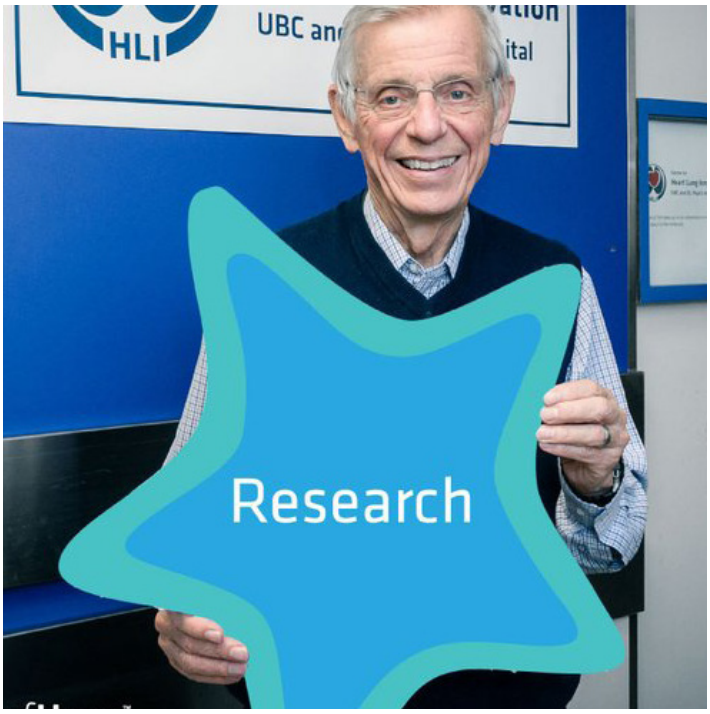
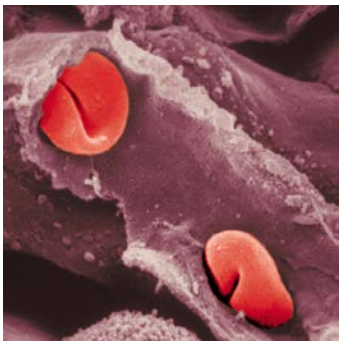
Centre for Heart Lung Innovation

UBC and St. Paul's Hospital

2015 Annual Report





AT A GLANCE

Established in 1977 by Drs. Jim Hogg and Peter Paré

Director:	Dr. Keith Walley
Associate Directors:	Dr. Gordon Francis
	Dr. Tillie-Louise Hackett
Principal Investigators:	32
Early Career Investigators	4
Investigators:	17
Research Associates:	6
Technicians:	28
Visiting Scientists:	3
Post-Doctoral Fellows:	25
Graduate Students:	45
Other Students:	68
Core/Operations Staff:	27
TOTAL :	255
Funding in FY 2014-15:	$10,203,500
Space:	over 50,000 square feet
Hosted Biotech / Spin-off companies:	5

CORE facilities:

Cardiovascular Registry
Lung Tissue Registry
Cellular Imaging and Biophysics
Imaging Services
Histology
Molecular Phenotyping
Preclinical Services
Clinical Research
Information Technology

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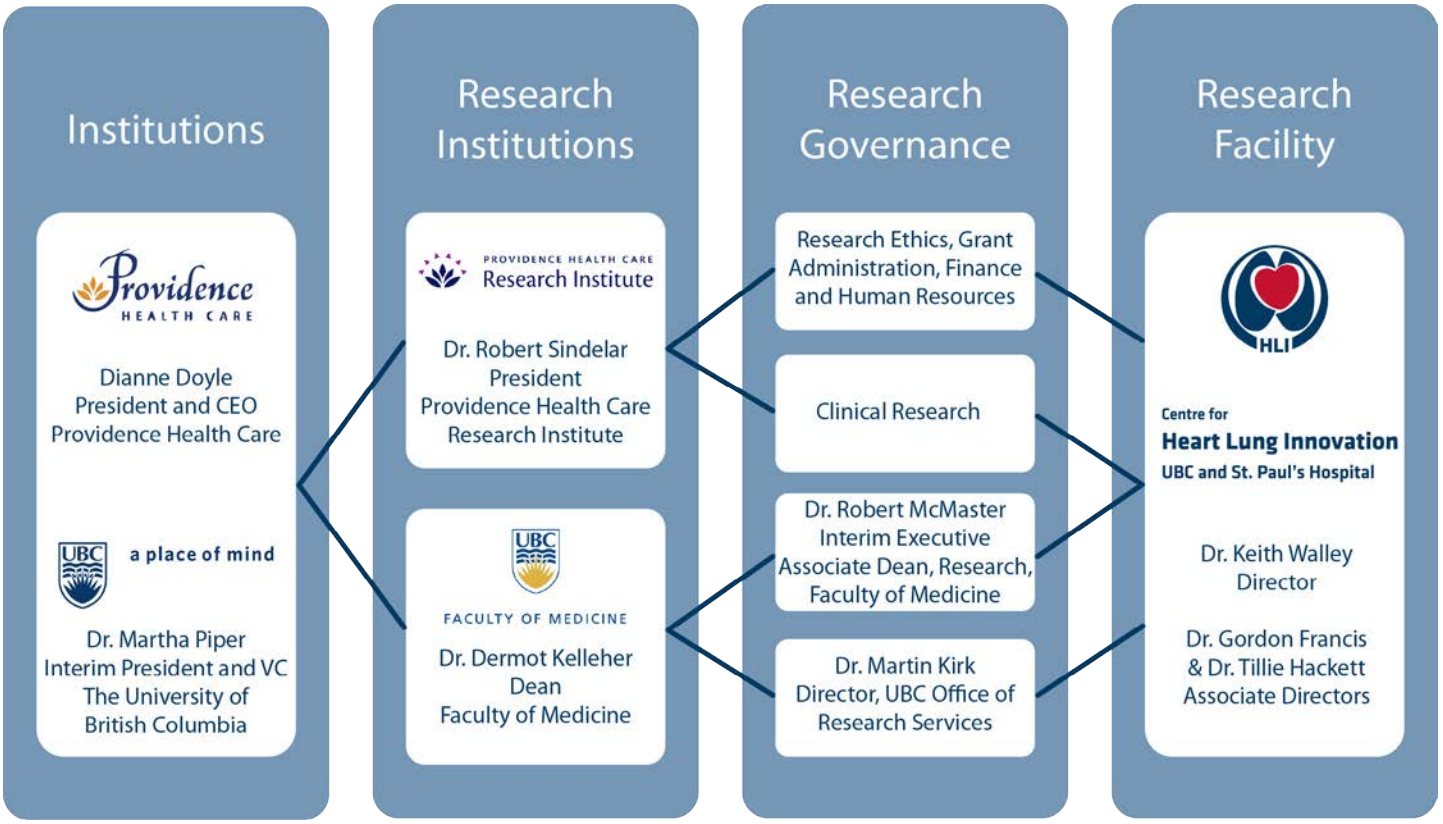
About the Centre for Heart Lung Innovation

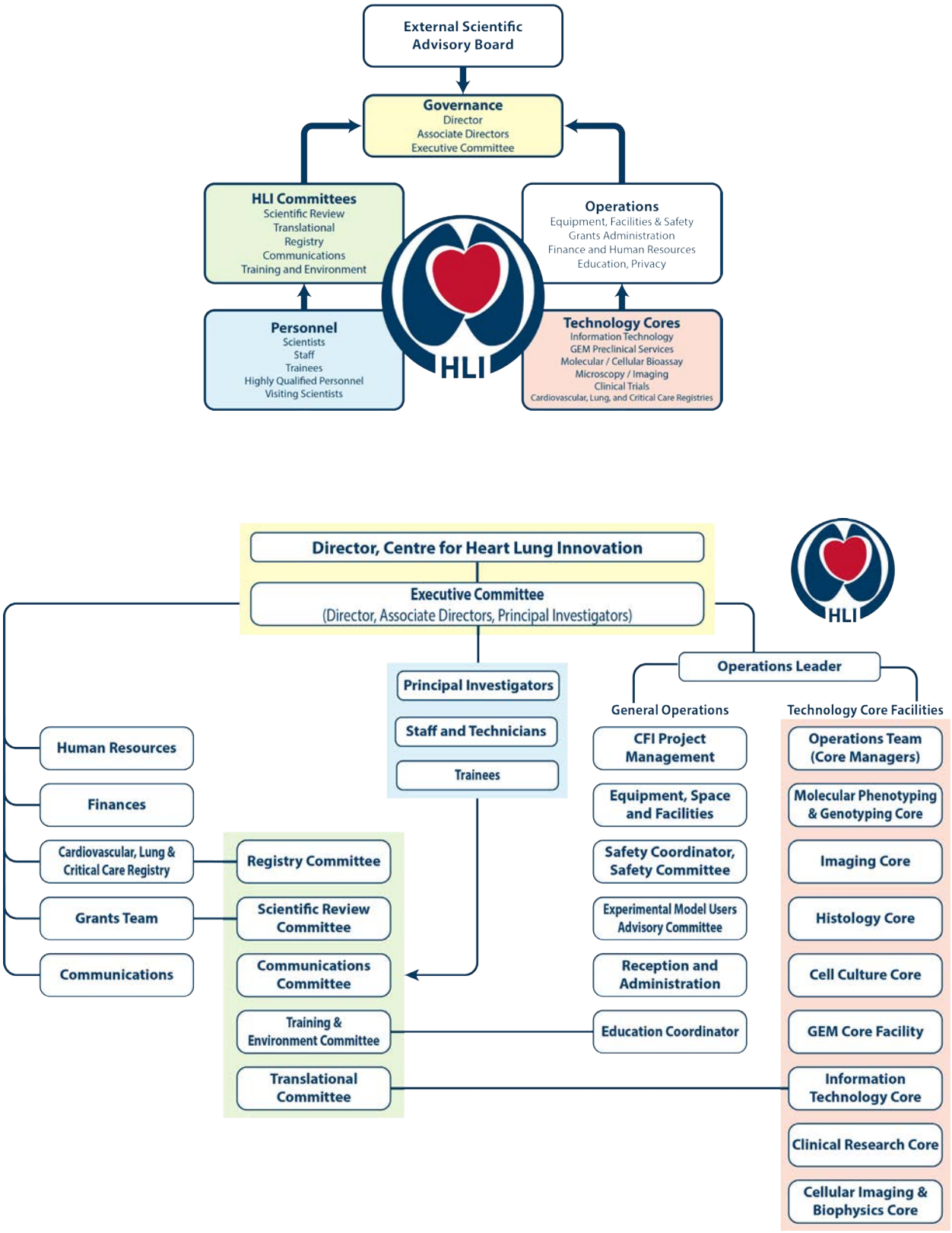
The Centre for Heart Lung Innovation (HLI; previously known as the iCapture and James Hogg Research Centre) is a University of British Columbia (UBC) Senate-approved Centre of Cardiovascular, Pulmonary, and Critical Care expertise, housed within Providence Health Care at St Paul's Hospital. The HLI's 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. Management structure of the Centre for Heart Lung Innovation.



MESSAGE FROM THE DIRECTOR

Dear Colleagues,

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

Our successes as a world-class research facility continue with the release of 244 publications for the calendar year 2015 and the receipt of $10.2 Million funding for fiscal year 2015/2016. In 2015, we continued to grow our family of exceptional researchers by adding two new Principal Investigators Drs. Andrew Krahn and Liam Brunham, and four early career investigators Drs. Mari DeMarco, Jeremy Hirota, Janice Leung and Michael Seidman, to support their development into Principal Investigators. We also created a High Capacity Computational Hub, which serves as a nidus for all Providence Health Care researchers who work with large and complex data.

This past year, the HLI researchers had phenomenal success in attracting prestigious and diverse research funding, including two grants in the first ever Canadian Institutes of Health Research (CIHR) Foundation Scheme competition, a $ 2.1 Million research contract with Boehringer Ingelheim Corp. and seven BC Lung Association (BCLA) grants — the largest number of BCLA grants ever awarded to researchers from one centre.

2015 was an exceptionally successful year for our trainees and young investigators; three of the seven BCLA grants were led by our trainees, our young Principal and Early Career investigators received two Early Research Leaders Initiative grants from the Heart and Stroke Foundation and the Canadian Respiratory Research Network, one John Evans Leader's award from Canada Foundation for

Innovation, one CIHR New Investigator Salary award, and numerous other awards.

The Centre for Heart Lung Innovation scientists, trainees and staff would like to thank our funding partners: Canadian Institutes for Health Research, 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, the St Paul's Hospital Foundation, the National Institutes for Health, and many vendors and industrial collaborators, for their crucial support of our ongoing programs for the race against cardiovascular/pulmonary/critical care disease.

We are proud of our progress to date and look forward an equally successful 2016.

Keith R. Walley, MD

Director, Centre for Heart Lung Innovation

Professor of Medicine, UBC

Associate Director ICU, St. Paul's Hospital

RESEARCH SPOTLIGHT

Dr. Chris Carlsten: Studying the effects of diesel smoke on DNA

Exposure to air pollution is associated with adverse health effects. In particular, exposure to diesel exhaust from traffic-derived air pollution increases asthma susceptibility and severity, though how this occurs is unclear. Recently, Dr. Chris Carlsten and his team showed that just 2 hours of exposure to diesel exhaust fumes caused epigenetic changes to DNA in asthmatics. The team put volunteers in a small room with diluted and aged exhaust fumes comparable to the air quality along a Beijing highway or a busy Vancouver port. They found that this exposure altered DNA methylation, a process that dampens or silences genes, at about 2,800 different points on the subjects' DNA, affecting around 400 genes. These findings indicate that epigenetic changes that lead to alternations in gene expression take place following very acute exposure to pollution and occur even when no obvious symptoms are present. These results will likely lead to future research which ultimately may help scientists find ways to prevent or reverse the impacts of air pollution.

> *Just 2 hours of exposure to diesel exhaust causes epigenetic changes to DNA in asthmatics*

Publication: Jiang R, Jones MJ, Sava F, Kobor MS, Carlsten C. Short-term diesel exhaust inhalation in a controlled human crossover study is associated with changes in DNA methylation of circulating mononuclear cells in asthmatics. Particle and Fibre Toxicology 2014 Dec 9;11:71.

FEATURED IN:

Globe and Mail, 7 Jan 2015
Air pollution can cause harm to DNA, UBC study finds
http://www.theglobeandmail.com/news/british-columbia/air-pollution-can-cause-harm-to-dna-ubc-study-finds/article22358556/

CBC news, 8 Jan 2015
Diesel exhaust a danger after 2 hours, indicates a UBC study
http://www.cbc.ca/news/canada/british-columbia/diesel-exhaust-a-danger-after-2-hours-indicates-ubc-study-1.2893849

Canada's Occupational Health and Safety Magazine, 20 Jan 2015
Diesel exhaust can alter DNA: study
http://www.ohscanada.com/health-safety/diesel-exhaust-can-alter-dna-study/1003275497/

Global News, Jan 7, 2015
UBC study says exhaust fumes can change DNA
http://globalnews.ca/news/1761786/ubc-study-says-exhaust-fumes-can-change-dna/

Dr. Denise Daley: A study to determine if "Super Seniors" are genetically protected from cancer-causing mutations

The HLI's Dr. Denise Daley, a Tier II Canada Research Chair in the genetic epidemiology of common complex diseases, is part of a research team investigating the factors that contribute to the longevity of "super seniors", individuals who remain cancer-free into their 80s and beyond.

Super seniors: What's their secret?

Dr. Daley and colleagues are comparing the genes of 500 super seniors to those who have cancer to determine if super seniors are genetically protected from cancer-causing mutations. In June 2015 the study was featured in an article in the Vancouver Courier and the Canada Journal. Ultimately, the team hopes to identify genetic "override switches" which could lead to the development of anti-cancer drugs.

Canada Journal, 12 Mar 2015
Researchers study 'super seniors' for clues to their longevity
http://canadajournal.net/health/researchers-study-super-seniors-clues-longevity-23991-2015/

Vancouver Courier, 5 Jun 2015
Supersenior study looking for volunteers: Study will try and determine factors for their longevity
http://www.vancourier.com/living/seniors/super-senior-study-looking-for-volunteers-1.1960109

Dr. Bradley Quon: Studying chronic rhinosinusitis in adults with cystic fibrosis

Cystic fibrosis is one of the most common life-shortening, genetic conditions affecting Canadian youth. Chronic rhinosinusitis is a condition that increases in prevalence with age and is associated with reduced health-related quality of life in people without cystic fibrosis. However, until recently, the prevalence and consequences of chronic rhionosinusitis in cystic fibrosis patients was unknown. Dr. Bradley Quon, a PI at the HLI and the Research Director of the St. Paul's Hospital Adult Cystic Fibrosis Clinic, and his team investigated the prevalence of chronic rhinosinusitis in 121 adults with cystic fibrosis and the impact of this condition on their health-related quality of life. They found that the majority of the subjects (59.2%) had evidence of chronic rhinosinusitis and that this was associated with worse symptoms on the cystic fibrosis-specific health-related quality of life questionnaire. These findings suggest that this condition should be diagnosed and managed to optimize the health-related quality of life of adults with cystic fibrosis.

Chronic Rhinosinusitis is prevalent in adults with cystic fibrosis and reduces health-related quality of life

Featured on the cover of Annals of the American Thoracic Society, Aug 2015
Association between chronic rhinosinusitis and health-related quality of life in adults with cystic fibrosis.
http://www.atsjournals.org/doi/abs/10.1513/AnnalsATS.201504-191OC#.VucSfuY0-G9

Dr. Christopher Ryerson: Predicting mortality in patients with systemic schleroderma-associated interstitial lung disease

Interstitial lung disease (ILD) is a significant cause of death in patients with systemic sclerosis (SSc), an autoimmune disease which can affect multiple organs of the gastrointestinal, cardiac, renal, and pulmonary systems. Systemic sclerosis-associated interstitial lung disease (SSc-ILD) can result in transformation and damage to tissues of the lung parencyhma, resulting in diminished respiratory function and death. The development and progression of SSc-ILD is highly variable from one patient to the next, and as of now there is no established way to predict short-term survival. Dr. Christopher Ryerson, a respirologist and PI at the HLI, and his colleagues recently conducted a study to test the ability of 4 different baseline risk prediction models, which are used to predict one-year mortality in idiopathic pulmonary fibrosis, to predict one-year mortality in patients with SSc-ILD. Their results suggest that all 4 models had acceptable discrimination for the prediction of one-year mortality in SSc-ILD, and that the modified du Bois index was the best predictor.

Methods used to predict 1-year mortality in patients with IPF can also be applied in SSc-ILD

Publication: Ryerson CJ, O'Connor D, Dunne JV, Schooley F, Hague CJ, Murphy D, Leipsic J, Wilcox PG. Predicting mortality in systemic sclerosis-associated interstitial lung disease using risk prediction models derived from idiopathic pulmonary fibrosis. Chest 2015 Nov;148(5):1268-75.

Schleroderma News, 8 Jun 2015
Study Findings Show IPF Methods For Predicting Mortality Also Work For SSc-ILD
http://sclerodermanews.com/2015/06/08/study-findings-show-ipf-methods-predicting-mortality-also-also-work-ssc-ild/

Dr. Ma'en Obeidat: Identifying genes fundamental to variation in lung function

Recently, Dr. Ma'en Obeidat, a postdoctoral fellow at the HLI, and a team of researchers, including Drs. Daley, Sandford, Paré, Sin, and Hogg from the HLI, used a systems genetics approach to identify genes in lung tissue that drive the variation in standard lung function measures (FEV1, FEV1/FVC) and susceptibility to COPD. In 1111 patients, they identified single nucleotide polymorphisms associated with lung function that act as expression quantitative trait loci (eQTLs) and change the level of expression of their target genes in lung tissue. The identification of these genes and the pathways in which they are enriched provides essential information on the pathophysiology of airway obstruction and will help identify novel therapeutic targets and biomarkers for COPD.

Publication: Obeidat M. et al. Molecular mechanisms underlying variations in lung function: a systems genetics analysis. The Lancet Respiratory Medicine. 2015 Oct;3(10):782-95.

Trainee paper spotlight - The American Society of Human Genetics, 24 Feb 2016
http://www.ashg.org/education/Trainee_PaperSpotlight.shtml?p=Obeidat

Drs. Liam Brunham and Simon Pimstone launch SAVE BC to study BC families with early onset heart disease

In December 2015, Dr. Liam Brunham, a PI at the HLI and physician in the St. Paul's Hospital Healthy Heart Program, in collaboration with Dr. Simon Pimstone, an Associate PI at the HLI, announced the official launch of their study aimed at reducing the burden of heart disease in families affected by early-onset atherosclerotic heart disease. The Study to Avoid CardioVascular Events in BC (SAVE BC) is the first of its kind in BC and Canada and will involve medical specialists identifying, managing, and providing long-term follow-up care to individuals with early atherosclerotic cardiovascular disease in BC as well as their first degree relatives and spouses who are at increased risk. The goal of SAVE BC is to identify novel cardiovascular disease risk factors in families and

> *SAVE BC aims to improve the health outcomes of patients with early onset heart disease and their family members who may also be at risk*

to develop new and cost-effective strategies to better diagnose and treat these high-risk individuals. Funds for the study have been secured from the St. Paul's Hospital Foundation, the VGH and UBC Hospital Foundation, and several industry partners.

Photo, left to right: Dr. Simon Pimstone, Ms. Kelsey Lynch (genetic counsellor), Dr. Liam Brunham

HLI News, 10 Dec 2015
SAVE BC launched to study BC families with early onset heart disease
https://www.hli.ubc.ca/news/save-bc-launched

Drs. Miranda Kirby and Harvey Coxson: Using imaging measurements to explain symptoms and exercise capacity in COPD

According to Statistics Canada, COPD is the fourth-leading cause of death and the number one cause of hospital admissions in Canada. Improved outcomes and quality of life for COPD patients remains an important goal of COPD research. Paramount to this goal is the development of sensitive techniques that can diagnose COPD early in the disease course, and distinguish between underlying COPD phenotypes, in order to provide individualized treatment strategies to help patients cope with COPD. A study published this year by Dr. Miranda Kirby, a CIHR Banting Postdoctoral Fellow in Dr. Harvey Coxson's lab at the HLI, and colleagues provided evidence that emerging imaging techniques may help practitioners achieve this goal. They evaluated patients with mild to severe COPD, and in addition to using standard clinical and physiological measurements, they also used hyperpolarized helium 3 magnetic resonance imaging (^{3}He MRI), a functional imaging measurement that allows us to visualize the areas of the lung that participate in ventilation and those that do not. They found that ^{3}He MRI could predict exercise capacity and symptom severity in patients with mild to moderate COPD, indicating its utility for the early diagnosis and management of COPD.

> *MRI may provide a way to diagnose early COPD and identify COPD phenotypes*

Photo: Dr. Miranda Kirby

Publication: Kirby M, Pike D, Sin DD, Coxson HO, McCormack DG, Parraga G. COPD: Do imaging measurements of emphysema and airway disease explain symptoms and exercise capacity? Radiology. 2015 Dec;277(3):872-80.

A podcast with Radiological Society of North America:
http://media.rsna.org/media/journals/rad/podcasts/2015/277.3.December2015.Kirby.mp3

HLI PI Dr. Gordon Francis and research associate Dr. Sima Allahverdian in their lipidology lab

HLI INVESTIGATORS

HLI Investigators

32 PRINCIPAL INVESTIGATORS

Michael Allard
Pascal Bernatchez
John Boyd
Liam Brunham
Pat Camp
Chris Carlsten
Harvey Coxson
Denise Daley
Del Dorscheid
Gordon Francis
David Granville
Jordan Guenette
Tillie Hackett
James Hogg
Andrew Krahn
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

4 EARLY CAREER INVESTIGATORS

Mari DeMarco
Jeremy Hirota
Janice Leung
Michael Seidman

NEW INVESTIGATORS

New Principal Investigators

Liam Brunham, MD, PhD

Assistant Professor, Department of Medicine, UBC

Dr. Liam Brunham joined the HLI as a Principal Investigator in March 2015. Dr. Brunham is a general internist with a focus on clinical lipidology and is an attending physician at the Healthy Heart Program Prevention clinic at St. Paul's hospital, one of the largest specialty lipid clinics in Canada. Dr. Brunham's research focuses on understanding how changes in specific genes contribute to differences in drug response as well as to alterations in plasma lipid levels and their relationship to metabolic and cardiovascular disease. His laboratory uses cutting-edge approaches in human genetics including genome-wide association studies and next-generation sequencing to investigate the role of genetic variation in these phenotypes. His laboratory also uses genome-editing tools and stem cell-based cellular models to dissect the functional impact of genetic variants and investigate molecular mechanisms underlying adverse drug reactions.

Dr. Brunham graduated from medical school at the University of British Columbia after which he completed his PhD in Medical Genetics at UBC under the supervision of Dr. Michael Hayden. For his PhD he was awarded the Governor General's gold medal, the most prestigious award offered to graduating doctoral students at Canadian Universities. His work is currently funded by the Canadian Institutes of Health Research, the Heart and Stroke Foundation of Canada and other sources.

Andrew Krahn, MD, FRCPC, FHRS

Professor of Medicine and Head, Division of Cardiology, UBC

Dr. Andrew Krahn joined the HLI as a Principal Investigator in May 2015. Dr. Krahn is a cardiologist and an internationally recognized expert in the management of cardiac arrhythmias. His current research interests include investigating the genetic causes of arrhythmias, causes of loss of consciousness, and implantable arrhythmia device monitoring. He currently is responsible for coordinating three national rare genetic disease registries, and is actively involved in clinical trial research.

Dr. Krahn received his MD from the University of Manitoba. In 2012, he was recruited as the new Head of the Division of Cardiology, Faculty of Medicine, University of British Columbia. His research is supported by $5.5 million in funding from the Heart and Stroke Foundation, the Sauder family, the Brunes family, the VGH & UBC Hospital Foundation, Cardiac Services BC, Providence Health Care, and UBC. He has published over 340 papers in scientific journals such as Circulation, JAMA, Journal of the American College of Cardiology, The New England Journal of Medicine, Heart Rhythm, Journal of Cardiovascular Electrophysiology, European Heart Journal, American Journal of Medicine, American Heart Journal, American Journal of Cardiology, Canadian Journal of Cardiology and the Canadian Medical Association Journal. He is an Associate Editor for Heart Rhythm, and sits on the Editorial Board of the Canadian Journal of Cardiology and the Journal of Cardiovascular Electrophysiology.

Early Career Investigators

Mari DeMarco, PhD, DABCC

Clinical Assistant Professor, Department of Pathology and Laboratory Medicine, UBC
Clinical Chemist, St Paul's Hospital, Providence Health Care

Dr. Mari DeMarco joined the HLI as an Early Career Investigator in June 2015. Dr. DeMarco's PhD thesis explored protein misfolding pathways and focused on the pathological mechanisms (misfolding, aggregation and replication) involved in human prion diseases. This interest in amyloidosis and neurodegeneration has carried over to Dr. DeMarco's clinical work, where she is pursuing assay development to support diagnostic and research efforts in these areas. Another active area of her research is the application of mass spectrometry to tackle challenging diagnostic problems in laboratory medicine. Reflecting these efforts, she was recently awarded the Outstanding Scientific Achievements By A Young Investigator award from the American Association for Clinical Chemists.

Dr. DeMarco earned a PhD in Medicinal Chemistry from the University of Washington, as part of the Biomolecular Structure and Design Program. She subsequently completed a Clinical Chemistry fellowship at Washington University School of Medicine in St Louis. In addition to her roles at SPH, she is the Associate Program Director for the Medical Biochemistry Residency Training Program at the University of British Columbia.

Jeremy Hirota, PhD

Assistant Professor of Medicine, Division of Respiratory Medicine, UBC

Dr. Jeremy Hirota joined the HLI as an Early Career Investigator in January 2015. He was previously a postdoctoral fellow at the Centre from 2009 to 2012. Dr. Hirota's main research interests revolve around respiratory mucosal immunology in the context of lung health and chronic lung diseases. For his research program, he uses a translational approach consisting of *in vitro* studies with primary human airway epithelial and blood cells, *in vivo* mouse models of airway disease, and clinical samples from well-phenotyped patients following controlled environmental exposures. Dr. Hirota's research program focuses on identifying how environmental exposures impact respiratory mucosal immune responses that can lead to the development or worsening of chronic lung diseases.

Dr. Hirota received his PhD in physiology and pharmacology from McMaster University. He completed postdoctoral fellowships at the University of British Columbia in Canada and the University of Newcastle in Australia. He was a Canadian Banting Postdoctoral Fellow from 2013 to 2014 and received the UBC Killam Postdoctoral Research Prize in 2014. His research is currently funded by the BC Lung Association, the Banting Research Foundation, the Canadian Institutes for Health Research, and Mitacs.

Early Career Investigators

Janice Leung, MD, FRCPC

Clinical Assistant Professor of Medicine, Division of Respiratory Medicine, UBC

Dr. Janice Leung joined the HLI as an Early Career Investigator in September 2015. She was previously a postdoctoral fellow at the Centre from 2013 to 2015. She is a respirologist with a current research interest in the clinical outcomes, manifestations, and underlying mechanisms of HIV-associated chronic obstructive pulmonary disease. In particular, Dr. Leung is interested in the pathogenesis of accelerated aging in the lung and has detected signs of accelerated aging using the blood and airway epithelial cells from HIV-infected patents. Platforms for this research include next generation sequencing methylomics and transcriptomics as well as microbiomics.

Dr. Leung received her Bachelor's degree from Harvard University and her MD from Johns Hopkins University. She completed her respirology training at Johns Hopkins University and the University of Washington. Dr. Leung was also a critical care fellow at the National Institutes of Health. Her research is currently funded by the British Columbia Lung Association and the Canadian Institutes of Health Research.

Michael Seidman, PhD, MD

Acting/Assistant Director of the Cardiovascular Tissue Registry and Research Histology at Providence Health Care

Dr. Michael Seidman is a cardiovascular pathologist at PHC, and is the Acting/Assistant Director of both the Cardiovascular Tissue Registry and Research Histology at HLI. Michael obtained a BA in biochemistry and molecular biology, PhD in Immunology, and MD all from Cornell University. He completed postgraduate medical education at Brigham & Women's Hospital and the other Harvard teaching hospitals, completing training in Anatomical Pathology, Cardiovascular/Pulmonary Pathology, and Molecular Genetic Pathology.

Michael joined HLI as a fellow in 2013 and became part of the PHC staff in 2015, with his UBC credentials still pending his permanent residency. Michael conducts primarily collaborative research studies, and is also working on several small projects of his own design aimed at improving diagnostics in cardiovascular pathology. Michael's areas of focus are cardiovascular pathology, research histopathology, and cardiovascular genetics.

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.

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.

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. Robert 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. Keith Walley and James Russell to develop an anti-PCSK9 therapy as a novel treatment for sepsis.

Liam Brunham
UBC Department of Medicine

Dr. Brunham's research focuses on understanding how changes in specific genes contribute to differences in drug response as well as to alterations in plasma lipid levels and their relationship to metabolic and cardiovascular disease. His laboratory uses cutting-edge approaches in human genetics including genome-wide association studies and next-generation sequencing to investigate the role of genetic variation in these phenotypes. In December 2015, Dr. Brunham started a collaboration with Dr. Simon Pimstone to launch the SAVE BC study, aiming to identify risk factors and develop new approaches for diagnosis and treatment of BC families affected by early-onset atherosclerotic heart disease.

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.

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 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.

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 Imaging Network of Canada and the Canadian Respiratory Research Network.

Denise Daley
UBC Department of Medicine

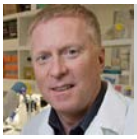
Dr. Daley is utilizing cutting edge statistical, epigenetic, and bioinformatics techniques to obtain a better understanding of how inherited genetic variants and environmental exposures interact to modify the risk for developing disease. Her lab has recently completed several genome-wide association 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.

Mari DeMarco
UBC Department of Pathology and Laboratory Medicine

With a strong interest in bridging basic biomedical science, analytical chemistry, and laboratory medicine, Dr. DeMarco's research group specializes in new methodological approaches for identification and quantitation of protein biomarkers of health and disease. A particular focus is advancing clinical diagnostics for neurodegenerative disorders, such as Alzheimer's disease and frontotemporal dementia. This work to translate new biomedical discoveries into patient care is accomplished in collaboration with clinicians and scientists at HLI, the UBC Centre for Brain Health and the provincial Clinic for Alzheimer's Disease and Related Disorders.

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.



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

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

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 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.

Jeremy Hirota
UBC Department of Medicine

Dr. Hirota's research program focuses on identifying the mechanisms governing how environmental exposures can contribute to allergic sensitization and exacerbations of asthma. To this end, he induces inflammatory responses in human airway epithelial cells using a variety of methods including exposure to urban particulate matter, diesel exhaust particles, allergens, and viruses in both single and multi-exposure models in order to determine how these influence adaptive immunity and chronic inflammation. He parallels the *in vitro* studies with *in vivo* models using genetically modified mice that will 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.

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 in order to prevent the initiation and perpetuation of pathological processes which contribute to obstructive airway diseases like asthma and chronic obstructive pulmonary disease.

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

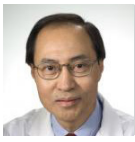
allow him to explore mechanisms of allergic sensitization in an intact organism. Lastly, he uses clinical models and isolated samples from well-phenotyped patients to test and confirm observations from his *in vitro* and *in vivo* studies. His research platform will be focused on asthma but will be adaptable to explore other respiratory diseases including cystic fibrosis and COPD.

Andrew Krahn
UBC Department of Medicine

Dr. Krahn's current research interests include investigating the genetic causes of arrhythmias, causes of loss of consciousness, and implantable arrhythmia device monitoring. Dr. Krahn is working on creating a province-wide network that would refer individuals with inherited arrhythmia and their relatives to a clinic at St. Paul's Hospital or Royal Jubilee Hospital in Victoria, or use telemedicine technologies to provide remote examinations and counselling.

Janice Leung
UBC Department of Medicine

Dr. Leung is studying the clinical outcomes, manifestations, and underlying mechanisms of HIV-associated chronic obstructive pulmonary disease. In particular, she is interested in the pathogenesis of accelerated aging in the lung and has detected signs of accelerated aging using the blood and airway epithelial cells from HIV-infected patents. Platforms for this research include next generation sequencing methylomics and transcriptomics as well as the microbiome.



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 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.

Scott Lear
Simon Fraser University 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

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 hypotheses.

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.

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 our 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 analyze their data in ways that are feasible, 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 Respirologist 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 clinic and several clinical trials investigating new therapies in CF.

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 and Ma'en 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 published over 225 peer-reviewed articles and editorials as well as 43 book chapters; he serves on the editorial boards of five journals. Dr. Russell has had an active research program focused on sepsis, particularly on: (1) novel, innovative therapies for sepsis; (2) genomics and pharmacogenomics of sepsis; (3) vasopressin treatment of septic shock; and (4) novel outcomes in trials in sepsis as well as the nature and mechanisms of impaired long-term outcomes of sepsis. Dr. Russell has worked closely with Drs. Walley and Boyd to discover that inhibition of the enzyme PCSK9 could improve the outcome of sepsis. They have spun off a new biotechnology company (Cyon Therapeutics) focused on development of PCSK9 inhibitors to treat sepsis.

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.

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.

Michael Seidman
UBC academic appointment pending

Dr. Seidman conducts primarily collaborative research studies, and is also working on several small projects of his own design aimed at improving diagnostics in cardiovascular pathology. His areas of focus are cardiovascular pathology, research histopathology, and cardiovascular genetics.

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.

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 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.

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

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.

Stephan van Eeden
UBC Department of Medicine

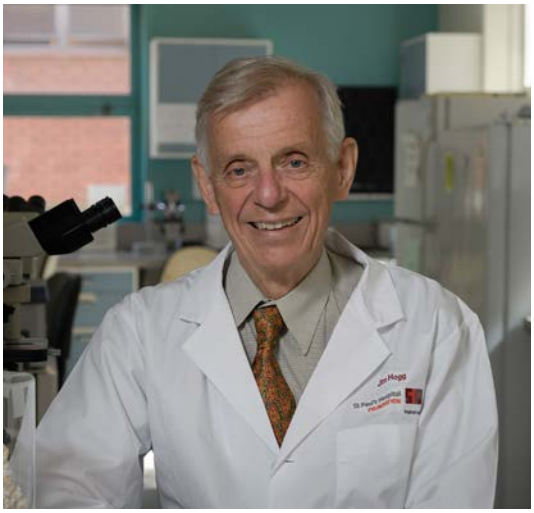
The focus of Dr. van Eeden's research is on the mechanisms of lung inflammation caused by infection, cigarette smoking and air pollution. His group demonstrated that pro-inflammatory mediators generated in the lung spill over in the blood stream and are responsible for the downstream adverse cardiovascular 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

Dr. James Hogg conferred with McGill University Honorary Degree



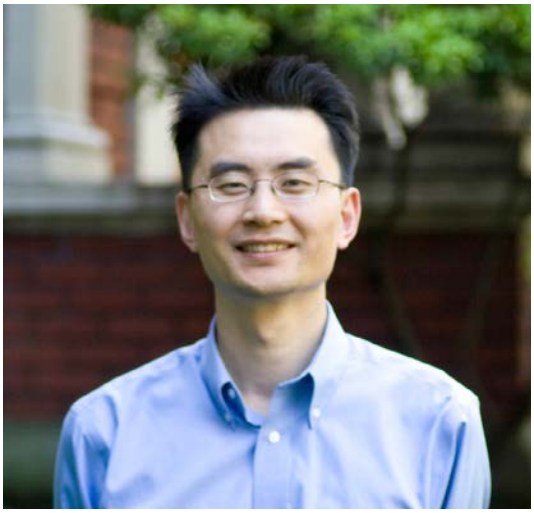
In 2015, Dr. James Hogg was awarded an honorary degree from McGill University for his recognition as a world leader on the pathology of chronic obstructive lung disease. After completing his medical degree in Manitoba, Dr. Hogg obtained an MSc and a PhD from McGill University before joining the faculty there. In 1977, Dr. Hogg was recruited to UBC to establish the Pulmonary Research Lab at St. Paul's Hospital, which has evolved over the decades to become the Centre for Heart Lung Innovation (HLI), 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). In addition to COPD, Dr. Hogg has made critical contributions to the study of other lung diseases, such as asthma and pulmonary fibrosis, and has been responsible for training many individuals who have gone on to leading roles in pulmonary science worldwide.

Dr. Bruce McManus presented with the Howard Morgan Award for Distinguished Achievements in Cardiovascular research

Dr. Bruce McManus was the recipient of the 2015 Howard Morgan award for his significant contributions to heart and lung research over the past 40 years. The award is given in honor of Dr. Howard Morgan, a clinician-scientist who made major contributions to our understanding of cardiac metabolism and its relation to protein biology and heart muscle health. The award was presented to Dr. McManus at the International Academy of Cardiovascular Sciences meeting in Omaha, Nebraska. Dr. McManus is the Co-Director of the Institute for Heart + Lung Health and the CEO for the Centre of Excellence for Prevention of Organ Failure (PROOF Centre). Dr. McManus is internationally-recognized for his research on the mechanisms, consequences, detection, and prevention of injury and aberrant repair in inflammatory diseases of the heart and blood vessels.

Photo, left to right: Dr. Naranjan Dhalla, Lifetime President, International Academy of Cardiovascular Sciences (IACS); Dr. Bohuslav Ostadal, President, IACS; Dr. Bruce McManus; Father Daniel Hendrikson, President, Creighton University.
Source: http://www.heartandlung.ca/

Dr. Don Sin receives 2015 Research and Mission Award

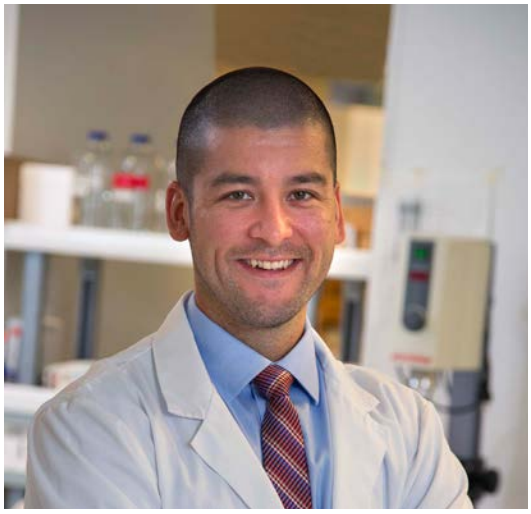


Dr. Don Sin was the 2015 recipient of the Providence Health Care's Research and Mission Award. This Award recognizes a scientist in the organization who demonstrates the mission and values of Providence Health Care while conducting outstanding research. Dr. Sin is recognized around the world for his contributions to COPD research, particularly his work to discover novel biomarkers to improve the care and diagnosis of patients with COPD, which currently is the 3rd leading cause of death worldwide. According to Expertscape, Dr. Sin is the leading medical expert in COPD across North America and the 2nd in the world. He is also the only Canadian to serve on the scientific committee of the Global Initiative for Chronic Obstructive Lung Disease (GOLD). Dr. Sin received his medical degree at the University of Alberta and a Master's of Public Health at Harvard University. He was recruited to UBC in 2004 as a Canada Research Chair in COPD.

Dr. Pat Camp wins the Inaugural PHC Innovation and Translational Research Award

The Inaugural PHC Innovation and Translational Research Award was received by Dr. Pat Camp of the HLI and her team of physiotherapy and nursing clinicians and researchers. The Innovation and Translational Research Award was launched in 2014 by PHC in recognition of the need for knowledge translation in the patient health care setting. The award will fund Dr. Camp's new knowledge translation study aiming to improve health outcomes for patients with acute exacerbations of chronic obstructive pulmonary disease (AECOPD) through exercise and increased activity. AECOPD, a leading cause of hospitalization in Canada, requires extensive care to reduce the risk of further health decline and mortality. While physical rehabilitation and in-hospital exercise programs have significant benefits for patients with COPD, there is little support and guidance for physical therapists and other health care professionals to prescribe safe and effective exercise programs for these patients. In response this, Dr. Camp and her team recently developed a mobile clinical decision-making tool called AECOPD-Mob, to assist physical therapists and other health care professionals who are new to the acute care setting in delivering such care. Dr. Camp and her team will develop a knowledge translation strategy to disseminate, implement and evaluate the use of AECOPD-Mob.

Dr. Jeremy Hirota receives the Ann Woolcock Memorial Award, American Thoracic Society



Dr. Jeremy Hirota was the 2015 recipient of the Ann Woolcock Memorial Award in honor of his overall accomplishments and future promise in the area of asthma research. This annual award honors the life of the late Ann Woolcock, an international leader in the field of asthma in areas of epidemiology, physiology and medicine. The award is given to a young investigator who has made substantial accomplishments to the field and holds great promise for future progress and success. Prior to this he was a Canadian Banting Postdoctoral Fellow from 2013 to 2014 and received the UBC Killam Postdoctoral Research Prize in 2014. Dr. Hirota obtained his Ph.D. from McMaster University and completed a postdoctoral fellowship at the HLI before becoming an Assistant Professor at UBC in 2015. His research focuses on identifying the mechanisms governing how environmental exposures can contribute to allergic sensitization and exacerbations of asthma. He uses a highly translational approach consisting of *in vitro* studies with primary human airway epithelial and dendritic cells, *in vivo* mouse models of airway disease, and clinical samples from well-phenotyped patients following controlled environmental exposures.

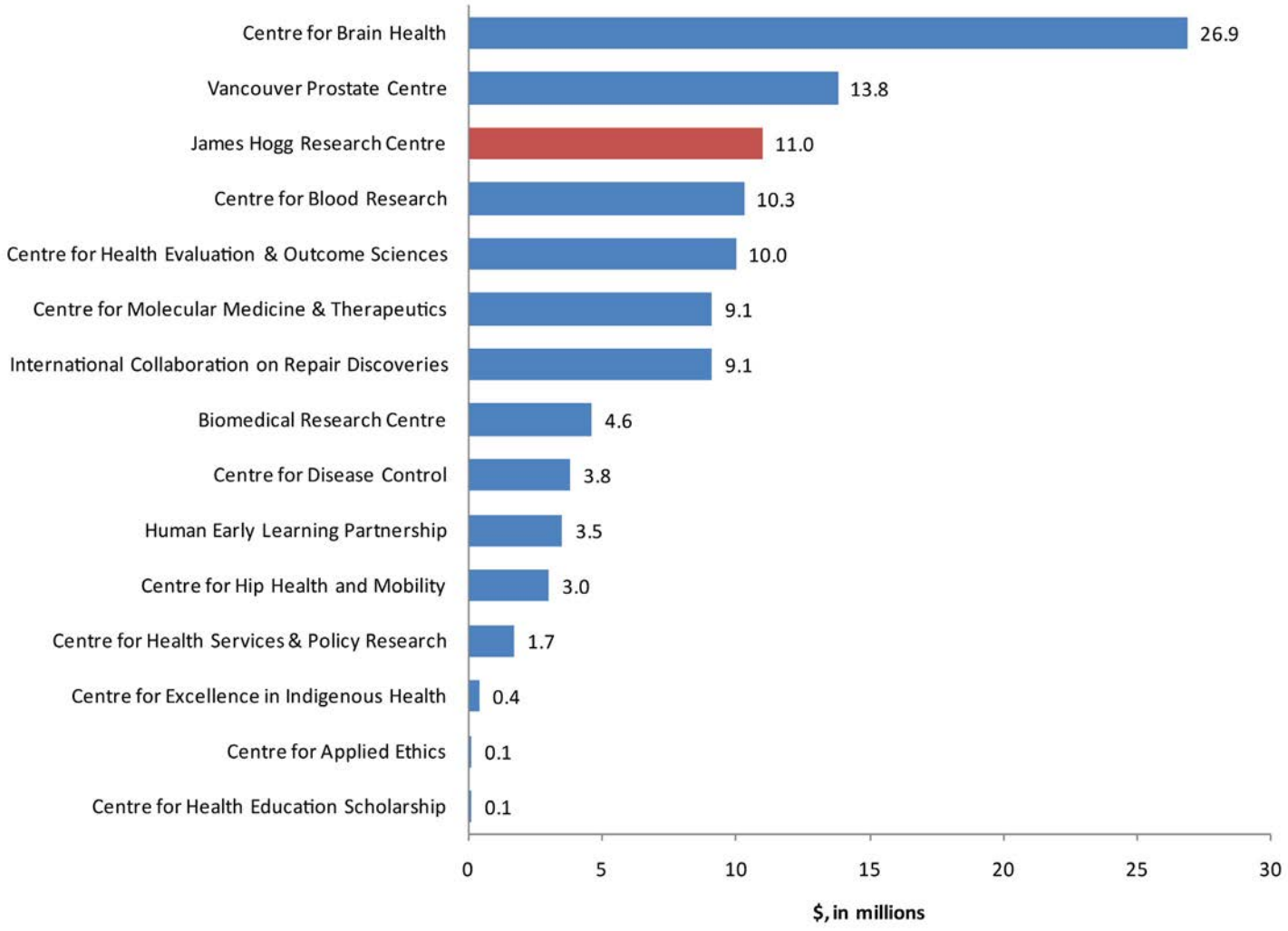
Research Funding

The Centre for Heart Lung Innovation (James Hogg Research Centre in the figure below) was successful in attracting **10%** of all of the UBC Faculty of Medicine funding for the previous fiscal year, 2014/2015.

Available data for fiscal year 2015–2016 indicate that the HLI Investigators were successful in attracting **$8,711,499** in external research grants and contracts.

Details about the HLI's funding for fiscal year 2015 – 2016 can be found in Appendix A.

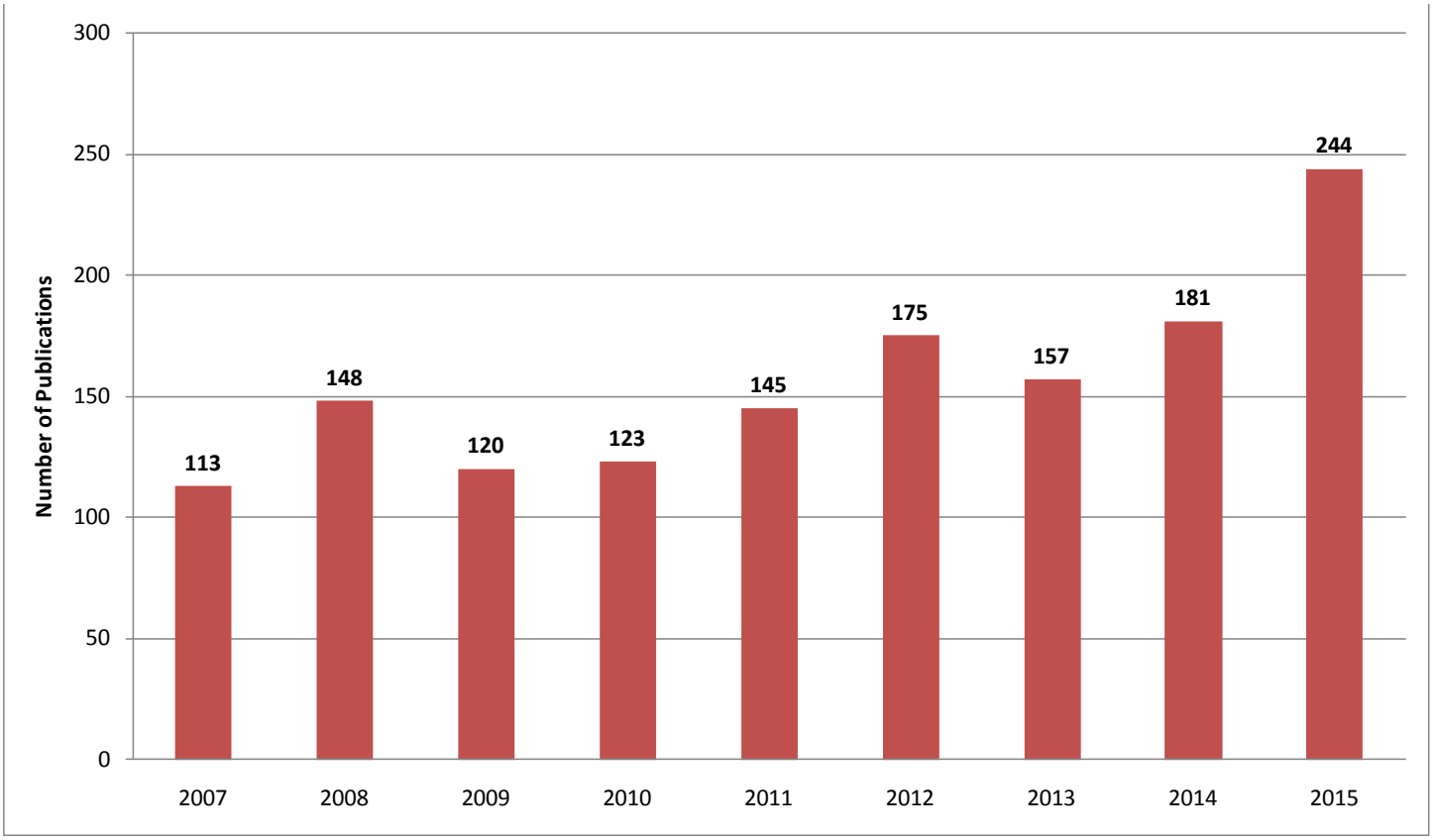
Figure 3. 2014-15 Faculty of Medicine research funding from all sources, by research centre.



Peer Reviewed Publicatons

The Centre for Heart Lung Innovation's investigators and students produced 244 publications in 2015. That's a 26% increase compared to 2014.

Figure 4. Publications by the Centre for Heart Lung Innovation PIs - 9 year trend. Full details about the 2015 HLI publications can be found in **Appendix B**.



High Impact Papers By HLI Investigators in 2015

Lancet

Impact Factor: 45.217

Journal Category: Medicine, General and Internal

Rank Within Category: 2/154

Khatib R, McKee M, Shannon H, Chow C, Rangarajan S, Teo K, Wei L, Mony P, Mohan V, Gupta R, Kumar R, Vijayakumar K, **Lear SA**, Diaz R, Avezum A, Lopez-Jaramillo P, Lanas F, Yusoff K, Ismail N, Kazmi K, Rahman O, Rosengren A, Monsef N, Kelishadi R, Kruger A, Puoane T, Szuba A, Chifamba J, Temizhan A, Dagenais G, Gafni A, Yusuf S; PURE study investigators. **Availability and affordability of cardiovascular disease medicines and their effect on use in high-income, middle-income, and low-income countries: an analysis of the PURE study data.** Lancet. 2015 Sep 17. [Epub ahead of print]

Leong DP, Teo KK, Rangarajan S, Lopez-Jaramillo P, Avezum A, OrlandiniA, Seron P, Ahmed SH, Rosengren A, Kelishadi R, Rahman O, Swaminathan S, Iqbal R, Gupta R, **Lear SA**, Oguz A, Yusoff K, Zatonska K, Chifamba J, Igumbor E, Mohan V, Anjana RM, Gu H, Wei L, Yusuf S. T**he prognostic importance of muscle strength in 139,691 people from 17 countries: A Prospective Urban Rural Epidemiology (PURE) study.** Lancet. 2015;386:266-273.

Smyth A, Teo KK, Rangarajan S, O'Donnell M, Zhang X, Rana P, Leong DP, Dagenais G, Seron P, Rosengren A, Schutte AE, Lopez-Jaramillo P, Oguz A, Chifamba J, Diaz R, **Lear S**, Avezum A, Kumar R, Mohan V, Szuba A, Wei L, Yang W, Jian B, McKee M, Yusuf S; PURE Investigators. **Alcohol consumption and cardiovascular disease, cancer, injury, admission to hospital, and mortality: a prospective cohort study.** Lancet. 2015 Nov 14;386(10007):1945-54.

Nature

Impact Factor: 41.456

Journal Category: Multidisciplinary Sciences

Rank Within Category: 1/57

Do R, Stitziel NO, Won HH, Jørgensen AB, Duga S, Angelica Merlini P, Kiezun A, Farrall M, Goel A, Zuk O, Guella I, Asselta R, Lange LA, Peloso GM, Auer PL; *NHLBI Exome Sequencing Project, Girelli D, Martinelli N, Farlow DN, DePristo MA, Roberts R, Stewart AF, Saleheen D, Danesh J, Epstein SE, Sivapalaratnam S, Hovingh GK, Kastelein JJ, Samani NJ, Schunkert H, Erdmann J, Shah SH, Kraus WE, Davies R, Nikpay M, Johansen CT, Wang J, Hegele RA, Hechter E, Marz W, Kleber ME, Huang J, Johnson AD, Li M, Burke GL, Gross M, Liu Y, Assimes TL, Heiss G, Lange EM, Folsom AR, Taylor HA, Olivieri O, Hamsten A, Clarke R, Reilly DF, Yin W, Rivas MA, Donnelly P, Rossouw JE, Psaty BM, Herrington DM, Wilson JG, Rich SS, Bamshad MJ, Tracy RP, Cupples LA, Rader DJ, Reilly MP, Spertus JA, Cresci S, Hartiala J, Tang WH, Hazen SL, Allayee H, Reiner AP, Carlson CS, Kooperberg C, Jackson RD, Boerwinkle E, Lander ES, Schwartz SM, Siscovick DS, McPherson R, Tybjaerg-Hansen A, Abecasis GR, Watkins H, Nickerson DA, Ardissino D, Sunyaev SR, O'Donnell CJ, Altshuler D, Gabriel S, Kathiresan S. ***Exome sequencing identifies rare LDLR and APOA5 alleles conferring risk for myocardial infarction***. Nature. 518(7537): 102-6, 2015.

*** NHLBI Exome Sequencing Project includes HLI Investigators Daley D, Paré PD, and Sin DD.**

Nature Genetics

Impact Factor: 29.352

Journal Category:	Rank Within Category:
Genetics and Heredity	2/167

Aminkeng F, Bhavsar AP, Visscher H, Rassekh SR, Li Y, Lee JW, **Brunham LR**, Caron HN, van Dalen EC, Kremer LC, van der Pal HJ, Amstutz U, Rieder MJ, Bernstein D, Carleton BC, Hayden MR, Ross CJ; Canadian Pharmacogenomics Network for Drug Safety Consortium. ***A coding variant in RARG confers susceptibility to anthracycline-induced cardiotoxicity in childhood cancer***. Nature Genetics. 47:1079-1084, 2015.

Journal of the American College of Cardiology

Impact Factor: 16.50

Journal Category:	Rank Within Category:
Cardiac and Cardiovascular Systems	1/123

Coyle D, Coyle K, Essebag V, Birnie DH, Ahmad K, Toal S, Sapp J, Healey JS, Verma A, Wells G, **Krahn AD**. ***Cost effectiveness of continued-warfarin versus heparin-bridging therapy during pacemaker and defibrillator surgery***. Journal of the American College of Cardiology. 65(9):957-9,2015.

Science Translational Medicine

Impact Factor: 15.843

Journal Category:	Rank Within Category:
Cell Biology	10/184
Medicine, Research, and Experimental	2/123

Arrieta MC, Stiemsma LT, Dimitriu PA, Thorson L, Russell S, Yurist-Doutsch S, Kuzeljevic B, Gold MJ, Britton HM, Lefebvre DL, Subbarao P, Mandhane P, Becker A, McNagny KM, Sears MR, Kollmann T, *CHILD Study Investigators, Mohn WW, Turvey SE, Brett Finlay B. ***Early infancy microbial and metabolic alterations affect risk of childhood asthma***. Science Translational Medicine. 7(307):307ra152, 2015.

***** CHILD Study Investigators include HLI investigators: **Daley D**, **Paré PD**, **Sandford AJ**, **Tebbutt SJ.**

European Heart Journal

Impact Factor: 15.203

Journal Category:	Rank Within Category:
Cardiac and Cardiovascular Systems	2/123

Costantino G, Sun BC, Barbic F, Bossi I, Casazza G, Dipaola F, McDermott D, Quinn J, Reed MJ, Sheldon RS, Solbiati M, Thiruganasambandamoorthy V, Beach D, Bodemer N, Brignole M, Casagranda I, Rosso AD, Duca P, Falavigna G, Grossman SA, Ippoliti R, **Krahn AD**, Montano N, Morillo CA, Olshansky B, Raj SR, Ruwald MH, Sarasin FP, Shen W, Stiell I, Ungar A, van Dijk JG, van Dijk N, Wieling W, Furlan R. ***Syncope clinical management in the emergency department: a consensus from the first international workshop on syncope risk stratification in the emergency department*.** European Heart Journal. 2015 Aug 4. [Epub ahead of print]

Farhad H, Murthy VL, **Seidman MA**, Abbasi SA, Blankstein R. ***A mimic of hypertrophic cardiomyopathy***. European heart journal. 36(12):763, 2015.

Circulation

Impact Factor: 15.073

Journal Category:	Rank Within Category:
Cardiac and Cardiovascular Systems	31/123
Peripheral Vascular Disease	1/60

Blondon M, **Quon BS**, Harrington LB, Bounameaux H, Smith NL. ***Association between newborn birthweight and the risk of postpartum maternal venous thromboembolism: a population-based case-control study***. Circulation 131(17):1471-6, 2015.

De Ferrari GM, Dusi V, Spazzolini C, Bos JM, Abrams DJ, Berul CI, Crotti L, Davis AM, Eldar M, Kharlap M, Khoury A, **Krahn AD**, Leenhardt A, Moir CR, Odero A, Olde Nordkamp L, Paul T, Rosés I Noguer F, Shkolnikova M, Till J, Wilde AA, Ackerman MJ, Schwartz PJ. ***Clinical management of catecholaminergic polymorphic ventricular tachycardia: the role of left cardiac sympathetic denervation***. Circulation. 131(25):2185-93, 2015.

Francis GA, Allahverdian S, Cheroudi AC, Abraham T, **McManus BM**. ***Response to letter regarding article, "contribution of intimal smooth muscle cells to cholesterol accumulation and macrophage-like cells in human atherosclerosis."*** Circulation. 131(3):e25, 2015.

Longtin Y, Connolly SJ, **Krahn AD**. **Letter by Longtin et al regarding article, "*Rates of and factors associated with infection in 200 909 Medicare implantable cardioverter-defibrillator implants: results from the National Cardiovascular Data Registry.*"** Circulation. 131(22):e517, 2015.

Rao G, Powell-Wiley TM, Ancheta I, Hairston K, Kirley K, **Lear SA**, North KE, Palaniappan L, Rosal MC. I**dentification of Obesity and Cardiovascular Risk in Ethnically and Racially Diverse Populations: A Scientific Statement From the American Heart Association.** Circulation. 2015;132:457-472.

American Journal of Respiratory and Critical Care Medicine

Impact Factor: 12.996

Journal Category:	Rank Within Category:
Critical Care Medicine	1/27
Respiratory System	1/58

Bhavani S , Tsai CL , Perusich S , Hesselbacher S , **Coxson H** , Pandit L , Corry DB , Kheradmand F. ***Clinical and immunological factors in emphysema progression: 5-year prospective LES-COPD study***. American Journal of Respiratory and Critical Care Medicine. 192(10):1171-1178, 2015.

Boon M, Verleden SE, Bosch B, Lammertyn EJ, McDonough JE, Mai C, Verschakelen J, Kemnervan de Corput M, Tiddens HA, Proesmans M, Vermeulen FL, Verbeken EK, Cooper J, Van Raemdonck DE, Decramer M, Verleden GM, **Hogg JC**, Dupont LJ, Vanaudenaerde BM, De Boeck K**. *Morphometric analysis of explant lungs in cystic fibrosis***. American Journal of Respiratory and Critical Care Medicine. 2015 Nov 9 [Epub ahead of print: PMID 26551917].

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Cho MH, Castaldi PJ, Hersh CP, Hobbs BD, Barr RG, Tal-Singer R, Bakke P, Gulsvik A, San José Estépar R, Van Beek EJ, **Coxson HO**, Lynch DA, Washko GR, Laird NM, Crapo JD, Beaty TH, Silverman EK, NETT Genetics, ECLIPSE, and COPDGene Investigators**. *A genome-wide association study of emphysema and airway quantitative imaging phenotypes***. American Journal of Respiratory and Critical Care Medicine. 192(5):559-569, 2015.

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Kirby M, **Coxson HO**. ***Uncovering the bronchovascular links in patients with chronic obstructive pulmonary disease with pulmonary hypertension***. American Journal of Respiratory and Critical Care Medicine. 191(1):8-10, 2015.

Quon BS, Goss CH. ***Adult-onset asthma prevention. Should we be investing in antioxidant defense?*** American Journal Respiratory and Critical Care Medicine. 191(1):8-10, 2015.

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Symanski EP, **Leung JM**, Fowler CJ, Haney C, Hsu AP, Chen F, Duggal P, Oler AJ, McCormack R, Podack E, Drummond RA, Lionakis MS, Browne SK, Prevots DR, Knowles M, Cutting G, Liu X, Devine SE, Fraser CM, Tettelin H, Olivier KN, Holland SM. ***Pulmonary nontuberculous mycobacterial infection: a multisystem multigenic disease*.** American Journal of Respiratory and Critical Care Medicine. 192(5):618-28, 2015.

Sze MA, Dimitriu PA, Suzuki M, McDonough JE, Campbell JD, Brothers JF, Erb-Downward JR, Huffnagle GB, Hayashi S, Elliott WM, Cooper J, **Sin DD**, Lenburg ME, Spira A, Mohn WW, **Hogg JC**. ***The host response to the lung microbiome in chronic obstructive pulmonary disease*.** American Journal of Respiratory and Critical Care Medicine. 192(4):438:45, 2015.

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Trends in Pharmacological Sciences

Impact Factor: 11.54

Journal Category:	Rank Within Category:
Pharmacology and Pharmacy	1/27
Respiratory System	1/58

Krishnan R, Park JA, **Seow CY**, Lee PV, Stewart AG**.** ***Cellular biomechanics in drug screening and evaluation: mechanopharmacology.*** Trends in Pharmacological Sciences. 2015 Dec 1 [Epub ahead of print: doi: 10.1016/j.tips.2015.10.005].

The Journal of Allergy and Clinical Immunology

Impact Factor: 11.48

Journal Category:	Rank Within Category:
Allergy	1/24
Immunology	1/58

de Jong K, Vonk JM, Timens W, Bossé Y, **Sin DD**, Hao K, Kromhout H, Vermeulen R, Postma DS, Boezen HM. ***Genome-wide interaction study of gene-by-occupational exposure and effects on FEV1 levels.*** The Journal of Allergy and Clinical Immunology. 136(6):1664-1672, 2015.

Do R, Stitziel NO, Won HH, Jørgensen AB, Duga S, Angelica Merlini P, Kiezun A, Farrall M, Goel A, Zuk O, Guella I, Asselta R, Lange LA, Peloso GM, Auer PL, *NHLBI Exome Sequencing Project, Girelli D, Martinelli N, Farlow DN, DePristo MA, Roberts R, Stewart AF, Saleheen D, Danesh J, Epstein SE, Sivapalaratnam S, Fuertes E, Söderhäll C, Acevedo N, Becker A, Brauer M, Chan-Yeung M, Dijk FN, Heinrich J, Koppelman GH, Postma DS, Kere J, Kozyrskyj A, Pershagen G, Sandford AJ, Standl M, Tiesler CMT, Waldenberger M, Westman M, Carlsten C, Melén E. (2015). ***Associations between the 17q21 region and allergic rhinitis in five birth cohorts.*** TThe Journal of Allergy and Clinical Immunology. 135(2): 573-6, 2015.

*** NHLBI Exome Sequencing Project includes HLI Investigators Daley D**, **Paré PD**, **Sin DD**.

Fuertes E, Söderhäll C, Acevedo N, Becker A, Brauer M, Chan-Yeung M, Dijk FN, Heinrich J, Koppelman GH, Postma DS, Kere J, Kozyrskyj A, Pershagen G, **Sandford AJ**, Standl M, Tiesler CMT, Waldenberger M, Westman M, Carlsten C, Melén E. (2015). ***Associations between the 17q21 region and allergic rhinitis in five birth cohorts***. The Journal of Allergy and Clinical Immunology. 135(2): 573-6, 2015.

Gold MJ, Hughes MR, Antignano F, **Hirota JA**, Zaph C, McNagny KM**.** ***Lineage-specific regulation of allergic airway inflammation by the lipid phosphatase Src homology 2 domain-containing inositol 5-phosphatase (SHIP-1)***. The Journal of Allergy and Clinical Immunology. 136(3):725-736, 2015.

Nature Communications

Impact Factor: 11.47

Journal Category:	Rank Within Category:
Multidisciplinary Sciences	3/57

Artigas MS, Wain LV, Miller S, Kheirallah AK, Huffman JE, Ntalla I, Shrine N, Obeidat M, TrochetH, McArdle WL, Alves AC, Hui J, Zhao JH, Joshi PK, Teumer A, Albrecht E, Imboden M, Rawal R, Lopez LM, Marten J, Enroth S, Surakka I, Polasek O, Lyytikäinen LP, Granell R, Hysi PG, Flexeder C, Mahajan A, Beilby J, Bossé Y, Brandsma CA, Campbell H, Gieger C, Gläser S, González JR, Grallert H, Hammond CJ, Harris SE, Hartikainen AL, Heliövaara M, Henderson J, Hocking L, Horikoshi M, Hutri-Kähönen N, Ingelsson E, Johansson Å, Kemp JP, Kolcic I, Kumar A, Lind L, Melén E, Musk AW, Navarro P, Nickle DC, Padmanabhan S, Raitakari OT, Ried JS, Ripatti S, Schulz H, Scott RA, **Sin DD**, Starr JM, UK BiLEVE, Viñuela A, Völzke H, Wild SH, Wright AF, Zemunik T, Jarvis DL, Spector TD, Evans DM, Lehtimäki T, Vitart V, Kähönen M, Gyllensten U, Rudan I, Deary IJ, Karrasch S, Probst-Hensch NM, Heinrich J, Stubbe B, Wilson JF, Wareha. ***Sixteen new lung function signals identified through 1000 Genomes Project reference panel imputation*.** Nature Communications. 6:8658, 2015.

Circulation Research

Impact Factor: 11.02

Journal Category:	Rank Within Category:
Cardiac and Cardiovascular Systems	4/123

Deyell MW, **Krahn AD**, Goldberger JJ. ***Sudden cardiac death risk stratification***. Circulation research. 116(12):1907-18, 2015.

Impact factors and journal rankings are based on the Thomson Reuters InCites Journal Citation report for 2014.

The HLI Principal Investigators' names are in **bold**; trainees, visiting scientists and research personnel are underlined.

HLI technician Fanny Chu demonstrating the powerful electron microscope to students participating in High School Science Week.

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 39 Countries and 6 continents.

HLI SUMMER STUDENT RESEARCH PROGRAM

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 (HLI-SSRP). 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.

A record number of summer students was hosted by the Centre in 2015

In addition to technical and scientific 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.

In 2015 we hosted **46 summer students** through our Summer Student Research Program, the largest number of students hosted by the Centre in one summer.

STEMPREP Program

In 2015, our summer student cohort included **12 students** from the Southern Methodist University, Dallas, Texas. The STEMPREP 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. STEMPREP students spent their summer in the HLI labs working on individual research projects which they presented at the Summer Student Research Day on August 11th.

Summer Student Research Day 2015

2015 Summer Student Research Day Award Winners

August 11, 2015

Dr. Bruce McManus Oral Presentation Awards

Award	Recipient	HLI Supervisor
Top Heart Oral Presentation	Alana Jackson	David Granville, Leigh Parkinson
Top Lung Oral Presentation	Esther Lin	Stephan van Eeden, Sally Miller
Top Innovation Oral Presentation	Stephanie Wong	Keith Walley

Dr. Bruce McManus Poster Presentation Awards

Award	Recipient	HLI Supervisor
Top Lung Poster (session 1)	Ronald Monillas	James Hogg
Top Lung Poster (session 2)	Madeleine Downey	James Hogg, Fanny Chu
Top Other Poster	Mennwa Abouelatta	Mari DeMarco
Top Heart Poster	Andy Hong	Honglin Luo

IMPACT Program

About IMPACT

7 postdoctoral fellows were funded by IMPACT in 2015

The Integrated and Mentored Pulmonary and Cardiovascular Training (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 for the Canadian population.

In 2015, the IMPACT program provided funding to **7 postdoctoral fellows**. Four of these fellows are located at the University of British Columbia and two are located at the University of Manitoba.

IMPACT's Impact on Training

Since the beginning of the IMPACT program in 2003 there have been **52 fellows**, 45 of whom have finished the program by the end of 2015.

Where are the past IMPACT Fellows now?

- 25 have secured faculty positions in universities and medical schools
- 9 are working as clinicians
- 2 have entered medical school
- 2 are working in government
- 4 are engaged in additional research or training
- 3 are working as research scientists

High School Science Week

For one week in Spring and Fall each year, high school students participate in the High School Science Week hosted at the HLI. A total of eight students are invited to participate in various laboratory sessions and seminars. This program is a very unique opportunity for students to get real hands-on biomedical lab experience that can help shape their future education 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 HLI (valued at $2,000).

Peter D. Paré scholarship provides funding for one high school student to spend 8 weeks as a summer student at the HLI

The Peter D. Paré Scholarship recipient for 2015 was **Esther Lin.** Esther worked in Dr. Stephan van Eeden's lab on the project, "*Changes in Macrophage Populations Induced by Statins in Patients with COPD",* and presented her research at Summer Student Research Day 2015.

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 features invited experts in specific fields from 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 2015 Research in Progress Seminars can be found in Appendix D.

Trainee Fellowships and Scholarships

Name	Type/Award Name	Awarding Body
Cheng, Vivian	Undergraduate Summer Student Program	Canadian Institutes for Health Research
Deskler, Hannah	Undergraduate Training Program in Proteomics	British Columbia Proteomics Network - Michael Smith Foundation for Health Research (MSFHR)
Inskip, Jessica	Respiratory Rehabilitation Postdoctoral Fellowship	BC Lung Association
Kearns, Mark	Frederick Banting and Charles Best Canada Graduate Scholarship - Doctoral Award	Canadian Institutes for Health Research
Kearns, Mark	(Inaugural) Robert Hayden Research Fellowship	BC Centre for Improved Cardiovascular Health (ICVHealth)
Kim, Young Woon	Trainee Award	Province of British Columbia
Kim,Young Woon	Trainee Award	Industry Canada
Kim, Young Woon	Trainee Award	Adiga Life Sciences Inc.
Kirby, Miranda	Banting Post Doctoral Fellowship	Canadian Institutes for Health Research
Lu, Eric	Undergraduate Studentship	AllerGen-National Center of Excellence (NCE)
Merkulova, Yulia	Frederick Banting and Charles Best Canada Graduate Scholarship - Master's Award	Canadian Institutes for Health Research
Parkinson, Leigh	Trainee Award	Province of British Columbia
Parkinson, Leigh	Trainee Award	Industry Canada
Parkinson, Leigh	Trainee Award	viDA Therapeutics Inc.
Ramsook, Andrew	Trainee Award	Canadian Institutes for Health Research
Saferali, Aabida	Doctoral Fellowship	Cystic Fibrosis Canada
Singh, Amritpal	Doctoral Award	Canadian Institutes for Health Research
Syed, Nafeez	Trainee Award	Agartree Technology
Syed, Nafeez	Trainee Award	Province of British Columbia
Syed, Nafeez	Trainee Award	Industry Canada
Syed, Nafeez	Trainee Award	National Research Council
Vasilescu, Dragos	Postdoctoral Fellowship	Alpha-1 Foundation
Wang, Ying	Postdoctoral Fellowship	Michael Smith Foundation for Health Research
Winstone, Tiffany	Scholarship	Canadian Pulmonary Fibrosis Foundation
Yang, Chen Xi	Trainee Award	Industrial Research and Development Internship (IRDI) Program - NCE
Yang, Chen Xi	Trainee Award	Industry Canada
Yang, Chen Xi	Trainee Award	Province of British Columbia
Yang, Chen Xi	Trainee Fellowship	BC Lung Association
Zheng, Emma	Post Doctoral Fellowship	Alzheimer Society of Canada
Zheng, Emma	Spark Award	Firefly Foundation

Trainee-Led Operating Grants

In 2015 three of our post-doctoral trainees won their very first operating grants as Principal Investigators through a national competition where their applications competed against applications led by established scientists/faculty members.

Name	Competition Name	Granting Agency	Amount
Janice Leung*	National Grant Review Grant-in-Aid	BC Lung Association	$59,598
	Title: Accelerated Aging and Oxidative Stress: Mechanisms of Lung disease in HIV		
Ma'en Obeidat	National Grant Review Grant-in-Aid	BC Lung Association	$59,000
	Title: Integrative Genomics Approach to Unravel the Molecular Mechanisms Underlying Lung Function Measures and Lung Cancer		
Dragos Vasilescu	National Grant Review Grant-in-Aid	BC Lung Association	$59,903
	Title: Molecular determinants of panlobular emphysema: A Stereology based approach		

Dr. Leung is now an Early Career Investigator at the HLI. Details about her research can be found on page 15.

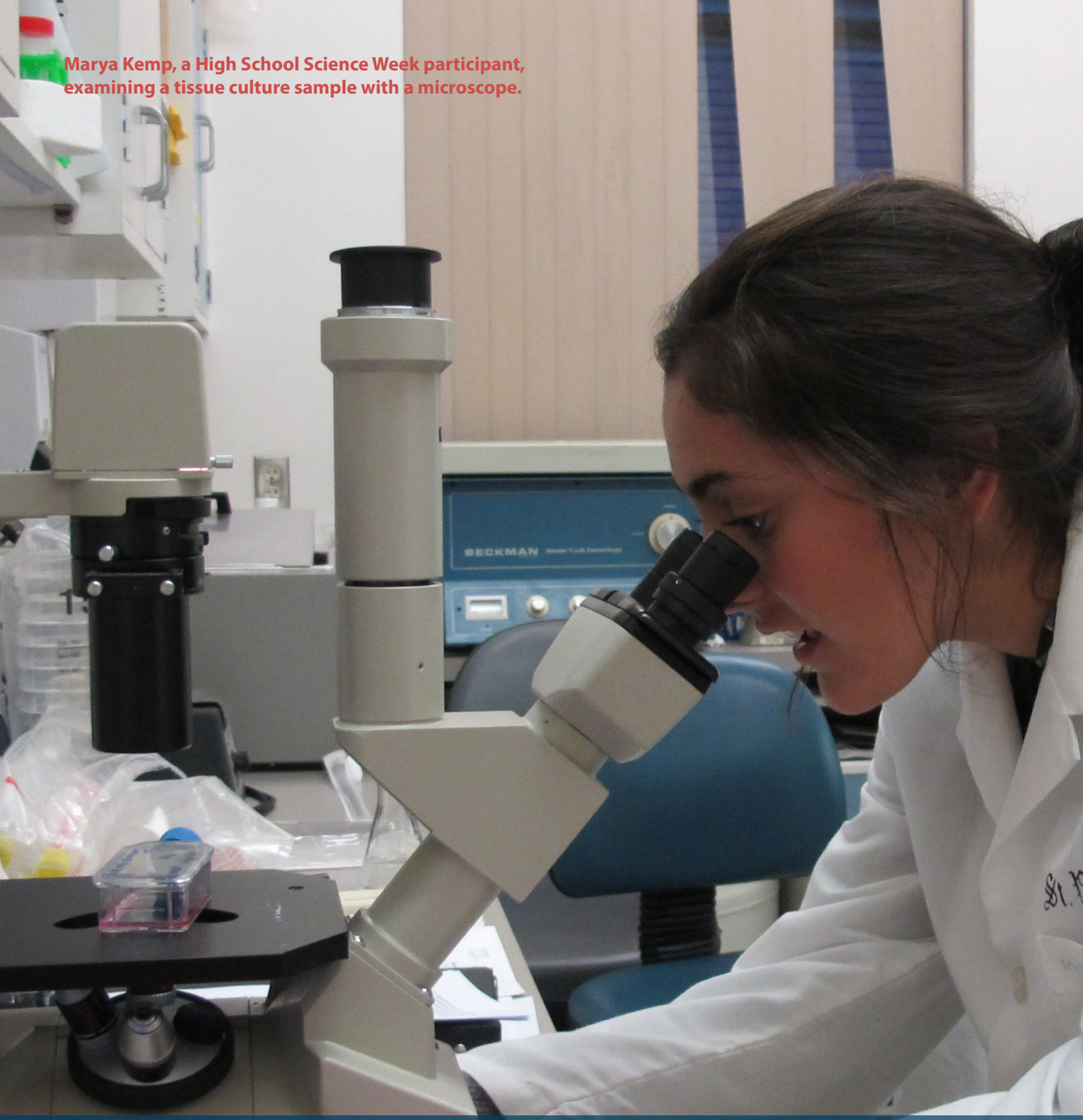
Other Trainee and Staff Awards and Recognitions

Name	Award	Awarding Body
Akhabir, Loubna	Travel Award	AllerGen
Akhabir, Loubna	Travel Award	UBC Postdoctoral Office
Chen, Rachel	Poster selected for the CTS Poster Competition	American Thoracic Society
Chen, Roy Yu-Wei	Travel Award	American Thoracic Society
Koo, Hyun-Kyoung	Abstract Scholarship Award	American Thoracic Society
Koo, Hyun-Kyoung	Abstract selected for the CTS Poster Competition	American Thoracic Society
Leung, Janice	Abstract Scholarship	American Thoracic Society/National Emphysema Foundation
Leung, Janice	Finalist for the CTS Poster Competition	American Thoracic Society
Ngan, David	2nd place in the AllerGen 2015 HQP Video Competition	AllerGen
Ngan, David	# Friendly Instagram Competition @ ATS2015	American Thoracic Society
Obeidat, Maen	Abstract Award	American Thoracic Society
Schaeffer, Michelle	Abstract Scholarship	American Thoracic Society Assembly on Nursing
Schaeffer, Michelle	Abstract selected for the CTS Poster Competition	American Thoracic Society
Shen, Steve	BCVS Abstract Travel Grant	American Heart Association
Singhera, Gurpreet	Travel Award	AllerGen
Sze, Marc	Travel Award Honouring Claude Lenfant	American Thoracic Society/National Emphysema Foundation
Vasilescu, Dragos	Abstract Scholarship	American Thoracic Society Respiratory Structure Function Assembly
Yang, Jasmine	# Friendly Instagram Competition @ ATS2015	American Thoracic Society

TRAINEE CAREER PATHS

In 2015, nine of our trainees finished their training at the HLI and moved on along impressive scientific career paths.

Trainee	Supervisor (s)	Start/End Date	Degree/Study Level	Present Position
Chris Fjell	John Boyd	Feb 2012 - Aug 2015	postdoctorate	Health Research Data Scientific Analyst, ARC, CHHM, VCHRI, MedIT, UBC
Leigh Parkinson	David Granville	Sep 2012 - Aug 2015	postdoctorate	Master of Physical Therapy candidate, UBC
Mehul Sharma	David Granville	Sep 2013 - Oct 2015	MSc	UBC Medical School applicant
Dorota Stefanowicz	Tillie Hackett	Sep 2014 - Dec 2015	postdoctorate	Research Programs Manager at Genome BC
Marc Sze	James Hogg	Sep 2012 - Sep 2015	PhD	Postdoctoral Fellow at University of Michigan
Jun Hou	Honglin Luo	Mar 2014 - Feb 2015	visiting scientist	Associate Professor, Chengdu Hospital, China
Christopher Pascoe	Peter Pare	Sep 2011 - Aug 2015	PhD	Postdoctoral Fellow at Children's Hospital Research Institute of Manitoba
Brandon Norris	Chun Seow	5/1/2013 - Dec 2015	MSc	Medical Student at the University of Brisbane, Australia
Kunihiko Hiraiwa	Stephan Van Eeden	May 2012 - Mar 2015	postdoctorate	Medical Director, Department of Surgery, Inagi Municipal Hospital, Japan



Marya Kemp, a High School Science Week participant, examining a tissue culture sample with a microscope.

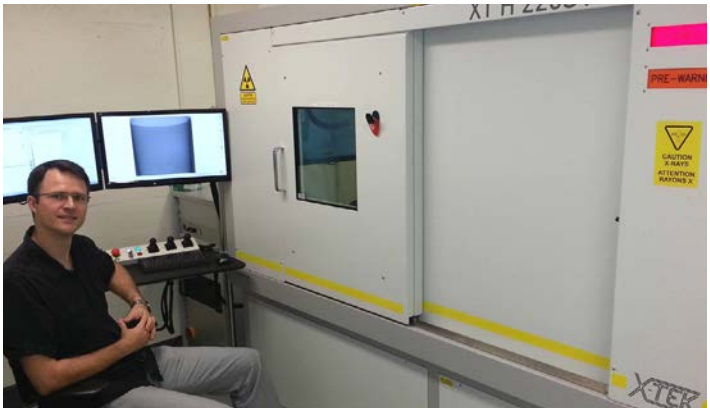
HLI OPERATIONS

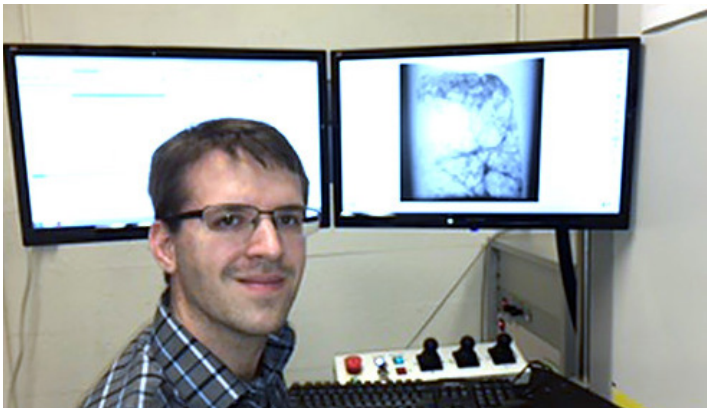
Centre Operational Highlights

Laboratory Equipment Acquisitions

In 2015, HLI continued to acquire much needed equipment with our third Canada Foundation for Innovation (CFI) Award, completing renovations and installations. Our Cellular Imaging Biophysics Core received a new Nikon micro computed tomography scanner enabling imaging of lung, heart, and bone tissue samples. Under the expert direction of Dr. Dragos Vasilescu and with the technical skills of Dr. Aaron Barlow, this new technology will stimulate collaborations and result in increased core service use by internal and external users.

Left: Postdoctoral fellow Dr. Dragos Vasilescu with the new XT H 225ST micro computed tomography scanner.
Right: MicroCT specialist Dr. Aaron Barlow reviews microCT scans.





Laboratory Safety in 2015

The Health and Safety Team held its first HLI Safety Day in 2015 with educational presentations on security, conflict management as well as a Code Red Fire Safety drill and Safety Awards. Throughout the year, under the leadership of Rich Wambolt, the team continued to achieve many goals including significantly reducing our chemical waste inventory, completing lab inspections and ensuring training and safety were kept on track.

Left: The HLI Health Safety and Environment Team.
Right: Technician Yeni Oh (left) and Research Associate Dr. Gurpreet Singhera, winners of the HLI Safety Day Awards.

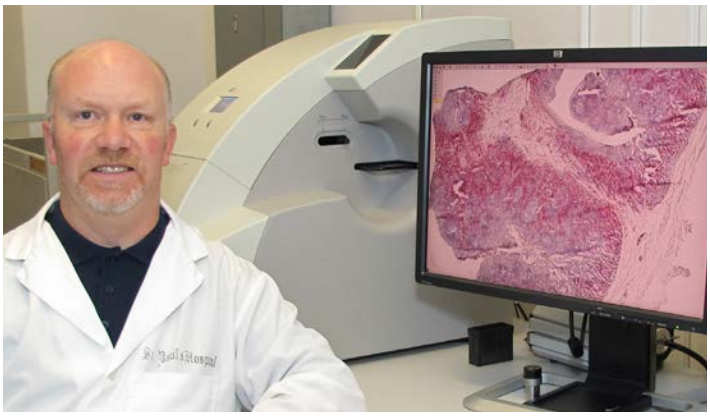
Digital Slide Scanning and Imaging Services

Digital Slide Scanning Services continued to attract more users and support international research programs while Imaging Services added fabric and banner printing to its repertoire of poster printing services.

Preclinical Services

The staff of the GEM (Genetically Engineered Models) facility continued to contribute to UBC Facility Management and Policy Development Committees and also acquired new CFI funded housing and containment equipment. The GEM group completed successful inspections with UBC and CCAC, ensuring the highest training standards and animal care were delivered.

Left: Imaging specialist, Mr. Dean English, with an Aperio slide scanner image.
Right: Dr. Don Sin's lab members Sheena Tam and David Ngan participate in a patient and donor education tour which allows HLI to share our research with those who benefit the most – patients.



Clinical Research Core

The Clinical Research Core (CRC), now in its 2nd year, continues to provide ethics and research project management services within HLI. In 2015 the CRC oversaw 54 research projects and submitted 16 new ethics applications.

IT Services

HLI's Information Technology team was busy with expansion of databases for Canadian FH, Interstitial Lung Disease and the HLI Lung Registry. The CF Lung registry's initial test environment was installed along with BC Cancer lung screening. Long awaited network upgrades for the 2nd floor of the Macdonald building were completed. They also upgraded the core networking to 10 Gb with plans to integrate the new Micro-CT. Upgraded -80°C freezer monitoring environment with future plans for adding fridge monitoring.

Cardiovascular and Lung Tissue Registry

The HLI Cardiovascular and Lung Tissue Registry was successful in their proposal (Hackett & Smits) for funding from the James Hogg iCAPTURE endowment, St. Paul's Hospital Foundation and the Providence Health Care Research Institute and will begin renovations in 2016 on our new state-of-the-art sample storage facilities. The newly expanded facility will ensure sustainability of the registry facilities and provide continued access for investigators worldwide (230 independent projects) to further grow our 30 year old registry.

Maitenance and Equipment Management Services

The Maintenance and Equipment Management Team continued with a busy schedule of equipment repair, answering over 115 maintenance service ticket requests and upgrading trainee seating areas. They also provided renovation expertise to build a third freezer room, which supports expansion of our biobanking and clinical programs.

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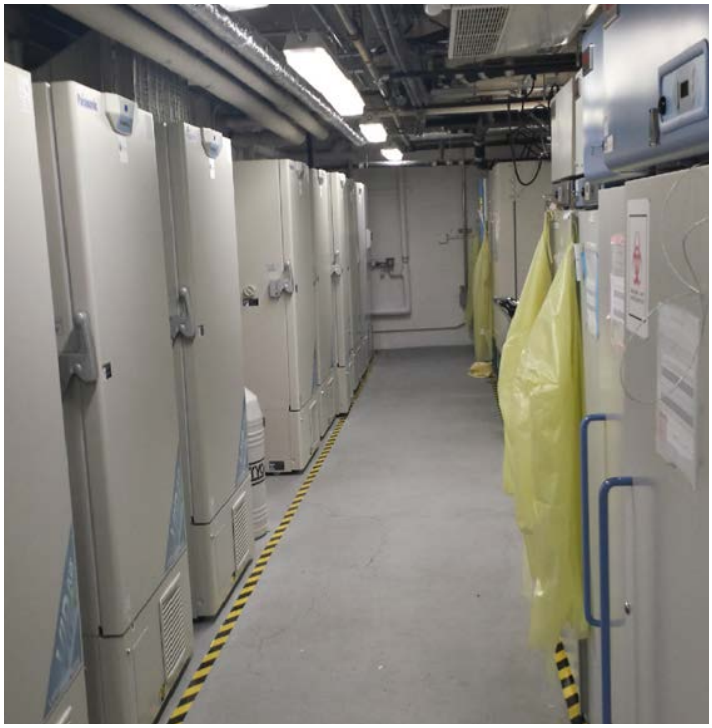
Photos: Renovations for our third freezer room were completed and -80C storage units were installed allowing for further expansion of our cold storage program.



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
- New expanded formalin storage facility

Cellular Imaging & Biophysics

- Automatic tissue processing capabilities
- Nikon Model XTH225ST Micro Computed Tomography System
- 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

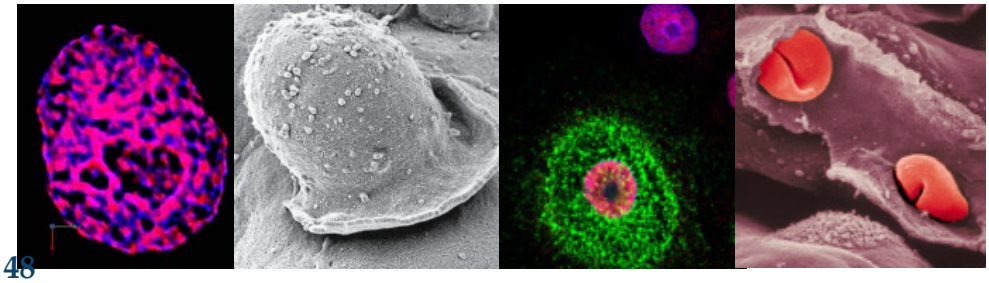
Clinical Research

- 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
- Secure web development

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



a place of mind
UBC

Facility Users

36 Scientists at the HLI and **728 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

Demand	Total number of users 2014-2015	
	Request for Access	Access Accommodated
HLI Biobank	63	63
HLI Databases (DNA, RNA, Protein, Phenotype)	203	203
HLI Technology Cores	462	462
Geographic Distribution of Users		
Non-HLI UBC	188	188
Non-UBC Local	144	144
Rest of British Columbia	5	5
Alberta	16	16
Manitoba	14	14
Newfoundland and Labrador	1	1
Nova Scotia	6	6
Ontario	44	44
Quebec	48	48
Saskatchewan	11	11
International	251	251
Total	728	728

Events at the HLI

Science Expo BC

HLI Trainee Stephanie Santacruz (left) facilitating the workshop on heart and lung disease

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 approximately 60,000 students at 120 high schools.

"Endeavor" was the theme chosen for Science Expo 2015, with the aim of demonstrating, to students, advancements in STEM and the major impact these innovations have on our world. HLI participated in the Dynamic Duo (Lung and Heart) workshops for a 2nd year. For the workshop HLI organized a display booth showcasing different heart and lung diseases, as well as the real tests doctors use to diagnose them.

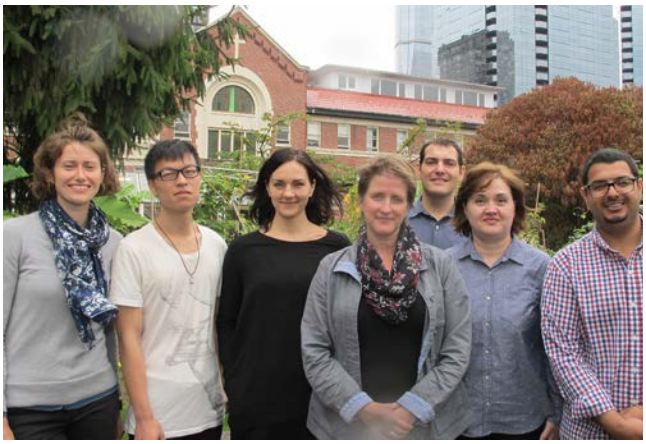
Breathing as One – Lung Association Tour for Patients and Donors

Breathing as One is a national fundraising campaign to support The Lung Association's new National Respiratory Research Strategy which aims to push beyond the traditional boundaries of lung research, leverage new knowledge, create the highest standards of treatments for respiratory diseases and attract the brightest medical minds to lung research in Canada. In February 2015, the HLI opened its doors to host a tour of its research facilities and lung tissue registry for donors and patients.

BC Lung Association President Scott McDonald's making opening remarks at the Breathing as One –HLI tour

HLI's Dr. Don Sin, Dr. Mark Eliott and Mr. Paul Hanson demonstrating HLI Lung Registry samples to 'Breathing as One' donors

Lung Health Day



Dr. Pat Camp and her team (from left: Dr. Jessica Inskip, Walden Cheung, Ashley Kirkham, Dr. Pat Camp, Ori Benari, Carmen Sima, Ali Alasmari)

Dr. Pat Camp, Robin Roots (Coordinator of Clinical Education Northern and Rural Cohort), MPT2 NRC student Mary Edgar, Postdoctoral Fellow Dr. Jessica Inskip, and MSc student Walden Cheung were in Takla Landing, a remote First Nations community north of Fort St James, on September 25, 2015 to work in partnership with the Takla Lake First Nation and Carrier Sekani Family Services to host a "Breathe Well to Live Well" Lung Health Day.

This event included meeting members of the community; talking about breathing and lung health; and inviting the community to participate in lung function and physical function testing. It also enabled an initial discussion about how tele-technology can be utilized to provide pulmonary tele-rehabilitation to remote and rural areas of BC.

BC Lung Association's Bicycle Trek for Life and Breath

The HLI Road Hoggs participated in BC Lung Association's Bicycle Trek for Life & Breath on September 12th and 13th, cycling 200 kms from White Rock to Cultus Lake and back. The team exceeded their fundraising goal, raising over $10,000 to support critical medical research, patient support programs and clean air initiatives.

Our team of heart and lung research professionals is called The Road Hoggs in honor of centre founder and world-renowned lung researcher, Dr. James Hogg.

Bring Your Kids to Work Day

Every year HLI invites its members to participate in Take Your Kid to Work Day. To demonstrate the inner workings of a biomedical research lab, volunteers from the Centre put together a day's worth of fun and educational events for the children. In 2015, the Centre had four students attend this exciting day of activities.

Safety Day

Laboratory and workplace safety is a key priority of HLI's day-to-day operations. Every year we hold a fun filled Safety Day event to acknowledge and reaffirm our commitment to this priority.

Lights of Hope

Every year the HLI supports the St. Paul's Hospital Lights of Hope Campaign. This year we earned a Gold Star on the Lights of Hope Display. This means HLI members have donated over $20,000 to the Lights of Hope in 2014!

HLI Tours and Open Houses

The HLI conducts tours and open houses for the public and specific groups throughout the year. In May 2015 we hosted a Chinese Business Leaders' Tour and a St. Paul's Hospital Foundation Tour for new members of the foundation Board. All HLI Principal Investigators and Research Staff contribute to these tours.

HLI in the News

HLI's trainee Dr. Leigh Parkinson talks about his breakthrough research of skin aging on 'The Science Show' in Australia

Dr. Leigh Parkinson, a postdoctoral fellow in Dr. David Granville's lab at the HLI, was interviewed on ABC Australia's 'The Science Show' in March 2015 about his research on Granzyme B. While studying the effect of this enzyme on cardiovascular disorders, researchers in the Granville lab noticed a marked difference in the skin of mice lacking Granzyme B. Dr. Parkinson and his colleagues have shown that when mice lacking Granzyme B are exposed to ultraviolet light, they develop less wrinkles and have better collagen integrity compared to normal mice. Granzyme B accumulates between cells where it damages proteins and leads to wrinkles and a breakdown of skin structure. The study was published in the journal *Aging Cell* in February of 2015. The Granville lab is now busy developing inhibitors of this enzyme in order to treat inflammatory and age-related conditions of the skin, respiratory, musculoskeletal, cardiovascular, and neurological systems.

> *Granzyme B deficiency protects against skin damage after exposure to UV light*

Photo: Dr. Parkinson working with the experimental "tanning bed" to expose mice to UV light.

Publication: Parkinson LG, Toro A, Zhao H, Brown K, Tebbutt SJ, Granville DJ. Granzyme B mediates both direct and indirect cleavage of extracellular matrix in skin after chronic low-dose ultraviolet light irradiation. Aging cell. 14(1):67-77, 2015.

The Science Show, ABC Australia, 14 March 2015
Skin damage following UV exposure traced to enzyme
http://www.abc.net.au/radionational/programs/scienceshow/skin-damage-following-uv-exposure-traced-to-enzyme/6315758

HLI Research holds promise - photo essay in the Promise Magazine

The exciting research being conducted at the HLI was featured in the St. Paul's Foundation's Promise Photo Essay in April 2015 and the Promise Magazine in September 2015. Highlights included Dr. Gordon Francis' research examining smooth muscle cells from HLI's heart registry to investigate cholesterol accumulation in arteries, and Dr. Don Sin's research on developing biomarkers to identify patients in the early stages of COPD and those at risk of acute exacerbations of COPD. HLI facilities were also featured, including the Fluorescence Activated Cell Sorting (FACS) system, which separates and labels cells with fluorescent dye, and the HLI heart and lung tissue registries, which include more than 50,000 lung and 14,000 heart specimen donated by patients undergoing heart or lung surgery over the past 33 years.

Photo, from left: Dr. Michael Sedman (Acting Director of the Heart Registry), Dr. Mark Elliot (Manager of the Lung Registry) and Dr. Tillie Hackett (Director of the Lung Registry and Associate Director of HLI).

Photo essay, The Promise Magazine, St.Paul's Hospital Foundation, Spring/Summer 2015
http://www.helpstpauls.com/app/uploads/2015/04/Promise-Sprg_Summ2015_PhotoEssay.pdf

HLI's Dr. Andrew Krahn getting to the heart of inherited heart rhythm disorders

Some stories speak to your heart, literally. In May of 2015, North Shore News wrote an article featuring Dr. Andrew Krahn, who was appointed as the Paul Brunes UBC Professor in Heart Rhythm Disorders in 2012. The Professorship was established by Mr. Per Brunes in partnership with the VGH and UBC Hospital Foundation in honor of his son, Paul Brunes, who died suddenly at the age of 31 after suffering cardiac arrest due to an undiagnosed cardiac arrhythmia. Dr. Krahn is an internationally recognized expert in the management of cardiac arrhythmias and is currently conducting research on the genetics and diagnosis of cardiac arrhythmias in order to better serve the estimated 7000 people in BC affected by an inherited heart rhythm disorder.

7,000 people in B.C. are affected by an inherited heart rhythm disorder

North Shore News, 3 May 2015
Getting to the heart of the matter: Professorship brings cardiac arrhythmias to the forefront in B.C.
http://www.nsnews.com/news/getting-to-the-heart-of-the-matter-1.1873023

Clearing the haze on the haze: HLI's Dr. Chris Carlsten interviewed by CTV News

More than 200 wildfires burned across BC in the summer of 2015 causing poor air quality and public concern about the negative effects of smoke inhalation. In July, the HLI's Dr. Chris Carlsten, who holds the endowed Chair in Occupational and Environmental Lung Disease at UBC, was interviewed on CTV News to discuss the short and long-term health effects of breathing in the smoke-filled air that blanketed much of Greater Vancouver. He advised the public about the precautions that should be taken under the current conditions, particularly for those in high-risk populations, including the elderly, young children, and those with chronic lung conditions.

What are the effects of inhaling smoky air?

CTV News, July 2015
What are the health risks of inhaling smoky air?
http://bc.ctvnews.ca/video?clipId=651499&binId=1.1184756&playlistPageNum=1

Dr. Brad Quon interviewed on CBC News about recent advances in cystic fibrosis research

The HLI's Dr. Bradley Quon, a respirologist at the Vancouver Adult Cystic Fibrosis Clinic at St. Paul's Hospital, was interviewed by the CBC on the recent progress in cystic fibrosis research. In the interview, also featured in an article on the CBC website, Dr. Quon discussed how there are now more adults living with cystic fibrosis in Canada than children due to the increased life expectancy of those suffering with this disease. This is largely a result of major research breakthroughs, particularly in the treatment of cystic fibrosis. While treatment used to be based on treating the complications of cystic fibrosis, such as mucus production and respiratory infections, new drugs are being developed to target the underlying protein defect that causes cystic fibrosis. Ultimately, this will not only increase the life expectancy of cystic fibrosis patients, but will also improve their quality of life by decreasing the enormous burden of an intense treatment load.

> *More adults now live with cystic fibrosis in Canada than children*

CBC News, 7 November 2015
Cystic fibrosis research: celebrating advances, helping seniors cope
http://www.cbc.ca/news/canada/british-columbia/cystic-fibrosis-research-celebrating-advances-helping-seniors-cope-1.3309220

Drs. Liam Brunham and Don Sin talk to Global News about the need for a new St. Paul's Hospital

Global News interviewed HLI's Dr. Liam Brunham, a new PI and physician in St. Paul's Healthy Heart Program, and Dr. Don Sin, the 2nd leading COPD expert in the world (Expertscape.com), about the need for a new St. Paul's Hospital. Although St. Paul's is a world-class teaching and research hospital, a major constraint is its current facilities and aging infrastructure, which create obstacles for conducting research and recruiting young stars in emerging research areas. The new St. Paul's Hospital will be three times the size of the current one and includes plans for a new research tower.

> *It's hoped a new St. Paul's Hospital will help attract and keep some of our country's best medical minds.*

Photo: Dr. Don Sin in an interview with Global News.

Global News, 15 November 2015
St. Paul's Hospital impacted by brain drain
http://globalnews.ca/news/2331694/st-pauls-hospital-impacted-by-brain-drain

More News Stories

InMed collaborates with HLI's Dr. Pascal Bernatchez to launch a study on cannabis-based COPD therapy

In June 2015 a Lung Disease News article featured research being conducted by InMed Pharmaceuticals in collaboration with the HLI's Dr. Pascal Bernatchez to find cannabis-based treatments for COPD. Their research focuses on the ability of THC, the most significant active ingredient in cannabis, to cause short-term bronchodilation and reduce inflammation of the airways.

Lung Disease News, 5 June 2015
InMed Launches Study on Cannabis-Based COPD Therapy
http://lungdiseasenews.com/2015/06/05/inmed-launches-study-cannabis-based-copd-therapy/

Mother and son share a genetic risk of sudden cardiac arrest

In September 2015 The Heart and Stroke Foundation's blog featured an article about the research of inherited cardiac conditions conducted by the HLI's Dr. Andrew Krahn. Dr. Krahn oversees a national registry of patients who experience unexplained cardiac arrest, in order to understand the genetic basis of potentially fatal inherited heart abnormalities. Dr. Krahn aims to develop tests to detect these conditions in individuals and their family members, such as April Kawaguchi and her son Andrew, both of whom suffer from long Q-T syndrome, a disorder of the heart's electrical system that puts healthy people at risk of cardiac arrest.

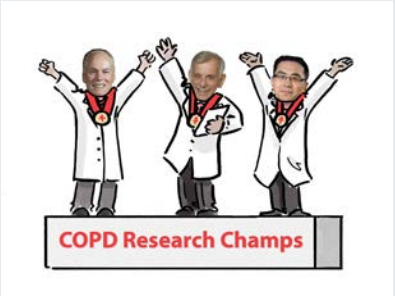
Heart and Stroke Foundation Blog, 23 September 2015
Mother and son share a genetic risk: Researchers are closing in on the inherited factors that put April and Andrew at risk for cardiac arrest.
http://blog.heartandstroke.ca/2015/09/mother-and-son-share-a-genetic-risk/

The Canadian Lung Association features HLI PIs in honour of Lung Month

In honour of Lung Month, The Canadian Lung Association did spotlights on Drs. Pat Camp, Jeremy Hirota, Don Sin, and Chris Carlsten on its blog. In a series of articles, these prominent lung health researchers discussed the focus of their research programs, examples of their significant research studies, their goals for improving the lives of patients, and their visions for future research in their fields.

Canadian Lung Association blog
'5 minutes with...' series
http://blog.lung.ca/2015/11/

BC Lung Association celebrates World COPD Day with a shout out to Drs. Peter Pare, James Hogg, and Don Sin, "COPD Research Champs"



The BC Lung Association celebrated World COPD Day with a shout out to Drs. Peter Paré, James Hogg, and Don Sin on their Facebook page in honor of their "life-changing work" dedicated to improving the lives of COPD patients.

BC Lung Association
https://www.facebook.com/BCLungAssociation/photos/a.180902652822.124912.127899757822/10153163577667823/?type=3&theater

Knowledge Translation

The HLI currently hosts five UBC spin-off companies including Cyon Therapeutics, viDA Therapeutics Inc, Aspect Biosystems, Black Tusk, and PROOF Centre.

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 two 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: cyontherapeutics.com/about

viDA Therapeutics: Novel Treatments for Inflammatory and Age-related Diseases

Founded in 2008 by Dr. David Granville, viDA Therapeutics is committed to the discovery, development and commercialization of novel and targeted therapeutics for the treatment of inflammatory and age-related diseases. Their unique discovery platform is based on novel research regarding a distinctly different and recently identified, extracellular role for Granzymes in the destruction and inflammation of tissues. Source: vidatherapeutics.com

Aspect Biosystems: Human Tissues on Demand

Dr. Sam Wadsworth, leading cell biologist at the HLI, co-founded the award-winning biotechnology company, Aspect Biosystems Ltd., in November, 2013 with Dr. Konrad Walus' research group. Aspect Biosystems specializes in 3D bioprinting and tissue engineering, bringing together a multi-talented team of individuals to develop cutting-edge custom human tissue technology for use in the life sciences. Source: aspectbiosystems.com

PROOF Centre: Biomarkers to prevent organ failure

The PROOF (Prevention of Organ Failure) Centre is a not-for-profit organization that develops blood tests to better predict, diagnose, manage and treat heart, lung and kidney disease. PROOF is a cross-disciplinary biosignature development engine of partners representing academia, health care, government, industry, patients and the public. The PROOF Centre, led by HLI PI and former HLI Director Dr. Bruce McManus, was initially established by the Networks of Centres of Excellence Secretariat under the Centre of Excellence for Commercialization and Research (NCE CECR) Program, and is co-hosted by the University of British Columbia and Providence Health Care in Vancouver, British Columbia, Canada.
Source: proofcentre.ca

Black Tusk Research Group Inc.

Founded in 2014, by HLI Clinical Research Core Manager Ms. Lynda Lazosky and HLI PI Dr. John Boyd, Black Tusk Research Group Inc. is a site monitoring organization supporting clinical trials and biobanking. BTRG supports Principal Investigators initiate and manage pharmaceutical phase II, III and IV clinical trials and academic grant funded clinical research projects.

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:

Adiga Life Sciences Inc.
Agartee Technology Inc.
AllerGen NCE
Alpha-1 Foundation
AMGEN Canada Inc.
AstraZeneca Canada Inc.
Bayer AG
Boehringer Ingelheim Ltd.
British Columbia Knowledge Development Fund (BCKDF)
British Columbia Proteomics Network
Canada Foundation for Innovation
Canadian Diabetes Association
Canadian Institutes of Health Research (CIHR)
Canadian Respiratory Research Network
Cyon Therapeutics Inc.
Cystic Fibrosis Canada
Cystic Fibrosis Foundation (US)
Genentech Inc.
Genome British Columbia
Gilead Sciences Inc.
GlaxoSmithKline
Grifols Shared Services North America Inc.
Heart and Stroke Foundation of Canada
Hoffmann-La Roche Ltd. (Canada)
Industrial Research and Development Internship (IRDI) Program - NCE
Industry Canada
InterMune Inc.
Ionis Pharmaceuticals Inc.
Janssen Inc.
La Jolla Pharmaceutical Company
Leading Biosciences Inc.
Merck Sharp & Dohme Corp.
Michael Smith Foundation for Health Research
National Institutes of Health
National Research Council
Natural Sciences and Engineering Research Council of Canada (NSERC)
Novartis Pharmaceuticals Canada Inc.
Octapharma Canada Inc.
Pharmaxis Ltd.
ProMetic Life Sciences Inc.
PROOF Centre of Excellence
Providence Health Care Research Institute (PHCRI)
Province of British Columbia
Respivert Ltd.
RxSource Corp.
St. Paul's Hospital Foundation
The Lung Association
Trius Therapeutics Inc
UBC Department of Medicine
Vertex Pharmaceuticals Inc.
viDA Therapeutics Inc.

We are grateful to the following individuals for their assistance in the creation of this report: Yuliya Shapova, Alexandra Robertson, Richa Anand, Kim Schmidt, Abbie Wright, Claire Smits, 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. However, 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 Hospital FOUNDATION
Inspired care.

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

UBC a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

University of British Columbia
Development and Alumni Engagement
500 - 5950 University Blvd
Vancouver, BC Canada V6T 1Z3
Phone: 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 2015 – March 2016)

PI Name	Funding Agency	Funding Program	Award Amount ($CAD)	Project Title	Award Type
Bernatchez, Pascal	Heart and Stroke Foundation of Canada	Grant-in-Aid	88,645	Aberrant endothelial mechano-sensing is a cause of early atherosclerosis and a pharma-cological target	Operating
Boyd, John	Trius Therapeutics Inc		12,941	A Phase 3 Randomized Double-Blind Study Comparing TR701 FA and Linezolid in Ventilated Gram-positive Nosocomial Pneumonia (TR701-132)	Cinical Trial
Boyd, John	Leading Biosci-ences Inc.		6,200	Treatment of Septic Shock by Inhibiting Autodigestion and Preserving Gut Integrity with Enteric LB1148 (SSAIL Study)	Operating
Boyd, John	La Jolla Pharmaceu-tical Company		7,615	A Phase 3, Placebo-Controlled, Randomized, Double-Blind, MultiCenter Study of LJPC-501 in Patients with Catecholamine-Resistant Hypotension (CRH)	Clinical Trial
Boyd, John	Cyon Therapeutics Inc.		62,952	PCSK9 Inhibitors for SIRS, Sep-sis and Septic Shock	Contract
Boyd, John	Canadian Institutes of Health Research (CIHR)	CIHR Doctor-al Research Award	35,000	A novel laboratory model of organ donation after circula-tory death (DCD): Investigating cardiac injury associated with the DCD process, viability of DCD hearts, and the impact of pre-treatment strategies	Fellowship (Non-Faculty)
Brunham, Liam	UBC Department of Medicine		33,000	Startup funds	Operating
Brunham, Liam	Providence Health Care Research Insti-tute (PHCRI)		75,000	Startup funds	Operating
Brunham, Liam	Heart and Stroke Foundation of Canada	Emerging Research Leaders Initiative	49,420	Genomic markers of leukoara-iosis in patients with premature vascular disease	Operating
Brunham, Liam	Canadian Institutes of Health Research (CIHR)	Travel Awards - Institute Community Support	1,200	Targeted next-generation se-quencing to diagnose abnor-malities of HDL cholesterol	Operating

Brunham, Liam	Canadian Institutes of Health Research (CIHR)	Transitional Operating Grant	100,000	Modeling the functional impact of genetic variants associated with doxorubicin-induced cardiotoxicity in genome-edited isogenic human cells	Operating
Brunham, Liam	Heart and Stroke Foundation of British Columbia and Yukon	Knowledge to Action Grant	40,000	SAVE-BC: Study to avoid vascular events in British Columbia	Operating
Camp, Pat	Canada Foundation for Innovation	Infrastructure Operating Fund	7,500	CFI Infrastructure Operating Fund	Operating
Camp, Pat	British Columbia Lung Association	Respiratory Rehabilitation Fellowship	12,500	Pulmonary rehabilitation in rural BC: Engaging with communities to create novel telehealth approaches	Fellowship (Non-Faculty)
Camp, Pat	Canadian Institutes of Health Research (CIHR)	Planning and Dissemination Grant - Institute Community Support	12,000	Pulmonary rehabilitation in rural BC: Engaging with aboriginal communities to create novel telehealth approaches	Operating
Daley, Denise	Canadian Institutes of Health Research (CIHR)	Team Grant: Canadian Epigenetics, Environment, and Health Research Consortium (CEEHRC)	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	Canadian Institutes of Health Research (CIHR)	Undergraduate Summer Student Program	5,000	Peanut allergy genome-wide association study - quality control and genetic association analysis	Fellowship (Non-Faculty)
DeMarco, Mari	British Columbia Proteomics Network - Michael Smith Foundation for Health Research (MSFHR)	Undergraduate Training Program in Proteomics	2,800	Investigating the role of a-synuclein as a diagnostic biomarker for neurodegenerative disorders	Fellowship (Non-Faculty)
Dorscheid, Delbert R.	Bayer AG		1,850	A Prospective, Randomized, Double-Blind, Placebo-Controlled, Multicenter Study to Evaluate the Safety and Efficacy of BAY 41-6551 as Adjunctive Therapy in Intubated and Mechanically-Ventilated Patients with Gram-Negative Pneumonia	Clinical Trial

Dorscheid, Delbert R.	AstraZeneca Canada Inc.		15,000	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	Clinical Trial
Dorscheid, Delbert R.	Novartis Pharmaceuticals Canada Inc.		16,552	"REal-LIfe" EFfectiveness and safety of omalizumab in patients with severe allergic asthma: The Latin American and Canadian experience (RELIEF)	Clinical Trial
Dorscheid, Delbert R.	AstraZeneca Canada Inc.		7,467	A Multicentre, Randomized, Parallel Group, Phase 3 Safety Extension Study to Evaluate the Safety and Tolerability of Benralizumab (MEDI-563) in Asthmatic Adults and Adolescents on Inhaled Corticosteroid Plus Long-acting β2 Agonist	Clinical Trial
Dorscheid, Delbert R.	Canadian Institutes of Health Research (CIHR)	Randomized Controlled Trials	7,600	OSCILLATE Knowledge Translation – an Audit of ARDS Management	Clinical Trial
Dorscheid, Delbert R.	British Columbia Lung Association		25,000	Conjugated linoletic acid (CLA) - A novel and natural anti-viral and anti-inflammatory molecule in asthma	Grant
Francis, Gordon A.	Ionis Pharmaceuticals, Inc.		12,267	A Randomized, Double-Blind, Placebo-Controlled, Phase 3 Study of ISIS 304801 Administered Subcutaneously to Patients with Familial Chylomicronemia Syndrome (FCS) - The APPROACH study	Clinical Trial
Francis, Gordon A.	Ionis Pharmaceuticals, Inc.		26,444	A Randomized, Double-Blind, Placebo-Controlled Phase 3 Study of ISIS 304801 Administered Subcutaneously to Patients with Hypertriglyceridemia	Clinical Trial
Francis, Gordon A.	AMGEN Canada Inc.		70,000	British Columbia physician education program in familial hyperlipidemia screening, diagnosis and management	Operating
Francis, Gordon A.	St. Paul's Hospital Foundation		385,000	Molecules to man: enhanced phenotyping for the discovery, prevention and treatment of heart, lung and blood vessel disease	Operating

Francis, Gordon A.	Canada Foundation for Innovation	Infrastructure Operating Fund	157,540	Molecules to human: enhanced phenotyping for discovery, prevention, & treatment of heart, lung, & blood vessel disease	Operating
Francis, Gordon A.	Michael Smith Foundation for Health Research	Postdoctoral Trainee Fellowship	24,208	The role of arterial smooth muscle cells in foam cell formation in atherosclerosis	Fellowship (Non-Faculty)
Francis, Gordon A.	Heart and Stroke Foundation of British Columbia and Yukon	Bridge Grant	65,000	Smooth muscle cells as a site of cholesterol accumulation and target for intervention in atherosclerosis	Operating
Granville, David J.	Canadian Institutes of Health Research (CIHR)	Operating Grant: Industry-Partnered Collaborative Research	40,369	Topical Granzyme B inhibitor research and development	Operating
Granville, David J.	Province of British Columbia		5,000	The effect of Granzyme B on photoaging	Operating
Granville, David J.	Industry Canada		5,000	The effect of Granzyme B on photoaging	Operating
Granville, David J.	viDA Therapeutics Inc.		5,000	The effect of Granzyme B on photoaging	Operating
Granville, David J.	Canadian Diabetes Association	Operating Grant	100,000	Granzyme B in non-healing diabetic skin ulcer pathogenesis	Operating
Granville, David J.	RxSource Corp.		10,000	Drug Re-Purposing: Assessing Approved Drugs for Anti-Fibrotic Activity	Contract
Granville, David J.	British Columbia Lung Association	Basic Science Research	25,000	Extracellular Granzyme B and pulmonary epithelial barrier disruption	Operating
Granville, David J.	Canadian Institutes of Health Research (CIHR)	Foundation Scheme : 2014 1st Live Pilot - Stage 2	297,902	Granzymes in tissue injury, inflammation and repair	Operating
Guenette, Jordan A.	Providence Health Care Research Institute (PHCRI)		1,070	Research Start-up Funds from PHCRI, UBC Dept of Physical Therapy and JHRC. and Drs. Donald Sin, Peter Pare & Bruce McManus	Operating
Guenette, Jordan A.	Natural Sciences and Engineering Research Council of Canada (NSERC)	Discovery Grants Program - Individual	30,000	Respiratory and locomotor muscle blood flow regulation during physiological stress	Operating
Guenette, Jordan A.	Canada Foundation for Innovation	Infrastructure Operating Fund	7,500	CFI Infrastructure Operating Fund	Operating

Guenette, Jordan A.	Natural Sciences and Engineering Research Council of Canada (NSERC)	Engage Grants Program	25,000	Evaluation of the Ezibreath in patients with chronic obstructive pulmonary disease	Operating
Guenette, Jordan A.	Canadian Respiratory Research Network	Emerging Research Leaders Initiative Grant	50,000	Mechanisms of dyspnea and exercise intolerance in patients with chronic respiratory diseases	Operating
Guenette, Jordan A.	Canadian Institutes of Health Research (CIHR)	Institute Community Support Award	1,200	Respiratory mechanisms and muscle activation patterns during inspiratory muscle training	Award (Non-Faculty)
Guenette, Jordan A.	Agartee Technology Inc.		2,500	Modification of wake/sleep identification algorithms in an innovative actigraph platform against polysomnography in patients with chronic obstructive pulmonary disease	Award (Non-Faculty)
Guenette, Jordan A.	Province of British Columbia		5,000	Modification of wake/sleep identification algorithms in an innovative actigraph platform against polysomnography in patients with chronic obstructive pulmonary disease	Award (Non-Faculty)
Guenette, Jordan A.	Industry Canada		5,000	Modification of wake/sleep identification algorithms in an innovative actigraph platform against polysomnography in patients with chronic obstructive pulmonary disease	Award (Non-Faculty)
Guenette, Jordan A.	National Research Council	Industrial Research Assistance Program (IRAP)	2,500	Modification of wake/sleep identification algorithms in an innovative actigraph platform against polysomnography in patients with chronic obstructive pulmonary disease	Award (Non-Faculty)
Hackett, Tillie Louise	Canadian Institutes of Health Research (CIHR)	Operating Grant	138,623	Resetting epithelial differentiation as a novel therapeutic approach to treating asthma	Operating
Hackett, Tillie Louise	Canadian Institutes of Health Research (CIHR)	Operating Grant	113,326	Molecular determinants of small airway obstruction in COPD	Operating
Hackett, Tillie Louise	National Institutes of Health	Research Grant	507,120	Integrative omics to discover molecular determinants of COPD	Other
Hackett, Tillie Louise	The Lung Association	CTS Studentship Award (PhD)	45,000	Multimodal characterization of airway remodeling with label-free nonlinear optical imaging	Fellowship (Non-Faculty)
Hackett, Tillie Louise	Michael Smith Foundation for Health Research	Postdoctoral Trainee Fellowship	6,708	Multimodal characterization of airway remodeling with label-free nonlinear optical imaging	Fellowship (Non-Faculty)

Hackett, Tillie Louise	British Columbia Knowledge Development Fund (BCKDF)		125,000	Molecular determinants of obstructive lung disease	Operating
Hackett, Tillie Louise	Canada Foundation for Innovation	John R. Evans Leaders Fund	125,000	Molecular determinants of obstructive lung disease	Operating
Hogg, James C.	Grifols Shared Services North America Inc.	Research grant	83,259	The Mechanism of Lung Tissue Destruction in Alpha One Anti trypsin Deficiency	Contract
Hogg, James C.	National Institutes of Health	Research Grant	97,322	Parametric response mapping in COPD	Other
Hogg, James C.	Alpha-1 Foundation	Postdoctoral Research Fellowship	60,000	Molecular determinants of small airway disease in AATD	Fellowship (Non-Faculty)
Hogg, James C.	Respivert Ltd.		501,912	Characterising the Molecular Alterations Associated with Structural Progression of Small Airways Disease and Emphysema in COPD	Contract
Hogg, James C.	British Columbia Lung Association		25,000	Molecular determinants of panlobular emphysema: A stereology based approach	Operating
Hogg, James C.	Gilead Sciences Inc.		41,299	Determine the Prevalence and Distribution of LOXL2.MMP-9 and phosphor-p38 at Sites of Active Fibrogenesis and Fibrotic Remodeling in Lung Explant Tissue from Patients with IPF and COPD	Contract
Hogg, James C.	Genentech Inc.		8,069	PHASE I: Pilot Study to Assess Effects of uCT Imaging on RNA Quality in Lung Tissue Samples; PHASE II: Analysis of Gene Expression Patterns in IPF and Normal Lung Tissues	Contract
Krahn, Andrew	Canadian Institutes of Health Research (CIHR)	Translational Open Operating Grant	137,082*	Impact of Early Repolarization on Long QT Syndrome: Canadian Genetic Heart Rhythm Network	Operating
Krahn, Andrew	Canadian Institutes of Health Research (CIHR)	Networks of Centres of Excellence	4,383,333*	Canadian Arrhtyhmia Network (CANet)	Operating
Krahn, Andrew	Heart and Stroke Foundation of Canada	Grant-In-Aid	74,726*	National Long QT Syndrome Registry and BioBank	Operating
Krahn, Andrew	March of Dimes	General Research Grant	83,333*	Role of Cardiac Mutations in Suddent Unexpected Death in Infants	Operating

Krahn, Andrew	Heart and Stroke Foundation of Canada	Grant-In-Aid	102,526*	CASPER: Canadian Genetic Heart Rhythm Network	Operating
Krahn, Andrew	Canadian Institutes of Health Research (CIHR)	Open Operating Grant	619,228*	Prevention of Arrhythmia Device Infection Trial	Clinical Trial
Krahn, Andrew	Boston Scientific Ltd		62,500*	Canadian Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC) Registry	Operating
Krahn, Andrew	Medtronic of Canada Ltd		41,389*	Canadian National Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC) Registry	Operating
Krahn, Andrew	St. Jude Medical (SJM)		36,775*	Prolonged Monitoring to Detect Ventricular Arrhythmias Presymptomatic ARVC Patients	Operating
Lear, Scott	Canadian Institutes of Health Research (CIHR)	eHealth Innovation Partnership Program	187,500*	Delivery of self-management through a peer-support telehealth intervention in patients with cardiovascular disease: The Healing Circles Project	Operating
Lear, Scott	Canadian Institutes of Health Research (CIHR)		100,000*	Implementation of a 'virtual' cardiac rehabilitation program	Operating
Lear, Scott	Canadian Institutes of Health Research (CIHR)		71,543*	Utility of a culturally relevant or a standard exercise program to reduce visceral adipose tissue and cardiovascular disease risk in abdominally obese South Asian women	Operating
Lear, Scott	Simon Fraser University (Community Trust Endowment Fund)		228,600*	Using a Systems Analytic Approach to Living (SynAL) with Chronic Diseases	Operating
Leung, Janice	The Lung Association	Clinical Research	25,000	Accelerated aging and oxidative stress: Mechanisms of lung disease in HIV	Operating
Luo, Honglin	Canadian Institutes of Health Research (CIHR)	China-Canada Joint Health Research Initiative	75,000	Interaction between REGgamma and p53 in heart infectious disease	Operating
Luo, Honglin	Canadian Institutes of Health Research (CIHR)	Operating Grant	105,927	Cleavage of serum response factor in viral cardiomyopathy	Operating
Man, S.F. Paul	Michael Smith Foundation for Health Research	Postdoctoral Trainee Fellowship	21,458	Investigation of aging-related pathways associated with an increased risk of emphysema in HIV-infected patients	Fellowship (Non-Faculty)

Man, S.F. Paul	Canadian Institutes of Health Research (CIHR)	Transitional Operating Grant	102,928	Epigenetic and transcriptomic disturbances in HIV-associated COPD	Operating
Pare, Peter D.	Michael Smith Foundation for Health Research	Postdoctoral Trainee Fellowship	41,500	Unraveling the molecular mechanisms for variation in lung function	Fellowship (Non-Faculty)
Pare, Peter D.	Allergy, Genes and Environment Network (AllerGen) - Networks of Centres of Excellence (NCE)	Undergraduate Studentship	3,000	Elucidation of smoothelin function in airway smooth muscle	Fellowship (Non-Faculty)
Pare, Peter D.	British Columbia Lung Association	Clinical Research	25,000	Integrative genomics approach to unravel the molecular mechanisms underlying lung function measures and lung cancer (Ma'en Obeidat)	Operating
Quon, Bradley S.	Vertex Pharmaceuticals Inc.		30,443	A Phase 3, Randomized, Double-Blind, Placebo-Controlled, Parallel-Group Study to Evaluate the Efficacy and Safety of VX-661 in Combination With Ivacaftor in Subjects Aged 12 Years and Older With Cystic Fibrosis, Homozygous for the F508del-C	Clinical Trial
Quon, Bradley S.	Pharmaxis Ltd.		7,516	Long Term Administration of Inhaled Mannitol in Cystic Fibrosis – A Safety and Efficacy Trial in Adult Cystic Fibrosis Subjects	Clinical Trial
Quon, Bradley S.	Vertex Pharmaceuticals Inc.		6,250	A Phase 3, Randomized, Double-Blind, Placebo-Controlled, Crossover Study to Evaluate the Efficacy and Safety of Ivacaftor and VX-661 in Combination With Ivacaftor in Subjects Aged 12 Years and Older With Cystic Fibrosis	Clinical Trial
Quon, Bradley S.	British Columbia Lung Association	Project Grant	25,000	Identification of novel blood biomarkers to predict pulmonary exacerbations in cystic fibrosis	Operating
Quon, Bradley S.	Cystic Fibrosis Canada	Clinical Project Grant	65,977	External replication of a plasma protein biosignature of predict cystic fibrosis pulmonary exacerbations	Operating
Quon, Bradley S.	Cystic Fibrosis Foundation (US)	Research Grant with LOI	106,726	Utilizing the CFFT biorepository to identify Y validate CF biomarkers	Operating

Ryerson, Chris	Gilead Sciences Inc.		9,788	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)	Clinical Trial
Ryerson, Chris	Boehringer Ingelheim (Canada) Ltd.		84,903	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...	Clinical Trial
Ryerson, Chris	InterMune Inc.		1,575	A Prospective Observational Study to Evaluate Adherence and Treatment Outcomes in Patients with Idiopathic Pulmonary Fibrosis (IPF) treated with Esbriet® (pirfenidone) in Canada	Clinical Trial
Ryerson, Chris	ProMetic Life Sciences Inc.		25,531	A Phase 2, Open-label, Single Arm, Exploratory, Observational Study to Evaluate the Safety and Tolerability of PBI-4050 in Patients with Idiopathic Pulmonary Fibrosis (IPF)	Clinical Trial
Ryerson, Chris	Boehringer Ingelheim (Canada) Ltd.		6,935	A twelve week, open-label, randomised, parallel-group study evaluating safety, tolerability and pharmacokinetics (PK) of oral nintedanib in combination with oral pirfenidone, compared to treatment with nintedanib alone, in patients with IPF	Clinical Trial
Ryerson, Chris	Boehringer Ingelheim (Canada) Ltd.	Clinical Research	324,285	The CAnadian REgistry for Pulmonary Fibrosis (CARE-PF)	Contract
Ryerson, Chris	British Columbia Lung Association	Clinical Research	25,000	Researching fraility, sarcopenia and healthcare costs in fibrotic interstitial lung disease (the "REFREsSH-ILD Study")	Grant
Ryerson, Chris	Boehringer Ingelheim (Canada) Ltd.	Clinical Research	450,000	High Oxygen Delivery to Preserve Exercise Capacity in PIF Patients Treated with Nintedanib: The HOPE-IPF Study	Contract
Sandford, Andrew J.	British Columbia Lung Association	Basic Science Research	25,000	Genetic determinants of obstructive sleep apnea	Operating

Sandford, Andrew J.	Allergy, Genes and Environment Network (AllerGen) - Networks of Centres of Excellence (NCE)	Research	6,600	Alternate Theme Leader/ Theme Coordination Support: Theme I - Genes and early life determinates	Operating
Schellenberg, Robert	Janssen Inc.		1,300	A Phase 2a, Randomized, Double-Blind, Placebo-Controlled, Multicenter, Parallel Group Study of JNJ-38518168 in Symptomatic Adult Subjects with Uncontrolled, Persistent Asthma	Clinical Trial
Schellenberg, Robert	Octapharma Canada Inc.		3,500	Canadian arm of the non-interventional study on the tolerability of octagam® 5% and octagam® 10% GAM10-06a (GammaTrack)	Clinical Trial
Schellenberg, Robert	Hoffmann-La Roche Ltd. (Canada)		4,390	A prospective, single arm, longitudinal cohort study to assess biomarkers in real world patients with severe asthma	Clinical Trial
Seow, Chun	Canadian Institutes of Health Research (CIHR)	Operating Grant	121,596	Plasticity in airway smooth muscle	Operating
Seow, Chun	Natural Sciences and Engineering Research Council of Canada (NSERC)	Discovery Grants Program - Individual	47,000	Visualization and assessment of physical and chemical interactions among smooth muscle proteins	Operating
Sin, Don	AstraZeneca Canada Inc.		33,426	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 COPD	Clinical Trial
Sin, Don	Boehringer Ingelheim (Canada) Ltd.		41,291	A randomised, double-blind, active-controlled parallel group study to evaluate the effect of 52 weeks of once daily treatment of orally inhaled tiotropium + olodaterol fixed dose combination compared with tiotropium on Chronic obstructive Pulmonary Disease	Clinical Trial

Sin, Don	GlaxoSmithKline		7,150	A randomized, double-blind (sponsor un-blinded), placebo-controlled study to evaluate the safety, efficacy and changes in induced sputum and blood biomarkers following daily repeat doses of inhaled GSK2269557 for 12 weeks in adult subjects	Clinical Trial
Sin, Don	Canadian Institutes of Health Research (CIHR)	Operating Grant	31,021	Inhaled corticosteroids as risk factors for severe viral infections in asthmatics: lessons from the H1N1 epidemic	Operating
Sin, Don	St. Paul's Hospital Foundation		210,995	Clinical implementation and outcomes evaluation of blood-based biomarkers for COPD management	Operating
Sin, Don	Providence Health Care Research Institute (PHCRI)		35,000	Clinical implementation and outcomes evaluation of blood-based biomarkers for COPD management	Operating
Sin, Don	PROOF Centre of Excellence		124,142	Clinical implementation and outcomes evaluation of blood-based biomarkers for COPD management	Operating
Sin, Don	Canadian Institutes of Health Research (CIHR)	Addressing Health Care and Health Policy Challenges of New Genetic Opportunities	240,000	The Canadian Respiratory Research Network: Origin and Progression of Airway Disease	Other
Sin, Don	AstraZeneca Canada Inc.		110,000	A Study to Investigate the Differential Effects of Inhaled Symbicort and Advair on Lung Microbiota	Clinical Trial
Sin, Don	Canadian Institutes of Health Research (CIHR)	Travel Grant	1,200	Travel Award - Institute Community Support	Grant
Sin, Don	Canada Foundation for Innovation	Infrastructure Operating Fund	12,000	Creating an infrastructure to better understand COPD as a systemic disease	Grant
Sin, Don	Canadian Institutes of Health Research (CIHR)	Foundation Scheme : 2014 1st Live Pilot - Stage 2	371,099	Using multi-omics to discover novel biomarkers and therapeutic targets fo chronic obstructive pulmonary disease	Grant
Sin, Don	Boehringer Ingelheim (Germany)		35,000	Airway Epithelian Barrier Function and Otodaterol	Contract

Sin, Don	Merck Sharp & Dohme Corp.		40,443	Integrative Genomics to Identify Therapeutic Targets for COPD	Contract
Sin, Don	Genome British Columbia		445,614	Clinical implementation and outcomes evaluation of blood-based biomarkers for COPD management	Other
Sin, Don	Canadian Institutes of Health Research (CIHR)	Genomics and Personalized Health	245,408	Clinical implementation and outcomes evaluation of blood-based biomarkers for COPD management	Grant
Sin, Don	Canadian Institutes of Health Research (CIHR)	Operating Grant	35,428	Why are women at increased risk of COPD?	Grant
Tan-Hogg, Wan C.	Canadian Institutes of Health Research (CIHR)	Randomized Controlled Trials	128,372	The Canadian Cohort Obstructive Lung Diseases (CanCOLD)	Clinical Trial
Tan-Hogg, Wan C.	Various Companies		141,482	The Canadian Cohort Obstructive Lung Diseases (CanCOLD)	Clinical Trial
Tebbutt, Scott	Natural Sciences and Engineering Research Council of Canada (NSERC)	Discovery Grants Program - Individual	34,000	When human and fungal worlds collide - a systems biology approach to understanding the dynamic interactions between human bronchial epithelial cells and conidiospores of Aspergillus fumigatus	Operating
Tebbutt, Scott	British Columbia Lung Association	Clinical Research	25,000	Validation of predictive biomarkers of the phase asthmatic response	Operating
Tebbutt, Scott	Adiga Life Sciences Inc.		5,000	Discovering the mechanism of action of a novel immunotherapy, Cat-SPIRE, using a network analysis	Fellowship (Non-Faculty)
Tebbutt, Scott	Province of British Columbia		5,000	Discovering the mechanism of action of a novel immunotherapy, Cat-SPIRE, using a network analysis	Fellowship (Non-Faculty)
Tebbutt, Scott	Industry Canada		5,000	Discovering the mechanism of action of a novel immunotherapy, Cat-SPIRE, using a network analysis	Fellowship (Non-Faculty)
Tebbutt, Scott	Province of British Columbia		9,166	Blood biomarkers of asthma	Fellowship (Non-Faculty)
Tebbutt, Scott	Industry Canada		6,666	Blood biomarkers of asthma	Fellowship (Non-Faculty)
Tebbutt, Scott	Industrial Research and Development Internship (IRDI) Program - Networks of Centres of Excellence (NCE)		5,000	Blood biomarkers of asthma	Fellowship (Non-Faculty)

Tebbutt, Scott	British Columbia Lung Association		9,166	Blood biomarkers of asthma	Fellowship (Non-Faculty)
Tebbutt, Scott	Canadian Institutes of Health Research (CIHR)	CIHR Doctoral Research Award	35,000	Molecular determinants of early and dual asthmatic responses	Fellowship (Non-Faculty)
Walley, Keith	Canadian Institutes of Health Research (CIHR)	Operating Grant	107,767	Toll-like receptor anti-inflammatory response in cardiac inflammatory states	Operating
Walley, Keith	Canadian Institutes of Health Research (CIHR)	Operating Grant	129,633	Mechanism of improved cardiovascular function and survival during sepsis when PCSK9 function is decreased	Operating
Yang, Decheng	Canadian Institutes of Health Research (CIHR)	Operating Grant	124,260	IRES-dependent translation of heat shock proteins in the pathogenesis of coxsackievirus myocarditis	Operating

Asterisk (*) denotes estimated annual grant amounts.

Appendix B: Centre for Heart Lung Innovation Publications in 2015

1. Adamson SL, Burns J, **Camp PG**, **Sin DD**, **van Eeden SF**. Impact of individualized care on readmissions after a hospitalization for acute exacerbation of COPD. International journal of chronic obstructive pulmonary disease. 11:61-71, 2015.

2. Amaral AF, Coton S, Kato B, **Tan WC**, Studnicka M, Janson C, Gislason T, Mannino D, Bateman ED, Buist S, Burney PG, BOLD Collaborative Research Group. Tuberculosis associates with both airflow obstruction and low lung function: BOLD results. The European respiratory journal. 46(4):1104-12, 2015.

3. Aminkeng F, Bhavsar AP, Visscher H, Rassekh SR, Li Y, Lee JW, **Brunham LR**, Caron HN, van Dalen EC, Kremer LC, van der Pal HJ, Amstutz U, Rieder MJ, Bernstein D, Carleton BC, Hayden MR, Ross CJ; Canadian Pharmacogenomics Network for Drug Safety Consortium. A coding variant in RARG confers susceptibility to anthracycline-induced cardiotoxicity in childhood cancer. Nature genetics. 47:1079-1084, 2015.

4. Andrade J, Ciaccia A, **Krahn AD**, Purdham D, Skanes A, Connors S. Attitudes, values and preferances of physicians and patients with non-valvular atrial fibrillation receiving oral anticoagulation therapy for stroke prevention. The Canadian journal of cardiology. 31(10):S303-S304, 2015.

5. Apperley S, Park HY, Holmes DT, **Man SFP**, Tashkin D, Wise RA, Connett JE, **Sin DD**. Serum bilirubin and disease progression in mild chronic obstructive pulmonary disease. Chest. 148:169-75, 2015.

6. Arrieta MC, Stiemsma LT, Dimitriu PA, Thorson L, Russell S, Yurist-Doutsch S, Kuzeljevic B, Gold MJ, Britton HM, Lefebvre DL, Subbarao P, Mandhane P, Becker A, McNagny KM, Sears MR, Kollmann T, CHILD Study Investigators*, Mohn WW, Turvey SE, Brett Finlay B. Early infancy microbial and metabolic alterations affect risk of childhood asthma. Science translational medicine. 7(307):307ra152, 2015. CHILD Study Investigators include HLI investigators: **Daley D**, **Paré PD**, **Sandford AJ**, **Tebbutt SJ.**

7. Artigas MS, Wain LV, Miller S, Kheirallah AK, Huffman JE, Ntalla I, Shrine N, Obeidat M, TrochetH, McArdle WL, Alves AC, Hui J, Zhao JH, Joshi PK, Teumer A, Albrecht E, Imboden M, Rawal R, Lopez LM, Marten J, Enroth S, Surakka I, Polasek O, Lyytikäinen LP, Granell R, Hysi PG, Flexeder C, Mahajan A, Beilby J, Bossé Y, Brandsma CA, Campbell H, Gieger C, Gläser S, González JR, Grallert H, Hammond CJ, Harris SE, Hartikainen AL, Heliövaara M, Henderson J, Hocking L, Horikoshi M, Hutri-Kähönen N, Ingelsson E, Johansson Å, Kemp JP, Kolcic I, Kumar A, Lind L, Melén E, Musk AW, Navarro P, Nickle DC, Padmanabhan S, Raitakari OT, Ried JS, Ripatti S, Schulz H, Scott RA, **Sin DD**, Starr JM, UK BiLEVE, Viñuela A, Völzke H, Wild SH, Wright AF, Zemunik T, Jarvis DL, Spector TD, Evans DM, Lehtimäki T, Vitart V, Kähönen M, Gyllensten U, Rudan I, Deary IJ, Karrasch S, Probst-Hensch NM, Heinrich J, Stubbe B, Wilson JF, Wareha. Sixteen new lung function signals identified through 1000 Genomes Project reference panel imputation. Nature communications. 6:8658, 2015.

8. Assayag D, **Ryerson CJ**. Determining respiratory impairment in connective tissue disease associated interstitial lung disease. Rheumatic diseases clinics of North America. 41(2):213-23, 2015.

9. Assayag D, Vittinghoff E, **Ryerson CJ**, Cocconcelli E, Tonelli R, Hu X, Elicker BM, Golden JA, Jones KD, King TE, Koth LL, Lee JS, Ley B, Shum AK, Wolters PJ, Ryu JH, Collard HR. The effect of bronchodilators on forced vital capacity measurement in patients with idiopathic pulmonary fibrosis. Respiratory medicine. 109(8):1058-62, 2015.

10. Auer PL, Nalls M, Meschia JF, Worrall BB, Longstreth WT, Seshadri S, Kooperberg C, Burger KM, Carlson CS, Carty CL, Chen WM, Cupples LA, DeStefano AL, Fornage M, Hardy J, Hsu L, Jackson RD, Jarvik GP, Kim DS , Lakshminarayan K, Lange LA, Manichaikul A, Quinlan AR, Singleton AB, Thornton TA, Nickerson DA, Peters U, Rich SS, National Heart, Lung, and Blood Institute Exome Sequencing Project*. Rare and coding region genetic variants associated with risk of ischemic stroke: The NHLBI Exome Sequence Project. Journal of the American Medical Association neurology. 72(7):781-8, 2015. *National Heart, Lung, and Blood Institute Exome Sequencing Project includes HLI investigators: **Daley D**, **Paré PD**, **Sandford AJ**, **Sin DD**.

11. Azad MB, Konya T, Guttman DS, Field CJ, Sears MR, HayGlass KT, Mandhane PJ, Turvey SE, Subbarao P , Becker AB, Scott JA, Kozyrskyj AL, CHILD Study Investigators*. Infant gut microbiota and food sensitization: associations in the first year of life. Clinical and experimental allergy: journal of the British Society for Allergy and Clinical Immunology. 45(3):632-43, 2015. *CHILD Study Investigators include HLI's: **Daley D**, **Paré PD**, **Sandford AJ**, **Tebbutt SJ**

12. Azad MB, Konya T, Persaud RR, Guttman DS, Chari RS, Field CJ, Sears MR, Mandhane PJ, Turvey SE, Subbarao P, Becker AB, Scott JA, Kozyrskyj AL; CHILD Study Investigators*. Impact of maternal intrapartum antibiotics, method of birth and breastfeeding on gut microbiota during the first year of life: a prospective cohort study. British journal of obstretics: an international journal of obstretics and gynaecology. 2015 Sep 28 [Epub ahead of print: PMID: 26412384]. *CHILD Study Investigators include HLI's: **Daley D**, **Paré PD**, **Sandford AJ**, **Tebbutt SJ**

13. Banner D, **Lear S**, Kandola D, Singer J, Horvat D, Bates J, Ignaszewski A. The experiences of patients undertaking a 'virtual' cardiac rehabilitation program. Studies in health technology and Informatics. 209:9-14, 2015.

14. Bennett MT, Leader N, **Krahn AD**. Recurrent syncope: differential diagnosis and management. Heart. 101(19):1591-9, 2015.

15. Bentzer P, **Russell JA**, **Walley KR**. Advances in sepsis research. Clinics in chest medicine. 36(3):521-530, 2015.

16. Besutti G, Raggi P, Zona S, Scaglioni R, Santoro A, Orlando G, Ligabue G, Leipsic J, **Sin DD**, **Man S**, Guaraldi G. Independent association of subliclinical coronary artery disease and emphysema in HIV-infected patients. HIV medicine. 2015 Aug 13 [Epub ahead of print: doi: 10.1111/hiv.12289].

17. Bhavani S , Tsai CL , Perusich S , Hesselbacher S , **Coxson H** , Pandit L , Corry DB , Kheradmand F. Clinical and immunological factors in emphysema progression: 5-year prospective LES-COPD study. American journal of respiratory and critical care medicine. 192(10):1171-1178, 2015.

18. Blondon M, **Quon BS**, Harrington LB, Bounameaux H, Smith NL. Association between newborn birthweight and the risk of postpartum maternal venous thromboembolism: a population-based case-control study. Circulation. 131(17):1471-6, 2015.

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21. Brandsma CA, van den Berge M, Postma DS, Jonker MR, Brouwer S, **Paré PD**, **Sin DD**, Bossé Y, Laviolette M, Karjalainen J. Fehrmann RS, Nickle DC, Hao K, Spanjer Ai, Timens W, Franke L. A large lung gene expression study identifying fibrulin-5 as a novel player in tissue repair in COPD. Thorax. 70(1):21-32, 2015.

22. **Brunham LR,** Hayden MR. Human genetics of HDL: Insight into particle metabolism and function. Progress in lipid research. 58:14-25, 2015.

23. Burns TM, Smith GA, Allen JA, Amato AA, Arnold WD, Barohn R, Benatar M, Bird SJ, Bromberg M, Chahin N, Ciafaloni E, Cohen JA, Corse A, Crum BA, David WS, Dimberg E, De Sousa EA, Donofrio PD, Dyck PJ, Engel AG, Ensrud ER, Ferrante M, Freimer M, Gable KL, Gibson S, Gilchrist JM, Goldstein JM, Gooch CL, Goodman BP, Gorelov D, Gospe SM, Goyal NA, Guidon AC, Guptill JT, Gutmann L, Gwathmey K, Harati Y, Harper CM, Hehir MK, HobsonWebb LD, Howard JF, Jackson CE, Johnson N, Jones SM, Juel VC, Kaminski HJ, Karam C, Kennelly KD, Khella S, Khoury J, Kincaid JC, Kissel JT, Kolb N, Lacomis D, Ladha S, Larriviere D, Lewis RA, Li Y, Litchy WJ, Logigian E, Lou JS, MacGowen DJ, Maselli R, Massey JM, Mauermann ML, Mathews KD, Meriggioli MN, Miller RG, Moon JS, Mozaffar T, Nations SP, Nowak RJ, Ostrow LW, Pascuzzi RM, Peltier A, Ruzhansky K, Richman DP, Ross MA, Rubin DI, **Russell JA**, Sachs GM, Salajegheh MK. Editorial by concerned physicians: unintended effect of the Orphan Drug Act on the potential cost of 3,4-diaminopyridine. Muscle & nerve. 2015 Dec 21 [Epub ahead of print: doi: 10.1002/mus.25009].

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HLI Principal Investigators' names are in bold; trainees' names are underlined

Appendix C: Centre for Heart Lung Innovation 2015 Seminar Series

Month	Day	Speaker	Host	Title of Lecture
January	9	**Michael Czubryt, PhD** Associate Professor, Department of Physiology, University of Manitoba	Dr. David Granville	Targeting scleraxis: Cardiac fibrosis in the crosshairs
	16	**Juergen Kast, PhD** Associate Professor, Department of Chemistry, University of British Columbia	Dr. Pascal Bernatchez	Elucidating platelet function in atherosclerosis using proteomics
	23	**Scott Lear, PhD** Professor, Faculty of Health Sciences, Simon Fraser University	HLI	Using technology to support patients with chronic diseases
	30	**Claudia dos Santos, MD, MSc, FRCPC** Assistant Professor, Department of Medicine, University of Toronto	Dr. Keith Walley	Attractors and divergents: Exploiting transcriptomic analysis for novel target discovery in critical illness
February	6	**York Hsiang, MB, ChB, MHSc, FRCSC** Professor, Department of Surgery, University of British Columbia	Dr. Pascal Bernatchez	The UBC Vascular Engineering and Biomaterials Group (VERG): Development and early progress
	13	**Grace Parraga, PhD** Professor, Department of Medical Biophysics, University of Western Ontario	Dr. Harvey Coxson	On the role of ventilation heterogeneity in obstructive lung disease
	20	**Andrew Halayko, PhD** Professor, Department of Physiology and Pathophysiology, University of Manitoba	Dr. Jeremy Hirota	Statins as a therapy for chronic airways disease: Bed, bench & back?
	27	**Irene H Heijink, PhD** Assistant Professor, Department of Pathology and Medical Biology, University Medical Center Groningen	Dr. Tillie Hackett	Airway epithelial integrity - role in the development of asthma and COPD
March	6	**Adam Linder, MD, PhD** Senior Registrar, Clinic of Infectious Diseases, Lund University Hospital	Dr. John Boyd	Aspects on sepsis – a neglected disease hard to spot and difficult to treat
	13	**Daniel J. Gottlieb, MD, MPH** Associate Professor of Medicine, Harvard Medical School	Dr. Don Sin	Obstructive sleep apnea and cardiovascular disease: Is hypoxia the culprit?
	20	**John D. Schuetz, PhD** Member & Vice Chair, Department of Pharmaceutical Sciences, St. Jude Children's Research Hospital	Dr. Jeremy Hirota	Intrahepatic cholestasis of Pregnancy (ICP): Ok for Mom, not so for neonate

April	10	**Pamela Hoodless, PhD** Professor, Department of Medical Genetics, University of British Columbia	HLI	Transcriptional networks regulating heart valve development
	17	**Agnieszka Biala, PhD** Post-Doctoral Fellow, Institute of Cardiovascular Sciences, University of Manitoba,	Dr. David Granville	Regulation of cell death pathways in the heart
	24	**Janice Leung, MD** Postdoctoral Fellow, HLI, UBC	HLI	Aging with HIV and implications for the lung
May	1	**Russ Algar, PhD** Assistant Professor, Department of Chemistry, University of British Columbia	Dr. Tillie Hackett	Fluorescent 'quantum dot' nanoparticles as tools for biological assays, sensing, and imaging
	8	**Jack H. Ladenson, PhD** Professor, Department of Pathology and Immunology, Washington University School of Medicine, Missouri	Dr. Mari DeMarco	Experiences with heart and brain Biomarkers
	22	**Peter Noble, PhD** Senior Research Fellow/Lecturer, School of Anatomy, Physiology and Human Biology, University of Western Australia	Dr. Chun Seow	A perspective on the structural and mechanical determinants of airway hyperresponsiveness in asthma
	29	**Chris Ryerson, MD, FRCPC** Assistant Professor, Department of Medicine, University of British Columbia	HLI	Predicting mortality in interstitial lung disease
June	5	**Honglin Luo, MD** Associate Professor, Department of Pathology and Laboratory Medicine, University of British Columbia	HLI	Proteotoxicity in viral cardiomyopathy
	12	**Gary K. Owens, PhD** Professor, Molecular Physiology and Biological Physics, University of Virginia	Dr. Gordon Francis	Role of embryonic stem cell pluripotency gene networks and epigenetic mechanisms in control of SMC plasticity during injury-repair and atherogenesis
	19	**Bradley Quon, MD, MSc, MBA** Assistant Professor, Department of Medicine, University of British Columbia	HLI	Blood protein biomarkers to enable precision care in cystic fibrosis
	26	**Julián Pardo, PhD** Assistant Lecturer in Immunology, Department of Microbiology, University of Zaragoza, Spain	Dr. David Granville	Inflammation induced by the serine-protease granzyme A in inflammatory/autoimmune disorders and host protection: A selective target to fight the dark side of inflammation?

July - August	**Summer Hiatus**			
September	18	**James C. Hogg, MD, PhD** Emeritus Professor, Department of Pathology & Laboratory Medicine, University of British Columbia	HLI	Small airways disease in cystic fibrosis and idiopathic pulmonary fibrosis
	25	**Bruce Carleton, PhD** Professor, Department of Pediatrics, University of British Columbia	Dr. Ma'en Obiedat	Transforming the clinical use of drugs with pharmacogenomics
October	2	**Paige Lacy, PhD** Professor, Department of Medicine, University of Alberta	Dr. Jim Hogg	Eosinophil degranulation: modes, mechanisms, and outcomes
	9	**Neeloffer Mookherjee, PhD** Associate Professor, Departments of Internal Medicine & Immunology, University of Manitoba	Dr. Chris Carlsten	Innate defence regulator peptides: A quest for new immunotherapy for chronic inflammation
	16	**Suzanne M. Leal, PhD** Professor, Department of Molecular and Human Genetics, Baylor College of Medicine, Texas	Dr. Denise Daley	Methods for analyzing sequence data for complex and mendelian traits
	23	**Annemarie L. Lee, PhD** Postdoctoral Research Fellow, West Park Healthcare Centre, Toronto	Dr. Pat Camp	Pain in COPD: a common comorbidity
	30	**Christopher Goss, MD, MSc, FCCP** Professor, Department of Medicine, University of Washington	Dr. Bradley Quon	Gallium, translating basic science into a potential therapeutic agent
November	6	**Sara Mostafavi, PhD** Assistant Professor, Departments of Statistics and Medical Genetics, University of British Columbia	Drs. Peter Pare & Ma'en Obeidat	From complex regulatory networks to complex disease
	13	**Xiaotao Li, MD, PhD** Professor, East China Normal University	Dr. Honglin Luo	The REGgamma proteasome in cancer development
	20	**Ynuk Bossé, PhD** Assistant Professor, Department of Medicine, Laval University	Drs. Peter Pare & Chun Seow	Airway smooth muscle: From helpful to harmful
	27	**Shannon Jackson, PhD** Clinical Associate Professor, Division of Hematology, Department of Medicine, University of British Columbia	Dr. Pat Camp	Could bleeding in hemophilia become a thing of the past in BC?

December	4	**Christine Bear, PhD** Professor, Department of Physiology, University of Toronto	Dr. Jeremy Hirota	Drug discovery in cystic fibrosis - parallels to the David and Goliath story
	11	**Mari DeMarco, PhD, DABCC** Clinical Assistant Professor, Department of Pathology and Laboratory Medicine, University of British Columbia	HLI	The protein biomarker assay wish list: fast, cheap and accurate- can you have it all?

Appendix D: Centre for Heart Lung Innovation 2015 Research in Progress Seminars

Month	Day	Speaker	Title of Lecture
January	12	Marc Sze	Chasing the white whale: The host response to the lung microbiota in COPD
	19	Anthony Tam	Estrogen drives cigarette smoke-induced small airway remodelling in a mouse model of COPD
	26	Nick Swyngedouw	The effect of inflammatory mediator stimulation on airway smooth muscle contractility and phenotype
February	2	Marijana Pavlovic	Propofol mediated cardioprotective signal transduction
	16	Brodie Sakakibara	A telehealth intervention to promote healthy lifestyles after stroke: The Stroke COACH protocol
	23	Steve Shen	Granzyme B in cardiac fibrosis
March	2	Roy Chen	C-reactive protein and n-terminal prohormone of brain natriuretic peptide as blood biomarkers for acute exacerbations of COPD
	9	Ma'en Obeidat	Harnessing gene expression data to unravel drugs potential benefits and side effects in COPD: Cases of statins and inhaled corticosteroids
	16	Chen Wang	Role of NLRP3 inflammasome in coxsackieviral myocarditis
	23	Aabida Saferali	Identification of novel anti-inflammatory targets in CF using an integrative 'omics' approach
March	30	Eric Deng	Cleavage of Gab1 under CVB3 infection enhances virus infectivity via upregulation of phosphorylation of ERK
April	20	Emily Ross	The use of text messaging to improve the hospital-to-community transition in cardiovascular disease patients
	27	Jasemine Yang	The role of IL-13 receptors in airway epithelial repair
May	4	Elena Topchiy	New insights into sepsis mechanism: Role of PCSK9
	11	Mark Kearns	Donor death and cardiac injury after withdrawal of life support in a rodent DCD protocol
	25	Beth Whalen, Amrit Samra, and Dragos Vasilescu	What can the new CFI equipment do for you?
June	1	Junyan Shi	Disruption of selective autophagy in coxsackievirus infection
	8	Iris Lesser	The effectiveness of a standard aerobic exercise program and a culturally relevant exercise program of Bhangra dance on visceral adipose tissue and cardio-metabolic risk factors in physically inactive post-menopausal South Asian women
	15	Ying Wang	Contribution of arterial smooth muscle cells to foam cell formation in lesions of commonly used mouse models of atherosclerosis

September	14	Chhavi Tripathi	Homogenization of dbGaP data
	21	Aida Eslami	Investigating imprinting as a mechanism for the development of asthma - in two Canadian birth cohorts
	28	Yulia Merkulova	Granzyme B in chronic wound healing pathogenesis: Role in keratinocyte migration
October	5	Michael Seidman	Slides of a different color: useful tips in using histology
	19	Miranda Kirby	Computed tomography imaging of chronic obstructive pulmonary disease
	26	Rachel Chen	Asthma and pH1N1: A murine model of host immune response
November	2	Loubna Akhabir	Associations and interactions of genetic variants with early life viral infections in asthma and related phenotypes
	9	Leila Mostaco-Guidolin	Deciphering airway remodeling in asthma: Application of multimodal nonlinear optical microscopy
	23	Aaron Barlow	Microscopic imaging techniques and technologies
	30	Young Woong Kim	Discovering the mechanism of action of a novel immunotherapy, Cat-SPIRE, using a network analysis
December	7	Naoya Tanabe	Micro CT comparison of preterminal bronchioles in centrilobular and panlobular emphysema

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