular carcinoma*

We are utilizing human HCC resection specimens to generate in vivo models of primary human HCC by generating tumor xenografts in immunodeficient mouse strains. We are also developing methods for stable in vitro culture of primary human HCC cells. We anticipate that these resources will permit the identification and characterization of tumor initiating cells in human HCC.

2) *Studying the pathophysiology of a variety of human liver diseases through the use of induced pluripotent stem cells*

We are interested in studying the developmental biology of human liver cell populations (hepatocytes and cholangiocytes) through the use of embryonic and induced pluripotent stem cells. We are interested in studying the differentiation potential of induced pluripotent stem cell (iPS) lines generated from patients with diseases of liver development in order to elucidate the mechanisms by which liver development is affected.

**Dr. Rebecca Gladly, Surgeon Scientist**

[rgladdy@mtsinai.on.ca](mailto:rgladdy@mtsinai.on.ca)

Cancer Genetics Group, Lunenfeld-Tanenbaum Research Institute, Mount Sinai Hospital

**Main Area of Interest**

Cancer Biology

**Students under Supervision**

Post Doctoral Fellow, Research Associate, Undergraduate Students

### **Current Research**

1) *Creating Novel Biologic Models of Soft Tissue Sarcoma.*

We have recently created a genetically flexible system whereby we are able to test which candidate genes are truly causing cancer. In our “mosaic” mouse system, we are currently testing rhabdomyosarcoma (RMS) genes in collaboration with the Pediatric Oncology Group. This work also focuses on the development of novel drug therapies for RMS, which is a common and devastating pediatric cancer.

2) *Identification of Selective Therapies for Sarcoma.*

Since chemotherapy has limited efficacy and is toxic for sarcoma patients, we are using primary sarcoma cell lines we have created in the lab for drug discovery. In conjunction with the Medicinal Chemistry Group at OICR, we have used focused drug screens to identify relevant biologic pathways for treatment that are then further investigated in the lab.

### **Dr. Anand Govindarajan, Surgeon Investigator**

[anand.govindarajan@utoronto.ca](mailto:anand.govindarajan@utoronto.ca)

Mount Sinai Hospital

#### **Main areas of interest**

Health services research, knowledge translation

#### **Current research**

- 1) Assessment of the use of preoperative staging and use of neoadjuvant therapy in the treatment of rectal cancer across the province.
- 2) Stage, presentation and treatment of colon cancers missed on screening.
- 3) Natural history of relatives of high risk patients with non-CDH1 mutant gastric cancer.

### **Dr. Teodor Grantcharov, Surgeon Scientist**

[grantcharovt@smh.ca](mailto:grantcharovt@smh.ca)

St. Michael's Hospital

#### **Main Area of Interest**

Surgical Education, Innovation, Simulation, Patient safety, Minimally Invasive Surgery

#### **Students under Supervision**

Marisa Louridas, MD; Peter Szasz, MD; Andras Fecso, MD



**Current Research**

- 1) Design and validation of comprehensive training and assessment curricula in Minimally Invasive Surgery
- 2) Design and validation of assessment tools in Basic and Advanced Laparoscopic procedures
- 3) Development of strategies for performance enhancement in surgery
- 4) Development and Implementation of tools and strategies for improving surgical safety

**Dr. Robert Gryfe, Surgeon Scientist**

[rgryfe@mtsinai.on.ca](mailto:rgryfe@mtsinai.on.ca)

Mount Sinai Hospital, Princess Margaret Hospital

**Main Area of Interest**

Genetic determinants of inherited risk, survival and response to therapy in patients with colorectal cancer

**Current Research**

Using both genome-wide association (GWAS) and candidate gene approaches, we are currently pursuing international, multi-institutional studies of genetic and epigenetic prognostic determinants of survival in patients with colorectal cancer and the predictive association of genetic variation with response to current chemotherapy.

**Dr. Sharifa Himidan, Surgeon Educator**

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Hospital for Sick Children, North York General Hospital

**Main Area of Interest**

Surgical and Imaging Technology Development and Innovation

**Field of Study**

Technology innovation

### **Current Research**

- 1) Development of next generation surgical tools; real-time and image fusion technology; simulation technology and products in collaboration with front-running technology industry partners.
- 2) Development of disruptive technologies that will fundamentally change the current surgical paradigm such as NOAD, MIEMS and MR-HIFU.
- 3) In collaboration with U of Waterloo, development of specific technologies based on nanotechnology for surgical and imaging diagnostic and therapeutic applications.

### **Dr. Claire Holloway, Surgeon Investigator**

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Sunnybrook Health Sciences Centre, Sunnybrook Research Institute

### **Main Area of Interest**

Imaging technology development for surgical application and Health Services Research (Surgical Oncology)

### **Current Research**

- 1) *Application of 3D Imaging and Pathological Evaluation Methods to Improve Accuracy of Breast Cancer Staging*

We have developed techniques for 3D assessment of lumpectomy and sentinel node specimens and are conducting studies to determine how 3D assessment affects assignment of tumour size, margin involvement and sentinel node involvement. Residents involved in this project will learn clinical study design, principles of technology development and evaluation, and computerized algorithm creation.

- 2) *Development of Supine Breast MRI for Intraoperative Applications*

Working with imaging scientists we are evaluating patients with breast cancer to determine optimal methods for acquiring therapeutic quality supine MRI images that can be co-registered to standard diagnostic prone images. Residents involved with this project should have a background/interest in engineering/physics/computer science.

- 3) *Improving Adoption of Core Needle Biopsy in Breast Diagnosis*

We will be conducting a systematic literature review to establish what is known about the indications for core needle biopsy and the target rate for its use. This review will inform an expert panel charged with developing core needle biopsy rate as a quality indicator in breast diagnosis using a consensus-based approach. Residents involved in this project will learn the techniques of systematic review and the modified Delphi approach to consensus-based quality indicator development.

### **Dr. David Hwang, Clinician Investigator (Lung Pathologist)**

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Toronto General Hospital, Toronto Medical Discovery Tower

### **Main Area of Interest**

Lung Pathology, Cystic Fibrosis

### **Students under Supervision**

Shawn Clark, PhD student; Kaleb Shelton, MSc student (Laboratory Medicine & Pathobiology)

### **Current Research**

- 1) Studies involving the role of the pulmonary microbiota in lung transplantation for cystic fibrosis.
- 2) Collaborative research in lung injury, repair, and transplantation

### **Dr. Timothy Jackson, Surgeon Investigator**

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University Health Network, General Surgery

### **Main Area of Interest**

Health services research related to surgical quality improvement and outcomes

### **Current Research:**

- 1) National Surgery Quality Improvement Program ([www.acsnsqip.org](http://www.acsnsqip.org)) and Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program ([www.mbsaqip.org](http://www.mbsaqip.org)) - Multiple projects using large prospective clinical datasets (ACS-NSQIP and MBSAQIP) for benchmarking and targeted quality improvement in surgery.
- 2) Development of Clinical Risk Predictive Model using the American College of Surgeons – Bariatric Surgery Center Network (ACS-BSCN) Clinical Database.
- 3) Evaluation of Healthcare Utilization in Patients Undergoing Out-of-Country Bariatric Surgery.
- 4) Evaluation of Disparities in Access to Bariatric Surgical Care

### **Dr. Paul Karanicolas, Surgeon Scientist**

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Sunnybrook Health Sciences Centre

### **Main Areas of Interest**

Clinical Trials, Quality of Life, Systematic Reviews, and Health Services Research. Hepatobiliary, Pancreatic, and Gastrointestinal Surgical Oncology

### **Field of Study**

Clinical Epidemiology

### **Current Research Projects**

- 1) *Clinical Trials of Surgical Techniques and Perioperative Care in Gastrointestinal Cancer*  
One stream of our research focuses on surgical trials in patients with gastrointestinal cancer. We have a number of single and multicentre clinical trials at different phases of development and accrual, including: (i) Medial Open Transversus Abdominis Plane (MOTAP) catheters to reduce postoperative pain after liver resection, (ii) Tranexamic Acid to reduce bleeding during liver resection, (iii) Optimal techniques of fascial closure, (iv) Extended duration thromboprophylaxis after major cancer surgery, and others. We have established a national collaborative group of HPB surgeons interested in conducting prospective clinical trials (The HPB-Concept Team) with CIHR funding, which provides an optimal infrastructure for developing and conducting trials. Residents could get involved with these trials by leading the background and development of a new concept (e.g. Starting with an idea for a trial,

conducting a systematic review, survey, population based study, etc to support a grant application, write the protocol, etc), or by building a new component into an existing trial (e.g. Adding in a quality of life component or economic analysis, etc). Residents will also be exposed to all aspects of trial development and conduct, including central coordination of clinical trials and on-site activities.

2) *Liver-directed therapies for metastatic colorectal cancer*

We have opened several unique programs for liver-directed therapy of metastatic colorectal cancer, including hepatic artery infusional pump (HAIP) chemotherapy, Drug-Eluting Bead Irinotecan (DEBIRI), and Stereotactic Ablative Radiotherapy (SABR). There is an opportunity for interested residents to explore the efficacy of these therapies alone or in combination, and potentially expand the therapeutic options available for patients. Residents will learn about design and conduct of clinical trials in oncology, including Phase I/II trial design.

3) *Development and Evaluation of Electronic Care Educational Aids*

We are currently implementing an infrastructure at the Odette Cancer Centre focused on electronic educational aids for patients with cancer. This includes an automated system for collection of quality of life data from all patients, personalized care plans, online forums/blogs, etc. Residents would have the opportunity to be involved in the development of this innovative eHealth platform and to rigorously investigate the impact of this program on patient-important outcomes.

### **Dr. Erin Kennedy, Surgeon Investigator**

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Mt. Sinai Hospital and the Centre for the Evaluation of Health Services in Surgery (University Health Network)

#### **Main Area of Interest**

Erin is an internationally recognized expert in Patient Centred Care and Shared Decision Making in Surgery. Her other research interests include Quality of Life and Cancer Survivorship. She holds research grants from the Canadian Institutes of Health Research and the Cancer Services Innovation Partnership. Erin teaches a graduate course on measurement of patients' preferences in health care decision making in the Institute of Health Policy, Management and Evaluation.

### **Dr. Andras Kapus, Non-Clinician Scientist**

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St. Michael's Hospital, Keenan Center for Biomedical Research

#### **Main Area of Interest**

Cell biology of fibrosis, cellular stress, osmoregulation

#### **Students under Supervision**

Two MSc students, two PhD students, one PDF, a co-supervised PDF

#### **Current Research**

1) *Epithelial-mesenchymal transition in fibrogenesis*

Cellular plasticity is the capacity of cells to switch phenotype, a phenomenon with major importance in physiology and pathology. A prime example for such change is epithelial-mesenchymal transition (EMT), key a process in development, organ fibrosis and cancer, whereby epithelial cells lose their strong contacts and polygonal shape and transform into motile, contractile and often invasive fibroblasts and myofibroblast. Pericytes and fibroblasts can also transform into myofibroblasts, i.e. contractile

mesenchymal cells, which are the culprit of fibroproliferative diseases. We study the cell biology EMT and myofibroblast generation; we aim at understanding the cellular and molecular mechanisms whereby kidney and lung cells, exposed to pathogenic stimuli, reorganize their cytoskeleton and reprogram their gene expression to become myofibroblasts. We are interested in the fundamental cell biology question of how cytoskeletal remodeling, triggered by mechanical factors and cytokines, can alter gene transcription and thereby cell fate.

We use a variety of techniques, including functional imaging of live and fixed cells (time lapse spinning disc confocal microscopy, FRAP, immunofluorescence microscopy), gene promoter assays, coimmunoprecipitation (for protein-protein interaction), site-directed mutagenesis, qPCR and others.

2) *Osmotic and volume regulation at the cellular level*

Dehydration of cells, which occurs under various physiological and many pathological conditions initiates 3 major adaptive responses: a) activation of ion and other solute transporters to regain water and volume; 2) reinforcement of the cytoskeleton and 3) change in gene expression to serve 1) and 2). We study how the initial volume change leads to these vital adaptive responses, and also monitor how cell stress remodels cellular organelles (mitochondria, cilia, nuclei). We use all the techniques described above, as well cell volume measurements and assays to follow signal transduction steps during osmotic or other cell stress.

## **Dr. Shaf Keshavjee, Surgeon Scientist**

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Latner Thoracic Surgery Research Labs, Toronto General Hospital Research Institute,

### **Main Area of Interest**

Lung Injury, Repair and Regeneration, Gene Therapy in Lung Transplantation

### **Students under Supervision**

multiple

### **Current Research**

1) *Injured Donor Lung Repair*

We have recently developed a method for stable normothermic ex vivo lung perfusion. Using this system, we are developing therapeutics to repair donor lungs currently deemed unsuitable for repair. Among others, we are currently developing IL-10 gene therapy as one such therapeutic technique using large animal models and rejected human lungs, moving towards clinical trials in lung transplantation.

2) *Mechanisms in chronic lung allograft dysfunction*

Chronic lung allograft dysfunction and Bronchiolitis obliterans syndrome is the major limitation to long term survival of lung transplant recipients. Using an intrapulmonary tracheal transplant model developed in this laboratory, and a mouse single lung transplant model we are studying the mechanisms which lead to the development of this syndrome. We anticipate that the use of knockout mice together with this system will further our understanding of the mechanism underlying the development of this syndrome.

3) *Identification of biomarkers for improved donor assessment*

Currently, assessment of the suitability of a donor lung for transplantation is a clinical judgment. Using microarray technology and our donor lung tissue bank, we seek to identify biomarkers which predict lung function and suitability for transplantation. We are working to develop a nanochip to rapidly assay gene expression in the donor lung. Ultimately, we hope to use these biomarkers clinically to both

identify suitable lungs and to diagnose specific lung injuries for targeted repair during ex vivo lung perfusion.

**Dr. Jacob Langer, Surgeon Educator**

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The Hospital for Sick Children Research Institute

**Main Area of Interest**

Pediatric General Surgery

**Students under Supervision**

Several residents and fellows

**Current Research**

1) *Delivery of Pediatric Surgical Care in Ontario*

Using linked data available through ICES and OHIP, we have been examining the effect of sub-specialization on outcome for common pediatric surgical conditions. We have also examined the effect of wait times on outcome for infants with inguinal hernia.

2) *Management of Hirschsprung Disease*

We are looking at ways to improve the management of children with Hirschsprung disease, both surgically and post-operatively. This research has taken the form of retrospective reviews, prospective evaluation of innovative techniques, and involvement in randomized trials. We are also initiating several collaborative studies looking at the genetics of Hirschsprung disease and the influence of genetic mutations on surgical outcomes.

3) *Randomized Trials in Pediatric Surgery*

We are involved in a number of randomized trials in the field of pediatric surgery.

**Dr. Calvin Law, Surgeon Investigator**

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The Edmond Odette Cancer Centre at Sunnybrook Health Sciences, ICES

**Main Area of Interest**

Health Services Research (Surgical Oncology)

**Current Research**

1) *Population Health Study on the delivery of care following colorectal cancer resection.*

2) *Decision Analysis on the preferred approach to the elderly patient with colorectal liver metastases.*

3) *Population Health Study on the surgical treatment of pancreatic neuroendocrine cancer.*

4) *Gastric Cancer*

Co-investigator on studies of population health services delivery and development of an expert consensus panel.

My questions revolve not around what is the ultimate treatment, but around what are the actual treatments delivered to a population, how consistently and how well optimized? From this understanding, we can hope to identify and address barriers that prevent even the best of treatment protocols from reaching the people it was intended to help in the first place.

## **Dr. Mingyao Liu, Non-Clinician Scientist**

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Toronto General Hospital, Toronto Medical Discovery Tower

### **Main Area of Interest**

Cellular and molecular mechanisms of acute lung injury, Drug discovery for ischemia-reperfusion-induced lung injury in transplantation, Nano-drug delivery, XB130 in intracellular signal transduction and tumorigenesis, Repair/regeneration of injured lung

### **Students under Supervision**

Hyunhee Kim, PhD student (Physiology); Serisha Moodley, PhD student (IMS); Hae-ra Cho, PhD student (Physiology); Dr. Hiroki Shimizu, PDF; Dr. Qifei Wu, PDF; Dr. Hongmei Liu, PDF; Dr. Huiqing Lin, PDF; Dr. Shuyun Xu, Visiting Professor; Dr. Mitsuteru Yoshida, Visiting Professor;

### **Current Research**

- 1) *Drug discovery for ischemia-reperfusion induced lung injury in transplantation*  
We are focusing on lung injury induced by ischemia-reperfusion in lung transplantation. A cell culture model has been developed for high throughput screening of drugs. A rat lung transplantation model is used for in vivo therapeutic assessment. A pig lung transplantation model and Ex Vivo Lung Perfusion system are available through collaboration with Dr. Shaf Keshavjee, to test new therapeutic drugs.
- 2) *Nanoparticle-based drug delivery*  
Another exciting research area in my lab is nano-particle-based drug delivery. We have used self-assembly peptide to formulate drugs that block signal transduction pathways related to inflammatory responses. A patent has been filed. We also developed a gold nanoparticle/peptide hybrid system for peptide based drug delivery.
- 3) *The role of XB130 in repair/regeneration of injured lung, and in tumorigenesis*  
XB130, an adaptor protein cloned in my lab, is involved in regulation of cell proliferation, survival and migration via PI3K/Akt pathway. Knock down of XB130 significantly inhibits tumor cell growth in vitro and in vivo. We have developed XB130 deficient mice to systemically study its role in repair/regeneration of injured lung, and in tumorigenesis. XB130 knockout mice showed post-natal growth retardation due to thyroid dysfunction. Detailed mechanisms are under investigation.

## **Dr. Nicole Look Hong, Surgeon Investigator**

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Odette Cancer Centre, Sunnybrook Health Sciences Centre

### **Main Areas of Interest:**

Economic analyses, breast cancer, qualitative methodology

### **Current Research:**

- 1) *Cost effectiveness analysis of staging investigations in stage III melanoma*

This modeled analysis looks at different staging regimens and their associated downstream outcomes and costs using Ontario-based costs. The goal of this project is to help promote mindful use of resources in a setting where widespread practice variation exists.

- 2) *Cost effectiveness analysis of radiation therapy in ductal carcinoma in situ*  
This analysis uses meticulously collected clinical data from a ductal carcinoma in situ (DCIS) database of Ontario women to determine the cost per quality adjusted life year for patients with and without adjuvant radiation.
- 3) *Comparative analysis of patterns of care pre-and post-development of an institutional breast rapid diagnostic unit.*  
This before-after study aims looks at institutional resource allocation and wait times before and after the institution of a rapid diagnostic unit for patients with breast lesions suspicious for carcinoma.

### **Dr. John Marshall, Surgeon Scientist**

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St. Michael's Hospital, Li Ka Shing Knowledge Institute

#### **Main Area of Interest**

The host response to life-threatening infection, trauma, and critical illness

#### **Students under Supervision**

Jennifer Tsang, PhD candidate (IMS); Zeenat Malam, PhD candidate (IMS)

#### **Current Research**

Mechanisms regulating neutrophil survival in sepsis: My CIHR-funded lab focuses on 3 novel themes:

- 1) *The role of PBEF/visfatin, a novel NAD-generating enzyme and insulin antagonist*  
We have identified this highly conserved protein as a cardinal regulator of neutrophil survival and seek to characterize its divergent roles in NAD generation and as a ligand for the insulin receptor.
- 2) *The role of tyrosine phosphorylation of caspase-8*  
We have found that phosphorylation fo the key apoptotic enzyme, caspase-8, not only prevents its activation, but is also necessary for activation of the PI3 kinase survival pathway.
- 3) *The role of a novel natural anti-sense transcript, ILIP*  
We have identified a novel gene that regulates a key earlier regulator of the MAP kinase cascade.

All of these are phenomena that are evident in neutrophils from septic critically ill patients. Participating residents would learn basic cell biology, flow cytometry, molecular biology, and imaging techniques, and have the opportunity to apply these to understanding persistent inflammation in septic critically ill patients.

### **Dr. Andrea McCart, Surgeon Scientist**

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Mount Sinai Hospital, Toronto General Hospital Research Institute

#### **Main Area of Interest**

Oncolytic Virotherapy for Cancer



### Students under Supervision

Katherine Ottolino-Perry, PhD candidate (IMS); Tiffany Ho, MSc candidate (IMS)

### Current Research

- 1) *Using a window chamber model to understand virus infection of tumour vascular.*  
Using cell culture and animal models of colon cancer, we will evaluate a fluorescent vaccinia virus for its ability to target, infect and kill tumour vascular. Prospective student will gain experience in small animal handling and surgery, cell culture, and viral propagation.
- 2) *Combination of virus and chemotherapy for colorectal carcinomatosis.*  
Virus and standard chemotherapy agents (irinotecan) are combined in mouse models of carcinomatosis. Results suggest virus increases the sensitivity of cells to the chemotherapy.
- 3) *Creating novel viral mutations to enhance safety and efficacy against cancer.*  
Using a combination of rational selection and high through-put siRNA technology we are making a panel of novel viruses which will be tested in animal models for improved safety and efficacy compared to our standard virus.

### Dr. Ian McGilvray, Surgeon Scientist

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Toronto General Hospital

### Main Areas of Interest

Our research goal is to reprogram the liver, both for the purpose of liver transplantation and to treat liver cancers. We are now studying how nanoparticles can be used to manipulate the liver inflammatory and immune microenvironment. Specifically designed nanoparticles can be targeted to individual cell populations in the liver, and triggered to eliminate or change those cells. Our research environment is very collaborative, and involves surgeons, hepatologists, and biomedical engineers.

### Dr. Robin McLeod, Surgeon Investigator

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Mount Sinai Hospital, General Surgery

### Main Areas of Interest

Evidence-based medicine, quality improvement in IBD and colorectal cancer

### Students under Supervision

Thomas Walters, Paediatric Gastroenterologist, PhD Candidate (IHPME); David Messenger, Colorectal Research Fellow

### Current Research

- 1) *Best Practice in General Surgery*  
The aim of Best Practice in General Surgery is to standardize care across the seven adult teaching hospitals at the University of Toronto and North York General Hospital based on best evidence. The rationale for this is to improve patient care, improve resident education, and increase collaboration among the faculty and hospitals. Residents have an opportunity to work with the committee on an area of interest and develop and implement a clinical practice guideline and evaluate its outcome on patients.

2) *Colorectal Cancer*

All patients having surgery for colorectal cancer at Mount Sinai Hospital are entered into a database. Surgical pathology and outcome data are available on over 1,500 patients. Recent studies include assessing surgical technique as well as the effect of synoptic pathology reports. Because of our interest in hereditary colon cancer, we have a large cohort of patients with FAP and HNPCC and are performing studies in collaboration with Steve Gallinger and Rob Gryfe.

3) *IBD*

Mount Sinai Hospital is recognized for its expertise in managing IBD. We have a database of over 2,000 ulcerative colitis patients and 3,000 Crohn's disease patients who have had surgery. This facilitates studies assessing surgical outcome and recruitment of patients for prospective studies. We have completed a number of clinical trials as well as prospective evaluations of quality of life, patient preferences for different treatment options and surgical-pathological-genetic correlative studies. We are currently assessing the impact of laparoscopic surgery on outcome in IBD patients.

**Dr. Carol-anne Moulton, Surgeon Scientist**

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Toronto General Hospital, Wilson Centre for Research in Education

**Main Area of Interest**

The main research focus of this lab is to develop a more explicit understanding of surgical judgment by exploring how surgeons make decisions and judgments in the moments of practice. Using a variety of methodologies we are exploring what makes an expert surgeon 'expert' and the factors - both cognitive and socio-cultural - that influence surgeons' abilities to self-regulate in the moment of practice.

**Students under Supervision**

Natashia Seemann, MSc Candidate (IMS); Dorotea Mutabdzic, MEd Candidate (OISE), Laurent St Martin MSc

**Current Research**

1) *Explore how surgeons experience risk in the moment of practice.*

This project focuses on surgeons' perspective on risk. Using constructivist grounded theory methodology we have set out to explore how surgeons experience risk in the moment of practice, the factors that cause a surgeon to be on either extreme of the risk-taking spectrum, and how surgeons' self-perception of risk tolerance affects their clinical practice.

2) *Examine surgeon's detection of situationally responsive moments when critical events occur.*

This research project will focus on the surgeon's detection of situationally responsive moments when critical events occur that are unanticipated pre-operatively. The project will examine the detection of these situationally responsive cues using videotapes of laparoscopic cholecystectomies, some with common duct injuries and some without, across a cohort of general surgeons. Surgeons will then be asked to 'think aloud' as they watch these videos to look for consistencies amongst their cognitive processes.

3) *Exploring the transition process from a surgical resident to attending staff.*

One of the most significant transitions in a physician's career is the transition to independent practice. Despite this, literature on this critical transition period is sparse. This project takes a constructivist grounded theory approach exploring the transition process from surgical resident to attending staff. The

objective of our study is develop an understanding of the influences and factors that affect this transition process and how the transition process itself can impact a surgeon's career trajectory.

4) *Examining how social pressures implicit within the surgical culture may influence a surgeon's judgment and decision-making abilities*

This project focuses on how social pressures implicit within the surgical culture may influence a surgeon's judgment and decision-making abilities and consequently, their ability to 'slow down' when they should. To reconstruct the social dynamics of the operating theatre, this project will explore surgeons' perceptions and experiences of these sociological forces, as well as the perceptions of non-surgeon team members (surgical trainees, anaesthetists, nurses, surgical trainees) on behaviors and characteristics of the staff surgeon. To further my understanding of the surgical culture, we will observe the surgeon and operative team in their natural environment to identify and understand social factors, which may impact their judgment or patient care.

5) *Explore if similarities exist in expert thinking and whether these can be utilized as a training tool for surgical trainees.*

With a recent push in medical education for competency-based training, surgical residents and fellows are expected to possess a large set of technical competencies with minimal focus on preoperative planning skills. Using the think aloud protocol, my project focuses on the cognitions that surgeons have preoperatively when viewing a CT scan and mapping out their cases. Through an assessment of senior surgeon's thoughts during their planning stages, we are curious if similarities in expert thinking can be found and whether these cognitions can be utilized as a training tool for surgical trainees.

## **Dr. Avery Nathens, Surgeon Scientist**

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Sunnybrook Health Sciences Centre, ICES, American College of Surgeons

### **Main Area of Interest**

Health services research related to trauma care delivery and trauma quality improvement

### **Students under supervision**

Chethan Sathya, General Surgery Resident, MSc candidate (IHPME); Debbie Li, General Surgery Resident, MSc candidate (IHPME)

### **Current Research**

1) *Access to trauma care and trauma system development*

Using a variety of unique datasets we use mixed methods approaches to evaluate how severely injured patients can be assured prompt access to care in a trauma center. Methodologic approaches include quantitative and qualitative analyses along with GIS to provide a spatial component.

2) *Trauma Quality Improvement Program (TQIP - [www.acstqip.org](http://www.acstqip.org))*

This is a large program that I run through the American College of Surgeons that allows benchmarking of trauma center performance. These data are maturing, but will allow the identification of best practices in trauma care and other unique attributes of high performing trauma centers.

3) *Access to neurosurgical care*

This project will address the gaps in the delivery of emergency neurosurgical (primarily neurotrauma) care using large population based datasets complemented with surveys of emergency medicine providers.

4) *Population-based evaluation of acute biliary syndromes in Ontario*

In this project we will evaluate the present management of patients who present to the emergency department with acute cholecystitis throughout Ontario. Specifically, we will describe the current practice in terms of early versus delayed cholecystectomy, along with outcomes and resource utilization for both approaches. Our goal is to proceed with a cost utility analysis to determine the optimal approach for patients presenting to the ED with acute cholecystitis.

**Dr. Allan Okrainec, Surgeon Investigator**

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Toronto Western Hospital

**Main Area of Interest**

Dr. Okrainec's research interest is in the use of simulation for the teaching and assessment of laparoscopic skills. His educational research lab at the Toronto Western Hospital is primarily dedicated to the development and use of telesimulation technologies for teaching surgical skills in remote areas and resource-restricted countries. His work is supported by numerous research grants, including the Ministry of Health Innovation Fund, the Health Technology Exchange, and the Royal College of Physicians and Surgeons of Canada.

**Dr. Agostino Pierro, Surgeon Scientist**

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The Hospital for Sick Children, Sick Kids Research Institute

**Main Areas of Interest**

- Pathogenesis of surgical gastro-intestinal diseases associated with high morbidity and mortality. This investigation will be leading to the design of novel surgical strategies aimed to reduce morbidity and mortality.
- Improving the nutrition of surgical infants and children to optimize growth and development and decrease infection.
- Development of regenerative medicine strategies for the treatment of congenital malformations.
- Multicentre randomized controlled trials in Pediatric Surgery: I developed an expertise in this field and established a track record of co-ordination and collaboration. I develop a novel network of collaborating institutions in North America, Europe and Australia.

**Students under supervision**

I recently moved from London, UK; my research group will expand but at present consists of 2 research fellows, 1 postdoc, 1 laboratory manager, 1 research nurse.

**Current Research**

Basic Science:

I) *Necrotizing enterocolitis (NEC)*

Gavage model (in rats and mice)

I. Role of hypothermia (preventive and/or treatment of advanced disease)

II. Role of stem cells – preventive and/or therapeutic

- III. Role of intestinal flora (germ-free animals)  
Intestinal ischaemia reperfusion
- I. Preconditioning
- II. Xenon effect and increase in hypothermia efficacy

2) *Development of tissue engineered oesophagus*

Clinical epidemiology:

1) *Randomised controlled trials*

Multicentre

I. Antibiotic treatment vs appendectomy for acute appendicitis in children (APPY Trial).

HYDrocele Resolution or Operation Trial (HYDRO Trial)

II. Laparoscopic vs Open Children Hernia Trial (LOCH Trial)

III. Thoracoscopic vs. Open Repair of Esophageal atresia (TORO Trial)

Single centre (SickKids)

I. DOT Trial: Diaphragmatic hernia Open versus Thoracoscopic repair

II. Activation/circulation of stem cells in necrotizing enterocolitis

2) *Prospective observational studies*

Epidemiology of NEC in Ontario/Canada (population based)

Neurological development after neonatal surgery for necrotizing enterocolitis

**Dr. Fayez Quereshy, Surgeon Investigator**

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UHN, Rotman School of Management

**Main Areas of Interest**

- 1) Process-level Evaluation and Systems Optimization
- 2) Economic Evaluation of Best Practices in Cancer Care

**Current Research**

1) *Programmatic Redesign: Realigning Health Resources using Mathematical Modeling in the UHN Bariatric Multidisciplinary Program*

This study serves to mathematically model the patient selection process using an operations management framework. This evaluation will enable an improved understanding of system delays, streamline care pathways, and augment patient throughput. These results will likely be transferrable to other complex healthcare systems with an aim to improve process-level efficiency.

2) *Repeat Colonoscopy Prior to Surgery for Colorectal Cancer*

This study serves to establish the rate of preoperative repeat colonoscopy for colorectal cancer (CRC) in the province of Ontario and the identify factors that influence this clinical decision. It is hypothesized that re-endoscopy of the lower GI tract can be safely omitted in a select group of patients with a reduction in health resource expenditure and improved patient satisfaction.

**Dr. Michael Reedijk, Surgeon Scientist**

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University Health Network, Ontario Cancer Institute, Campbell Family Institute for Breast Cancer Research

**Main Area of Interest**

Signal transduction, Notch Signaling, Breast Cancer

**Students under Supervision**

Jifeng Song, MSc candidate (Department of Medical Biophysics); Julia Izrailit, PhD candidate (Department of Medical Biophysics)

**Current Research**

1) *Notch signaling in breast cancer*

Current efforts in the laboratory are directed towards elucidating the mechanism(s) by which activated Notch signaling contributes to breast cancer development. We are using genome-wide approaches including: expression array analyses, chromatin immunoprecipitation, and a large-scale RNA interference screen to identify novel regulators and targets of Notch activation in breast cancer. Recently we have identified the pseudokinase Tribbles homologue 3 (TRB3) as a novel regulator of JAG1-induced Notch activation and tumor growth through its control of MAPK and TGF $\beta$  signaling pathways. Our current research is focused on exploring the role of TRB3 in breast tumorigenesis through the use of transgenic and knockout mouse models. The value of identifying Notch regulators and targets is for their ultimate exploitation as biomarkers or therapeutic targets in Notch-activated breast cancer. This work is imperative as Phase I and II breast cancer clinical trials with Notch inhibitors emerge.

2) *The role of Notch in breast cancer microenvironment crosstalk*

Stromal cells in the tumor microenvironment (such as immune cells, endothelial cells and fibroblasts) make a significant contribution to the progressive growth and metastatic spread of cancer. Accumulating evidence in our laboratory suggests that Notch signaling plays a critical role in tumor-stromal cell crosstalk and tumor progression. By further exploring the role of Notch in breast cancer microenvironment crosstalk, we will deepen our understanding of the molecular mechanisms behind crosstalk and shed light on potential therapeutic interventions that may interfere with crosstalk and tumor progression.

**Dr. Joao Rezende-Neto, Surgeon Scientist**

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St. Michael's Hospital, Li Ka Shing Knowledge Institute

**Main Area of Interest**

Modulation of the inflammatory response to trauma, hemorrhagic shock, and coagulopathy.

**Students under Supervision**

Paulo Carreiro, PhD candidate (Federal University of Minas Gerais, Brazil); Roger Lage, MSc candidate (Federal University of Minas Gerais, Brazil).

**Current Research**

1) *Determining the effect of hydrogen on fluid resuscitation*

In a mouse model we investigate the effect of hydrogen enriched resuscitation fluids on the inflammatory response and coagulopathy.

- 2) *Studying the effect of vagus nerve stimulation on inflammation post haemorrhage*  
In a rat model we investigate the effect of vagus nerve stimulation on the inflammatory response and coagulopathy.

### **Dr. Sandro Rizoli, Surgeon Investigator**

[rizolis@smh.ca](mailto:rizolis@smh.ca)

St. Michael's Hospital

#### **Main Area of Interest**

Trauma, Coagulopathy, Resuscitation, Thromboelastometry, Clinical Trials

#### **Students under Supervision**

Syed Shahid Hassan, MSc candidate (IMS); Precilla D'Souza, PhD candidate (IMS); Luis Teodoro da Luz, MSc candidate (IMS); Paulo Espada, Post-Doctoral Fellow (Keenan Research)

#### **Current Research**

- 1) *Early coagulopathy in trauma and thromboelastography (TEG)*  
Coagulation parameters are investigated using thromboelastography (TEG) and standard functional tests. Blood is analyzed for markers of activation of the coagulation and inflammation/complement.
- 2) *Formula-driven vs. laboratory-guided transfusion practices in bleeding trauma patients*  
Investigate whether a pre-defined ratio of FFP to PLT to RBC transfusion (1:1:1) protocol reduces the rate of death by exsanguination when compared to a laboratory driven transfusion protocol in a population of massive bleeding trauma patients.
- 3) *Catecholamines as Outcome Markers in Traumatic Brain Injury Study*  
Clinical trial on association between catecholamine levels and outcome in severe traumatic brain injury (TBI) patients; to demonstrate the effect of catecholamine levels on inflammatory, neuro-injury biomarkers, coagulation and organ injury in severe TBI patients and to demonstrate that there is a unique catecholamine profile following TBI as compared to other neurologic injury.

### **Dr. Ori Rotstein, Surgeon Scientist**

[rotsteino@smh.ca](mailto:rotsteino@smh.ca)

St. Michael's Hospital, Li Ka Shing Knowledge Institute

#### **Main Area of Interest**

Patients who have sustained major trauma with associated hemorrhagic shock are at increased risk of developing multiple organ dysfunction in the post resuscitation phase. Our research group focuses on translational research studies intended to bring basic research to investigations in patients. This includes the use of cell and animal systems to investigate the cellular and molecular mechanisms whereby shock/resuscitation causes injury to tissues including the lung and liver. Using this information, we perform interventions in trauma patients to study the immunological responses, hypothesizing that this will minimize inflammation and hence tissue injury. The lab environment has multiple senior investigators, postdoctoral fellows and graduate students, which makes it a vibrant and productive environment. In addition to your own work, there are regular lab meetings, journal clubs, and lectures at the exciting Li Ka Shing Knowledge Institute at St. Michael's Hospital.

**Dr. Adena Scheer, Surgeon Investigator**

[scheera@smh.ca](mailto:scheera@smh.ca)

St. Michael's Hospital

**Main Area of Interest**

Knowledge translation and qualitative research in the areas of decision support and breast oncology.

**Current Research**

- 1) *Evaluation of the efficacy and necessity of breast cancer treatments (surgery and adjuvant therapies) in elderly patients with early stage breast cancer*

This study is multi-faceted, with multiple projects, and will utilize a variety of research methods. Knowledge translation techniques such as systematic review and guideline development. Qualitative studies using questionnaires and surveys. Cost-effectiveness and large database methods to evaluate variability in practice. There are many opportunities to be involved here, for both small and large projects.

- 2) *Patient-reported outcomes following breast cancer surgery and reconstruction*

This is a prospective, multi-center study investigating the differences in patient-reported outcomes and processes of care. The main focus is to evaluate differences between patients who undergo immediate reconstruction followed by radiation versus those who undergo delayed reconstruction after radiation.

- 3) *Additional study ideas or questions are welcome!*

**Dr. Markus Selzner, Surgeon Scientist**

[markus.selzner@uhn.ca](mailto:markus.selzner@uhn.ca)

Toronto General Hospital, MARS

**Main Area of Interest**

Hepatic ischemia and reperfusion injury

**Current Research**

- 1) *Determining mechanisms of sinusoidal endothelial cell injury after hepatic ischemia and reperfusion*

In a mouse model we investigate the induction of sinusoidal endothelial cell death early after hepatic ischemia and reperfusion. We evaluate the binding of inflammatory mediators to surface receptors on endothelial cells and the subsequent induction of apoptotic cell death.

- 2) *Ex vivo liver perfusion for the evaluation and repair of marginal liver grafts*

We are using a pig liver model of ex vivo liver perfusion to evaluate liver graft function and injury prior to liver transplantation. Inhibition of mediators of injury and induction of survival signals are used to improve the outcome of marginal grafts.

**Dr. Jory Simpson, Surgeon Investigator**

[simpsonjo@smh.ca](mailto:simpsonjo@smh.ca)

St. Michael's Hospital

**Main Area of Interest**

Breast cancer and improving quality of care



### **Current Research**

Dr. Simpson's research interest in many ways mirrors his clinical practice. Currently he is examining ways to improve care to disenfranchised populations with breast cancer, as well as working on projects for quality improvement in breast cancer care and surgical education. His academic and research interest is in improving breast cancer outcomes in disenfranchised populations and he is completing his Masters degree at the Ontario Institute for Studies in Education with a focus on Adult Education and Community Development. He is currently the Assistant Medical Director of the CIBC Breast Centre at St. Michael's Hospital and a lecturer in the Department of Surgery at the University of Toronto.

### **Dr. Carol Swallow, Surgeon Investigator**

[cswallow@mtsinai.on.ca](mailto:cswallow@mtsinai.on.ca)

Mount Sinai Hospital

### **Students under Supervision**

Karineh Kazazian, General Surgery Resident, PhD candidate (IMS); David Berger-Richardson, General Surgery Resident, MSc candidate (IMS); Olga Brashavitskaya, PhD candidate (LMP); Roland Xu, Medical Student

### **Current Research**

1) *Defining genes that differ between metastases and primary colorectal cancer (both in terms of expression and mutations)*

We are using banked specimens from the same patient, and comparing primary to metastasis. The goal is to understand what permits/facilitates metastases, and therefore how we might intervene at a molecular level.

2) Understanding how aberrant expression of the cell cycle protein polo like kinase 4 contributes to carcinogenesis, particularly hepatoma

3) Studying the effect of Plk4 on cell motility and invasion, new functions for this gene

4) Exploring the mechanisms by which malignant cells (in particular sarcoma, gastric, and appendiceal) implant in the surgical field and wounds, and determine the role of surgical technique, gloves and instruments in this process

### **Dr. David Urbach, Surgeon Scientist**

[david.urbach@uhn.ca](mailto:david.urbach@uhn.ca)

Centre for the Evaluation of Health Services in Surgery (University Health Network), ICES

### **Main Area of Interest**

Clinical Epidemiology, Surgical Health Services Research, Health Technology Assessment

### **Students under Supervision**

Anna Bendzsak, Thoracic Surgery Fellow, PhD candidate (IMS)

### **Current Research**

1) *Structures, processes and outcomes of care in cancer surgery*

Our research group is conducting a number of studies on the quality of cancer care, including analyses of structures (characteristics of hospitals where care is provided), processes (what providers actually do in the course of providing clinical care), and clinical outcomes. These projects are funded by a number of

agencies, including a 5-year, \$1.2 million CIHR grant to study structures, processes and outcomes in colorectal cancer.

- 2) *Applied surgical health services research at the Institute for Clinical Evaluative Sciences (ICES)*  
The student will choose a project of interest to them. Previous students have looked at questions related to esophageal surgery, gall bladder disease, lung cancer, colorectal cancer, thyroid cancer, and gynecologic cancers. Typical research questions may include epidemiology, patterns of health services, and innovative methods of evaluating treatment outcomes. We provide guidance on refinement of the research question, study design, data analysis, and data presentation. Protocols are developed through weekly research-in-progress meetings in the Centre for the Evaluation of Health Services in Surgery at the University Health Network. Students attend ICES student Research-in-Progress rounds twice a month. Past students have published their thesis projects in high-impact journals such as JAMA. Through course work and applied research, all students gain familiarity with study design, analytic methods including regression models, scientific writing, and presentation skills.

The Centre for the Evaluation of Health Services in Surgery is an inter-disciplinary research unit focusing on health services research in surgery, located at the University Health Network. This collaborative unit is currently comprised of five surgeon-scientists, two non-clinician PhD scientists (one biostatistician and one qualitative researcher), four research coordinators, an administrative coordinator, six graduate students and a varying number of medical students and summer students. We provide a comprehensive research experience for clinical trainees and non-clinical trainees at all levels of training. The Centre occupies excellent research office space, provides research trainees with computers, software, and other research supplies, has appropriate rooms for meetings and workshops, and provides trainees with immediate support for research problems. Students develop, refine and present their research at weekly 1/2 day research meetings/workshops.

### **Dr. Thomas K. Waddell, Surgeon Scientist**

[tom.waddell@uhn.ca](mailto:tom.waddell@uhn.ca)

Toronto General Hospital

### **Main Area of Interest**

Stem Cell Biology of Lung Regeneration and Lung Cancer

### **Students under Supervision**

Humberto Lara-Guerra, PhD candidate (IMS); Sarah Gilpin, PhD candidate (IMS); Siba Haykal, Plastic Surgery Resident, PhD candidate (IMS); Lily Guo, PhD candidate (IMS); Kota Ishizawa, PDF; Yingzhe Zhou, PDF; Paula Marcus, PDF; John Soleas, MSc candidate (IMS); Geoffrey Frost, MSc candidate (IBBME)

### **Current Research**

#### *1) Lung Regeneration*

##### *I. Bone marrow-derived cells*

Numerous studies have suggested that bone marrow cells can contribute to recovery and repair following lung injury. We have identified specific bone marrow cells that seem to be particularly useful in this regard. We are systematically pursuing the therapeutic potential of these cells for patients with advanced lung disease using human patients, transgenic animal models, and in vitro studies.

##### *II. Pluripotent cells*

Directed differentiation of pluripotent cells towards lung phenotype will be critical for success in developing alternatives to human lung transplantation, including cell therapy approaches. In collaboration with Drs Janet Rossant, Gordon Keller, Mick Bhatia and Martin Post, we are developing

the in vivo applications of such cells to both test their function and direct the phenotype. In collaboration with Andras Nagy at Mount Sinai Hospital, we are pursuing novel means of directing pluripotent cells toward a lung epithelial phenotype.

### *III. Decellularization of Airway and Lung for Scaffold*

Decellularization of human tissues for use as a scaffold for reconstitution of human organs has moved surprisingly rapidly towards generation of functional tissues. The first decellularized tracheal allograft was implanted in 2008 and we are pursuing pre-clinical development of second generation approaches to overcome some of the limitations seen. Moving beyond the airway, the prospect of decellularizing an entire human lung for reconstitution with stem cell-derived progenitors is an exciting new project in the lab under active pursuit with engineering faculty from the Institute of Biomaterials and Biomedical Engineering.

#### 2) *Lung Cancer*

Studies in leukemia and some other solid organs have suggested that only a subset of all tumour cells is capable of initiating tumour growth. We are attempting to isolate tumour-initiating cells in early stage lung cancer, using human specimens and xenograft models. Other cancer projects including laboratory based analysis of lung cancer biopsies before and after therapy with epidermal growth factor inhibitors.

## **Dr. Paul Wales, Surgeon Investigator**

[paul.wales@sickkids.ca](mailto:paul.wales@sickkids.ca)

The Hospital for Sick Children Research Institute

### **Main Area of Interest**

Paediatric Short bowel syndrome and Intestinal Failure. Outcomes research (IHPME) and Translational neonatal porcine model.

### **Students under Supervision**

Jessica Josephson, MSc candidate (Paediatrics, University of Alberta); David Lim, PhD candidate (Surgical Resident, University of Alberta); Chethan Sathya, MSc candidate (Surgical Resident)

### **Current Research**

We have a novel and unique translational lab dedicated to the study of short bowel syndrome and chronic PN in neonates utilizing a neonatal piglet model. The lab provides a fantastic experience as the disease processes under study are highly relevant and surgical trainees receive excellent operative experience as well. The lab investigates therapies on the forefront of pediatric intestinal failure.

#### 1) *Omega-3 lipids and parenteral nutrition associated liver disease*

Using a neonatal porcine model of short gut, the mechanism of omega-3 lipids in liver cholestasis is investigated. Research has also expanded beyond the liver and includes examining the effect of parenteral lipid emulsions in preterms on immune function, intestinal microbiome and barrier function, and neurocognitive outcome.

#### 2) *Intestinal adaptation in a porcine model of short bowel syndrome*

The lab utilizes various anatomical subtypes of short bowel syndrome to assess adaptive potential of various therapies. Current studies explore the role of exogenous GLP-2 and EGF on gut adaptation.

#### 3) *Epidemiological Studies in Intestinal Failure*

Studies include a variety of quantitative (time series analysis, economic evaluation, Bayesian analysis,

clinical trials, meta-analysis) and qualitative methodologies (quality of life studies employing focus groups, surveys) to explore outcomes of intestinal failure.

**Dr. Alice Wei, Surgeon Investigator**

[alice.wei@uhn.ca](mailto:alice.wei@uhn.ca)

Centre for the Evaluation of Health Services in Surgery (University Health Network)

**Main Area of Interest**

Quality improvement, surgical outcomes

**Current Research**

1) *Exploring barriers to access to care high quality surgical care for patient with liver metastases from colorectal cancer*

This is a mixed methods project that evaluates current practice patterns and access to liver resection for metastatic colorectal cancer. The impact of a knowledge translation strategy, with the implementation of an evidence based guideline is being assessed.

2) *Improving the quality of surgery through changes in processes of care*

This is a multi-faceted research program that includes development and implementation of process improvement tools for GI surgery.

I. Surgical Process Improvement Tools in Cancer Surgery

This project will develop a conceptual framework and catalog of surgical process improvement tools available. This study is the initial step in a multi-faceted quality improvement project that will develop process improvement tools for use in gastrointestinal cancer surgery.

II. Development of evidence based clinical pathways in pancreas cancer surgery

This project works with surgeons from all the high volume HPB sites in Ontario. It focuses of quality of care and knowledge exchange of best evidence. The objective of this project is to develop a clinical pathway for patients undergoing pancreatic surgery in Ontario using a point of care instrument that will bring best practices into clinical care. This research project includes developing and implementing an evidence-based clinical pathway in Ontario.

3) *Development of surgical registries*

I. The Ontario HPB Clinical Database Project

This project is a prospective provincial database of HPB surgical cases. This database has been the starting point for several surgical outcome research projects to date.

**Dr. Frances Wright, Surgeon Investigator**

[frances.wright@sunnybrook.ca](mailto:frances.wright@sunnybrook.ca)

Odette Cancer Centre, Sunnybrook Health Sciences Centre

**Main Area of Interest**

Health Services Research (Surgical Oncology), qualitative methodology

### Previous Student Projects

Nicole Look Hong - Understanding barriers and enablers to establishing multidisciplinary cancer conferences. This work was used to inform Cancer Care Ontario's implementation strategy for multidisciplinary cancer conferences.

### Current Research

1) *Why are more women choosing mastectomy for breast cancer?*

This exploratory study is seeking to understand why women chose mastectomy rather than breast conserving surgery when diagnosed with breast cancer. Dr. Covelli who is completing this study will learn qualitative methodology, and interview techniques.

2) *Qualitative study of women's impressions of immediate breast reconstruction with and without radiation afterwards*

We are completing a qualitative study using interview methods to identify women's impressions of cosmesis after immediate breast reconstruction. Two groups are being studied – those who have had radiation after immediate breast reconstruction and those that have not had radiation. This study is relevant as many women are told they are not candidates for immediate reconstruction after mastectomy as they will be having radiation post operatively as surgeons believe the cosmetic outcomes are worse. This study will address the women's view of their cosmesis.

### Dr. Kazuhiro Yasufuku, Surgeon Investigator

[kazuhiro.yasufuku@uhn.ca](mailto:kazuhiro.yasufuku@uhn.ca)

Toronto General Hospital, Toronto Medical Discovery Tower

### Main Area of Interest

Minimally-invasive diagnostic and therapeutic techniques in lung cancer, Translational research in thoracic image guided therapeutics, Molecular staging and therapies in thoracic oncology

### Students under Supervision

Hironobu Wada (PDF); Tatsuya Kato (PDF); Priya Patel (Research Fellow); Hsin-Pei (Spencer) Hu (Masters Thesis Student, Master of Health Science in Clinical Engineering, Institute of Biomaterials and Biomedical Engineering, University of Toronto)

### Current Research

1) *Development of new technology in early diagnosis and ultra-minimally invasive thoracic surgery*

Our laboratory focuses on the development and evaluation of advanced bronchoscopic technology (high performance bronchoscopy, endobronchial US, narrow band imaging (NBI), endocytoscopy, endoscopic RFA) as well as new thoracoscopic technology for early diagnosis and ultra-minimally invasive thoracic surgery. Using a clinically relevant disease and intervention model of central and peripheral lung tumor in animals, the newest technologies are being evaluated.

2) *Translational research in thoracic image guided therapeutics (GTx)*

As part of the Guided Therapeutic Program at UHN, we are investigating the utility of different imaging modalities in the detection and treatment of lung cancer. Currently, a pig model of small peripheral lung tumor is being developed to evaluate a new GPS-guided intraoperative localization technique of small lung nodules, in the frame of minimally-invasive approach. The feasibility and reliability of this new method and its possible application area in the lung is being investigated.

3) *Molecular profiling of advanced stage lung cancer that predict response to chemo-radiation by minimally invasive procedures*

Optimal management of locally advanced lung cancer remains undefined. Patients with mediastinal nodal disease (N2/N3) are treated with chemo-radiotherapy with or without surgery. Overall prognosis is poor for these patients. We are looking at the role of minimally invasive endoscopic techniques (EBUS, EUS) for molecular profiling of these patients. Tissue obtained by minimally invasive procedures from tumors as well as mediastinal lymph nodes are being used for various molecular assays. This will perhaps provide genetic signatures that will predict response to treatment.

## CURRENT SSTP RESIDENTS

### David Berger-Richardson

[davidbergerrichardson@gmail.com](mailto:davidbergerrichardson@gmail.com)

SSP Year: 1

Department: IMS (MSc Stream)

Supervisor: Dr. Carol Swallow

#### Projects Underway:

- 1) Determine the role of surgical gloves and instruments in intra-operative tumour seeding.

### James Byrne

[jbyrne@gmail.com](mailto:jbyrne@gmail.com)

SSP Year: 1 (MSc Stream)

Department: IHPME

Supervisor: Dr. Avery Nathens

#### Projects Underway

- 1) Identification of determinants of high performing trauma centers in North America

### Ashton Connor

[Ashton.Connor@utoronto.ca](mailto:Ashton.Connor@utoronto.ca)

SSP Year: 2

Department: IMS (MSc Stream)

Supervisor: Dr. Steven Gallinger

#### Projects Underway:

- 1) Colorectal cancer genomics
- 2) Pancreatic cancer genomics

### Maryam Elmi

[mrym\\_elmi@yahoo.com](mailto:mrym_elmi@yahoo.com)

SSP Year: 1 (MSc Stream)

Department: IHPME

Supervisor: Dr. Natalie Coburn

#### Projects Underway

- 1) Gastric cancer outcomes and resource utilization: a population-based analysis.

### Andras B. Fecso

[andras.fecso@mail.utoronto.ca](mailto:andras.fecso@mail.utoronto.ca)

SSP Year: 1 (MSc Stream)

Department: IMS

Supervisor: Dr. Teodor Grantcharov

#### Project Underway

- 1) Error-event and technical skills analysis in laparoscopic surgery.

### Daniel Kagedan

[dkagedan@gmail.com](mailto:dkagedan@gmail.com)

SSP Year : 1 (MSc Stream)

Department : IHPME

Supervisor : Dr. Natalie Coburn

#### Projects Underway

- 1) A population-based analysis of patients with pancreatic adenocarcinoma who have undergone curative-intent surgery to compare survival outcomes based on type of adjuvant therapy (chemotherapy vs. chemoradiation) and to identify independent predictors of receipt of adjuvant therapy in this population.
- 2) Evaluating the completeness of pathology reports for pancreas resections following the implementation of mandatory synoptic reporting by Cancer Care Ontario.
- 3) Assessing the accuracy of pre-operative radiologic staging of gastric cancer in predicting intraoperative and pathologic TNM staging.

### **Karineh Kazazian**

[Karineh.Kazazian@utoronto.ca](mailto:Karineh.Kazazian@utoronto.ca)

SSP Year : 4 (PhD Stream)

Department : IMS

Supervisor : Dr. Carol Swallow

#### **Projects Underway**

- 1) Identification and investigation of novel genes that drive metastatic progression in Colorectal Cancer.
- 2) Defining the role of Polo-Like Kinase 4 (PLK4) on cancer invasion and metastasis, and identification of novel PLK4 interactors in cancer cells.

### **Marisa Louridas**

[Marisa.Louridas@utoronto.ca](mailto:Marisa.Louridas@utoronto.ca)

SSP Year: 2 (MSc Stream)

Department: IMS

Supervisor: Dr. Teodor Grantcharov

#### **Projects Underway**

- 1) Coping with complicated situations. Mental practice and simulator training to enhance surgical performance in the operating room and in adverse situations.
- 2) Selection criteria for incoming residents technical ability

### **Stephanie Mason**

[saamason@gmail.com](mailto:saamason@gmail.com)

SSP Year: 1 (MSc CEHCR Stream)

Department: HPME

Supervisor: Dr. Avery Nathens and Dr. Marc Jeschke

#### **Projects Underway**

- 1) A population-based study of long-term outcomes and health-care utilization after major burn injury in Ontario

### **Dorotea Mutabdizic**

[Dorotea.Mutabdizic@gmail.com](mailto:Dorotea.Mutabdizic@gmail.com)

SSP Year: 1 (Med Stream)

Department: OISE

Supervisor: Dr. Carol-anne Moulton

#### **Projects Underway:**

- 1) A qualitative study exploring how coaching can be applied in surgery.

### **Chethan Sathya**

[Chethan.Sathya@utoronto.ca](mailto:Chethan.Sathya@utoronto.ca)

SSP Year: 2 (MSc Stream)

Department: IHPME

Supervisor: Dr. Avery Nathens

#### **Projects Underway**

- 1) Determining and analyzing predictors of quality of care within pediatric trauma centers.



**Natashia Seemann**

[Nseemann2011@meds.uwo.ca](mailto:Nseemann2011@meds.uwo.ca)

SSP Year: 1 (MSc Stream)

Department: IMS

Supervisor: Dr. Carol-anne Moulton

**Projects Underway:**

1) This project will examine the phenomenon of stress in surgery. We know that surgery is an exceedingly stressful career and while some surgeons thrive on the rush, others do not cope well with stress. Burnout is alarmingly common in surgeons and an inability to cope with stress is one of the leading causes. This project aims to understand the causes of stress and coping strategies used by surgeons. The second phase of the study will look specifically at intra-operative stress and combine both physiologic and observational data. Better understanding stress in the surgeon will eventually allow us to help surgeons better cope with stress and in turn provide better care to their patients.

**Peter Szasz**

[Peter.Szasz@utoronto.ca](mailto:Peter.Szasz@utoronto.ca)

SSP Year: 2 (MSc Stream)

Department: IMS

Supervisor: Dr. Teodor Grantacharov

**Projects Underway:**

1) The development of feasible, reliable and valid in-training milestones as a means to assess technical and non-technical competence in General Surgery trainees.

## SSTP ALUMNI

### **Eisar Al-Sukhni**

[Eisar.al.Sukhni@utoronto.ca](mailto:Eisar.al.Sukhni@utoronto.ca)

Eisar Al-Sukhni completed a MSc at IHPME in 2011 under the supervision of Dr. Erin Kennedy. Her research focused on the quality of MRI reporting in the preoperative staging of rectal cancer in Ontario.

### **Andrea Covelli**

[Andrea.Covelli@utoronto.ca](mailto:Andrea.Covelli@utoronto.ca)

Andrea Covelli completed a PhD through IHPME under the joint supervision of Drs Francis Wright and Nancy Baxter. Her research involved qualitative studies of decision making in breast cancer surgery.

### **Charles De Mestral**

[Charles.deMestral@gmail.com](mailto:Charles.deMestral@gmail.com)

Charles de Mestral completed a PhD at the Institute of Medical Science under the supervision of Dr. Avery Nathens between July 2010 and June 2013. Using methods of health services research and economic evaluation he compared early to delayed cholecystectomy for acute cholecystitis.

### **Barbara Haas**

[Barbara.Haas@utoronto.ca](mailto:Barbara.Haas@utoronto.ca)

Barbara Haas completed a PhD under the supervision of Dr. Avery Nathens. Her focus was on trauma systems.

### **Marvin Hsiao**

[Marvin.my.Hsiao@gmail.com](mailto:Marvin.my.Hsiao@gmail.com)

Marvin Hsiao completed a PhD through IMS under the supervision of Drs Prabhat Jha and Avery Nathens in 2013. His research elucidated the numbers, rates, mechanisms, and access to trauma care of road traffic injury deaths in India using a nationally representative verbal autopsy survey dataset (Million Death Study - [www.cghr.org](http://www.cghr.org)), along with geographic information system (GIS) methods. Feel free to contact Marvin regarding your interests in international / global surgery research.

### **Debbie Li**

[Debbie.X.Li@gmail.com](mailto:Debbie.X.Li@gmail.com)

Debbi Li completed an MSc through IHPME under the supervision of Dr Avery Nathens in 2014. Her research involved a population-based analysis of practice patterns and long-term outcomes in colonic diverticulitis.

### **Vanessa Palter**

[Vanessa.Palter@utoronto.ca](mailto:Vanessa.Palter@utoronto.ca)

Vanessa Palter completed a PhD at IMS under the supervision of Dr Teodor Grantcharov in 2011. Her research focused on simulation and curriculum development for surgical procedures.

### **Lakho Sandhu**

[Lakho.Sandhu@utoronto.ca](mailto:Lakho.Sandhu@utoronto.ca)

Lakho Sandhu completed her PhD at IHPME under the supervision of Dr. David Urbach in 2013. Her research focused on quantifying the bias in non-randomized studies and randomized controlled trials in surgery. Lakho used the following methods for her dissertation work; modified framework synthesis, meta-analysis and Bayesian meta-regression.

### **Megha Suri**

[Megha\\_Suri@hotmail.com](mailto:Megha_Suri@hotmail.com)

Megha Suri completed her MSc at IMS under the supervision of Dr. Paul Wales in 2012. Megha's research focussed on the role of glucagon-like peptide-2 (a hormone known to augment intestinal adaptation) in neonatal piglet models of short bowel syndrome.

**Jon Yeung**

[Jon.Yeung@utoronto.ca](mailto:Jon.Yeung@utoronto.ca)

Jon Yeung completed a PhD at IMS under the supervision of Dr. Shaf Keshavjee. His research focused on lung preservation for transplantation.

**Boris Zevin**

[Boris.Zevin@utoronto.ca](mailto:Boris.Zevin@utoronto.ca)

Boris Zevin completed a PhD at IMS under the supervision of Dr. Teodor Grantcharov in 2013. His research focused on the development, validation and implementation of simulation-enhanced training curricula for advanced minimally invasive operations.

**Francis Zih**

[Francis.Zih@utoronto.ca](mailto:Francis.Zih@utoronto.ca)

Francis Zih completed a MSc at IMS under the supervision of Dr. Carol Swallow in 2011. His research focused on the role of Polo-Kinase 4 in cancer cell motility and invasion, particularly in colorectal cancer.

**Nathan Zilbert**

[Nathan.Zilbert@utoronto.ca](mailto:Nathan.Zilbert@utoronto.ca)

Nathan Zilbert completed an MEd at OISE under the supervision of Dr Carol-anne Moulton. His research investigated how surgeons prepare for operations, looking at the differences between staff surgeons and trainees.