**Intro Message (on homepage):**

Welcome to the Critical Care Research Lab website.

We are a multi-disciplinary group of clinician-researchers passionate about studying novel medical technologies aimed at improving outcomes of critically ill patients. Take a look around to learn more about our research!

**About Us:**

Liz Röhrs

Liz works as a Respiratory Therapist at Royal Columbian Hospital and is simultaneously pursuing a PhD at Simon Fraser University, studying the effect of mechanical ventilation on lung structure and function. Upon degree completion, she will be among the first RT/PhD's in British Columbia and the second in Canada.

Dr. Thiago Bassi

Thiago completed his medical training and neurosurgical residency in Brazil – where he worked as a neurosurgeon until 2016. Since moving to Canada, he is using his understanding of brain physiology to complete his PhD at Simon Fraser University.

Karl Fernandez

Karl is working as a Respiratory Therapist at Royal Columbian Hospital and St. Paul's Hospital, as well as pursuing his PhD at SFU by studying diaphragmatic function and muscle fiber composition in mechanically ventilated patients. Upon degree completion, Karl will join Liz as one of the first RT/PhD's in British Columbia and the second in Canada.

Michelle Nicholas

Michelle works as specialized registered nurse in the cardiac ICU at Royal Columbian Hospital. Since obtaining her MSc. at Cardiff University, she is applying her academic and clinical expertise to complete a PhD at Simon Fraser University studying a novel, digital therapeutic, non-pharmacological treatment for delirium experienced by critical care patients. Michelle is also completing research involving cardiac function during prolonged mechanical ventilation and incidence of pleural effusions following cardiac surgery.

Marlena Ornowska

Marlena is completing her Masters degree at Simon Fraser University, studying the efficacy of novel intravenous catheter practices in reducing rates of hospital-acquired infections and complications in the intensive care unit. She is also researching the effects of long-term mechanical ventilation on the kidney, as well as providing research assistance for a clinical trial investigating best treatment practices for cardiac arrest patients at Royal Columbian Hospital.

Dr. Steve Reynolds- Principal Investigator

Dr. Reynolds is an actively practicing critical care physician and Site Medical Director at Royal Columbian Hospital, in addition to holding Associate Clinical Professorship at Simon Fraser University. His unique perspective as both ICU physician and experienced researcher serve to provide strong mentorship to his graduate students aiming to make a difference in the lives to critically ill patients.

Sue Willems

Sue facilitates all research activities pursued by this team through her role as Clinical Research Coordinator in the Intensive Care Unit at Royal Columbian Hospital.

Jessica Dakin

Jessica provides assistance with all research activities and select analysis through her roles as Assistant to the research team members as well as to the research coordinator.

**Presentations and Publications** (includes more in-depth bio, as well as list of publications and presentations):

Steve Reynolds

Dr. Reynolds is a researcher and critical care physician at the Royal Columbian Hospital. He is the recipient of the Royal Columbian Hospital Foundation Professorship in Critical Care at Simon Fraser University to support his research on multi-organ effects of mechanical ventilation. He has been awarded two CIHR grants as the Principal Investigator to explore the impact of phrenic nerve stimulation as an adjunct to mechanical ventilation in preventing ventilator-induced organ injury.

Active areas of inquiry in his lab include; pulmonary-neural interactions during ventilation, mitigation of ventilator induced lung injury, histological basis of diaphragm atrophy during mechanical ventilation, and cardio-respiratory and renal interactions during mechanical ventilation. His lab conducts much of this research in a large pig model in a mock ICU. This group has extensive expertise conducting complex, multi-day experiments employing sophisticated physiological monitoring devices evaluating real time atelectasis, ventilation parameters, cardiac physiology and brain functioning.

Dr. Reynolds is specialized in Critical Care, Infectious Diseases and Internal Medicine. Beyond this lab research he maintains a clinical research program in the Intensive Care unit and participates in collaborative research with the Canadian Critical Care Trials Group. He participates as a collaborator and on the executive committee of multi-center clinical trials.

Dr. Reynolds has an interest in bench to bedside innovation and the development of novel solutions to clinical problems. He is active in developing these solutions through to commercialization, such as investigating early stage device designed to non-pharmacologically manage patients with delirium, as well as central venous catheter technology aimed at mitigating catheter-associated infection and occlusion.

In addition to his research and clinical duties, Dr. Reynolds is the acting Site Medical Director at Royal Columbian Hospital.

Liz Röhrs

Elizabeth Röhrs is PhD candidate at Simon Fraser University (SFU) interested in studying the effects of long-term mechanical ventilation on lung structure and function.

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Liz began her scientific career by completing a BSc. in Biology from the University of British Columbia, after which she was accepted to the Respiratory Therapy (RT) Program at Thompson Rivers University. During her time as an RT student, Liz excelled in her studies and co-authored a hemodynamics course-rewrite.

Following completion of her RT diploma in 2009, Liz began working as an Respiratory Therapist at Royal Columbian Hospital and became involved in mechanical ventilation research surrounding the use of esophageal balloons, prolonged weaning evaluation, diaphragm measurement using ultrasound, H1N1 surveillance, and neonatal ventilation. In 2013, Liz's continued hard work led to her establishing a Respiratory Therapy Research Program and Critical Care Journal Club at Royal Columbian Hospital and Simon Fraser University. Her current research interests include the effects of long-term mechanical ventilation on lung structure and function and subsequent consequences, as well as clinical applications of her findings. Beyond her studies and clinical work, Liz also serves as a Critical Care Research Associate for the clinical research program at Royal Columbian Hospital.

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During her PhD studies at SFU, Liz has been a teaching assistant for BPK 140 (Contemporary Issues in Health Care). Upon completion of her degree, Liz will become one of the first Respiratory Therapists to hold a PhD in British Columbia, and the second in all of Canada. Liz hopes to continue her career in research by pursuing post-doctoral work in the mechanical ventilation field.

Karl Fernandez

Karl Fernandez has returned to Simon Fraser University (SFU) as PhD candidate interested in studying the effects of long-term mechanical ventilation on diaphragm composition and function.

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During his time as an undergraduate student at SFU, Karl completed a BSc. in Molecular Biology & Biochemistry, a BBA from the Beedie School of Business with a concentration in Marketing, as well as a Certificate in Liberal Arts. Upon graduation from SFU, Karl was accepted to the Respiratory Therapy program at Thompson Rivers University (TRU), which he completed in 2012. During his time at TRU, Karl was the recipient of both the Outstanding Clinical Student and Patient Care awards. Karl began working as a Respiratory Therapist at both Royal Columbian Hospital and St. Paul's Hospital in 2012, and subsequently as a Basic Life Support Course Instructor for the Heart and Stroke Foundation of Canada in 2015. Karl became involved with clinical research upon the establishment of the ventilation research lab in 2016, where he is currently studying the correlation of long-term mechanical ventilation with oxidative stress and myofiber composition in the diaphragm.

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Karl is passionate about teaching and has held a teaching assistant position at Simon Fraser University for BPK 140 (Contemporary Health Issues) and BPK 110 (Human Nutrition- Current Issues). Karl has also been a guest lecturer and co-instructed BPK 305 (Human Physiology I). Upon completion of his degree, Karl will become one of the first Respiratory Therapists to hold a PhD in British Columbia, and the second in all of Canada.

Thiago Bassi

Dr. Thiago Bassi is PhD candidate at Simon Fraser University (SFU) interested in studying the effects of long-term mechanical ventilation on the nervous system.

After obtaining his Medical Doctor (M.D.) degree from the University of Catanduva (Sao Paulo, Brazil), he specialized in Neurosurgery and completed his residency and training at the Dr. Mario Gratti Hospital in 2008. Dr. Bassi then went on to work as a General Neurosurgeon at the Santa Casa de Rio Preto Hospital, where also he was particularly interested in pain management using implanted spinal cord stimulation systems.

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In 2015, Dr. Bassi moved to Canada to get involved in research and pursue his PhD. Dr. Bassi is a recipient of the Graduate Science and Technology Commercialization Scholarship from the Beedie School of Business, with which he completed his certificate in Science and Technology Commercialization in 2018. At SFU, Dr. Bassi has served as a teaching assistant for BPK 448 (Rehabilitation of Movement Control) and BPK 110 (Human Nutrition- Current Issues), as well as served on the organization committee for BPK Research Day 2018.

Dr. Bassi's research interests include novel medical technology, pain management devices, and mechanical ventilation research. In the future, Dr. Bassi hopes to realize his dream of using research to improve the lives of patients all over the world.

Michelle Nicholas

Michelle Nicholas is a PhD candidate at Simon Fraser University (SFU) studying the application of a novel, non-pharmacological digital therapeutic therapy to help manage delirium symptoms in critically ill patients. Michelle is also involved in the ventilation studies through her role in investigating the effects of long-term mechanical ventilation  on the cardiovascular system. Michelle is also the Principal Investigator of a research project at Royal Columbian Hospital aiming to elucidate trends and determinants of pleural effusions in patients following cardiac surgery.

After completing her nursing degree at the  Auckland Institute of Technology in 1999, Michelle travelled to Saskatchewan where she started her career in cardiac nursing. She then spent 4 years in Manchester, UK, where she worked as an agency nurse in local hospitals. Upon moving back to Canada in 2005, she started working as a Registered Nurse for the Fraser Health Authority. In 2008, Michelle completed her certification in Critical Care Nursing, and is currently employed at the Royal Columbian Hospital in the Cardiac Surgery Intensive Care Unit (CSICU).

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In 2017, Michelle completed her Masters degree in Critical Care under the supervision of Sharon Johnson at Cardiff University, during which she investigated targeted temperature management in the post cardiac arrest intensive care patient population. She is most interested in bench-to-bedside knowledge translation, which she can apply to her clinical work in managing the critically ill.

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In addition to working at the cardiac surgery intensive care unit, Michelle serves as a subject matter expert and examiner at the Nursing Community Assessment Service (NCAS); the process for international nurses to re-certify their credentials in Canada.

Marlena Ornowska

Marlena Ornowska is masters student investigating the application of novel central venous catheter practices to reduce catheter-association infections and occlusions. Marlena also participates in the ventilation studies through her role in determining the effects of long-term mechanical ventilation on the kidney. In addition, Marlena works as a research assistant for a collaborative project between the Neurology, Emergency Medicine, Pharmacy, and Intensive Care Units at Royal Columbian Hospital aimed at investigating best practices for management of cardiac arrest patients.

Marlena joined this research team as an Honours Student during the final year of her BSc. program at Simon Fraser University, where she majored in Biomedical Physiology. Marlena completed her Honours thesis under the supervision of Dr. Reynolds investigating the effect of phrenic nerve stimulation on heart rate.

Throughout her time as a Masters student, Marlena has served as a teaching assistant in BPK 340 (Active Health: Behaviour and Promotion), as well as a teaching assistant and tutor marker in BPK 304W (Inquiry and Measurement in Kinesiology).