

Centre for Heart Lung Innovation

ANNUAL REPORT 2014



a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA



PROVIDENCE HEALTH CARE
Research Institute

At A Glance



Centre for
Heart Lung Innovation
UBC and St. Paul's Hospital

Established: 1977 by Drs. Jim Hogg and Peter Paré

Director: Dr. Keith Walley
Associate Directors: Dr. Gordon Francis
Dr. Tillie-Louise Hackett

Principal Investigators: 30
Early Career Investigators 4
Investigators: 16
Research Associates: 7
Technicians: 24
Visiting Scientists: 5
Post-Doctoral Fellows: 22
Graduate Students: 37
Other Students: 71
Core/Operations Staff: 22
TOTAL : 241

Funding in FY 2013-14: \$8,408,159 to Feb. 28, 2014

Funding in FY 2014-15: \$8,018,180* to Feb. 28, 2015

*Note that this is a pre-year end figure and is less than the final figure. The final funding figure for FY 2013-14 was \$13,202,523.

Space: over 50,000 square feet

Hosted Biotech / Spin off companies: 4

CORE facilities include:

HLI Cardiovascular and Lung Tissue Registries

Cellular Imaging and Biophysics

Imaging Services

Histology

Molecular Phenotyping

Preclinical Services

Clinical Research

Information Technology

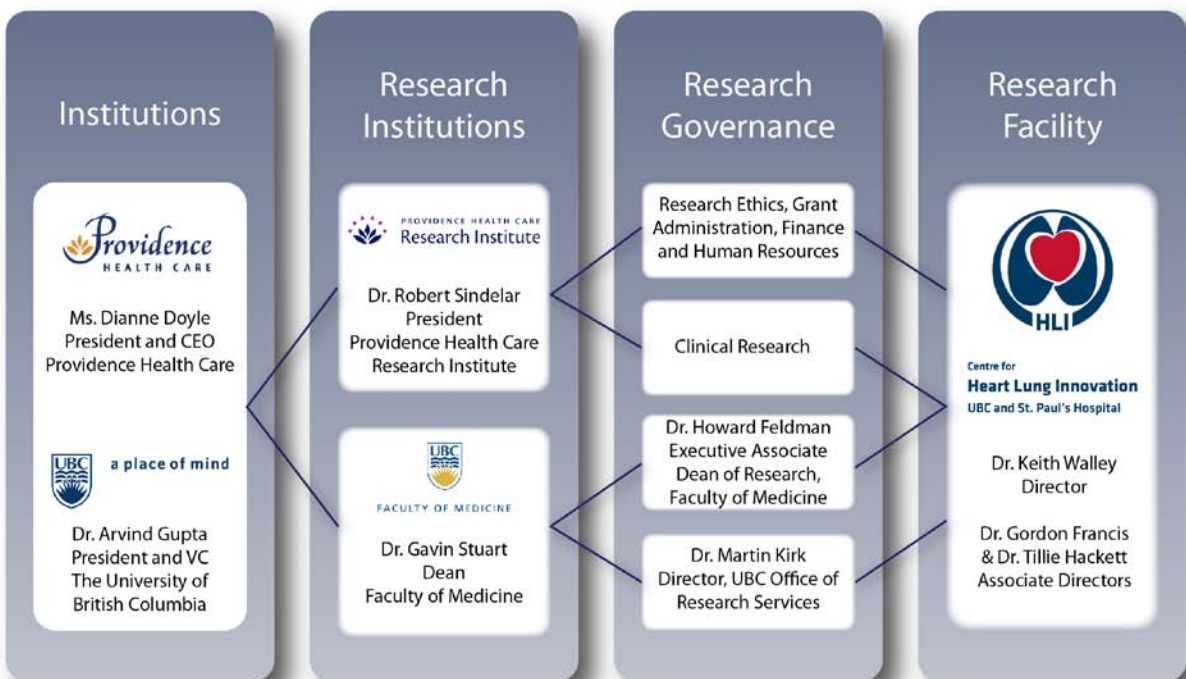
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About the Centre for Heart Lung Innovation

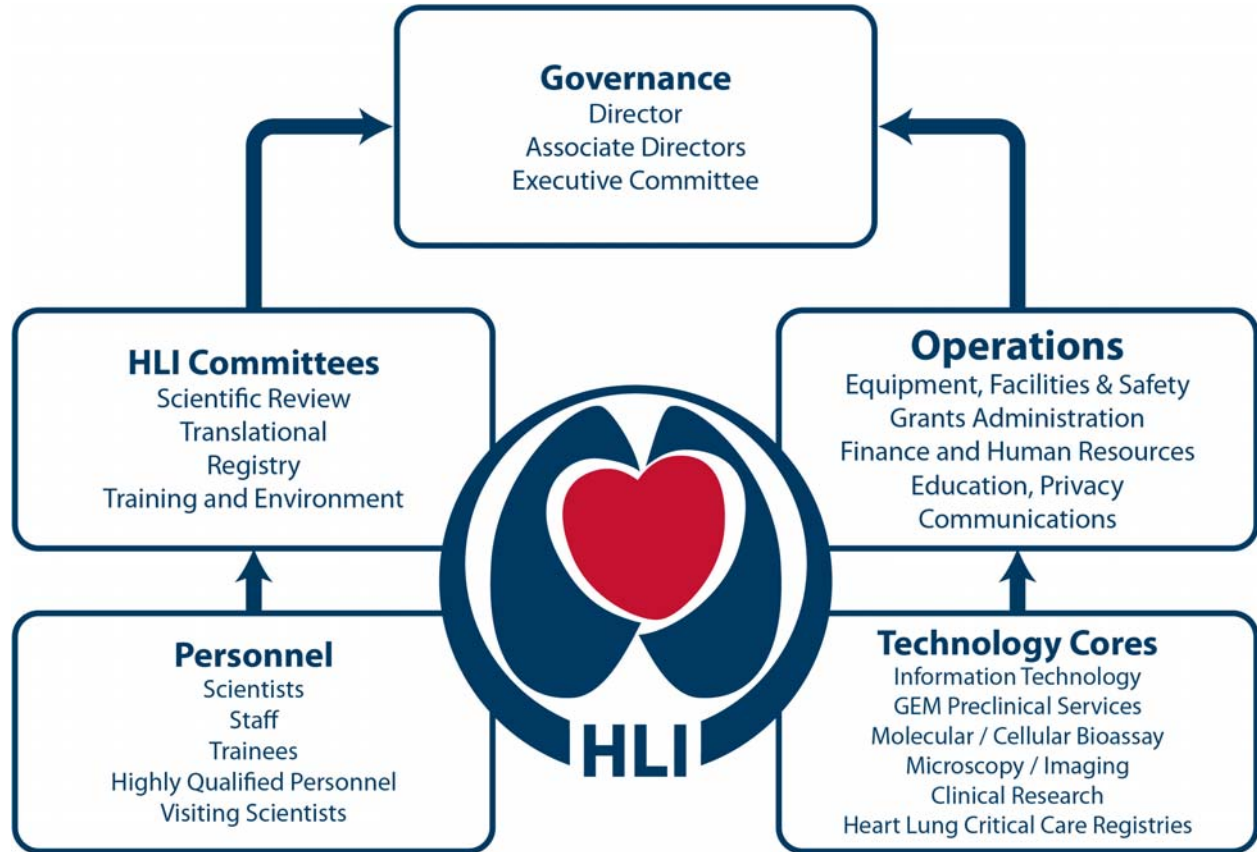
The Centre for Heart Lung Innovation (HLI) (previously known as the iCapture and James Hogg Research Centre) is a University of British Columbia (UBC) Senate-approved Centre of Cardiovascular, Pulmonary, and Critical Care expertise, housed within Providence Health Care at St Paul's Hospital. The HLI dual reporting structure is shown below in **Figure 1**. This ensures that the research conducted within the HLI adheres to the UBC Strategic Research Plan and is focused on the Providence Health Care "populations of emphasis" that include people with heart and lung disease.

Figure 1. Governance structure of the Centre for Heart Lung Innovation.



The management structure under the HLI Executive involves a team approach led by Principal Investigators, Operations staff and the Technology Cores (Figure 2).

Figure 2. Management structure of the Centre for Heart Lung Innovation(HLI)



Message from the Director

Dear Colleagues,

This Annual Report highlights the achievements of the scientific leaders and trainees of the Centre for Heart Lung Innovation (HLI).



Our successes as a world-class research facility continue with the release of 181 publications in the calendar year 2014; and the receipt of \$8,018,180 in funding for fiscal year 2014/2015, up to Feb. 28th. We have nearly completed the implementation of our third Canada Foundation for Innovation (CFI) award which provided us with a much needed renovation of our remaining original laboratory space and new technology to advance our scientific programs, as well as to develop and facilitate collaborations with over 700 external users that use our research facilities.

In 2014, we added two new Principal Investigators Drs. Bradley Quon and Scott Lear and developed a new appointment category to specifically support early career investigators in the process of their development into Principal Investigators. The HLI now hosts four biotechnology based, start-up/spin-off companies including the PROOF Centre of Excellence, viDA Therapeutics Inc., Aspect Biosystems Ltd., and Cyon Therapeutics Inc., which was established in this reporting period.

The HLI's scientists, trainees and staff would like to thank our funding partners: Canada Foundation for Innovation, BC Knowledge Development Fund, Providence Health Care, University of British Columbia, Heart and Stroke Foundation of BC and Yukon, BC Lung Association, St Paul's Hospital Foundation and many vendors and industrial collaborators, for their crucial support of our ongoing programs for the race against cardiovascular, pulmonary and critical care disease.

We are proud of our progress to date and look forward to an equally successful 2015.

With kind regards,

A handwritten signature in black ink that reads "Keith Walley". The signature is written in a cursive, flowing style.

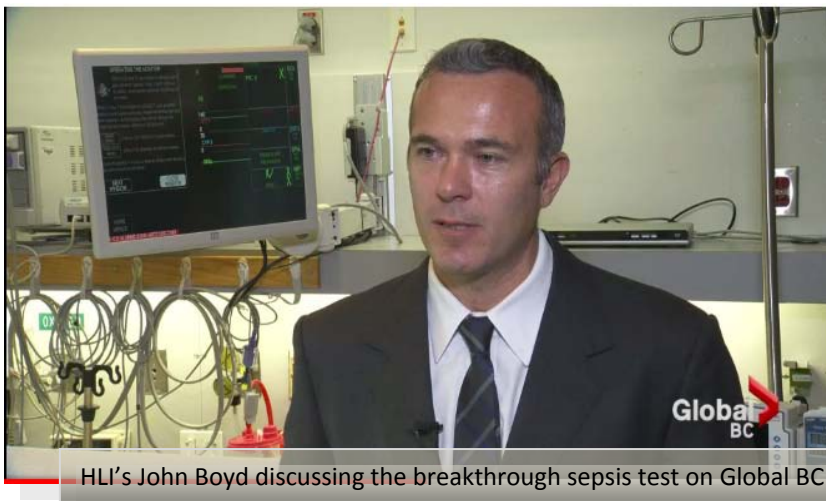
Keith R. Walley, MD
Director, Centre for Heart Lung Innovation (HLI)
Professor of Medicine, UBC
Associate Director ICU, St. Paul's Hospital

Research Spotlight

Successes in Sepsis Research: Early Diagnosis and Improved Outcomes for Patients with Severe Infection

Sepsis, a syndrome caused by severe infection, leads to organ failure and is responsible for up to five million deaths annually. There are 18 million cases of sepsis worldwide, every year. In 2014, HLI researchers made two major breakthroughs which address the challenge of sepsis at two levels: early diagnosis and gene/enzyme targeted treatment.

Rapid test to diagnose sepsis



HLI's John Boyd discussing the breakthrough sepsis test on Global BC

UBC researchers, including the HLI PIs Drs. **John Boyd and Jim Russell** and HLI postdoctoral fellows Drs. **Chris Fjell and Adam Linder**, have identified a genetic signature that is associated with the diagnosis of sepsis and subsequent organ failure. A rapid test of this genetic signature can be performed as soon as the

patient arrives in the emergency ward, to identify those most at risk for rapid deterioration and organ failure. Published recently in EBioMedicine, the test accurately identified 96 per cent of patients who were at the very early stages of sepsis. Where typically diagnosis takes 24-48 hours, this new test would take as little as one hour and the physicians could start treating patients almost immediately.

Watch Global BC video @ <http://globalnews.ca/news/1632824/watch-ubc-scientists-make-a-breakthrough-in-sepsis-research/>

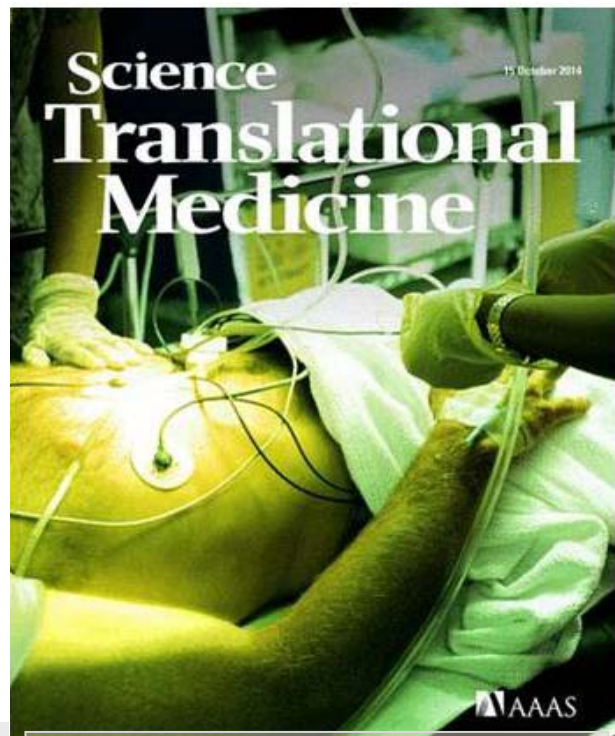
Read the science: Olga M. Pena, David G. Hancock, Ngan H. Lyle, Adam Linder, James A. Russell, Jianguo Xia, Christopher D. Fjell, John H. Boyd, Robert E.W. Hancock, An Endotoxin Tolerance Signature Predicts Sepsis and Organ Dysfunction at Initial Clinical Presentation, EBioMedicine, Volume 1, Issue 1, November 2014, Pages 64-71.

Breakthrough in sepsis treatment

Dr. **Keith Walley** and colleagues found that decreased function of the enzyme PCSK9 may improve survival from severe sepsis. It is known that decreased function of the PCSK9 enzyme increases clearance of fatty molecules, including cholesterol and toxic fatty molecules from the blood.

Working from the idea that cell walls of common pathogens i.e. bacteria and fungi are also made up of toxic fatty molecules, Dr. Walley and collaborators explored the role of PCSK9 in clearance of bacterial toxins in mice and humans. They found that genetic variants with reduced PCSK9 function resulted in faster clearance of toxic bacterial molecules in mice and resulted in improved outcomes and increased survival in mice and humans.

Read the Science: Walley KR, Thain KR, Russell JA, Reilly MP, Meyer NJ, Ferguson JF, Christie JD, Nakada T-A, Fjell CD, Thair SA, Cirstea MS, Boyd JH. PCSK9 is a critical regulator of the innate immune response and septic shock outcome. *Science Transl. Med.* October 2014, 6 (258), p 258ra143.



HLI's PCSK9/sepsis research on the cover of Science Translational Medicine

A Simple Blood Test to find Indicators of Chronic Obstructive Pulmonary Disease (COPD)



Dr. Don Sin

According to Statistics Canada, COPD is the fourth-leading cause of death and the number one cause of hospital admissions in Canada. The total cost of such hospitalizations is estimated to be more than \$2 billion per year. The definitive identification of COPD in the early stages has been a challenge for effective treatment and management of the disease. HLI's Dr. **Don Sin** and his team are using a genomics approach to

find indicators of COPD in patients using a simple blood test. These blood tests will identify patients in the early stages of COPD, so they can receive appropriate therapies sooner and avoid complications at the later stages of the disease. Further, in already diagnosed COPD patients, the blood tests will signal when patients are at high risk for lung attacks and in need of preventative drugs. At the same time, patients at low risk can avoid unnecessary medicines and their potential side effects. (Information and Photo source: PHC News, Nov 20, 2014).

Granzyme B may hold the Key to Sun-Induced Skin Aging



Dr. David Granville discussing his discovery on Global News

While investigating the effects of the protein degrading enzyme, Granzyme B, in atherosclerosis and heart attacks, the HLI's Dr. **David Granville** and his team discovered that mice lacking Granzyme B maintained a wrinkle-free, smooth skin despite exposure to UV light while normal mice showed signs of age. Dr. Granville envisions revolutionary cosmetic uses for this discovery, through inhibition of Granzyme B.

Dr. Granville's laboratory has been interested in how factors such as smoking, obesity, immobility, cardiovascular disease and diabetes affect chronic inflammation and how

this dysregulated immune cell accumulation orchestrates tissue damage and impedes tissue repair. In their search for factors, his team identified a proteolytic enzyme Granzyme B that degrades structural proteins that are critical for normal wound healing. When these proteins are degraded by Granzyme B, wounds do not close properly. Granzyme B is abundant in diseases associated with age, smoking, diabetes and chronic inflammation. Further, Granzyme B inhibition results in a marked improvement in tissue repair and integrity in models of aortic aneurysm, diabetic wound healing and aging.

viDA Therapeutics, an HLI-hosted, UBC spin-off company that was founded in 2009, based on Dr. Granville's ongoing research, is already actively developing Granzyme B inhibitors that will be used initially for the treatment of non-healing skin ulcers including diabetic skin ulcers and pressure ulcers.

Read More @

<http://www.vancouver.sun.com/scientists+have+accidentally+discovered+secret+wrinkle+free+skin/10658536/story.html>

Watch @ <http://globalnews.ca/news/1730358/a-drug-to-help-stop-wrinkles-and-aging-ubc-scientists-raising-hopes/>

Using Pulmonary Imaging to Move Chronic Obstructive Pulmonary Disease (COPD) beyond FEV1



Review article by Drs. Harvey Coxson and Don Sin on the cover of the July 15, 2014 – American Journal of Respiratory & Critical Care Medicine

Force expiratory volume in one second (FEV₁), measured by spirometry is currently the main intermediate endpoint used in research studies and for the development of new COPD therapies. However, in patients with COPD, the relationship of FEV₁ with symptoms and outcomes such as exacerbations and mortality is weak, and, importantly, FEV₁ does not take into account the heterogeneity of COPD or its different phenotypes. Dr. **Harvey Coxson** and his team are using multi-modality thoracic imaging techniques that provide sensitive, specific, and precise measurements of the structural and functional characteristics of COPD (with high spatial and temporal resolution) to provide a complete understanding of the significant relationships between lung pathology, respiratory physiology, clinical symptoms and patient outcomes.

Read the science: Coxson HO, Leipsic J, Parraga G, Sin DD. (2014). Using Pulmonary Imaging to Move COPD Beyond FEV1. Am J Respir Crit Care Med. 190(2): 135-144.

Where does cholesterol accumulate in atherosclerotic arteries?: Smooth Muscle Cells implicated

Dr. **Gordon Francis**, a renowned atherosclerosis researcher and an Associate Director of the HLI, along with his colleagues discovered that cholesterol accumulates in smooth muscle cells of arteries to cause atherosclerosis. This debunks the current standard thinking that cholesterol mostly accumulated in large white blood cells called macrophages. This finding also leads to the possibility that cholesterol removal from smooth muscle



Dr. Gordon Francis and Dr. Sima Allahverdian pose for the Vancouver Sun

cells could be a promising target for atherosclerosis prevention and treatment, moving forward. Dr. Francis and his team are studying this possibility further.

Read article *'Vancouver researchers make breakthrough in study of heart disease St. Paul's Hospital scientists discover smooth muscle cells may play a role'* @

<http://www.vancouversun.com/health/Vancouver+researchers+make+breakthrough+study+heart+disease/9546281/story.html>

Read the Science in : Allahverdian S, Chehroudi AC, McManus BM, Abraham T, and Francis GA. Contribution of Intimal Smooth Muscle Cells to Cholesterol Accumulation and Macrophage-Like Cells in Human Atherosclerosis. *Circulation* 2014 Epub Jan 30, 2014. PMID: 24481950

New Principal Investigators

Bradley S. Quon, MD, FRCPC, MSc, MBA

Assistant Professor, Department of Medicine, Division of Respiratory Medicine, Faculty of Medicine, The University of British Columbia.



Dr. Brad Quon joined the HLI as a Principal Investigator in January, 2014. Dr. Quon is an Adult Respiriologist and Clinician-Scientist with a primary clinical and research interest in cystic fibrosis (CF). His research focuses on bridging discoveries from the basic laboratory into the clinic to improve patient outcomes. He is currently searching for novel biomarkers of inflammation and infection to improve disease monitoring in CF. He is also actively involved in several quality improvement initiatives within the St. Paul's Hospital Adult CF clinic and several clinical trials investigating new therapies in CF patients.

Dr. Quon graduated from medical school at McGill University. During his medical training he was also enrolled in a health care management stream and earned a Master's degree in Business Administration. Following completion of both medical and business schools, he completed specialty and sub-specialty training in Internal Medicine and Respiratory Medicine at the University of British Columbia. Following clinical training, he obtained a Master of Science Degree in Epidemiology at the University of Washington through the UBC Clinician Investigator Program. To round off his training, he completed post-doctoral translational research training at the HLI through the Integrated and Mentored Pulmonary and Cardiovascular Training Program (IMPACT). We are very delighted to have him join the Centre again as a Principal Investigator (Source: Pacific Lung Health Centre).

Scott Lear, PhD

Professor, Faculty of Health Sciences and the Department of Biomedical Physiology and Kinesiology, Simon Fraser University

Dr Scott Lear joined the HLI as Principal Investigator in July 2014. Dr. Lear is a Professor in the Faculty of Health Sciences at Simon Fraser University and the inaugural Pfizer/Heart and Stroke Foundation Chair in Cardiovascular Prevention Research at St. Paul's Hospital. Dr. Lear is also the Director of Community Health Solutions (CHS). CHS engages with community partners to learn, develop, and apply novel and sustainable approaches, programs, and policies to enhance chronic disease prevention and management to support healthy individuals and communities. Under CHS, Dr. Lear's research spans the breadth of prevention of chronic diseases at a population level to the management of chronic diseases at an individual level. Dr. Lear received his PhD at the University of British Columbia in the area of cardiac rehabilitation. Building on the success of his doctoral intervention program, Dr. Lear founded and now leads the British Columbia Alliance for Telehealth Policy and Research, a team of university-based researchers and health authority decision makers, to develop and evaluate Internet-based solutions for chronic disease management. Another area of Dr. Lear's research consists of the identification of environmental characteristics (the so-called 'built environment') that may act as facilitators and barriers to healthy lifestyle habits and downstream cardiovascular disease risk. His research is currently funded by the Canadian Institutes of Health Research, the Heart and Stroke Foundation of BC and Yukon and the Michael Smith Foundation for Health Research (Source: <http://www.coheart.ca/profiles/>).



HLI Principal Investigators

Michael Allard	Pascal Bernatchez
John Boyd	Pat Camp
Chris Carlsten	Harvey Coxson
Denise Daley	Del Dorscheid
Gordon Francis	David Granville
Jordan Guenette	Tillie Hackett
James Hogg	Scott Lear
Honglin Luo	Paul Man
Bruce McManus	Raymond Ng
Peter Pare	Brad Quon
James Russell	Chris Ryerson
Andrew Sandford	Chun Seow
Don Sin	Wan Tan-Hogg
Scott Tebbutt	Stephan van Eeden
Keith Walley	Decheng Yang

Principal Investigator Research Profiles

Michael Allard

UBC Department of Pathology and Laboratory Medicine

Dr. Allard's research program focuses on adaptation of the heart to physiological states, such as endurance exercise, and pathological processes, such as hypertension, that result in cardiac hypertrophy. He is particularly interested in how these conditions alter substrate use by the heart and how changes in substrate use influence heart function. A major recent focus of his research has been delineation of the cellular and molecular mechanisms that account for the alterations in substrate use by the hypertrophied heart.

John Boyd

UBC Department of Medicine

Dr. Boyd's clinical research program is focused on defining and reversing the elements of the host response that causes sudden organ failure during severe infection. In collaboration with Dr. R.Hancock, he recently identified a 31 gene endotoxin tolerance profile which predicts subsequent organ failure. Following the recent discovery of the role of the PCSK9 enzyme in the clearance of pathogenic bacterial and fungal lipids from the bloodstream, he collaborates with Drs. K.Walley and J.Russell to develop an anti-PCSK9 therapy as a novel treatment for sepsis.

Christopher Carlsten

UBC Department of Medicine

Dr. Carlsten's clinical and research interests center on occupational airways disease, including the effects of inhaled exposures on asthma induction and exacerbation. His laboratory investigates the pulmonary-immunological health effects of inhaled environmental and occupational exposures, using diesel exhaust, western red cedar, and phthalates as model inhalants. His research addresses the fundamental question of the synergism of inhaled

Pascal Bernatchez

UBC Department of Anesthesiology, Pharmacology, and Therapeutics

Dr. Bernatchez's research program is aimed at the dynamic interplay between blood vessel homeostasis and chronic diseases, such as hypertension, atherosclerosis, rare muscular dystrophies and aortic aneurysm associated with Marfan syndrome, as well as exploring novel pharmacological approaches to treat and prevent endothelial dysfunction and its consequences. Dr. Bernatchez's most recent work focuses on the novel regulation mechanism of nitric oxide bioavailability and its role in vascular disease, and how plasma lipid levels influence the loss of muscle function in dystrophic patients.

Pat Camp

UBC Department of Physical Therapy

Dr. Camp's research interests focus on improving the physical activity of individuals with chronic lung disease. Her current studies include optimal exercise prescription and the measurement of physical activity for COPD patients as part of a pulmonary rehabilitation program; eHealth technology for pulmonary rehabilitation; and pulmonary rehabilitation for lung disease patients with cardiovascular comorbidity.

Harvey Coxson

UBC Department of Radiology

Dr. Coxson specializes in quantitative imaging of the lung, particularly computed tomography, with correlations to quantitative pathology and pulmonary function. Dr. Coxson's laboratory is the core imaging site for the CanCOLD study, a population based study of COPD, and was the core imaging analysis site for the international COPD study ECLIPSE. Dr. Coxson also works with investigators across Canada as part of the Thoracic

PI Research Profiles Contd.

particles and allergens in mediating health effects. Dr. Carlsten's lab uses an interdisciplinary, team-focused approach to ask related questions on genetic, cellular, functional, and epidemiologic levels.

Denise Daley

UBC Department of Medicine

Dr. Daley is utilizing cutting edge statistical, epigenetic, and bioinformatics techniques to obtain a better understanding of how inherited genetic variants and environmental exposures interact to modify the risk for developing disease. Her lab has recently completed several genome-wide association and sequencing studies to identify genetic susceptibility to common complex diseases such as asthma and COPD, and initiated new studies focused on the evaluation of the "epigenome", or the genome's response to environmental exposures. Dr. Daley's overall research goal is to better understand the etiology of disease and the modifiable environmental risk factors to identify individuals at greatest risk and develop biomarkers and public health interventions.

Gordon Francis

UBC Department of Medicine

Dr. Francis' research involves understanding the mechanisms of accumulation of cholesterol in arteries in atherosclerosis, and how to remove this cholesterol to prevent coronary heart disease and stroke. Current major projects in his lab include: understanding the role of cholesterol derived from lysosomes in regulating gene expression required for cholesterol removal from cells, and whether accumulation of excess cholesterol in lysosomes is a feature of atherosclerosis; understanding the reason arterial smooth muscle cells appear to accumulate more cholesterol than arterial macrophages; and developing synthetic peptides that turn on production of the beneficial cholesterol particles, high density lipoproteins (HDL), to help remove excess cholesterol from the artery wall and thereby reduce atherosclerosis. His lab recently demonstrated that smooth muscle cells, rather than monocyte-derived macrophages, are the primary

Imaging Network of Canada and the Canadian Respiratory Research Network.

Delbert Dorscheid

UBC Department of Medicine

Dr. Dorscheid leads an active research group investigating the role of the airway epithelium in the genesis of inflammatory airways diseases. The research program studies the role for inappropriate injury-repair cycles in the development of both chronic diseases such as asthma and acute illnesses like ALI/ARDS. Specific projects include the role of glucocorticoid-induced airway epithelial cell apoptosis, novel glycoproteins and the glycomics involved in the repair of an injured epithelium, and the expression of FasL as an immune barrier for the airway.

David Granville

UBC Department of Pathology and Laboratory Medicine

Dr. Granville's research group has identified a pathogenic role for granzyme serine proteases in inflammation, impaired tissue healing and remodeling. It is now recognized that apoptosis is not the only function of granzymes and that granzymes also promote inflammation, activate protease-activated receptors, and cleave extracellular proteins. Dr. Granville's recent publication defined a mechanism by which UV light induces GzmB in the skin, leading to collagen degradation and disrupted remodeling. In collaboration with viDA Therapeutics, Dr. Granville's laboratory is developing a novel, small molecule inhibitor of GzmB that can be applied topically to the skin to treat UV-induced skin injury and scarring.

site of cholesterol overaccumulation in human atherosclerotic plaque, which may lead to a major paradigm shift in the understanding of the pathogenesis of ischemic vascular disease.

Jordan Guenette

UBC Department of Physical Therapy

The primary aim of Dr. Guenette's research program is to better understand the physiological factors that limit exercise tolerance across the spectrum of health and chronic lung disease. His lab uses a number of novel measurement techniques to simultaneously assess the respiratory, cardiovascular, muscular and neuro-physiological responses to exercise. His current project aims to identify the causes of shortness of breath in patients with interstitial lung disease (ILD) and chronic obstructive pulmonary disease (COPD). Ultimately, this research will lead to the development of more effective treatments to better manage breathlessness and improve exercise tolerance and quality of life for individuals with chronic respiratory diseases.

James Hogg

UBC Department of Pathology and Laboratory Medicine

Dr. Hogg has been on the staff of the University of British Columbia at St. Paul's Hospital since 1977 and is currently an Emeritus Professor of Pathology at UBC. He maintains an active research program focused on the inflammatory process in the lung with particular reference to the structure and function of the lungs in COPD. Very recently he and his colleagues used microCT to show that terminal and respiratory bronchioles are sequentially destroyed in COPD. Dr. Hogg collaborated with Dr. Spira's group at Boston University to demonstrate a 127 gene expression signature for emphysematous destruction that showed this signature could be reversed toward control levels by the tripeptide GHK. He began to study the lung microbiome in COPD and is currently examining the host response to this microbiome in human lung.

Tillie Hackett

UBC Department of Anesthesiology, Pharmacology, and Therapeutics

Dr. Hackett's research program is focused on understanding the disruption of normal repair processes within the epithelial-mesenchymal trophic unit (EMTU) of the lung and how this propagates inflammation and tissue remodeling in patients with obstructive lung disease. Her laboratory uses an innovative and targeted approach to isolate cells from donor lungs guided by Computed Tomography imaging. The goal of this research program is to further understand the airway microenvironment to determine therapeutic targets to prevent the initiation and perpetuation of pathological processes which contribute to obstructive airway diseases like asthma and chronic obstructive pulmonary disease.

Scott Lear

SFU Faculty of Health Sciences

Dr. Lear's research focuses on effective prevention and management policies and programs for cardiovascular and other chronic diseases. His research uses a population and health services approach to prevent and manage disease (www.CoHeaRT.ca). This work includes investigating how the 'built' environment in which we live acts as either a barrier or facilitator of healthy behaviors. His Multi-cultural Community Health Assessment Trial (M-CHAT) is an ongoing investigation to identify the role of ethnic background in risk for obesity, diabetes and cardiovascular disease. For people with disease, Dr. Lear looks at how technology can support patients in managing their chronic diseases under the umbrella of the British Columbia Alliance for Telehealth Policy and Research (www.BCATPR.ca).

Honglin Luo

UBC Department of Pathology and Laboratory Medicine

The focus of Dr. Luo's research is to define the pathogenetic determinants of virus-host interactions in enterovirus-induced heart disease. She is currently working on: 1) Protein degradation pathways, including the ubiquitin/proteasome pathway and the autophagy, in virus-induced myocarditis and dilated cardiomyopathy; and 2) The molecular mechanisms of impaired cardiac function in viral myocarditis.

Bruce McManus

UBC Department of Pathology and Laboratory Medicine

Dr. McManus is the CEO for Centre of Excellence for Prevention of Organ Failure (PROOF) and the Co-Director of the Institute for Heart + Lung Health. His basic and clinical investigative program is focused on mechanisms, consequences, detection and prevention of injury and aberrant repair involved in inflammatory diseases of the heart and blood vessels. Dr. McManus works in a cross-disciplinary fashion on translational research questions for which answers are critically enabled by computational sciences including molecular biomarker discovery and validation, information acquisition, annotation, and use, and registry development to support heart and lung research.

Peter Paré

UBC Department of Medicine

Dr. Paré is an Emeritus Professor of Respiratory Medicine and Pathology. Dr. Paré's research expertise is in the pathophysiology and genetics of asthma and COPD. Dr. Paré and colleague Chun Seow are investigating the molecular and bio-mechanical events which relate broncho-constricting stimuli to the ultimate airway narrowing in asthma and other obstructive airway diseases. They are examining isotonic and isometric length-tension properties, and the plastic behavior of smooth muscle using physiologic, morphologic and biochemical approaches. With colleagues Don Sin

S.F.Paul Man

UBC Department of Medicine

Dr. Man's research expertise is in clinical trials and translational research, particularly in chronic obstructive lung disease. The clinical outcomes in COPD are unexpectedly influenced by the premature development of atherosclerosis. In close collaboration with Dr. Don Sin, he has been trying to understand epidemiological observations in clinical context, and to design and execute clinical studies and trials to test specific hypothesis.

Raymond Ng

UBC Department of Computer Sciences

Dr. Ng's research focuses on data mining, which can be broadly viewed as large scale data analysis. With the advancement of computer technologies and biotechnologies, data are collected and accumulated at a phenomenal rate, however the collective ability to collect data far exceeds the ability to analyze them. The general focus of Dr. Ng's research is to develop tools that can help domain experts to analyze their data in ways that are feasible and efficient to deal with the volume of the data, and statistically sound. One focus is to perform gene expression profiling for various heart and blood vessel diseases. A specific goal is to identify genes and pathways that are critical to the development, and hence cure, of those diseases.

Bradley Quon

UBC Department of Medicine

Dr. Quon is an Adult Respiriologist with a primary clinical and research interest in cystic fibrosis (CF). His research focuses on bridging discoveries in the basic laboratory into the clinic to improve patient outcomes. He is currently searching for novel biomarkers of inflammation and infection to improve disease monitoring in CF. He is co-Investigator of an international collaboration examining health outcomes for individuals with CF living in Canada and the United States. He is also actively involved in several quality improvement initiatives within the St. Paul's Hospital Adult CF

and Maen Obeidat, he is studying the genetic control of gene expression in the lung and blood of COPD patients.

James Russell

UBC Department of Medicine

Dr. Russell has an active research program investigating genomics of septic shock and has made discoveries regarding genetic variants (single nucleotide polymorphisms) of key coagulation, inflammatory and innate immunity genes. In collaboration with Drs. Walley and Boyd, he discovered that reduced PCSK9 function protects against adverse outcomes in systemic inflammation and septic shock. This discovery has potentially important therapeutic implications in septic shock. He also has an active randomized controlled trials (RCTs) program in critical care. Most recently, his team has published animal model studies and clinical trials of vasopressin for septic shock.

Andrew Sandford

UBC Department of Medicine

The focus of Dr. Sandford's research is the genetic basis of obstructive lung disease. His current work includes identification of genetic risk factors for the development of asthma and chronic obstructive pulmonary disease as well as genetic modifiers of disease severity in cystic fibrosis. He is also investigating the functional impact of genetic variants that have been associated with respiratory disease.

Don Sin

UBC Department of Medicine

Dr. Sin's research is geared towards biomarker discovery in COPD and related conditions such as lung cancer, ischemic heart disease and stroke. His group has shown that patients with COPD experience persistent low-grade systemic inflammation, which can be assessed by interrogating their peripheral circulation. By deploying this strategy, they found that certain pneumoproteins (proteins that are synthesized predominantly in lungs but secreted into the

clinic and several clinical trials investigating new therapies in CF.

Christopher Ryerson

UBC Department of Medicine

Dr. Ryerson specializes in interstitial lung disease (ILD), idiopathic pulmonary fibrosis (IPF), emphysema, dyspnea, and pulmonary rehabilitation. His current research aims to provide a comprehensive understanding of frailty in ILD, including its prevalence, causes, and impact on outcomes. He specifically plans to develop an improved ILD-specific rehabilitation program to target the key deficits in ILD patients. This area of research is particularly important given the marginal benefits and major toxicities of existing ILD pharmacotherapies, thus having the potential to significantly improve the lives of ILD patients.

Chun Seow

UBC Department of Pathology and Laboratory Medicine

Dr. Seow specializes in smooth and skeletal muscle cell biology/physiology. His current research focus is on the mechanical function, ultrastructure and biochemistry of airway smooth muscle in health and disease. His other interests include skeletal muscle mechanics, ATPase cycle associated with the crossbridge cycle, energetics of muscle contraction, and mathematical modeling of muscle function.

Wan Tan

UBC Department of Medicine

Dr. Tan is a co-principal investigator of CanCOLD (Canadian Cohort of Obstructive Lung Disease), a multi-centre cohort study conducted across Canada, dedicated to increase the understanding of the Chronic Obstructive Pulmonary Disease (COPD) and related co-morbidities, to improve its management and to reduce its burden. The objectives are to characterize the severity of COPD and patient response to disease (link of structural/physiological, clinical variables and health perception) while taking

systemic circulation) are promising biomarkers of COPD clinical endpoints. Currently, Dr. Sin's team is using high throughput and high volume proteomics and genomics platforms to accelerate biomarker discovery in COPD.

Scott Tebbutt

UBC Department of Medicine

Dr. Tebbutt's research programme is focused on multi-omics analyses of complex respiratory diseases, including the development of biomarker signatures of early and late reactions in allergic asthma and rhinitis. His research combines hypothesis-driven study of biological mechanisms with the development of advanced tools and technology (including bioinformatics and computational biology) to better facilitate basic and translational research. Dr. Tebbutt is also Chief Scientific Officer of the Prevention of Organ Failure (PROOF) Centre of Excellence - a not-for-profit organization dedicated to moving research findings into health care, and focused on non-invasive biomarkers that can diagnose and/or predict organ failure (heart, lung and kidney).

Keith Walley

UBC Department of Medicine

The focus of Dr. Walley's research is to investigate 1) the mechanism of decreased left ventricular contractility and other organ failure during sepsis and 2) the impact of genotype on patient outcomes in sepsis and systemic inflammatory states. Dr. Walley translates basic discoveries into clinical practice in the ICU. Together with Drs. J. Russell and J. Boyd, he recently demonstrated that blocking the function of PCSK9, an enzyme that inhibits the clearance of endogenous cholesterol from blood, is associated with increased pathogen lipid clearance via the LDLR, a decreased inflammatory response, and improved septic shock outcome. This important discovery facilitated the emergence of anti-PCSK9 therapies as a one of the most promising treatments for sepsis.

into account lifestyle risk factors (smoking and other modifiable risk factors), age and sex, and associated co-morbidities (cardiovascular diseases, osteoporosis, anxiety and depression).

Stephan van Eeden

UBC Department of Medicine

The focus of Dr. van Eeden's research is on the mechanisms of lung inflammation caused by infection, cigarette smoking and air pollution. His group demonstrated that pro-inflammatory mediators generated in the lung spill over in the blood stream and are responsible for the downstream adverse cardiovascular health effects following exposure to air pollution. Dr. van Eeden recently discovered that statins, a medication commonly used to treat patients with increased blood lipid/cholesterol, significantly attenuated the inflammatory response in the lung induced by exposure to air pollution particles. This novel finding holds promise for future use of this class of drug to protect the hearts and lungs during episodes of worsening air pollution.

Decheng Yang

UBC Department of Pathology and Laboratory Medicine

The first area of Dr. Yang's research is the molecular biology and pathogenesis of coxsackievirus, an RNA virus known to cause myocarditis. Dr. Yang is studying the mechanisms of host-pathogen interactions, viral translation initiation, and cardiovirulence with the aim to develop novel antiviral therapies to treat coxsackievirus-induced myocarditis. The second area of Dr. Yang's research is the study of host gene responses to viral infection. He and his team have previously identified genes as well as microRNAs involved in myocarditis induction. His specific focus is the roles of these selected genes and microRNAs in signal transduction pathways and epigenetic modifications leading to cardiomyocyte apoptosis or cardiac hypertrophy. These studies have great potential to discover new targets for gene therapy and molecular markers for diagnosis of viral myocarditis and other related infectious diseases.

Recognizing Research Excellence – Investigator

James Hogg: Order of BC



In 2014, Dr James C. Hogg was recognized for his extraordinary contribution to the province of British Columbia and was appointed to the Order of British Columbia.

Dr. James Hogg is the founding leader of the HLI, which is officially known as the James Hogg Research Centre. For his outstanding contributions to lung health as a researcher, teacher and leader, he is already an officer of the Order of Canada (2005) and member of the Canadian Medical Hall of Fame (2010). (Photo Source: With permission from The Order of BC website <https://www.orderofbc.gov.bc.ca/2014-recipient-james-c-hogg-vancouver/>)

Pat Camp: Jean Francois Bowden Award

HLI's Dr. Pat Camp received the Jean-Francois Bowden award from the Healthy Heart Program at St. Paul's Hospital for her highly translational work on pulmonary rehabilitation. Dr. Camp is working to develop a new smartphone system for pulmonary rehabilitation. Pulmonary rehabilitation, a proven treatment for those with chronic obstructive lung disease (COPD), improves physical fitness and quality of life and reduces shortness of breath. However, only two per cent of Canadians with COPD have access to a program in their community. In addition, maintaining exercise habits afterwards without guidance and monitoring can be a challenge. Dr. Camp's team is developing a smartphone system as a solution. The system will enable patients to safely and effectively exercise in their



Jean-Francois Bowden award recipient Dr. Pat Camp (centre) with award presenters Dr. Jiri Frohlich (left) and Dr. Scott Lear (right)

own community while receiving the same monitoring as hospital-based programs. It could also be potentially adapted for other chronic disease populations such as those with chronic heart failure. For more information on Dr. Camp's work visit: <http://prrl.rehab.med.ubc.ca/>. (Photo and Content Source: IHLH News).

Peter Paré: Bill and Marilyn Webber Lifetime Achievement Award



Dr. Peter Paré (left) with Mrs. Marilyn Webber (centre) and Dean Gavin Stuart (right)

In 2014, the UBC Faculty of Medicine recognized Dr. Peter Paré for his outstanding contributions to pulmonary research. During his 36 years in Vancouver, Dr. Paré's work in the pathophysiology of asthma and chronic obstructive pulmonary disease (COPD) has established UBC as one of the world's premier scientific centres in lung disease. His work has increased understanding of small airways, and in particular the mechanics underlying airway narrowing, through studies published in such high-impact journals as the *New England Journal of Medicine*, the *American Review of Respiratory Disease*, and the *American Journal of Respiratory Cell and Molecular Biology*.

The UBC Faculty of Medicine's Bill and Marilyn Webber Lifetime Achievement Award recognizes extraordinary members of the Faculty of Medicine who have had sustained distinguished careers at UBC in the areas of research, teaching and/or service.

Read more: <http://med.ubc.ca/faculty-of-medicines-bestows-lifetime-achievement-award-on-peter-pare/>

Gordon Francis: Senior Investigator Award, Canadian Lipoprotein Conference



Dr. Gordon Francis

Dr. Gordon Francis received the 2014 Canadian Lipoprotein Conference Senior Investigator Award. Dr. Francis received this award for his many years of work on how HDL (good cholesterol) is made in the body, and his work showing that smooth muscle cells are the main cell type accumulating excess cholesterol in arterial plaque, not macrophages, as long believed.

Mike Allard: William Boyd Lectureship, Canadian Association of Pathologists



Dr. Mike Allard (left) with his William Boyd Lectureship Award and Dr. Dominique Trudel (University of Montreal), recipient of the Junior Scientist Lectureship Award

Dr. Mike Allard received the Canadian Association of Pathologists' William Boyd Lectureship Award, at the annual meeting in Toronto on July 13, 2014. Dr. Allard is a Professor of Pathology and Laboratory Medicine at UBC, and is currently the Head of the Department. He is also a Clinician Scientist at St. Paul's Hospital in Vancouver where he is a Cardiovascular Pathologist and a Principal Investigator at the HLI. The Award was established in 1981 in honor of Dr. William Boyd, a great Canadian pathologist and the first Head of the UBC Department of Pathology and Laboratory Medicine. It recognizes the contribution to Laboratory medicine of a senior member of the CAP/ACP.

David Granville: Royal Society of Canada-Fellow in the Inaugural Cohort; College of New Scholars, Artists, and Scientists



Dr. Granville at the Royal Society of Canada for the induction ceremony

Dr. David Granville of the HLI was inducted to the College of New Scholars, Artists and Scientists of the Royal Society of Canada. Dr. Granville is one of just two UBC researchers who became inaugural members of the College this year. Dr. Granville's groundbreaking research of novel therapeutics to treat chronic inflammatory diseases has earned him a nomination by his peers for this highly prestigious honor. Those named to the College have been nominated by 51 Canadian universities and the National Research Council, and they represent the emerging generation of scholarly, scientific and artistic leadership in Canada.

Tillie Hackett, Jordan Guenette and Chris Ryerson: The Michael Smith Foundation for Health Research Scholar Awards



Drs Hackett, Guenette and Ryerson with other 2014 MSFHR Scholars

Three of HLI's young investigators received the prestigious MSFHR Scholar Awards. These salary awards are catalysts for health research innovation that help attract top research talent to BC and retain our province's best and brightest. Dr. Tillie Hackett was among only eight winners in the Biomedical Category. She won the award for her project 'Molecular Determinants of Small Airway Obstruction in Chronic Obstructive Pulmonary Disease'.

Drs. Jordan Guenette and Chris Ryerson were both among 13 awardees in the Clinical category, for their projects 'Mechanisms of Dyspnea and Exercise Tolerance in Patients with Chronic Respiratory Diseases' and 'Frailty in Interstitial Lung disease' respectively.

Tillie Hackett: CIHR New Investigator Award



Dr. Tillie Hackett received the CIHR New Investigator Award for her project 'Molecular Determinants of Small Airway Obstruction in COPD'. This prestigious award provides outstanding new investigators in the early stages of their research careers with the opportunity to develop and demonstrate their independence in initiating and conducting health research.

Research Funding

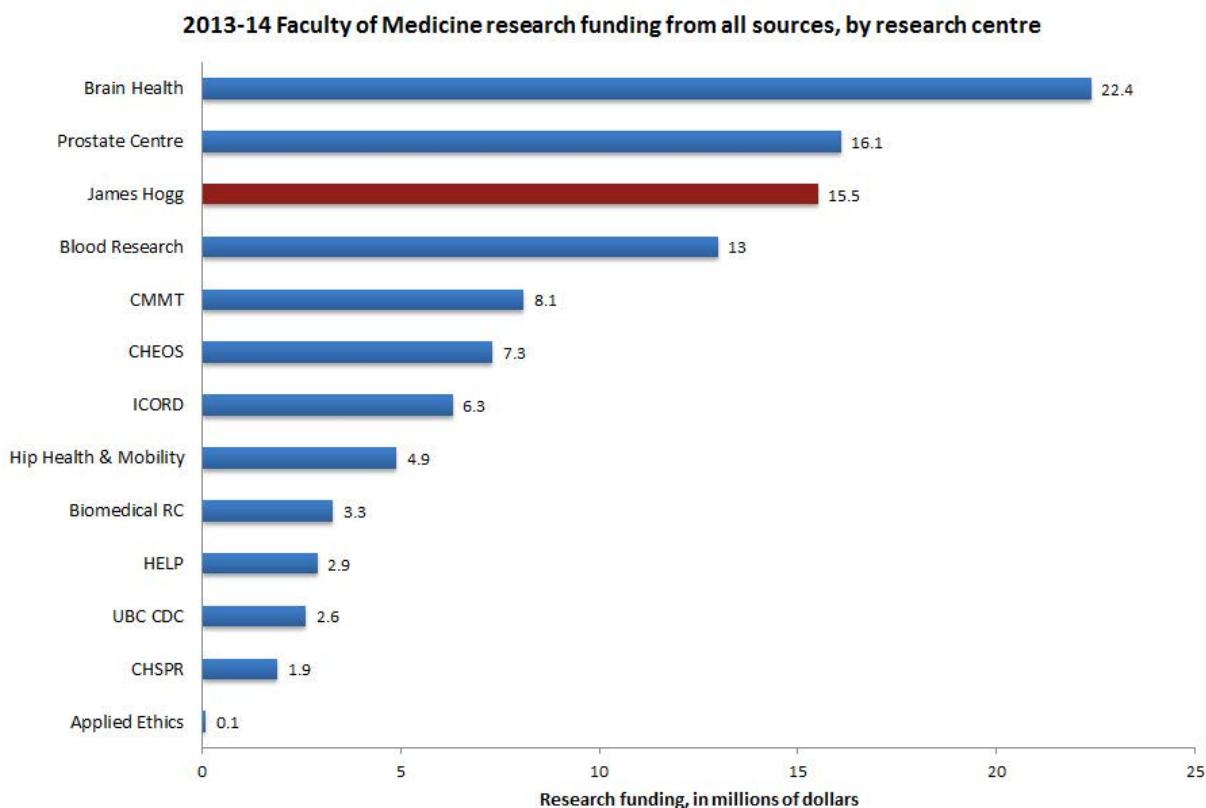
The Centre for Heart Lung Innovation (HLI) in **Figure 3** was successful in attracting 14.8% of all of the UBC Faculty of Medicine funding for the previous fiscal year, 2013/2014.

Available data for fiscal year 2014 – 2015, up to February 28, 2015, indicate that the HLI Investigators were successful in attracting **\$8,018,180*** in research grants and contracts.

*(This is a preliminary figure before final year-end figures are available)

Details about the HLI’s funding for fiscal year 2014 – 2015 can be found in **Appendix A**.

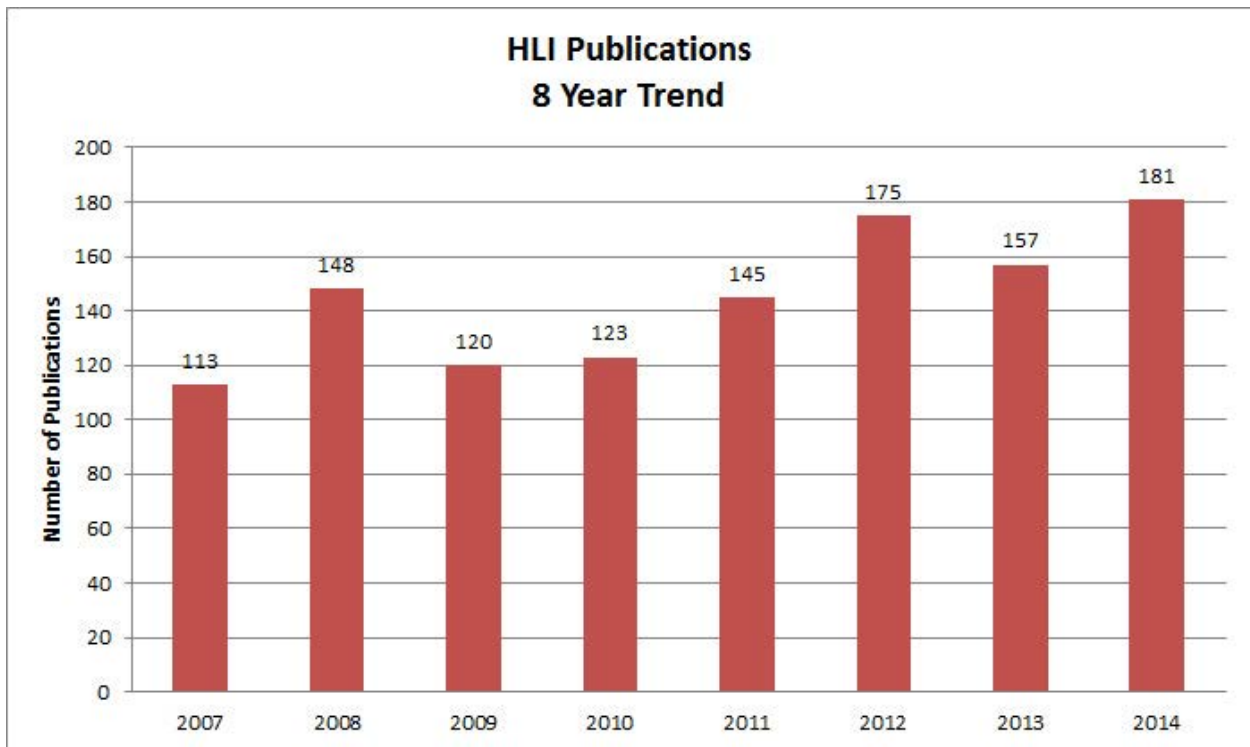
Figure 3. Centre for Heart Lung Innovation (HLI) funding in relation to other UBC Faculty of Medicine Research Centres in the previous Fiscal Year 2013/2014.



Source of Data: UBC Faculty of Medicine 2013-14 Annual Report

Peer Reviewed Publications

The Centre for Heart Lung Innovation's Investigators and students produced **181** publications in 2014. The 8 year trend of publications can be seen in **Figure 4** below.



Full details about the 2014 HLI publications can be found in **Appendix B**.

Recent High-Impact Papers Published by HLI Investigators

The New England Journal of Medicine

Impact Factor: 54.42

Journal Category:

Medicine, General and Internal

Rank Within Category:

1/156

Criner GJ, Connett JE, Aaron SD, Albert RK, Bailey WC, Casaburi R, Cooper JA Jr, Curtis JL, Dransfield MT, Han MK, Make B, Marchetti N, Martinez FJ, Niewoehner DE, Scanlon PD, Sciruba FC, Scharf SM, Sin DD, Voelker H, Washko GR, Woodruff PG, Lazarus SC; COPD Clinical Research Network; Canadian Institutes of Health Research. **Simvastatin for the prevention of exacerbations in moderate-to-severe COPD.** N Engl J Med. 2014 Jun 5; 370(23):2201-10. Epub 2014 May 18. Pubmed ID: 24836125.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=24836125>

Russell JA. **Is there a good MAP for septic shock?** N Engl J Med. 2014 Apr 24; 370(17):1649-51. Epub 2014 Mar 18. PubMed ID:24635771.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=24635771>

O'Donnell M, Mente A, Rangarajan S, McQueen MJ, Wang X, Liu L, Yan H, Lee SF, Mony P, Devanath A, Rosengren A, Lopez-Jaramillo P, Diaz R, Avezum A, Lanas F, Yusuf K, Iqbal R, Ilow R, Mohammadifard N, Gulec S, Yusufali AH, Kruger L, Yusuf R, Chifamba J, Kabali C, Dagenais G, Lear SA, Teo K, Yusuf S; PURE Investigators. Urinary sodium and potassium excretion, mortality, and cardiovascular events. N Engl J Med. 2014 Aug 14; 371(7):612-23. PubMed ID: 25119607.

<http://www.ncbi.nlm.nih.gov/pubmed/25119607>

Yusuf S, Rangarajan S, Teo K, Islam S, Li W, Liu L, Bo J, Lou Q, Lu F, Liu T, Yu L, Zhang S, Mony P, Swaminathan S, Mohan V, Gupta R, Kumar R, Vijayakumar K, Lear S, Anand S, Wielgosz A, Diaz R, Avezum A, Lopez-Jaramillo P, Lanas F, Yusuf K, Ismail N, Iqbal R, Rahman O, Rosengren A, Yusufali A, Kelishadi R, Kruger A, Puoane T, Szuba A, Chifamba J, Oguz A, McQueen M, McKee M, Dagenais G; PURE Investigators. **Cardiovascular risk and events in 17 low-, middle-, and high-income countries.** N Engl J Med. 2014 Aug 28; 371(9):818-27. PubMed PMID: 25162888.

<http://www.ncbi.nlm.nih.gov/pubmed/25162888>

Nature Medicine

Impact Factor: 28.05

Journal Category:

Biochemistry and Molecular Biology
Cell Biology
Medicine, Research & Experimental

Rank Within Category:

2/291
3/185
1/124

Marchant DJ, Bellac CL, Moraes TJ, Wadsworth SJ*, Dufour A, Butler GS, Bilawchuk LM, Hendry RG, Robertson AG, Cheung CT, Ng J, Ang L*, Luo Z, Heilbron K, Norris MJ, Duan W, Bucyk T, Karpov A, Devel L, Georgiadis D, Hegele RG, Luo H, Granville DJ, Dive V, McManus BM, Overall CM. **A new transcriptional role for matrix metalloproteinase-12 in antiviral immunity.** Nat Med. 2014 May; 20(5):493-502. Epub 2014 Apr 28. PubMed ID: 24784232.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=24784232>

Circulation		<u>Impact Factor: 14.95</u>
Journal Category:	Cardiac and Cardiovascular Systems	Rank Within Category: 2/125
	Peripheral Vascular Disease	1/65

Allahverdian S*, Chehroudi AC, McManus BM, Abraham T*, Francis GA. **Contribution of intimal smooth muscle cells to cholesterol accumulation and macrophage-like cells in human atherosclerosis.** Circulation. 2014 Apr 15; 129(15):1551-9. Epub 2014 Jan 30. PubMed ID: 24481950.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=24481950>

Science Translational Medicine		<u>Impact Factor: 14.41</u>
Journal Category:	Cell Biology	Rank Within Category: 10/185
	Medicine, Research & Experimental	3/124

Walley KR, Thain KR*, Russell JA, Reilly MP, Meyer NJ, Ferguson JF, Christie JD, Nakada TA*, Fjell CD*, Thair SA*, Cirstea MS*, Boyd JH. **PCSK9 is a critical regulator of the innate immune response and septic shock outcome.** Sci Transl Med. 2014 Oct 15; 6(258):258ra143. PubMed ID: 25320235.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=25320235>

American Journal of Respiratory and Critical Care Medicine		<u>Impact Factor: 11.99</u>
Journal Category:	Critical Care Medicine	Rank Within Category: 1/27
	Respiratory System	1/54

Coxson HO, Leipsic J, Parraga G, Sin DD. **Using pulmonary imaging to move chronic obstructive pulmonary disease beyond FEV1.** Am J Respir Crit Care Med. 2014 Jul 15; 190(2):135-44. Review. PubMed ID: 24873985.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=24873985>

Dijkstra AE, Postma DS, van Ginneken B, Wielpütz MO, Schmidt M, Becker N, Owsijewitsch M, Kauczor HU, de Koning HJ, Lammers JW, Oudkerk M, Brandsma CA, Bossé Y, Nickle DC, Sin DD, Hiemstra PS, Wijmenga C, Smolonska J, Zanen P, Vonk JM, van den Berge M, Boezen HM, Groen HJ. **Novel genes for airway wall thickness identified with combined genome-wide association and expression analyses.** Am J Respir Crit Care Med. 2015 Mar 1; 191(5):547-56. PubMed ID: 25517131.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=25517131>

Linder A*, Fjell C*, Levin A, Walley KR, Russell JA, Boyd JH. **Small acute increases in serum creatinine are associated with decreased long-term survival in the critically ill.** Am J Respir Crit Care Med. 2014 May 1; 189(9):1075-81. PubMed ID: 24601781.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=24601781>

Vestbo J, Agusti A, Wouters EF, Bakke P, Calverley PM, Celli B, Coxson H, Crim C, Edwards LD, Locantore N, Lomas DA, MacNee W, Miller B, Rennard SI, Silverman EK, Yates JC, Tal-Singer R; Evaluation of COPD Longitudinally to Identify Predictive Surrogate Endpoints Study Investigators. **Should we view chronic obstructive pulmonary disease differently after ECLIPSE? A clinical perspective from the study team.** Am J Respir Crit Care Med. 2014 May 1; 189(9):1022-30. PubMed ID: 24552242.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=24552242>

Carlsten C, Georas SN. **Update in environmental and occupational lung diseases 2013.** Am J Respir Crit Care Med. 2014 May 1; 189(9):1037-43. Review. PubMed ID: 24787066.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=24787066>

Morty RE, Walley KR. **A step forward toward the clinical application of palifermin for acute respiratory distress syndrome?** Am J Respir Crit Care Med. 2014 Jun 15; 189(12):1455-6. PubMed PMID: 24930526.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=24930526>

Verleden SE, Vasilescu DM*, Willems S, Ruttens D, Vos R, Vandermeulen E, Hostens J, McDonough JE*, Verbeken EK, Verschakelen J, Van Raemdonck DE, Rondelet B, Knoop C, Decramer M, Cooper J, Hogg JC, Verleden GM, Vanaudenaerde BM. **The site and nature of airway obstruction after lung transplantation.** Am J Respir Crit Care Med. 2014 Feb 1; 189(3):292-300. PubMed ID: 24354907.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=24354907>

Park HY*, Sin DD. **Reply: Club cell protein and chronic obstructive pulmonary disease progression: the unrealized potential of a peripheral lung biomarker.** Am J Respir Crit Care Med. 2014 Mar 1; 189(5):615. PubMed ID: 24579842.
<http://www.ncbi.nlm.nih.gov/pubmed/?term=24579842>

Wunderink RG, Walley KR. **Update in sepsis and pulmonary infections 2013.** Am J Respir Crit Care Med. 2014 Jul 1; 190(1):25-31. PubMed ID: 24983219
<http://www.ncbi.nlm.nih.gov/pubmed/?term=24983219>

Meyer NJ, Ferguson JF, Feng R, Wang F, Patel PN, Li M, Xue C, Qu L, Liu Y, Boyd JH, Russell JA, Christie JD, Walley KR, Reilly MP. **A functional synonymous coding variant in the IL1RN gene is associated with survival in septic shock.** Am J Respir Crit Care Med. 2014 Sep 15;190(6):656-64. PubMed ID: 25089931
<http://www.ncbi.nlm.nih.gov/pubmed/?term=25089931>

Chapman DG, Pascoe CD*, Lee-Gosselin A, Couture C, Seow CY, Paré PD, Salome CM, King GG, Bossé Y. **Smooth muscle in the maintenance of increased airway resistance elicited by methacholine in humans.** Am J Respir Crit Care Med. 2014 Oct 15; 190(8):879-85. PubMed ID: 25191967.
<http://www.ncbi.nlm.nih.gov/pubmed/?term=25191967>

The Journal of Allergy and Clinical Immunology

Impact Factor: 11.25

Journal Category:

Rank Within Category:

Allergy

1/21

Immunology

8/144

Scholtens S, Postma DS, Moffatt MF, Panasevich S, Granell R, Henderson AJ, Melén E, Nyberg F, Pershagen G, Jarvis D, Ramasamy A, Wjst M, Svanes C, Bouzigon E, Demenais F, Kauffmann F, Siroux V, von Mutius E, Ege MJ, Braun-Fahrländer C, Genuneit J; GABRIELA study group, Brunekreef B, Smit HA, Wijga AH, Kerkhof M, Curjuric I, Imboden M, Thun GA, Probst-Hensch N, Freidin MB, Bragina Elu, Deev IA, Puzyrev VP, Daley D, Park J, Becker A, Chan-Yeung M, Kozyrskyj AL, Paré P, Marenholz I, Lau S, Keil T, Lee YA, Kabesch M, Wijmenga C, Franke L, Nolte IM, Vonk J, Kumar A, Farrall M, Cookson WO, Strachan DP, Koppelman GH, Boezen HM. **Novel childhood asthma genes interact with in utero and early-life tobacco smoke exposure.** J Allergy Clin Immunol. 2014 Mar; 133(3):885-8. Epub 2013 Dec 6. PubMed ID: 24315450.
<http://www.ncbi.nlm.nih.gov/pubmed/?term=24315450>

Biagioni BJ, Pui MM, Fung E, Wong S, Hosseini A, Dybuncio A, Alexis NE, Carlsten C. **Sputum adiponectin as a marker for western red cedar asthma**. J Allergy Clin Immunol. 2014 Dec; 134(6):1446-1448.e5. Epub 2014 Aug 13. PubMed ID: 25129682.
<http://www.ncbi.nlm.nih.gov/pubmed/?term=25129682>

Akhabir L*, Bérubé JC, Bossé Y, Laviolette M, Hao K, Nickle DC, Timens W, Sin DD, Paré PD, Postma DS, Sandford AJ. **Lung expression quantitative trait loci data set identifies important functional polymorphisms in the asthma-associated IL1RL1 region**. J Allergy Clin Immunol. 2014 Sep; 134(3):729-31. Epub 2014 Apr 18. PubMed ID: 24746754.
<http://www.ncbi.nlm.nih.gov/pubmed/?term=24746754>

The Impact Factors and Journal Rankings are based on the Web of Science Journal Rankings for 2013.

The HLI Principal Investigators' names are underlined; trainees, visiting scientists and research personnel are denoted with an asterisk.

Training the Next Generation

The HLI prides itself on its success in attracting international trainees and research personnel from all over the world. In the past 5 years, the Centre has hosted trainees and research personnel from 38 Countries and 6 continents.

Figure 5. HLI: Training the World



HLI Summer Student Research Program

In 2014 we hosted 43 summer students through our Summer Student Research Program (HLI-SSRP), the largest number of summer students hosted by the Centre in one summer.

About the HLI-SSRP: Throughout the year, numerous undergraduate students are trained at the HLI through co-operative education programs, directed studies programs or various employment opportunities. Our busiest time of year is May to August when undergraduate students participate in our Summer Student Research Program. Students are mentored by a senior professor and an immediate supervisor, and gain hands-on basic science laboratory experience while working on a research project. Not only does each student learn, in detail, one or two technologies per 4-month or 8-month fellowship, but, more importantly for this formative period of development, students learn the critical logic of complementary technologies and when to employ them to experimental advantage.

In addition to technical and intellectual training, students learn to present their original work at the end-of-summer Student Research Day, a one day conference featuring both oral and poster presentations by student researchers.

2014 Summer Student Research Day August 12th, 2014 Award Winners

Dr. Bruce McManus Oral Presentation Awards		
Place	Recipient	HLI Supervisor
First	Jane Fisher	John Boyd
Second	Saheedat Sulaimon	Decheng Yang
Third	Julia Yang	Don Sin

Dr. Bruce McManus Poster Presentation Awards		
Place	Recipient	HLI Supervisor
First	Simon Adamson	Stephen van Eeden
Second	Jari Ullah	Tillie Hackett
Third	Ronald Monillas	Pat Camp & Chris Fjell



2014 HLI-SSRP Students at the Summer Student Research Day

HLI Hosts STMPREP Students from the Southern Methodist University, Dallas, Texas



STEM PREP students and program advisor at the HLI

The STMPREP Project at Southern Methodist University in Dallas Texas is a vehicle for producing the next generation of minority researchers in Science, Technology, Engineering,

Math (STEM) and Medicine. Thirteen students from The Physician Scientist Training Program (PSTP) division of the STEMPREP program spent their summer in the HLI labs working on individual research projects which they presented at the Summer Student Research Day on August 12th.

The HLI and St. Paul's Hospital's contribution to this unique program was featured on Global News in August 2014.

Watch @ <http://globalnews.ca/video/1503691/st-pauls-takes-on-interns>

Integrated and Mentored Pulmonary and Cardiovascular Training

In 2014, the IMPACT program provided funding to 14 postdoctoral fellows. 9 of these fellows are located at the University of British Columbia and 5 are located at the University of Manitoba

About IMPACT: The IMPACT program is a CIHR supported strategic training program at the University of British Columbia and the University of Manitoba. This program provides funding to high quality clinical and basic science post-doctoral fellows and gives these fellows the opportunity to join focused teams of researchers in unique multidisciplinary research groups. IMPACT is helping train the next generation of investigators capable of developing and translating knowledge from bench to bedside with the outcome of improved cardio-pulmonary health status of the Canadian population.

IMPACT's Impact on Training: Since the beginning of the IMPACT program in 2003, there have been 52 fellows, 40 of which have finished the program by the end of 2014. Where have the past IMPACT Fellows ended up?

- 19 have secured faculty positions in universities and medical schools
- 3 have entered medical school
- 1 has joined an international healthcare company as an Application Scientist
- 2 are working in industry
- 6 have obtained clinical or clinical scholar positions
- 9 are engaged in additional research or clinical training

HLI Weekly Seminars

The Centre for Heart Lung Innovation holds two weekly seminars, the Research in Progress Seminar Series and the HLI Friday Seminar Series, both of which run from September through June each year.

The HLI Friday Seminar series involves the invitation of experts in specific fields from the all over the world to give talks which encourage education and collaboration. Detailed information about the 2014 HLI Friday Seminars can be found in **Appendix C**.

The Research in Progress seminar series gives graduate students and post-doctoral fellows at the HLI the opportunity to present their ongoing research to other HLI researchers. The idea behind these seminars is for a critical, but supportive audience to give feedback at the conceptual or analytic stage of the trainees' research program. Detailed information about the 2014 Research in Progress Seminars can be found in **Appendix D**.

High School Science Week

For one week in Spring and Fall each year, high school students participate in the High School



High School Student Week participants in action

Science Week hosted at the HLI. A total of eight students per week are invited to participate in various laboratory sessions and seminars. This program is a very unique opportunity for students to get real hands-on lab biomedical experience that can help shape their university and career paths.

Students who participate in the High School Science Week are eligible to apply for the Peter D. Paré Scholarship, an eight week summer internship at the Centre for Heart Lung Innovation (valued at \$2,000).

The Peter D. Paré Scholarship recipient for 2014 was **Andy Hong**. Andy worked in Dr. Honglin Luo's lab on his project, Role of TAR-DNA Binding Protein-43 in Viral-Induced Cardiomyopathy and presented his research at Summer Student Research Day 2014.

Trainee Awards

Dr. Jeremy Hirota awarded the 2014 Killam Postdoctoral Fellow Research Prize



Dr. Jeremy Hirota after the Killam Award Ceremony at UBC

Established in 2011, the Killam Postdoctoral Fellow Research Prizes are awarded annually for excellence in research. Two prizes in the amount of \$5,000 each are awarded to full-time Postdoctoral Fellows at UBC in recognition of outstanding research and scholarly contributions while at UBC. Dr. Hirota was nominated by local, national, and international leaders in respiratory research for the award based on his contributions to respiratory mucosal immunology during his tenure at UBC as a postdoctoral fellow.

Read more @

https://www.hli.ubc.ca/news_events/news.php?user=Events&index=9&count=1&date=20141101&folder=

HLI Trainees win poster presentation awards at the 2014 IHLH Heart+Lung Health FEST



2014 FEST award winners with IHLH Co-Director Dr. Bruce McManus

The Heart +Lung FEST is an annual meet of the heart and lung research communities affiliated with the Institute of Heart Lung Health. FEST Guarantees engaging speakers, networking opportunities and thought provoking discussion with leaders in cardiovascular and pulmonary health. The following HLI trainees won awards in both categories:

Cardiovascular: Gabriel Fung, Seti Boroomand, Casey Shannon

Pulmonary: Marc Sze, Miranda Kirby

The following trainees and staff also received awards during 2014:

Last Name	Title	Awarding Body
Gabriel Fung	Graduate Award	Faculty of Medicine, UBC
Stephanie Warner	AllerGen NCE Travel Award	American Thoracic Society
Jasemine Yang	Travel award	American Thoracic Society
Anthony Tam	Institute of Gender Health Travel Award	Canadian Institutes of Health Research
Michele Schaeffer	UBC Doctoral Fellowship	The University of British Columbia
Michele Schaeffer	Respiratory Rehabilitation Fellowship	BC Lung Association
Dragos Vasilescu	Fellowship	Canadian Thoracic Society Research Committee of the Lung Association
Maen Obeidat	Travel	American Thoracic Society
Janet Xu	Summer Student Research Program Award	UBC Faculty of Medicine
Stephanie Sellers	Michael Smith Foreign Study Supplement	Canadian Institutes of Health Research
Stephanie Sellers	Experimental Biology Travel Award	American Society for Pharmacology And Experimental Therapeutics (ASPET)
Stephanie Sellers	Best Poster Award	Yale University and North American Vascular Biology Inflammation and Cardiovascular Remodeling Conference
Gurpreet Singhera	2nd place 2014 AllerGen Poster competition	Canadian Society for Allergy and Clinical Immunology

Trainee Career Paths

In 2014, fourteen of our Graduate Students and Postdoctoral Trainees finished their training at the HLI and moved on along impressive scientific career paths.

Trainee	Supervisor(s)	Start / End Date	Study / Postdoctoral Level	Present Position
Jeremy Hirota	Chris Carlsten/Don Sin	Jan 2012 - Jan 2014	Post-doctorate	Assistant Professor - University of British Columbia
Brad Quon	Don Sin	Jul 2012 - Jan 2014	Post-doctorate	Assistant Professor - University of British Columbia
Soo Jung Um	Don Sin	Sept 2012 - Jan 2014	Post-doctorate	Assistant Professor - A-Dong University, Korea
Josh Douglas	Keith Walley, John Boyd	Jul 2012 - Jul 2014	Post-doctorate	Assistant Professor - University of Calgary
Hussain Kanji	John Boyd	Jul 2012 - Jul 2014	Post-doctorate	Assistant Professor - University of British Columbia
Adam Linder	Jim Russell, John Boyd	Jan 2012 - Jan 2014	Post-doctorate	Assistant Professor - Lund University
Sarah Williams	David Granville	Dec 2013 - Jul 2014	Research Associate	Associate Scientist - Centre for Drug Research and Development
Xin Ye	DC Yang	Jul 2008 - Apr 2014	Doctorate	Research Scientist - Tekmira Pharmaceutical Corporation
Bo Lan	Chun Seow, Peter Pare	Sept 2012 - Dec 2014	Doctorate	Postdoctoral Fellow - Harvard School of Public Health
Dorota Stefanowicz	Tillie Hackett	May 2007 - Apr 2014	Doctorate	Postdoctoral Fellow - University of British Columbia
Stephanie Warner	Tillie Hackett	Jan 2007 - Jul 2014	Doctorate	Postdoctoral Fellow - University of Alberta
Hyun-Kyoung Koo	Tillie Hackett	Feb 2012 - May 2014	Master's Thesis	Research Technician - Centre for Heart Lung Innovation
Soheil Hajimohammadi	Tillie Hackett	May 2013 - May 2014	Master's Thesis	Biomedical Engineer Mechanical EIT - Stantec
Sijranke Post	Tillie Hackett	Sept 2013 - May 2014	Post-doctorate	PRA Health Sciences - The Netherlands
Tracee Wee	Tillie Hackett	May 2012 - May 2014	Master's Thesis	Clinical Research Coordinator, Department of Nephrology, UBC

Centre Operational Highlights

Laboratory Renovations 2014



In 2014, we made great progress with our third **Canada Foundation for Innovation (CFI) Award**, with the completion of a 5000 sq ft lab renovation and acquisition of major pieces of equipment that will revitalize our centre's facilities. New technology and

equipment upgrades have stimulated collaborations and resulted in an increase in core service use by internal and external users.

The HLI Operations Team created a training fund accessible for in-house training needs and progressed with renovation of the Atherosclerosis Specialty Lab (ASL), as well as plans to upgrade registry facilities. In 2015, we aim to complete CFI equipment acquisition and to continue upgrading a number of lab and trainee areas.

IT Services Updates

The HLI's Information Technology team was part of a review process this year and was also busy consolidating network communications for the McDonald Building and installing new servers for resources that included WordPress and Drupal. The team provided "R" Studio servers and training which were utilized, centre wide. The team put into production freezer & sample management with bar-coding, and Big Data Hadoop servers for a Proof of Concept linking of data sets. New registries including Mild and FH-Registries were brought online.

Registry Updates

The James Hogg Lung Registry, with HLI Advanced Computing and CFI funded infrastructure, developed a new electronic inventory management system to allow barcoding and digitalization of the lung tissue resources at the HLI for all existing and prospective users. The Lung registry is also working with the St. Paul's Hospital Foundation and the Providence Health Care Research Institute to develop new state-of-the-art sample storage facilities to ensure sustainability of the registry facilities and ensure continued access by investigators worldwide (230 independent projects) to our extensive registry built over the last 30 years.

The Cardiovascular Tissue Registry continues to modernize its inventory management and record keeping, with the help of the HLI IT team. They have also continued or initiated research collaborations with the Francis, Granville, Bernatchez, Boyd, and Sin laboratories, and with PROOF, UBC Pathology, BC Children's Hospital, Windsor University, Stanford University, and the University of Florida.

Equipment Updates

The **Molecular Phenotyping Core** has added Nanostring nCounter® capabilities and a new hematology analyzer to its services repertoire. Our Beckman Coulter Flow Cytometry Facility with bio-containment continues to be utilized for a wide variety of projects.

Histology upgraded with a new Leica Cryostat, Tissue Processor and Autostainer thanks to CFI funding.

Cellular Imaging & Biophysics has been actively cataloguing and archiving data and facility space is being prepared for the arrival of our new Nikon Micro-CT in 2015.

GEM (Preclinical Services) staff contributed to UBC Committees on Facility Management and Policy Development while acquiring new CFI funded–DSI Telemetry equipment. UBC and CCAC facility and training standards were met or exceeded in 2014.

Digital Slide Scanning Services continues to attract more users and support international research programs.

Laboratory Safety in 2014

The HLI Health, Safety and Environment Team received a UBC Safety Award from UBC Risk Management Services (RMS) for their achievements. Only 3 awards were given throughout the entire UBC system and HLI was the only research/science group to be acknowledged.

The safety award is given to a local Health and Safety Committee for achieving and maintaining excellence under challenging conditions (high risk activity, aging facilities, etc.) Over the past five years, HLI has consistently provided quality resources and impactful initiatives that have improved health and safety for all Faculty and Staff. UBC RMS was thoroughly impressed by the level of activity and the style of engagement achieved at HLI by the guidance of the HS&E Team.



The HLI Health Safety and Environment Team Displaying their 2014 UBC Safety Award

Maintenance and Equipment Management Services

The Maintenance and Equipment Management Team continued with a busy schedule of overseeing the Cold Storage Program, equipment service and repair, answering over 80 maintenance service ticket requests and working with renovation project management.

Clinical Research Team

Clinical Research was a new service initiated at the HLI in 2014. The clinical research team provided assistance with ethics applications and submissions and with clinical research project management activities.

Centre for Heart Lung Innovation

What we can do for you



Centre for
Heart Lung Innovation
UBC and St. Paul's Hospital

The Centre for Heart Lung Innovation technicians have extensive training and experience to ensure that results are consistent and reliable with minimal turnover time.

Some of our services, equipment and tools are:

HLI Cardiovascular and Lung Tissue Registries

- Tissue and sample archiving
- Gross and microscopic specimen images
- Gross specimen photography

Cellular Imaging & Biophysics

- Automatic tissue processing capabilities
- Bioscope Atomic Force Microscope with Nanoscope IIIa Controller
- Pelco BioWave Microwave Processor
- Image processing work stations
- Wide Field Fluorescence Microscope
- Leica Upright Fluorescence Microscope with Fast Confocal Scanner and CCD camera
- Leica Inverted Fluorescence microscope with Confocal Scanner
- Tunable Ultra-short pulse Infrared Laser for Two-Photon Excitation microscopy

Imaging Services

- Digital slide scanning
- Poster and banner printing

Histology

- Processing and embedding
- Staining and Sectioning
- Immunohistochemistry
- Immuno-peroxidase
- Immuno-alkaline phosphatase
- FITC immunofluorescence
- TUNEL staining
- in situ Hybridization (ISH)

Molecular Phenotyping

- BeckmanCoulter Astrios EQ® high speed cell sorter
- Laser Capture Microdissection Pixcell II
- Siemens Advia 2120 Hematology analyzer
- BeckmanCoulter Gallios® Flow Cytometer
- Miltenyi AutoMACS
- ABI ViiA 7 Real-Time PCR
- Luminex IS100 XYP
- NanoString nCounter Analysis system
- Biobanking services

Preclinical Services

- Available for contract or collaborative animal research projects
- Flexivent Lung Function system and DSI Telemetry
- Echocardiography
- Level 2 Containment suite
- Colony management services
- Micro surgical services

Clinical Research

- Available for consultation and project management
- Assistance with ethics applications submissions

Information Technology

- Advanced computing services
- Hosting of physical servers, virtual servers
- Secured and controlled access
- Long term storage
- Custom database and data management services

For more information on our research capabilities and services, please contact:
Claire Smits, Laboratory Operations Leader
t: 604.806.8852 | e: claire.smits@hli.ubc.ca

Facility Users

Thirty Scientists at the HLI and 705 external users (table below) access the Centre’s Technology Cores each year to contribute to external national and international research projects. 96% of users are external to the HLI, 74% of users are external to UBC and 54% of users are external to British Columbia.

Table 1. Geographic distribution and number of facility users in the past calendar year

Geographic Distribution of Users	Total number of users (in 2014)
From host institution (UBC)	181
From local institutions/organizations	140
From Provinces (excluding users at Host Institution)	
From Alberta	15
From British Columbia	5
From Manitoba	14
From New Brunswick	0
From Newfoundland & Labrador	1
From Northwest Territories, Nunavut and Yukon	0
From Nova Scotia	5
From Ontario	43
From Prince Edward Island	0
From Quebec	48
From Saskatchewan	11
From outside Canada (USA and international)	242
TOTAL	705

NOTE: The numbers above reflect ACTUAL EXTERNAL USERS of the facility/services and DO NOT reflect facility usage by HLI scientists.

HLI Event Highlights

Inauguration of Renovated Laboratory Space and Public Tour

In August 2011 we hosted a formal inaugural function for our newly renovated laboratory space. The HLI laboratories also threw their doors open to interested members of the public and donors to the renovation project, for tours to showcase our research.



HLI Associate Director Dr. Gordon Francis Cutting the Ribbon



HLI Trainee Dr. Loubna Akhabir Conducting a Lab Tour

Science Expo BC

Science Expo is the largest student-run, non-profit organization that connects high school students to the STEM community across Canada. The organization has a network of 100 active leaders, reaching 120 high schools (approximately 60,000 students). The theme, in 2014, was the prismatic nature of the STEM fields, with the goal to show youth how much science has impacted the world.

At the Science Expo 2014, the HLI organized a display booth, led by our Education Coordinator Jennifer Myers, and two workshops of 90 minutes each for groups of 30 students at a time. The primary goal of these workshops was to allow students to take a more proactive approach in their learning by interacting with experienced researchers.

Workshop 1: Journey into the human Lung: How does it function in your body?

Volunteer Leaders: Drs. Tillie Hackett & Dragos Vasilescu



Dr. Vasilescu with a student at the Lung Session

The aim of this session was to provide a true visual journey into the micro structures of the human lung by using some of today's top-of-the-line imaging technology. After a brief intro to the lung architecture and basic functions, students got to test their own lung function using spirometry, a standard clinical device for measuring lung function. At the end we presented samples of clinical evidence on how the lungs' ability to function is decreased in common lung disease such as asthma and COPD.

Workshop 2: The Human Heart: Structure and Function

Volunteer Leaders: Dr. Mike Seidman, Stephanie Sellers, Pat Walley



Students were exposed to heart structure and function. Volunteers had an ultrasound performed on their heart. A series of cases was presented with both ultrasound and pathological specimens, including an opportunity for students to actually hold and examine donor hearts from our cardiovascular registry up close.

Dr. Seidman demonstrating real heart tissues at the Heart Session

Bring Your Child to Work Day



HLI Members' children geared up for the labs

Each year the HLI invites its members to participate in Take Your Child to Work Day. Volunteers from the Centre put together a day's worth of lab activities to show the children the inner workings of a biomedical research laboratory. In 2014, the Centre had 11 students attend this exciting day of activities.

UBC and BC Life Sciences China Trade Delegates Tour



The HLI hosted a UBC and BC Life Sciences' China Trade Delegates' Tour of the HLI Laboratories and the St. Paul's Intensive Care Unit in November 2014. At this event we invited the delegates to an introductory talk and laboratory tours.

HLI in the News

In addition to other HLI achievements that made the news in 2014 (listed in other sections of this report), the HLI and its members continued to make valuable contributions to healthcare and the communication of healthcare information to the public.

HLI Cardiac Registry on Global News (Feb 27, 2014): Donor comes to HLI to visit his heart



Tyler Smith (right) with Dr. Michael Seidman (left), Acting Director of the HLI Cardiovascular registry

Tyler Smith from Revelstoke BC was diagnosed with Hypertrophic Cardiomyopathy (HCM) in 2010. This caused his heart to grow twice the size of a normal human heart. He received a heart transplant and donated his own heart for research. His diseased heart is now part of the HLI's Cardiovascular registry along with 3,000 others collected over 28 years.

Watch: Human tissue registry at St. Paul's aids medical research @

<http://globalnews.ca/news/1178198/watch-human-tissue-registry-at-st-pauls-aids-medical-research/>

Portable Ultrasound Technology: Improving the speed and accuracy of care at St. Paul's Hospital

St. Paul's hospital is the first in Canada to use new palm-top ultrasound devices which are helping expedite the diagnosis and treatment of more patients with life-threatening conditions.

The HLI's Dr. John Boyd, a critical care physician, has had a major role in the testing, adoption and implementation of this technology at the hospital. Starting in 2011, Boyd and a team of researchers conducted a two-year study at St. Paul's into the use of hand-held ultrasounds, which



Dr. Boyd talking about hand held ultrasound machines on Global News

produce electronic images of a patient's internal organs. They found significant improvements in the accuracy of diagnosing heart and lung conditions and prescribing treatments to patients.

10 per-cent more patients are recovering thanks to the use of these devices.

Read More @ <http://www.helpstpauls.com/news/publications/#breakthroughs>

Watch @ <http://globalnews.ca/video/1431804/handheld-ultrasounds>

The hand-held ultrasounds at St. Paul's are currently being used by trained physicians and senior residents. St. Paul's has also taught the use of this device to nine fellows, who now practice at other hospitals. In his interviews with St. Paul's Foundation's Promise Magazine and Global News Dr. Boyd said that he sees training on the use of the devices expanding into medical schools, residencies and fellowships in the near future.

HLI's Dr. Delbert Dorscheid interviewed by CTV Morning Live



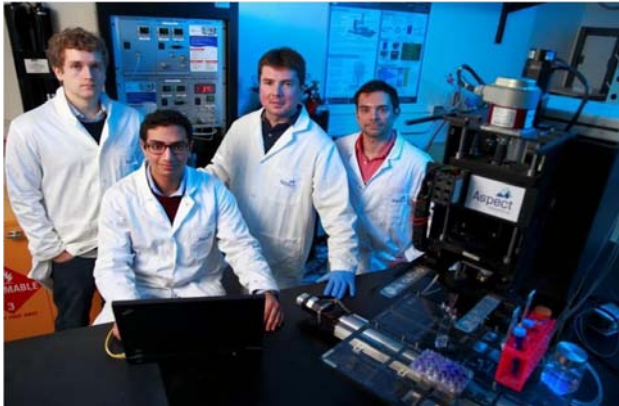
In light of the latest global projection that the number of people with asthma globally is likely to increase by 100 million over the next decade, Dr. Del Dorscheid who is the Director of the Asthma Clinic at St Paul's hospital was interviewed by CTV. Dr. Dorscheid answered questions about the general causes, potential allergens, and symptoms of asthma in the interview.

Watch @: <http://www.ctvnews.ca/video?clipId=359186&binId=1.810401&playlistPageNum=1>

Knowledge Translation

The HLI currently hosts four UBC Spin-off ventures including the PROOF Centre for Excellence, ViDa Therapeutics Inc., Aspect Biosystems Ltd., and the 2014 start-up, Cyon Therapeutics.

Aspect Biosystems : Human Tissues on Demand for Faster Drug



Simon Beyer (left), Tamer Mohamed, Konrad Walus, and HLI's Sam Wadsworth (right) with the Aspect Biosystems 3-D tissue printer

Facilitated by Entrepreneurship@UBC, Dr. Sam Wadsworth, leading cell biologist at the HLI, co-founded Aspect Biosystems Ltd. in November, 2013 with Dr. Konrad Walus' research group. Dr. Wadsworth has been developing state-of-the-art 3D human tissue models for the past six years with a focus on the human airway.

In September 2014, Aspect Biosystems won 2nd Place and \$55,000 at the BC Council for Innovation's New Ventures Competition, among 125+ competitors.

Read more @: <http://www.bcic.ca/pdfs/UBC%20technology%20.pdf>

Cyon Therapeutics: Better Outcomes in Sepsis

Driven by the knowledge that better outcomes in sepsis are possible, Cyon Therapeutics Inc. was formed in 2014 to make this a reality. Led by a team of HLI scientists and critical care physicians, Drs. Keith Walley, Jim Russell and John Boyd, and supported by 2 CEOs, the goal of the spin-off is to bring a novel treatment platform to sepsis. Through their groundbreaking scientific discoveries the team is developing the means to boost the body's natural ability to clear infectious toxins from the bloodstream. (Source: <http://cyontherapeutics.com/about>)

Partnerships and Acknowledgements

The HLI is grateful to our funding partners: Canada Foundation for Innovation, British Columbia Knowledge Development Fund, Providence Health Care, University of British Columbia, Heart and Stroke Foundation of BC and Yukon, BC Lung Association, the St Paul's Hospital Foundation and many vendors and industrial collaborators, for their crucial support of our ongoing programs.

We wish to thank our current partners:

BC Knowledge Development Fund
BC Lung Association
Canada Foundation for Innovation
Canadian Institutes of Health Research
Canada Research Chairs
Genome British Columbia
Genome Canada
GlaxoSmithKline
Heart and Stroke Foundation of BC and Yukon
Merck Frosst Canada
Michael Smith Foundation for Health Research
National Institutes of Health (USA)
National Sanitarium Association
Novartis
MITACS
Providence Health Care, St. Paul's Hospital

We are grateful to the following individuals for their assistance in the creation of this report: Richa Anand, Yuliya Shapova, Shemim Manji, Jane Ebreo, Claire Smits, Jennifer Myers, Kelly Ceron, Chris Robinson, Jo-Lynn Mervyn, Gwen Sin, Dean English, Dr. Keith Walley and all the HLI Principal investigators.

Supporting our Fight against Heart and Lung Diseases

Heart and lung diseases combined are still the world's number one cause of death and disability. Help us win this fight.

The Centre for Heart Lung Innovation has been extremely successful at attracting infrastructure grants and government research dollars. But attracting funds to allow us to retain our expertly trained staff and purchase new equipment remains a challenge. We actively seek interest and donation from private and individual donors whose interests are in alignment with our research, with the help of the following organizations.



St. Paul's Foundation

178 – 1081 Burrard Street,
Vancouver, BC V6Z 1Y6

Phone (for residents of Metro Vancouver): 604-682-8206

Phone (toll-free number for residents of rest of BC): 1-800-720-2983

sphfoundation@providencehealth.bc.ca / www.helpstpauls.com



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University of British Columbia

Development and Alumni Engagement

500 - 5950 University Blvd

Vancouver, BC Canada V6T 1Z3

Tel 604 822 8900

info@startanevolution.ubc.ca

<https://startanevolution.ubc.ca/category/projects-by-faculty/faculty-of-medicine>

Appendices

Appendix A: Centre for Heart Lung Innovation Grants, Contracts, Clinical Trials and Agreements April 2014–to February 28, 2015

PI Name	Funding Agency	Amount (\$ CAD)	Project Title	Grant Type
Bernatchez, Pascal	CIHR	15,000	Cellular mechanisms underlying vascular dysfunction and aortic aneurysm in Marfan syndrome	Operating
Boyd, John	National Sanitarium Association	200,000	Cell free RNA in plasma: disease-specific transcriptomes will provide diagnostic molecular signatures to differentiate severe pneumonia from congestive heart failure	Faculty Salary (Scholarship)
Boyd, John	CIHR	33,333	SON RIS: Sepsis Outcomes National Registry to improve survival	Operating
Boyd, John	Trius Therapeutics Inc	6,248	A Phase 3 Randomized Double-Blind Study Comparing TR701 FA and Linezolid in Ventilated Gram-positive Nosocomial Pneumonia (TR701-132)	Other
Boyd, John	Cyon Therapeutics Inc.	75,000	PCSK9 Inhibitors for the Treatment of Sepsis and Organ Failure	Other
Camp, Pat	UBC Department of Physical Therapy	25,000	Safe and effective prescription of exercise in acute exacerbations of chronic obstructive pulmonary disease: a consensus of experts	Operating
Camp, Pat	Canada Foundation for Innovation	3,450	Optimizing physical activity to improve health outcomes in chronic obstructive pulmonary disease: a respiratory rehabilitation-based approach	Equipment/Infrastructure
Camp, Pat	Canada Foundation for Innovation	7,500	Optimizing physical activity to improve health outcomes in chronic obstructive pulmonary disease: a respiratory rehabilitation-based approach	Equipment/Infrastructure
Coxson, Harvey O.	CIHR	29,963	Thoracic Imaging Network of Canada (TIN_CAN)	Operating

Daley, Denise	CIHR	250,000	Epigenetic mechanisms for the development of asthma	Operating
Daley, Denise	Genome British Columbia	50,000	Epigenetic Mechanisms for the Development of Asthma	Operating
Daley, Denise	CIHR	20,000	Get-facts: Genetics, environment and therapies: Food allergy clinical tolerance studies	Operating
Dorscheid, Delbert R.	National Sanitarium Association	186,518	Bio-airway research offering new concepts in health (BRONCH) Partnership.	Operating
Dorscheid, Delbert R.	Novartis Pharmaceuticals Canada Inc.	6,630	A Canadian, 12-month, multicentre, open-label study evaluating the oral corticosteroid sparing effect of Xolair* (omalizumab) therapy in inadequately-controlled moderate to severe allergic asthma patients	Other
Dorscheid, Delbert R.	CIHR	375	OSCILLATE Knowledge Translation – an Audit of ARDS Management	Other
Dorscheid, Delbert R.	AstraZeneca Canada Inc.	9,066	A Multicenter, Randomized, Double-blind, Parallel Group, Placebo-controlled, Phase 3 Efficacy and Safety Study of Benralizumab (MEDI-563) to Reduce Oral Corticosteroid Use in Patients with Uncontrolled Asthma on High Dose Inhaled Corticosteroids	Other
Dorscheid, Delbert R.	Novartis Pharmaceuticals Canada Inc.	3,000	“REal-Life” Effectiveness and safety of omalizumab in patients with severe allergic asthma: The Latin American and Canadian experience (RELIEF)	Other
Francis, Gordon A.	Canada Foundation for Innovation	3,754	Identifying mechanisms of intracellular cholesterol transport and apolipoprotein A-I-cell interactions necessary to increase formation of cardioprotective high density lipoproteins	Operating
Francis, Gordon A.	CIHR	132,528	The role of lysosomal cholesterol in the regulation of ABCA1 expression and HDL formation	Operating
Francis, Gordon A.	CIHR	129,841	Cellular lipid efflux and HDL formation	Operating

Francis, Gordon A.	Canada Foundation for Innovation	171,498	Molecules to human: enhanced phenotyping for discovery, prevention, & treatment of heart, lung, & blood vessel disease	Operating
Francis, Gordon A.	Canada Foundation for Innovation	84,623	Molecules to human: enhanced phenotyping for discovery, prevention, & treatment of heart, lung, & blood vessel disease	Operating
Francis, Gordon A.	St. Paul's Hospital Foundation	885,000	Molecules to human: enhanced phenotyping for discovery, prevention, & treatment of heart, lung, & blood vessel disease	Operating
Frohlich, Jiri	Merck Canada Inc.	710	A 1-Year, Worldwide, multicenter, Double-Blind, Randomized, Parallel, Placebo-Controlled Study to Assess the Efficacy and Tolerability of Anacetrapib When Added to Ongoing Statin Therapy With or Without Other Lipid Modifying Medication(s)	Operating
Frohlich, Jiri	AMGEN Canada Inc.	19,898	A Multicentre, Controlled, Open-label Extension (OLE) Study to Assess the Long-term Safety and Efficacy of AMG 145.	Other
Frohlich, Jiri	Sunovion Pharmaceuticals Canada Inc.	1,500	Healthy Heart Program	Operating
Frohlich, Jiri	McGill University Health Centre Research Institute	30,000	Creation and implementation of a Registry for Familial Hypercholesterolemia	Other
Frohlich, Jiri	Pfizer Canada Inc.	11,000	A 52 Week, Phase 3 Double-Blind, Randomized, Placebo-Controlled, Parallel-Group Study to Assess the Efficacy, Safety and Tolerability of PF-04950615 in Subjects With Heterozygous Familial Hypercholesterolemia	Other
Granville, David J.	viDA Therapeutics Inc.	122,997	Research and Development of Granzyme B Inhibitors	Other
Granville, David J.	CIHR	52,072	Granzyme B in abdominal aortic aneurysm	Operating

Granville, David J.	CIHR	160,950	Topical Granzyme B inhibitor research and development	Operating
Granville, David J.	Canadian Diabetes Association	100,000	Granzyme B in non-healing diabetic skin ulcer pathogenesis	Operating
Granville, David J.	Province of British Columbia	7,500	The effect of Granzyme B on photoaging	Fellowship (Non-Faculty)
Granville, David J.	Industry Canada	15,000	The effect of Granzyme B on photoaging	Fellowship (Non-Faculty)
Granville, David J.	viDA Therapeutics Inc.	7,500	The effect of Granzyme B on photoaging	Fellowship (Non-Faculty)
Granville, David J.	Rick Hansen Institute	45,000	Granzyme B Inhibition to Accelerate Pressure Ulcer Wound Closure and Reduce Recurrence	Operating
Guenette, Jordan A.	Providence Health Care Research Institute (PHCRI)	11,420	Research Start-up Funds from PHCRI, UBC Dept of Physical Therapy and JHRC. and Drs. Donald Sin, Peter Pare & Bruce McManus	Other
Guenette, Jordan A.	Natural Sciences and Engineering Research Council of Canada (NSERC)	30,000	Respiratory and locomotor muscle blood flow regulation during physiological stress	Operating
Guenette, Jordan A.	British Columbia Lung Association	30,000	Mechanisms of exertional dyspnea in fibrotic interstitial lung disease	Operating
Guenette, Jordan A.	Canada Foundation for Innovation	36,968	Sex, gender and cardio-respiratory limitations during exercise in health and chronic lung disease	Equipment/In frastructure
Guenette, Jordan A.	Canada Foundation for Innovation	27,847	Sex, gender and cardio-respiratory limitations during exercise in health and chronic lung disease	Equipment/In frastructure
Guenette, Jordan A.	Providence Health Care Research Institute (PHCRI)	7,683	Sex, gender and cardio-respiratory limitations during exercise in health and chronic lung disease	Equipment/In frastructure
Guenette, Jordan A.	Canada Foundation for Innovation	7,500	Sex, gender and cardio-respiratory limitations during exercise in health and chronic lung disease	Equipment/In frastructure

Guenette, Jordan A.	British Columbia Lung Association	12,500	Physiological mechanisms of exertional dyspnea in patients with fibrotic interstitial lung disease	Fellowship (Non-Faculty)
Hackett, Tillie Louise	CIHR	139,079	Resetting epithelial differentiation as a novel therapeutic approach to treating asthma	Operating
Hackett, Tillie Louise	British Columbia Lung Association	30,000	Molecular determinants of small airway obstruction in COPD	Operating
Hackett, Tillie Louise	CIHR	98,568	Molecular determinants of small airway obstruction in COPD	Operating
Hogg, James C.	Canadian Lung Association	45,000	Phenotyping small airway disease in patients with COPD	Fellowship (Non-Faculty)
Hogg, James C.	National Institutes of Health	78,737	Parametric response mapping in COPD	Operating
Hogg, James C.	Grifols Inc.	114,398	The Mechanism of Lung Tissue Destruction in Alpha One Anti trypsin Deficiency	Operating
Luo, Honglin	CIHR	108,701	Cleavage of serum response factor in viral cardiomyopathy	Operating
Luo, Honglin	CIHR	75,000	Interaction between REGgamma and p53 in heart infectious disease	Operating
Man, S.F. Paul	CIHR	126,398	Emphysema and inflamm-aging in HIV-seropositive patients	Operating
Man, S.F. Paul	Michael Smith Foundation for Health Research	49,625	Investigation of aging-related pathways associated with an increased risk of emphysema in HIV-infected patients	Fellowship (Non-Faculty)
McManus, Bruce M.	CIHR	66,839	Dysregulated STAT-3 activation underlies lung fibroblast heterogeneity: Implications for idiopathic pulmonary fibrosis.	Operating
McManus, Bruce M.	PROOF Centre of Excellence	560,673	Clinical implementation of diagnostic biomarker assays in heart and kidney transplantation	Operating
McManus, Bruce M.	AstraZeneca AB	446,177	Prognostic Biomarkers of Chronic Kidney Disease Progression	Other
Paré, Peter D.	National Institutes of Health	132,271	Integrative omics to discover molecular determinants of COPD	Operating

Paré, Peter D.	Michael Smith Foundation for Health Research	41,500	Unraveling the molecular mechanisms for variation in lung function	Fellowship (Non-Faculty)
Ryerson, Chris	Gilead Sciences Inc.	45,371	A Phase 2, Randomized, Double-Blind, Placebo-Controlled, Multi-Center Study to Assess the Efficacy and Safety of GS-6624 in Subjects with Idiopathic Pulmonary Fibrosis (RAINIER)	Other
Ryerson, Chris	Boehringer Ingelheim (Canada) Ltd.	77,016	A double blind randomized placebo controlled trial evaluating the effect of oral nintedanib 150 mg twice daily on high resolution computerized tomography quantitative lung fibrosis score, lung function, six minute walk test distance and St.	Other
Ryerson, Chris	InterMune Inc.	9,600	UBC Interstitial Lung Disease Summer Studentship	Other
Sandford, Andrew J.	AllerGen - Networks of Centres of Excellence (NCE)	6,600	Alternate Theme Leader/ Theme Coordination Support: Theme I - Genes and early life determinates	Operating
Schellenberg, Robert	Janssen Inc.	5,598	A Phase 2a, Randomized, Double-Blind, Placebo-Controlled, Multicenter, Parallel Group Study of JNJ-38518168 in Symptomatic Adult Subjects with Uncontrolled, Persistent Asthma	Other
Seow, Chun	CIHR	134,450	Mechanical properties of human airway smooth muscle in vitro and in vivo: Normal structure and function and abnormalities in asthma	Operating
Seow, Chun	Natural Sciences and Engineering Research Council of Canada (NSERC)	47,000	Visualization and assessment of physical and chemical interactions among smooth muscle proteins	Operating
Seow, Chun	CIHR	120,339	Plasticity in airway smooth muscle	Operating
Sin, Don	CIHR	138,500	Why are women at increased risk of COPD?	Operating

Sin, Don	Boehringer Ingelheim (Canada) Ltd.	19,007	A randomised, double-blind, parallel group study to assess the efficacy and safety of 52 weeks of once daily treatment of orally inhaled tiotropium + olodaterol fixed dose combination (2.5 µg / 5 and 5 µg / 5 µg) (delivered by the Respimat®)	Operating
Sin, Don	CIHR	123,393	Inhaled corticosteroids as risk factors for severe viral infections in asthmatics: lessons from the H1N1 epidemic	Operating
Sin, Don	Omnitura Therapeutics Inc.	16,148	A Phase I, Open-Label, Multiple Dose Study to Assess the Safety, Tolerability and Pharmacokinetics of Oral Aneustat (OMN54) Administered on a Daily Oral Regimen in Patients with Advanced Cancer and Lymphomas	Operating
Sin, Don	St. Paul's Hospital Foundation	208,025	Clinical implementation and outcomes evaluation of blood-based biomarkers for COPD management	Operating
Sin, Don	Providence Health Care Research Institute (PHCRI)	50,000	Clinical implementation and outcomes evaluation of blood-based biomarkers for COPD management	Operating
Sin, Don	Genome British Columbia	516,985	Clinical implementation and outcomes evaluation of blood-based biomarkers for COPD management	Operating
Sin, Don	CIHR	250,000	Clinical implementation and outcomes evaluation of blood-based biomarkers for COPD management	Operating
Sin, Don	Institut universitaire de cardiologie et de pneumologie de Québec	1,000	The RAMBO trial: Impact of Roflumilast on visceral adiposity and metabolic profile in chronic obstructive lung disease	Other
Sin, Don	Simon Fraser University	29,054	Services provided by Dr. Don Sin's Lab	Other
Sin, Don	AstraZeneca Canada Inc.	7,259	A randomised, double-blind, chronic dosing (56 week), placebo-controlled, parallel group, multicentre, phase III study to evaluate the efficacy and safety of 2 doses of benralizumab (MEDI-563) in patients with moderate to very severe Chronic Obstructive Pulmonary Disease	Other

Sin, Don	British Columbia Knowledge Development Fund (BCKDF)	74,476	Creating an infrastructure to better understand COPD as a systemic disease	Operating
Sin, Don	Canada Foundation for Innovation	74,476	Creating an infrastructure to better understand COPD as a systemic disease	Operating
Sin, Don	Providence Health Care Research Institute (PHCRI)	40,515	Creating an infrastructure to better understand COPD as a systemic disease	Operating
Sin, Don	CIHR	240,000	The Canadian Respiratory Research Network: Origin and Progression of Airway Disease	Other
Sin, Don	Mayo Clinic	42,762	Phase IIB trial of myo-inositol in smokers with bronchial dysplasia	Operating
Tan-Hogg, Wan C.	CIHR	46,480	The Canadian Cohort Obstructive Lung Diseases (CanCOLD)	Other
Tebbutt, Scott	AllerGen - Networks of Centres of Excellence (NCE)	7,500	Allergic asthma functional and pharmacogenomics for early and late phase response biomarkers	Operating
Tebbutt, Scott	CIHR	5,000	Molecular determinants of early and dual asthmatic responses	Fellowship (Non-Faculty)
Tebbutt, Scott	Adiga Life Sciences Inc.	5,000	Blood RNA signatures of usual allergen challenge	Other
Van Eeden, Stephanus F.	British Columbia Lung Association	30,000	The impact of HMG-CoA reductase inhibitors on lung inflammation in COPD	Operating
Van Eeden, Stephanus F.	CIHR	40,000	Novel mechanisms to control lung inflammation by clearance of air pollutants via lung cells	Fellowship (Non-Faculty)
Van Eeden, Stephanus F.	CIHR	5,000	Novel mechanisms to control lung inflammation by clearance of air pollutants via lung cells	Fellowship (Non-Faculty)
Van Eeden, Stephanus F.	Simon Fraser University	9,658	BM Stimulation	Other
Walley, Keith	CIHR	107,767	Toll-like receptor anti-inflammatory response in cardiac inflammatory states	Operating

Walley, Keith	CIHR	64,816	Mechanism of improved cardiovascular function and survival during sepsis when PCSK9 function is decreased	Operating
Wilcox, Pearce G.	Vertex Pharmaceuticals Inc.	5,330	Clinical and Economic Burden of Illness Study of Cystic Fibrosis Patients Homozygous for F508del Mutation – Retrospective Chart Review Study	Other
Yang, Decheng	CIHR	131,064	MicroRNA-mediated gene regulation as a determinant of tissue tropism and pathogenesis in coxsackievirus infection	Operating
Yang, Decheng	CIHR	124,640	IRES-dependent translation of heat shock proteins in the pathogenesis of coxsackievirus myocarditis	Operating

Appendix B: Centre for Heart Lung Innovation Publications for 2014

1. Agusti A, Sin DD. Biomarkers in COPD. *Clinics in chest medicine* 2014;35:131-141.

2. Akhabor L, Berube JC, Bosse Y, Laviolette M, Hao K, Nickle DC, Timens W, Sin DD, Pare PD, Postma DS, Sandford AJ. Lung expression quantitative trait loci data set identifies important functional polymorphisms in the asthma-associated IL1RL1 region. *The Journal of allergy and clinical immunology* 2014; 134:729-731.

3. Alexis NE, Carlsten C. Interplay of air pollution and asthma immunopathogenesis: a focused review of diesel exhaust and ozone. *International immunopharmacology* 2014;23:347-355.

4. Allahverdian S, Chehroudi AC, McManus BM, Abraham T, Francis GA. Contribution of Intimal Smooth Muscle Cells to Cholesterol Accumulation and Macrophage-Like Cells in Human Atherosclerosis. *Circulation* 2014.

5. Allard MD, Saeedi R, Yousefi M, Frohlich J. Risk stratification of patients with familial hypercholesterolemia in a multi-ethnic cohort. *Lipids in health and disease* 2014;13:65.

6. Anantasit N, Boyd JH, Walley KR, Russell JA. Serious Adverse Events Associated With Vasopressin and Norepinephrine Infusion in Septic Shock. *Critical care medicine* 2014.

7. Anderson TJ, Gregoire J, Hegele RA, Couture P, Mancini GB, McPherson R, Francis GA, Poirier P, Lau DC, Grover S, Genest J, Jr., Carpentier AC, Dufour R, Gupta M, Ward R, Leiter LA, Lonn E, Ng DS, Pearson GJ, Yates GM, Stone JA, Ur E. Are the ACC/AHA Guidelines on the Treatment of Blood Cholesterol a Game Changer? A Perspective From the Canadian Cardiovascular Society Dyslipidemia Panel. *The Canadian journal of cardiology* 2014.

8. Apperley S, Park HY, Holmes DT, Man SF, Tashkin D, Wise RA, Connett JE, Sin DD. Serum Bilirubin and Disease Progression in Mild Chronic Obstructive Pulmonary Disease. *Chest* 2014.

9. Arntfield R, Millington S, Ainsworth C, Arora R, Boyd J, Finlayson G, Gallagher W, Gebhardt C, Goffi A, Hockman E, Kirkpatrick A, McDermid R, Waechter J, Wong N, Zavalkoff S, Beaulieu Y. Canadian recommendations for critical care ultrasound training and competency. *Canadian respiratory journal : journal of the Canadian Thoracic Society* 2014;21:341-345.

10. Assayag D, Lubin M, Lee JS, King TE, Collard HR, Ryerson CJ. Predictors of mortality in rheumatoid arthritis-related interstitial lung disease. *Respirology* 2014;19:493-500.

11. Barjaktarevic I, Springmeyer S, Gonzalez X, Sirokman W, Coxson HO, Cooper CB. Diffusing Capacity for Carbon Monoxide Correlates Best with Tissue Volume from Quantitative Ct Analysis. *Chest* 2014.

12. Batool S, O'Donnell M, Sharma M, Islam S, Dagenais GR, Poirier P, Lear SA, Wielgosz A, Teo K, Stotts G, McCreary CR, Frayne R, DeJesus J, Rangarajan S, Yusuf S, Smith EE, Investigators PS. Incidental magnetic resonance diffusion-weighted imaging-positive lesions are rare in

neurologically asymptomatic community-dwelling adults. *Stroke; a journal of cerebral circulation* 2014;45:2115-2117.

13. Becker AB, Pare PD. Wheezing in young children: WAITing for pharmacogenomics? *The Lancet Respiratory medicine* 2014;2:776-777.

14. Biagioni BJ, Pui MM, Fung E, Wong S, Hosseini A, Dybuncio A, Alexis NE, Carlsten C. Sputum adiponectin as a marker for western red cedar asthma. *The Journal of allergy and clinical immunology* 2014;134:1446-1448 e1445.

15. Boulet LP, Pare PD. History of respiratory medicine in Canada: A new Canadian Respiratory Journal series. *Canadian respiratory journal : journal of the Canadian Thoracic Society* 2014;21:276.

16. Boyd JH, Russell JA, Fjell CD. The Meta-Genome of Sepsis: Host Genetics, Pathogens and the Acute Immune Response. *Journal of innate immunity* 2014:272-283.

17. Brandsma CA, van den Berge M, Postma DS, Jonker MR, Brouwer S, Pare PD, Sin DD, Bosse Y, Laviolette M, Karjalainen J, Fehrmann RS, Nickle DC, Hao K, Spanjer AI, Timens W, Franke L. A large lung gene expression study identifying fibulin-5 as a novel player in tissue repair in COPD. *Thorax* 2014.

18. Brunham LR, Kang MH, Van Karnebeek C, Sadananda SN, Collins JA, Zhang LH, Sayson B, Miao F, Stockler S, Frohlich J, Cassiman D, Rabkin SW, Hayden MR. Clinical, Biochemical, and Molecular Characterization of Novel Mutations in ABCA1 in Families with Tangier Disease. *JIMD reports* 2014.

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Appendix C - Centre for Heart Lung Innovation 2014 Friday Seminar

Centre for Heart Lung Innovation
 Friday Seminar Series 2014
 Gourlay Conference Room, Fridays, 11:30 am –12:30 pm

2014				
Month	Day	Speaker	Host	Title of Lecture
January	10	Steven Georas, MD Professor of Medicine and of Environmental Medicine Director, Division of Pulmonary and Critical Care Medicine University of Rochester Medical Center	Dr. Chris Carlsten	“Initiation of immune responses in the lung: breaking the epithelial barrier”
	17	Ruban H. Zamar, PhD Professor of Statistics Department of Statistics, University of British Columbia	HLI	“Ensembling Classification Models Based on Phalanxes of Variables with Applications in Drug Discovery”
	24	Janice Eng, PhD Professor, Dept of Physical Therapy Health Research Coordinator & CIHR Delegate, Office of the VP Research and International, University of BC Scientist, GF Strong Rehab Centre	HLI	“Canadian Institute of Health Research (CIHR) Reforms Foundation and Project Scheme”

	31	<p>Bruce McManus, MD, PhD, FRSC, FCAHS, FRCPC, FCAP, FACC</p> <p>Co-Director, Institute for Heart + Lung Health Director, NCE CECR Centre of Excellence for Prevention of Organ Failure Professor, Department of Pathology and Laboratory Medicine, UBC Principal Investigator, Centre for Health Lung Innovation</p>	HLI	<p>“PROOF Centre of Excellence Current and Potential Synergies with the Centre for Heart Lung Innovation”</p>
February	14	<p>Clayton D. Crawley, PhD.</p> <p>Research Professional, Department of Surgery, University of Chicago</p>	Dr. Keith Walley	<p>“NF-κB: a key regulator of genome stability and aging”</p>
	21	<p>Russell Bowler, MD, PhD</p> <p>Director of Program in Personalized Medicine Director of COPD Clinic Professor of Medicine, Division of Pulmonary Medicine, Department of Medicine National Jewish Health, Denver, Colorado</p>	Dr. Don Sin	<p>“Using Integration of COPD Gene Omics Datasets to Better Understand COPD pathogenesis”</p>
	28	<p>Andrew D. Krahn, MD, FRCPC, FHRS</p> <p>Professor of Medicine & Head UBC Division of Cardiology The Sauder Family and Heart & Stroke Foundation of BC & Yukon Chair in Cardiology Paul Brunes UBC Professorship in Heart Rhythm Disorders</p>	Dr. Keith Walley	<p>“Influencing Rare but Catastrophic Outcomes in Clinical Medicine: Novel Study Designs”</p>

<p>March</p>	<p>07</p>	<p>Peter Watson, MD, PhD Director of the Tumour Tissue Repository, the BC Cancer Agency [BCCA/PHSA] and the University of British Columbia Office of Biobank Education and Research [UBC-OBER], Professor of Pathology, BC Cancer Agency and University of British Columbia, Chief Physician, BC Cancer Agency's Vancouver Island Cancer Centre, Adjunct Professor, University of Victoria Department of Biochemistry and Molecular Biology</p>	<p>Dr. Tillie Hackett</p>	<p>“Biobanks biobanks everywhere but ne’re a biospecimen to access....how to find the right biospecimens or recognize the right biobank for our research”</p>
	<p>14</p>	<p>Ed Conway, MD, PhD, MBA Director, Centre for Blood Research Professor of Medicine, UBC & Gordon Francis, MD FRCPC, FAHA Professor of Endocrinology and Metabolism, UBC Director, Healthy Heart Program Prevention Clinic Director, Heart and Stroke Foundation Lipid Research Laboratory Associate Director, Centre for Heart Lung Innovation</p>	<p>HLI</p>	<p>“Red, gold and the CBR” & “Preventing Heart Disease: The Healthy Heart Program at St. Paul's”</p>

	21	<p>Aslam Anis, PhD, FCAHS Professor Co-Lead, Health Care Services and Systems Director, MHA Program Director, Centre for Health Evaluation and Outcome Sciences National Co-Director, CIHR Canadian HIV Trials Network Senior Scientist, Arthritis Research Centre of Canada</p> <p>&</p> <p>Robert Sindelar, PhD, MSc Vice President of Research & Academic Affairs, Providence Health Care Research Institute</p>	HLI	<p>“The Centre for Health Evaluation and Outcome Sciences (CHÉOS): A Research Collective Focused on Health Outcomes”</p> <p>&</p> <p>“The Centre for Heart Lung Innovation and the Future of Research at Providence Health Care”</p>
	28	<p>William Cole, PhD Andrew Family Professor in Cardiovascular Research, Department of Physiology & Pharmacology, Faculty of Medicine, University of Calgary</p>	Dr. Chun Seow	<p>“Mechanotransduction by integrin membrane adhesions of vascular smooth muscle cells is required for the myogenic response and blood flow autoregulation in response to intravascular pressure elevation in cerebral arterioles”</p>
April	04	<p>Georgia Perona-Wright, PhD Assistant Professor, Department of Microbiology & Immunology, Principal Investigator, Life Sciences Institute, University of British Columbia</p>	Dr. Tillie Hackett	<p>“Cytokine regulation in infection, immunity and repair”</p>

	11	<p>Spencer Proctor, PhD Associate Professor, Department of Agricultural, Food and Nutritional Science Director, Metabolic and Cardiovascular Diseases Laboratory University of Alberta</p>	Dr. David Granville	<p>“Remnant Cholesterol”: what is it and is it causative to cardiovascular disease? - <i>Insights to new mechanisms of arterial retention may explain how remnant-derived cholesterol is causative to atherosclerosis development</i></p>
	25	<p>Karin Humphries, MSc, MBA, DSc Scientist, CHÉOS Associate Professor, Medicine, UBC Scientific Director, BC Centre for Improved Cardiovascular Health (ICVHealth) UBC-Heart and Stroke Foundation Professor in Women’s Cardiovascular Health</p>	HLI	<p>“Update on HRT and CVD risk”</p>
May	02	<p>Paul Hancock Access and Privacy Manager University of British Columbia</p>	Melanie Hanson	<p>“Privacy and Information Security for Researchers: What You Need to Know to Stay Out of the Headlines”</p>
	30	<p>Jules Doré, Ph.D. Assistant Dean of Graduate Studies, Faculty of Medicine Associate Professor, Cell/Molecular Biology Senior Scientist, Beatrice Hunter Cancer Research Institute Memorial University, Newfoundland</p>	Dr. Jim Hogg	<p>"Transforming growth factor-beta signal transduction; An old dog does new tricks"</p>

June	06	Graham Donovan, PhD Senior Lecturer, Department of Mathematics, University of Auckland	Dr. Chun Seow	“Understanding Asthma Using Mathematical Modelling”
	13	J Alberto Neder, MD, PhD Professor of Respiratory Medicine Division of Respiratory and Critical Care Medicine Queen’s University and Kingston General Hospital	Dr. Jordan Guenette	“From Mouth to Mitochondria: The Dire Straits for Oxygen in Chronic Cardiopulmonary Diseases”
	20	Alastair Stewart, PhD Professor of Pharmacology, University of Melbourne	Dr. Chun Seow	“Glucocorticoids and inflammatory networks in airway structural cells: forces to be reckoned with”
September	19	Grace Parraga, PhD Scientist, Robarts Research Institute Professor and Graduate Chair, Department of Medical Biophysics, Departments of Medical Imaging, Oncology, Graduate Program in Biomedical Engineering The University of Western Ontario	Dr. Havey Coxson	“On the role of ventilation heterogeneity in obstructive lung disease”
	26	Sverre Vedal, MD Director, Environmental and Occupational Health MPH Program Professor, Environmental and Occupational Adjunct Professor, General Internal Medicine University of Washington	Dr. Don Sin	“Occupational exposures and COPD as measured by CT”

<p>October</p>	<p>3</p>	<p>David Walker, PhD Associate Professor, Pathology and Laboratory Medicine, University of British Columbia Centre for Heart Lung Innovation</p>	<p>HLI</p>	<p>“Consequences of stent placement in arteries, why look”</p>
	<p>10</p>	<p>Mark Wurfel, PhD Associate Professor Division of Pulmonary and Critical Care Medicine, University of Washington</p>	<p>Dr. Keith Walley</p>	<p>“Genetic and genomics of ARDS susceptibility and outcomes”</p>
	<p>17</p>	<p>Christoph Borchers, PhD Director, UVic Genome BC Proteomics Centre Professor, Department of Biochemistry and Microbiology, University of Victoria Don and Eleanor Rix BC Leadership Chair in Biomedical and Environmental Proteomics Research Professor, Department of Oncology, McGill University, Montreal Segal Chair in Molecular Oncology, Jewish General Hospital, McGill University, Montreal</p>	<p>Dr. Bruce McManus</p>	<p>“Clinical Proteomics - Present and Future”</p>
	<p>24</p>	<p>Steven Rowe, MD, MSPH Associate Professor, School of Medicine, University of Alabama at Birmingham</p>	<p>Dr. Bradley Quon</p>	<p>“Acquired CFTR Dysfunction in Chronic Bronchitis”</p>

	31	<p>Bruce McManus, MD, PhD, FRSC, FCAHS, FRCPC, FCAP, FACC</p> <p>Professor, Department of Pathology and Laboratory Medicine, UBC</p> <p>Co-Director, Institute for Heart + Lung Health</p> <p>Director, NCE CECR Centre of Excellence for Prevention of Organ Failure</p>	HLI	<p><i>“A Frightful Biomarker Roadtrip Highways and Byways on the Journey to Better Blood Tests”</i></p>
November	7	<p>Jeffrey Man, MD</p> <p>PhD Candidate, Institute of Medical Science, University of Toronto</p> <p>Clinical Assistant, Respiriology and Critical Care Medicine, University Health Network & Mount Sinai Hospital, University of Toronto</p>	Drs. Jim Russell and Keith Walley	<p><i>“Vascular endothelial gene regulation: the contribution of long non-coding RNA”</i></p>
	14	<p>Ahmed Al-Jumaily, PhD, MSc, BSc</p> <p>Director, Institute of Biomedical Technologies</p> <p>Auckland University of Technology</p> <p>Auckland, New Zealand</p>	Dr. Chun Seow	<p><i>“Pressure Oscillation- Effectiveness in Lung Therapy”</i></p>
	21	<p>Stephen Rappaport, PhD</p> <p>Professor, Environmental Health Sciences</p> <p>Director, Berkeley Center for Exposure Biology</p>	Dr. Chris Carlsten	<p><i>“The exposome and EWAS: finding causes of chronic diseases”</i></p>

	28	<p>Sunita Mathur, BScPT, MSc, PhD Assistant Professor Department of Physical Therapy University of Toronto</p>	Dr. Pat Camp	“Skeletal muscle dysfunction in acute and chronic respiratory disease”
December	5	<p>Meilan K. Han, MD, MS Associate Professor of Internal Medicine Co-Director, Pulmonary Rehabilitation Director, Women’s Respiratory Clinic Division of Pulmonary & Critical Care Medicine University of Michigan Health System</p>	Dr. Don Sin	“Radiologic Assessment of COPD”
	12	<p>Muredach P. Reilly, MBBCH, MSCE Associate Professor of Medicine, University of Pennsylvania School of Medicine Cardiologist, Hospital of the University of Pennsylvania Associate Director, Cardiovascular Fellowship Program, University of Pennsylvania</p>	Dr. John Boyd	“Translational Genomics of Complex Traits”

Appendix D - Centre for Heart Lung Innovation Research In Progress Seminar Series 2013

Centre for Heart Lung Innovation

Research in Progress Seminar Series 2014

Gourlay Conference Room, Mondays – 9:00 am to 10:00 am

January	6	Anthony Tam	The effects of estrogen on cigarette smoke-induced xenobiotic enzymes in the lung epithelium
	13	Jeremy Hirota	Uric acid - a good or a bad thing for airway disease?
	20	Junyan Shi	Disrupted Selective Autophagy in Coxsakievirus-Induced Myocarditis
	27	Dragos Vasilescu	The Site and Nature of Airway Obstructions after Lung Transplantation
February	3	Ivy Hsu	SerpinA3N accelerates wound closure in a mouse model of impaired diabetic wound healing
	17	Stephanie Sellers	Losartan: A Case of Off-Target Therapeutic Utility in Marfan Syndrome
	24	Satvir Dhillon	Physical activity strategies in advanced lung disease
March	3	Janice Leung	HIV-Associated COPD
	10	Adam Linder	Heparin-Binding Protein (HBP) - An early predictive marker and potential therapeutic target in severe infections with organ dysfunction
	17	Daisuke Kinose	Comprehensive analysis of emphysema in alpha-1 antitrypsin deficiency Project overview
	24	Gabriel Fung	Understanding the Role of TAR DNA binding protein-43 (TDP43) in Viral-Induced Cardiomyopathy
	31	Chris Fjell	Metagenomics of community acquired pneumonia: paired lung microbiome and host gene expression identifies subgroups of patients with differing patterns of bacterial infection, host response and clinical outcome
April	7	Carmen Sima	The modulatory effect of exercise on the relationship between arterial stiffness and heart rate in COPD
	14	Maen Obeidat	Systems Genetics of Lung Function Measures
	28	Amrit Singh	Differentiating asthmatic responses using component based statistical integrative methods
May	5	Marc Sze	The Role of MT1JP in COPD Progression: Why all the fuss over a Pseudogene
	12	Miranda Kirby	Quantitative Computed Tomography Imaging Phenotypes of COPD

	26	Chris Pascoe	Expression of genes associated with contraction and the cytoskeleton in the airways of asthmatic and non-asthmatic patients
June	2	Christen Chan	LungFIT: Smartphone Application for Pulmonary Rehabilitation-Phase 1
	9	Brandon Norris	Calcium-Independent Airway Smooth Muscle Force and Stiffness
September	8	Mehul Sharma	Role of extra-cellular Granzyme K in endothelial activation through PAR-1
	15	David Jaw	A mouse plaque rupture model related to lung LPS exposure
	22	Ye Qiu	Coxsackievirus B3 induces expression of Hsp70 to favor its replication
	29	Josh Dubland	Lysosomal acid lipase in atherosclerosis
October	6	Ali Hosseini	Airway inflammatory responses to combination of inhaled diesel exhaust and allergen challenge in atopic humans
	20	Kunihiko Hiraiwa	Air pollution-induced lung inflammation: the effect of HMG-CoA reductase inhibitors
	27	Andrew Ramsook	Effects of inspiratory muscle training on respiratory muscle mechanics and oxygenation in healthy males
November	3	Loubna Akhabir	Functional follow-up of asthma GWAS polymorphisms and beyond
	10	Yannick Molgat-Seon	Sex-differences in the mechanical ventilatory constraints on exercise hyperpnea in healthy aging
	17	Paul Hanson	Dynamic and emerging regulation and functions of nuclear pore protein 98 in Coxsackie virus B3 induced myocarditis
	24	Dragos Vasilescu	Quantifying differences between Centrilobular and Panlobular Emphysema: A Stereology based approach
December	1	Sima Allahverdian	Cholesterol homeostasis and foam cell formation in vascular smooth muscle cells
	8	Michele Schaeffer	Physiological and Perceptual Effects of Hyperoxia during Exercise in Fibrotic Interstitial Lung Disease



Centre for
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UBC and St. Paul's Hospital

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