



# **Pediatric Anesthesia Research Team**

## **Annual Report**

### **January 2010 - December 2010**



Department of Pediatric Anesthesia, British Columbia Children's Hospital

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of British Columbia

Vancouver, British Columbia, Canada





## Overview

Research in the Pediatric Anesthesia Research Team (PART; [www.part.cfri.ca](http://www.part.cfri.ca)) at British Columbia Children's Hospital (BCCH; [www.bcchildrens.ca](http://www.bcchildrens.ca)) continues to flourish. The full cooperation and participation of all members of the staff and research team has created an environment where new ideas have been met with support and cooperation. Additionally, the tradition of successful transdisciplinary collaboration has continued with other medical departments (surgery, orthopedics, emergency medicine and perinatology), engineering, health informatics and psychology. We have strengthened our links with the Office of Pediatric Surgical Evaluation and Innovation (OPSEI; [www.opsei.bc.ca](http://www.opsei.bc.ca)) and we are members of the iAct (Innovations in Acute Care and Technology) cluster at the Child & Family Research Institute (CFRI; [www.cfri.ca](http://www.cfri.ca)).

This year, the Department has published or has in press, 22 peer reviewed manuscripts and submitted an additional 4 manuscripts for consideration. We have presented 24 abstracts and plan to present many more in the coming months.

Numerous new grant applications were completed by team members this year as Principal Investigators (PI) and Co-investigators (CI). New grant funding this year totals over \$450,000 with more than \$1,000,000 pending. This adds to our ongoing PI and CI funding, which has garnered over \$4 million over the last five years. Our multi-disciplinary research collaboration with the Electrical & Computer Engineering in Medicine (ECEM; <http://ecem.ece.ubc.ca>) group at The University of British Columbia (UBC; [www.ubc.ca](http://www.ubc.ca)) has grown in funding and productivity. Our team members were also recognised this year through fellowship and conference presentation awards. We have renewed our industry research partnership (with Dräger Medical) and look forward to making our research endeavours a clinical reality.

Our funded positions expanded this year and now include three anesthesia clinical/research fellows, four research assistants, a research manager, research engineer and research grant facilitator, two post-doctoral fellows and five graduate students. Three summer students and a visiting graduate student were also integrated into this year's research program.

The PART website ([www.part.cfri.ca](http://www.part.cfri.ca)) has proven to be a popular destination; a Google search for "pediatric anesthesia research" lists the PART site first. This continually evolving website provides information for patients and their families on our current research projects, an introduction to the research team and investigators, and updates on news items.





## New Faces

The Pediatric Anesthesia Research Team (PART) welcomed new faces in 2010. Jonathon Stinson joined us as a Research Assistant in July. Jon's engineering background has helped him to integrate easily and quickly into the PART. He has taken on his projects with enthusiasm to aid the investigators in all aspects of their research. In February, Jennifer Gow took up her role as Grant Facilitator. Jennifer's extensive experience with biological research and publishing has made her an invaluable addition to the team.

Frank Kloprogge, a pharmacology graduate student from the Netherlands, joined us for the first six months of this year to help with an anesthetic drug pharmacokinetic study. In the summer of 2010, three summer students, Serena Shum, Jules Sleiman and Srinivas Raman, worked on research projects within the PART. All of these medical students have been productive members, and we look forward to working with and fostering the interest of other future student researchers.

The PART also welcomed a new engineering Post-doctoral Fellow this fall; Dr. Matthias G6rges from Germany via the University of Utah. The PART's close connection with the UBC Electrical & Computer in Engineering (ECEM) group provides us with a steady stream of exceptional engineers.

Dr. John Chandler and Dr. Katherine Brand completed their Clinical and Research Fellowships with our team during 2010. Their contributions to our team were greatly valued and we wish them every success in their continued

training. Drs. Emma Whyte and Pamela Winton then joined us as Clinical Fellows this summer. We were fortunate to have another Clinical and Research Fellow, Dr. Amelia Pickard, join our team at the beginning of 2010. Initially a part-time volunteer research position, the Department was able to fund Amelia for a further 6 months as a full time Clinical and Research Fellow.

This year, we also said good luck and farewell to Kate Hunc (Research Assistant) and Dr. Jin-Oh Hahn (Post-doctoral Fellow). Kate's hard work has been a tremendous aid for all our investigators and team, and we wish her every success in her new endeavours at nursing school at Langara College. Jin-Oh leaves us after a very productive research year to become an engineering faculty member at the University of Alberta. We look forward to our continued collaboration with him in his new role



*Lesley Davidson's retirement party. Left to right: Kate Hunc, Dorothy Myers, Lesley Davidson, Chris Brouse, Erin Cooke, Joanne Lim*





## Awards & Successes

Continuing our success within the Clinical Research division of the summer student program, Srinivas Raman received the Best Poster award, and Jules Sleiman an Honourable Mention for their posters at the CFRI's Summer Research Program Poster Day.

Our team's research success is further highlighted by awards to our members from several other forums:

- Dr. John Chandler won 1st place in the Fellows division in the oral presentation competition, as well as and 1st place in Anesthesiology in the poster competition, at the UBC Department of Anesthesiology, Pharmacology and Therapeutics 4th Annual Research Day.
- Dr. Simon Whyte received the 2nd Place Award for his presentation at the

14th Annual Society for Airway Management Scientific Meeting.

- Dr. Walter Karlen won the Best Abstract Award for the Society of Technology in Anesthesia (STA) Excellence in Technology Innovation at the 2010 American Society of Anesthesiologist's (ASA) annual meeting.

Our team's success is also reflected in the numerous new salary awards and grants received this year, including funding from the BC Children's Hospital Telethon Foundation, the Canadian Anesthesiologists' Society, CFRI including the iACT cluster, the Canadian Institutes of Health Research (CIHR), Foreign Affairs and International Trade Canada and UBC. This funding will build upon our foundation, enabling our long-term research programs to be carried out within the department.





## Current Research Projects, Collaborations & Partnerships

Our research projects continue to foster strong collaborations among anesthesiologists, as well as developing strong partnerships with other departments and disciplines within BC Children's Hospital (BCCH) and beyond. Specifically, in 2010:

- Dr. Norbert Froese and the cardiac surgeons have recently completed recruitment for their investigation of coagulation after cardiac surgery.
- Drs. Stephan Malherbe and Simon Whyte continue to lead a team of five anesthesiologists evaluating the Air-Q<sup>®</sup> intubating laryngeal airway, with Phase II started in 2010. Dr. Simon Whyte has also begun a collaborative study with pharmacologists comparing two anesthesia methods (intravenous vs. inhalational) to improve child patient safety.
- Dr. Gillian Lauder continues to investigate the ultrasonic evaluation of local anesthetic spread for caudal epidurals in collaboration with radiologists, as well as conduct a quality assurance audit and root cause analysis. She is also beginning two collaborative studies with pharmacologists to determine the efficacy of nalaxone to prevent opioid-induced pruritus.
- Dr. Carlyne Montgomery continues to lead research that is investigating emergence delirium in children under different anesthesia regimens, and has recently begun a collaborative study with pharmacologists investigating the pharmacokinetics of oral morphine in children.

- As we enter the 9<sup>th</sup> year of close collaboration with the ECEM group to build safer clinical monitoring systems, we have been further supported by psychology, computer science, interactive arts and technology. Within this collaborative framework, Dr. Mark Ansermino continues to lead research projects that are developing clinical decision support systems for anesthesiologists and investigating physiological measures of intraoperative nociception in children. He is also at the helm of a new project that is developing and evaluating the potential of a new tool, the Phone Oximeter, to bring safer anesthesia monitoring to poorer areas of the world.
- Dr. Mark Ansermino's collaboration with the Canadian Neonatal Network (including membership on the Informatics Research Committee), Canadian Perinatal Network and The Pediatric Emergency Research Consortium has continued. We hope to establish an anesthesia research network as a component of the Perioperative Network for BC (PAN-BC).

We are in talks with multiple other industry collaborators to sign research agreements in the upcoming months. We continue to work with a number of other monitoring companies who have shown interest in collaboration to further develop software solutions to enhance clinical monitoring.





## The Phone Oximeter (<http://phoneoximeter.org>)

Following successful usability trials here at BCCH and at Vancouver General Hospital, members of the PART and ECEM travelled to Africa this September to test the usability of the first *Phone Oximeter* prototype at Mulago Hospital in Kampala, Uganda. Composed of a pulse oximeter sensor and module connected to a mobile phone, the highly portable, battery-powered *Phone Oximeter* can convey the quality and trend of physiological data over time through an intuitive display.



*The Phone Oximeter*

This project, which has been funded by a UBC Martha Piper Research Award, has demonstrated the potential for enhanced delivery of information from a pulse oximeter to improve the safety of anesthesia care throughout the developing world. An international workshop supported by CIHR and UBC that the PART will host in Vancouver in May 2011 will convene the world's leading experts in pulse oximetry to explore the potential applications of the *Phone Oximeter* beyond anesthesia.

Several of our conference abstracts presenting on this topic have been awarded for their excellence, with several more presentations on the *Phone Oximeter* planned in the near future.

## Research Environment

Biweekly PART research meetings take place on the first and third Tuesday of each month. The Wednesday morning departmental research rounds are well attended and useful for review of new study protocols, recruiting clinician subjects and practicing presentations. This forum allows department members to voice any concerns or questions that may arise from a research project.

We have begun to recruit subjects in areas other than the Surgical Daycare Unit with the goal of increasing our recruitment rates. We will be working with departments such as ophthalmology, dentistry, and the endoscopy clinic. In conjunction with the Pre Admission Clinic (PAC), we have also been able to contact potential subjects earlier to better inform them of research studies. The PART website is also linked from the main BCCH website, so patients and families are able to see our current research studies.





## Publications (clinicians are in bold; trainees and research staff are underlined)

Amari E, Vandebeek C, **Montgomery CJ**, Skarsgard E, **Ansermino JM**. Telephone and web-based administration of pediatric day surgery questionnaires. *International Journal of Health Care Quality Assurance* 2010; 23(3):339-351.

**Ansermino JM**, Lim J, Dumont GA, Brouse C, Yang P, Dunsmuir D, Daniels J, Schwarz SKW. Clinical decision support in physiological monitoring. *International Journal of Biomedical Engineering and Technology* 2010; 3(3/4):264-286.

**Ansermino JM**, Vandebeek C, Myers D. An allometric model to estimate fluid requirements in children following burn injury. *Pediatric Anesthesia* 2010; 20(4):305-312.

Choo E, Magruder W, **Montgomery C**, Lim J, Brant R, **Ansermino JM**. Skin Conductance Fluctuations Correlate Poorly with Postoperative Self-Report Pain Measures in School-Aged Children. *Anesthesiology* 2010; 113(1):175-182.

Daniels J, King A, Cochrane DD, Carr R, Shaw NT, Lim J, **Ansermino JM**. A human factors and survey methodology based design of a web-based adverse event reporting system for families. *International Journal of Medical Informatics* 2010; 79(5):339-348.

Dosani M, McCormack J, **Reimer E**, Brant R, Dumont G, Lim J, **Ansermino JM**. Slower administration of propofol preserves adequate respiration in children. *Pediatric Anesthesia* 2010; 20(11):1001-1008.

Ford S, Birmingham E, King A, Lim J, **Ansermino JM**. At-a-glance monitoring: Covert observations of anesthesiologists in the operating room. *Anesthesia and Analgesia* 2010; 111(3):653-658.

Ford S, Dosani M, Robinson A, Campbell GC, **Ansermino JM**, **Lauder G**. Defining the Reliability of Sonoanatomy Identification by Novices in Ultrasound-guided Pediatric Ilioinguinal and Iliohypogastric Nerve Blockade. *Anesthesia and Analgesia*, 2009; 109(6):1793-8.

Hahn J-O, Shrawane P, Dumont GA, **Ansermino JM**. An empirical model of end-tidal CO<sub>2</sub> response to minute ventilation. 32<sup>nd</sup> IEEE EMBS Annual International Conference, 31 August – 4 September 2010, Buenos Aires, Argentina.

Hahn J-O, Dumont GA, **Ansermino JM**. Robust closed-loop control of propofol administration using WAV<sub>CNS</sub> index as the controlled variable. 32<sup>nd</sup> IEEE EMBS Annual International Conference, 31 August – 4 September 2010, Buenos Aires, Argentina.

Khosravi S, Hahn J-O, Dosani M, Dumont GA, **Ansermino JM**. Monitor-decoupled pharmacodynamics of propofol in children using state entropy as the clinical end point. 32<sup>nd</sup> IEEE EMBS Annual International Conference, 31 August – 4 September 2010, Buenos Aires, Argentina.

Hume-Smith H, McCormack J, **Montgomery CJ**, Brant R, **Malherbe S**, Mehta D, **Ansermino JM**. The effect of age on variability of the dose of remifentanyl for tracheal intubation in infants and children. *Pediatric Anesthesia* 2010; 20(1):19-27.

King A, Daniels J, Lim J, Cochrane DD, Taylor A, **Ansermino JM**. Time to listen: a review of methods to solicit patient reports of adverse events. *Quality and Safety in Healthcare*, 2010; 19: 148-157. Editor's Choice Article.

**Malherbe S**, **Whyte S**, Singh P, Amari E, King A, **Ansermino JM**. Total intravenous anesthesia and spontaneous respiration for airway endoscopy in children – a prospective evaluation. *Pediatric Anesthesia* 2010; 20(5):434-438.

McCormack J, Mehta D, Peiris K, Dumont GA, Fung P, Lim J, **Ansermino JM**. The effect of a target controlled infusion of propofol on predictability of recovery from anesthesia in children. *Pediatric Anesthesia* 2010; 20(1):56-62.





Peiris K, **Traynor MT**, **Whyte SD**. Intubation via the intubating laryngeal airway in two pediatric patients with predicted difficult airways. *Pediatric Anesthesia* 2010; 20 (2): 202-4.

Yang P, Dumont GA, **Ansermino JM**. Online pattern recognition based on a generalized hidden Markov model for intraoperative vital sign monitoring. *International Journal of Adaptive Control and Signal Processing* 2010; 24: 363-381.

Mehta D, Sanatani S, **Whyte SD**. The effects of droperidol & ondansetron on myocardial repolarisation in children. *Pediatr Anesth* 2010; 20: 905-912.

## Submitted / Accepted Publications

Yang P, Dumont GA, **Ansermino JM**. A Cusum-based multilevel alerting method for physiological monitoring. Accepted to *Transactions on Information Technology in BioMedicine*, January 2010.

von Dadelszen P, Payne B, Li J, **Ansermino JM**, Pipkin FB, Côté A-M, Douglas MJ, Gruslin A, Hutcheon JA, Joseph KS, Kyle PM, Lee T, Loughna P, Menzies J, Merialdi M, Millman AL, Moore MP, Moutquin J-M, Ouellet AB, Smith GN, Walker JJ, Walley KR, Walters BN, Widmer M, Lee SK, Russell JA, Magee LA. Predictions of adverse maternal outcomes in pre-eclampsia: development and validation of the fullPIERS model. Accepted to *Lancet*, September 2010.

Hahn J-O, Dumont GA, **Ansermino JM**. Closed-Loop Anesthetic Drug Concentration Estimation Using Clinical Effect Feedback. Accepted to *IEEE Transactions on Biomedical Engineering*, September 2010.

**Froese N**, McVicar J, **Ansermino JM**. Equipment limitations of a multichannel infusion pump. Accepted to *Canadian Journal of Anesthesiology*, September 2010.

Daniels JP, Elston BM, Balka E, Lim J, Chow ES, **Reimer EJ**, **Ansermino JM**. The effectiveness of standard pediatric daycare surgery discharge communication: A quality improvement gap analysis. Submitted to *Journal of Communication in Healthcare*, February 2010.

Pickard A, Karlen W, **Ansermino JM**. Capillary refill time – is it still a useful clinical sign? Accepted to *Anesthesia & Analgesia*, December 2010.

Hahn J-O, Khosravi S, Dosani M, Dumont GA, **Ansermino JM**. Pharmacodynamic Modeling of Propofol-Induced Tidal Volume Depression in Children. Submitted to *Journal of Computer-Mediated Communication*, September 2010.

Magee LA, von Dadelszen P, Allen V, **Ansermino JM**, Audibert F, Barrett J, Brant R, Bujold E, Crane J, Demianczuk N, Joseph KS, Lee SK, Piedboeuf B, Smith G, Walker M, Whittle W, Wood S, Lee T, Li J, Payne B, Liston R. Identifying between-center variability in adverse maternal and perinatal outcomes. Submitted to *American Journal of Obstetrics and Gynecology*, Mar 2010.

## Books

Chronic Regional Pain Syndrome (CRPS) Explained. For Teenagers by Teenagers. Published by Xlibris Publishing, USA. October 2010. <b>Lauder GR</b> and Massey R.
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## Abstracts (clinicians are in bold; trainees and research staff are underlined)

Title	Authors	Presented at
Monitor-decoupled pharmacodynamics of propofol in children using state entropy as the clinical end point	<u>Khosravi S</u> , <u>Hahn J-O</u> , Dumont G, <b>Ansermino JM</b> .	The Institute for Computing, Information and Cognitive Systems (ICICS) Biomedical Engineering Workshop, Vancouver, Canada, Nov 24, 2010.
Wavelet transform cardiorespiratory coherence for monitoring nociception	<u>Brouse C</u> , Dumont G, <u>Myers D</u> , <u>Cooke E</u> , <u>Lim J</u> , <b>Ansermino JM</b> .	ICICS Biomedical Engineering Workshop, Vancouver, Canada, Nov 24, 2010.
Capillary refill time assessment using a mobile phone application ( <i>iRefill</i> )	<u>Karlen W</u> , <u>Petersen C</u> , <u>Pickard A</u> , Dumont G, <b>Ansermino JM</b> .	American Society of Anesthesiologists' 2010 Annual Meeting, San Diego, CA, USA, Oct 16-20, 2010. [ <b>Best Abstract Award for the Society of Technology in Anesthesia (STA) Excellence in Technology Innovation</b> ].
Comparison of absolute and relative rules for identifying hypotension in children during anesthesia	<u>Myers D</u> , <u>Cooke E</u> , <u>Dunsmuir D</u> , <u>Brouse C</u> , <b>Ansermino JM</b> .	American Society of Anesthesiologists' 2010 Annual Meeting, San Diego, CA, USA, Oct 16-20, 2010.
Pharmacodynamic models of propofol in children: respiratory and EEG end-points compared	<u>Khosravi S</u> , <u>Hahn J-O</u> , <u>Dosani M</u> , <u>McCormack J</u> , Dumont GA, <b>Ansermino JM</b> .	American Society of Anesthesiologists' 2010 Annual Meeting, San Diego, CA, USA, Oct 16-20, 2010.
Wavelet transform cardiorespiratory coherence for monitoring nociception	<u>Brouse C</u> J, Dumont GA, <u>Myers D</u> , <u>Cooke E</u> , <u>Lim J</u> , <b>Ansermino JM</b> .	Computers in Cardiology Conference, Belfast, Ireland, Sep 26-29, 2010.
Cardiac preload indicators in children, evaluation of invasive and non-invasive markers	<u>Chandler J</u> , <b>Froese N</b> , Hosking M, <u>Cooke E</u> , Heran R, <b>Ansermino JM</b>	iACT Research Day, Vancouver, Canada, Sep 24 2010.
Estimating respiratory rate from the photoplethysmogram	<u>Raman S</u> , <u>Karlen W</u> , <b>Ansermino JM</b> .	iACT Research Day, Vancouver, Canada, Sep 24 2010.
Evaluation of the intubating laryngeal airway in children	<u>Cooke E</u> , <b>Whyte S</b> , <b>Malherbe S</b> , <b>Morrison A</b> , <u>Lim J</u> , <u>Mehta D</u> .	Society of Airway Management 2010 Annual Meeting, Chicago, IL, USA, Sep 24-25, 2010. [ <b>2nd Place Award</b> ].
Mobile phone pulse oximetry: A usability study of iPleth	<u>Sleiman J</u> , Hudson J, Kimenye SM, <u>Lim J</u> , <u>Petersen C</u> , <b>Ansermino JM</b> .	CFRI Summer Student Program Poster Day, Vancouver, Canada, Jul 29 2010 [ <b>Honourable Mention</b> ].





Title	Authors	Presented at
A quality assurance audit of pain management at home following pediatric day surgery at British Columbia Children's Hospital	<u>Shum S, Lim J, Page T, Lamb E, Ansermino JM, Lauder G</u>	CFRI Summer Student Program Poster Day, Vancouver, Canada, Jul 29 2010.
Estimating Respiratory Rate from the Photoplethysmogram	<u>Raman S, Karlen W, Ansermino JM.</u>	CFRI Summer Student Program Poster Day, Vancouver, Canada, Jul 29 2010 [ <b>1<sup>st</sup> Place</b> ].
Safe administration of propofol in children	<u>Dosani M, McCormack J, Reimer E, Brant R, Dumont G, Lim J, Ansermino JM.</u>	Canadian Anesthesiologists' Society 2010 Annual Meeting, Montreal, Canada, Jun 25-29, 2010.
Arterial & oximeter wave relationship in ventilated children	<u>Chandler JRS, Cooke E, Petersen C, Froese N, Lim J, Ansermino JM.</u>	Canadian Anesthesiologists' Society 2010 Annual Meeting, Montreal, Canada, Jun 25-29, 2010.
Evaluation of the intubating laryngeal airway in children	<u>Cooke E, Whyte S, Malherbe S, Morrison A, Lim J, Mehta D.</u>	Canadian Anesthesiologists' Society 2010 Annual Meeting, Montreal, Canada, Jun 25-29, 2010.
A novel method of measuring capillary refill time using photoplethysmography	<u>Pickard A, Karlen W, Petersen C, Dumont GA, Ansermino JM.</u>	UBC Department of Anesthesiology, Pharmacology and Therapeutics Research Day, Vancouver, Canada, Jun 23, 2010.
Visual cues for the interaction of two physiological parameters improve change detection performance	<u>Chandler JR, Tappan J, Dolnik M, Daniels J, Lim J, Dumont GA, Ansermino JM.</u>	UBC Department of Anesthesiology, Pharmacology and Therapeutics Research Day, Vancouver, Canada, Jun 23, 2010. [ <b>1<sup>st</sup> Place for Anesthesiology poster</b> ].
Arterial and plethysmograph waveform relationship in children, 2 sides of the same coin?	<u>Chandler JR, Cooke E, Petersen C, Froese N, Lim J, Ansermino JM.</u>	UBC Department of Anesthesiology, Pharmacology and Therapeutics Research Day, Vancouver, Canada, Jun 23, 2010. [ <b>1<sup>st</sup> Place for Fellows in oral competition</b> ].
The effectiveness of standard pediatric daycare surgery discharge communication: A quality improvement gap analysis	<u>Daniels JP, Elston BM, Balka E, Chow ES, Lim J, Reimer EJ, Ansermino JM</u>	UBC Department of Anesthesiology, Pharmacology and Therapeutics Research Day, Vancouver, Canada, Jun 23, 2010.
Pharyngeal mucosal pressure exerted by the paediatric ProSeal™ LMA with two techniques of cuff inflation: manufacturer recommended volume vs. seal pressure guided	<u>Peiris K, Cooke E, Whyte S, Ansermino JM.</u>	Association of Paediatric Anaesthetists of Great Britain and Ireland with the Canadian Pediatric Anesthesia Society (APA-CPAS) Annual Scientific Meeting, Glasgow, Scotland. May 13 – 14, 2010.





Title	Authors	Presented at
The Effects of Droperidol and Ondansetron on Dispersion of Myocardial Repolarization in Children	<u>Mehta D</u> , <b>Whyte S</b>	Association of Paediatric Anaesthetists of Great Britain and Ireland with the Canadian Pediatric Anesthesia Society (APA-CPAS) Annual Scientific Meeting, Glasgow, Scotland. May 13 – 14, 2010.
A web-based tool for family-initiated adverse event reporting: An end-user investigation of usability and reliability	<u>Daniels JP</u> , <u>King A</u> , <u>Hunc K</u> , <u>Cochrane DD</u> , <u>Taylor A</u> , <u>Heathcote S</u> , <u>Lim J</u> , <b>Ansermino JM</b> .	Canada's Forum on Patient Safety and Quality Improvement, Toronto, ON, Canada, Apr 12-14, 2010.
The effectiveness of standard pediatric daycare surgery discharge communication: A quality improvement gap analysis	<u>Daniels JP</u> , <u>Elston BM</u> , <u>Balka E</u> , <u>Chow ES</u> , <u>Lim J</u> , <b>Reimer EJ</b> , <b>Ansermino JM</b> .	Canada's Forum on Patient Safety and Quality Improvement, Toronto, ON, Canada, Apr 12-14, 2010.
Are respiratory induced changes in pulse pressure and pulse oximeter plethysmograph wave amplitude related in ventilated children?	<u>Chandler JRS</u> , <u>Cooke E</u> , <u>Petersen C</u> , <b>Froese N</b> , <u>Lim J</u> , <b>Ansermino JM</b> .	International Anesthesia Research Society Annual Meeting; Honolulu, HI, USA, Mar 20-23, 2010.
A passive network tap for wireless display of physiological data in multi-bed environments	<u>Petersen C</u> , <b>Ansermino JM</b> .	Society for Technology in Anesthesia 2010 Annual Meeting, West Palm Beach, FL USA, Jan 13-16, 2010.
CapnoBase: Signal database and tools to collect, share and annotate respiratory signals	<u>Karlen W</u> , <u>Turner M</u> , <u>Cooke E</u> , <u>Dumont GA</u> , <b>Ansermino JM</b> .	Society for Technology in Anesthesia 2010 Annual Meeting, West Palm Beach, FL USA, Jan 13-16, 2010.
Closed-loop compartmental drug concentration estimation	<u>Hahn J</u> , <u>Dumont GA</u> , <b>Ansermino JM</b> .	Society for Technology in Anesthesia 2010 Annual Meeting, West Palm Beach, FL USA, Jan 13-16, 2010.
Propofol pharmacodynamics in children using state entropy	<u>Khosravi S</u> , <u>Hahn J</u> , <u>Dumont GA</u> , <b>Ansermino JM</b> .	Society for Technology in Anesthesia 2010 Annual Meeting, West Palm Beach, FL USA, Jan 13-16, 2010.





## Submitted / Accepted Abstracts

Title	Authors	To be presented at
Automated Phase of Anesthesia Detection for Providing Context Appropriate Alerts	<u>Dunsmuir D</u> , <u>Stinson J</u> , <u>Myers D</u> , <b>Ansermino JM.</b>	Society for Technology in Anesthesia 2011 Annual Meeting, Las Vegas, NV, USA, Jan 12-16, 2011.
Capturing vital signs for research in a multi-bed monitoring environment	<u>Görges M</u> , <u>Petersen C</u> , <b>Ansermino JM.</b>	Society for Technology in Anesthesia 2011 Annual Meeting, Las Vegas, NV, USA, Jan 12-16, 2011.
Prototyping a mobile application for anesthesia assistants	<u>Görges M</u> , Barretto R, Gagne J, Thomas P, <b>Ansermino JM.</b>	Society for Technology in Anesthesia 2011 Annual Meeting, Las Vegas, NV, USA, Jan 12-16, 2011.
Location independence in patient monitoring	<u>Karlen W</u> , Blackstock M, <b>Ansermino JM</b>	Society for Technology in Anesthesia 2011 Annual Meeting, Las Vegas, NV, USA, Jan 12-16, 2011.
Preliminary comparison of absolute and relative rules for identifying hypertension in children during anesthesia	<u>Stinson J</u> , <u>Myer.s D</u> , <u>Dunsmuir D</u> , <u>Brouse CJ</u> , <b>Ansermino JM</b>	Society for Technology in Anesthesia 2011 Annual Meeting, Las Vegas, NV, USA, Jan 12-16, 2011.
An adaptive single frequency phase vocoder for low-power heart rate detection.	<u>Karlen W</u> , <u>Gow J</u> , Dumont GA, <b>Ansermino JM</b> , <u>Petersen C</u> .	BIOSTEC 2011, Rome, Italy, Jan 26-29, 2011.
Human-centred phone oximeter interface design for the operating room.	<u>Karlen W</u> , Dumont GA, <u>Petersen C</u> , <u>Gow J</u> , <u>Lim J</u> , <u>Sleiman J</u> , <b>Ansermino JM.</b>	HEALTHINF, BIOSTEC 2011, Rome, Italy, Jan 26-29, 2011.
Two-stage versus mixed effects approach to pharmacodynamic modeling of propofol in children using state entropy	<u>Khosravi S</u> , <u>Hahn J-O</u> , Dumont GA, <b>Ansermino JM.</b>	3 <sup>rd</sup> World Congress of Total Intravenous Anesthesia and Target Controlled Infusion (TIVA-TCI 2011), Singapore, March 31 – April 2, 2011.
Comparison between number of skin conductance fluctuations and heart rate for detecting nociception in children during anesthesia	<u>Myers D</u> , <u>Brouse CJ</u> , <u>Cooke E</u> , <u>Lim J</u> , <u>Karlen W</u> , Dumont GA, <b>Montgomery CJ</b> , <b>Ansermino JM.</b>	3 <sup>rd</sup> World Congress of Total Intravenous Anesthesia and Target Controlled Infusion (TIVA-TCI 2011), Singapore, March 31 - April 2, 2011.
A pilot study to investigate plasma bupivacaine concentrations in children receiving total intravenous anesthesia and caudal analgesia	<u>Myers D</u> , Ensom M, <u>Winton P</u> , Decarie D, <b>Whyte S.</b>	3 <sup>rd</sup> World Congress of Total Intravenous Anesthesia and Target Controlled Infusion (TIVA-TCI 2011), Singapore, March 31 - April 2, 2011.
Computer control of depth of anesthesia based on PKPD identification during induction of anesthesia.	<u>Soltész K</u> , <u>Hahn J-O</u> , Dumont GA, <b>Ansermino JM.</b>	3 <sup>rd</sup> World Congress of Total Intravenous Anesthesia and Target Controlled Infusion (TIVA-TCI 2011), Singapore, March 31 – April 2, 2011.





Title	Authors	To be presented at
Safety of modern anesthesia for children with Long QT Syndrome (LQTS)	Sanatani S, <u>Myers D</u> , Andrade J, Kannkeril P, Collins K, <b>Whyte S</b> .	Heart Rhythm 2011, San Francisco, CA, USA, May 4 – 7, 2011.
Inter-observer and intra-observer repeatability of capillary refill time	<u>Stinson J</u> , <u>Pickard A</u> , <u>Cooke E</u> , <u>Myers D</u> , <u>Karlen W</u> , <b>Ansermino JM</b> .	International Anesthesia Research Society Annual Meeting, Vancouver, BC, Canada, May 21 – 24, 2011.
Is regional anaesthesia in children safer with TIVA?	<b>Whyte SD</b> , <u>Myers D</u> , Ensom MH, Decarie D.	International Anesthesia Research Society Annual Meeting, Vancouver, BC, Canada, May 21 – 24, 2011.
Safety of modern anesthesia for children with long qt syndrome (LQTS)	<b>Whyte SD</b> , Sanatani S, Watkins SC, Kannankeril PJ, Collins KK, Andrade J.	International Anesthesia Research Society Annual Meeting, Vancouver, BC, Canada, May 21 – 24, 2011.
Families identify safety learning opportunities in hospitalized children not reported by healthcare providers	<u>Daniels JP</u> , <u>Hunc K</u> , Cochrane DD, Carr R, Shaw NT, Taylor A, Heathcote S, Brant R, <u>Lim J</u> , <b>Ansermino JM</b> .	International Anesthesia Research Society Annual Meeting, Vancouver, BC, Canada, May 21 – 24, 2011.
Development of a mobile monitoring and communications solution for anesthesia team members	<u>Görges M</u> , <b>Ansermino JM</b> .	International Anesthesia Research Society Annual Meeting, Vancouver, BC, Canada, May 21 – 24, 2011.
Comparison of the Air-Q ILA and Proseal LMA in children	<b>Whyte SD</b> , <u>Cooke E</u> , <b>Malherbe S</b> , <b>Morrison A</b> , <b>Traynor M</b> , <b>Ansermino JM</b> .	International Anesthesia Research Society Annual Meeting, Vancouver, BC, Canada, May 21 – 24, 2011.
Volume responsiveness in children, a comparison of static and dynamic indices	<u>Chandler JRS</u> , <u>Cooke E</u> , Hosking M, <b>Froese N</b> , <u>Karlen W</u> , <b>Ansermino JM</b> .	International Anesthesia Research Society Annual Meeting, Vancouver, BC, Canada, May 21 – 24, 2011.
Inter-Observer and Intra-Observer Repeatability of Capillary Refill Time	<u>Stinson J</u> , <u>Pickard A</u> , <u>Cooke E</u> , <u>Myers D</u> , <u>Karlen W</u> , <b>Ansermino JM</b> .	Canadian Anesthesiologists' Society Annual Meeting, Toronto, ON, Canada, Jun 24 – 28, 2011.
Is regional anaesthesia in children safer with TIVA?	<b>Whyte SD</b> , <u>Myers D</u> , Ensom MH, Decarie D.	Canadian Anesthesiologists' Society Annual Meeting, Toronto, ON, Canada, Jun 24 – 28, 2011.





Title	Authors	To be presented at
Safety of modern anesthesia for children with long qt syndrome (LQTS)	<b>Whyte SD, Myers D, Sanatani S, Watkins SC, Kannankeril PJ, Collins KK, Andrade J.</b>	Canadian Anesthesiologists' Society Annual Meeting, Toronto, ON, Canada, Jun 24 – 28, 2011.
Capillary refill time assessment using a mobile phone application	<b>Karlen W, Petersen C, Pickard A, Cooke E, Myers D, Stinson J, Dumont G, Ansermino JM.</b>	Canadian Anesthesiologists' Society Annual Meeting, Toronto, ON, Canada, Jun 24 – 28, 2011.
Comparison of the Air-Q ILA and Proseal LMA in children	<b>Whyte SD, Cooke E, Malherbe S, Morrison A, Traynor M, Ansermino JM.</b>	Canadian Anesthesiologists' Society Annual Meeting, Toronto, ON, Canada, Jun 24 – 28, 2011.

## Current Projects Led by PART Members

	Project Title	PI(s)	CI(s)	Description
1	Skin conductance fluctuations and heart rate variability as measures of intraoperative nociception in children	Mark Ansermino	Chris Brouse, Joanne Lim, Dorothy Myers	To determine a threshold in the number of skin conductance fluctuations (NFSC) that will identify children who may require rescue anesthetic intervention.
2	Real-time assessment of the Intelligent Anesthesia Navigator	Mark Ansermino	Guy Dumont, Chris Brouse, Dustin Dunsmuir, Joanne Lim, Jonathan Stinson	The overall purpose of this study is to contribute to the development of a decision support system for clinical anesthesiologists that integrates the steady stream of data produced by patient monitoring systems. The objective in this study is to conduct a real time assessment of the Intelligent Anesthesia Navigator (IAN).
3	iKnow: A knowledge authoring tool for clinical decision support during anesthesia	Mark Ansermino	Dustin Dunsmuir, Jonathan Stinson, Matthias Gorges	iKnow is a software application that is being developed to allow expert clinicians to develop and collaborate on a knowledge base without requiring an expert programmer.





	<b>Project Title</b>	<b>PI(s)</b>	<b>CI(s)</b>	<b>Description</b>
4	iControl: Interface Usability Evaluation	Mark Ansermino	Guy Dumont, Chris Petersen, Jin-Oh Hahn, Joanne Lim, Simon Whyte, Jonathon Stinson	To evaluate the usability of the interface of a control prototype (iControl) in the hands of expert anesthesiologists to determine areas of improvement for the interface.
5	Development and evaluation of a wireless pulse oximeter on a cell phone (iPleth), for safe perioperative care in Uganda	Mark Ansermino	Erik Skarsgard, Geoffrey Blair, Chris Petersen, Joanne Lim, Guy Dumont, Sidney Fels, Walter Karlen, Srinivas Raman	To evaluate the usability of the interface of a wireless pulse oximeter prototype (iPleth) in the hands of expert anesthesiologists and non-anesthesiologists to determine areas for improvement for the interface.
6	Storage bank of monitored physiological clinical events	Mark Ansermino	Guy Dumont, Erin Cooke	To collect a sample of significant clinical events to evaluate the performance of the physiological monitoring systems that detect them.
7	Comparison of an automated calculation of capillary refill time with a standard clinical measurement – a pilot study	Mark Ansermino	Amelia Pickard, Walter Karlen, Chris Petersen	To compare a standard clinical measurement of CRT with an automated, calculation of CRT.
8	eVENT: an expert system for detecting ventilatory events during anesthesia	Mark Ansermino	Guy Dumont, Nicola Shaw, Peter Choi, Sidney Fels, Matthias Gorges, Pamela Winton	This study has several specific goals. Primarily, through structured interviews with anesthesiologists, we will generate specific rules for identifying 3 dangerous ventilatory events. Secondly, we hope to reach a consensus among a panel of expert anesthesiologists over the rules for identifying the three critical events using the Delphi method.
9	Online monitoring of physiological parameters in critical care: iAssist	Mark Ansermino	Guy Dumont, Dustin Dunsmuir, Chris Brouse, Chris Petersen, Jonathon Stinson	To use data from 200 children and 100 adults undergoing routine surgery to produce software algorithms to automatically highlight significant changes to the overall trend of physiological parameters (such as BP, HR, SpO2, ETCO2, etc.).





	<b>Project Title</b>	<b>PI(s)</b>	<b>CI(s)</b>	<b>Description</b>
10	Cardiac preload indicators in children, evaluation of invasive and non-invasive markers of fluid responsiveness	Norbert Froese	Martin Hosking, Mark Ansermino, John Chandler, Erin Cooke, Manraj Heran	To examine the ability of dynamic preload indicators: PPV, PlethV and PVI to predict the cardiac output response to fluid bolus administration in anesthetised, ventilated children.
11	Naloxone for the treatment of opioid-induced pruritus: A double-blind, prospective, randomized, controlled study	Gillian Lauder	Mark Ansermino, Roxane Carr, Joanne Lim, Colleen Court	To determine the efficacy of naloxone simultaneously administered with PCA basal and bolus morphine in the treatment of opioid-induced pruritus in a tertiary care pediatric patient population.
12	Naloxone infusion for the prevention of neuraxial opioid-induced pruritus: A double-blind, prospective, randomized, controlled study	Gillian Lauder	Mark Ansermino, Roxane Carr, Emma Whyte, Colleen Court, Karen Leung, Joanne Lim	To determine the efficacy of naloxone simultaneously administered with epidural hydromorphone and bupivacaine local anesthetic in the treatment of neuraxial opioid-induced pruritus in a tertiary care pediatric patient population.
13	A quality assurance audit of pain management after discharge from day surgery	Gillian Lauder	Mark Ansermino, Joanne Lim, Michelle Gibson, Eugene Choo, Serena Shum	To determine which pharmacological agents and at what dose are prescribed for analgesia on discharge from pediatric day case surgery.
14	Root cause analysis of critical incidents in pediatric patients receiving parenteral opioid infusions in the acute care setting at BC Children's Hospital	Gillian Lauder	Mark Ansermino, Jonathan Stinson	To conduct a retrospective chart review of critical incidents related to morphine and hydromorphone infusions at BCCH and employ a modified root cause analysis (RCA) methodology to evaluate factors that led to critical incidents in patients receiving PCA or COI opioids infusions.
15	Pediatric caudal epidural anesthesia: Ultrasonic evaluation of local anesthetic spread	Gillian Lauder	Mark Ansermino, Ashley Robinson, Katherine Brand, Jonathan Stinson, Emma Whyte	To visualize the spread of a standard dose of local anesthetic injected into the caudal epidural space and determine the spread in the cephalad direction; to correlate results to age, height, weight, and body surface area.







	<b>Project Title</b>	<b>PI(s)</b>	<b>CI(s)</b>	<b>Description</b>
16	Emergence delirium (ED) in children: total intravenous anesthesia with propofol-remifentanyl versus inhalational sevoflurane anesthesia	Carolyne Montgomery	John Chandler, Dorothy Myers	This study will compare the recovery profile of sevoflurane with that of propofol-remifentanyl and their associated incidence of ED.
17	Pharmacokinetics of oral morphine and pharmacogenomics of CYP2D6 and UGT2B7, in an urban pediatric population (2 – 6 years of age) presenting for elective surgery	Carolyne Montgomery	Gideon Koren, Michael Rieder, Katharine Brand, Gillian Lauder, Bruce Carleton, Erin Cooke, Pamela Winton	To determine the pharmacokinetic properties of morphine, following the oral administration of one of three recommended doses, in a cohort of 2 – 6 year old, healthy children undergoing elective surgery under general anesthesia.
18	Evaluation of the intubating laryngeal airway in children	Simon Whyte	Erin Cooke	The aim is to rigorously evaluate the Air-Q <sup>®</sup> intubating laryngeal airway (Air-Q <sup>®</sup> ILA). This LMA has features that encompass the characteristics of the ideal LMA.
19	A pilot study to compare two anesthesia methods to improve child patient safety	Simon Whyte	Mary Ensom, Pamela Winton, Dorothy Myers, Diane Decarie	To compare plasma bupivacaine concentrations between two general anaesthesia groups (intravenous vs. inhalational) whose patients all receive caudal epidural anaesthesia with bupivacaine.

### Recently Completed Projects Led by PART Members

	<b>Project Title</b>	<b>PI(s)</b>	<b>CI(s)</b>	<b>Description</b>
1	Relationship between respiratory induced variation in pulse oximetry plethysmogram and arterial pulse pressure waveforms in ventilated children, an observational study	Mark Ansermino	John Chandler, Horacio Osivich, David Wensley, Erin Cooke	Our main objective is to investigate whether the respiratory induced changes in arterial and plethysmograph waveforms are related in children.





Project Title	PI(s)	CI(s)	Description
2 The Bedside Observer: using patient and family observations to enhance patient safety	Mark Ansermino	Roxanne Carr, Doug Cochrane, Annemarie Taylor, Nicola Shaw, Jeremy Daniels, Joanne Lim, Dina Shafey, Kate Hunc	The Bedside Observer is a survey tool that allows families to identify errors or adverse events during their child's stay on the ward 3R at BCCH.
3 Safe administration of propofol for sedation in children	Mark Ansermino	Jon McCormack, Eleanor Reimer, Maryam Dosani	To develop a safe dosing schedule for propofol administration in children that will ensure spontaneous ventilation is maintained in at least 95 % of subjects.





## New Salary Awards

Recipient	Supervisor	Award
Srinivas Raman	Mark Ansermino	CFRI summer studentship, UBC SSRP summer studentship
Walter Karlen	Mark Ansermino, Guy Dumont	CIHR Post-Doctoral Fellowship
Walter Karlen	Mark Ansermino, Guy Dumont	CFRI Post-Doctoral Fellowship
Matthias Gorges	Mark Ansermino, Guy Dumont	Canadian Post-Doctoral Research Fellowships (PDRF) of Foreign Affairs and International Trade Canada (DFAIT)

## Current Salary Awards

Recipient	Award
Chris Brouse	Michael Smith Foundation for Health Research Trainee Award Senior Graduate Studentship (2009-2011), supervised by Mark Ansermino, Guy Dumont
Mark Ansermino	Michael Smith Foundation for Health Research Scholar Award (2007-2012)

## Grants Currently Held by PART Members

Project Title	PI	Year Awarded	Granting Agency	Amount Awarded
n/a	Mark Ansermino	2010	CFRI Clinical Research Capacity Building Award	\$40,000
Cell phone oximetry workshop: Canadians working towards improved safety of anesthesia care around the world	Mark Ansermino	2010	CIHR Meetings, Planning and Dissemination Grant	\$9,175
An international workshop on cell phone oximetry: working towards improved anesthesia safety around the world	Mark Ansermino	2010	VPRI International Research Collaboration Workshop Grant, UBC	\$3,000
Naloxone for the treatment of neuroaxial opioid-induced pruritus: A double-blind, prospective, randomized, controlled study	Gillian Lauder	2010	BC Children's Hospital Foundation Telethon Award	\$28,525
Naloxone for the treatment of opioid-induced pruritus: A double-blind, prospective, randomized, controlled study	Gillian Lauder	2010	Canadian Anesthesiologists' Society	\$20,000





<b>Project Title</b>	<b>PI</b>	<b>Year Awarded</b>	<b>Granting Agency</b>	<b>Amount Awarded</b>
Pharmacokinetics of oral morphine and pharmacogenomics of CYP2D6 and UGT2B7, in an urban pediatric population (2 – 6 years of age) presenting for elective surgery	Carolyne Montgomery	2010	Canadian Anesthesiologists' Society	\$5,000
Pharmacokinetics of oral morphine and pharmacogenetics of CYP2D6 and UGT2B7 in an urban pediatric population (2-6years of age) presenting for elective surgery	Carolyne Montgomery	2010	iACT Grant Competition Research Award	\$10,000
A pilot study to investigate plasma bupivacaine concentrations in children receiving total intravenous anesthesia and caudal anesthesia	Simon Whyte	2010	BC Children's Hospital Foundation Telethon Award	\$29,892
A pilot study to investigate plasma bupivacaine concentrations in children receiving total intravenous anesthesia and caudal anesthesia	Simon Whyte	2010	iACT Grant Competition Research Award	\$8,000
Development and evaluation of a wireless pulse oximeter on a cell phone (iPleth), for safe perioperative care in Uganda	Mark Ansermino	2009	UBC Martha Piper Research Award	\$25,000
eVENT: An expert system for detecting ventilatory events during anesthesia	Mark Ansermino	2009	Canadian Institutes of Health Research Operating Grant	\$299,187
Evaluation of the intubating laryngeal airway	Stephan Malherbe & Simon Whyte	2009	BCCH Telethon Awards Competition	\$30,000
Emergence delirium in children: total intravenous anesthesia with propofol-remifentanyl versus inhalational sevoflurane anesthesia	Carolyne Montgomery	2009	BCCH Telethon Awards Competition	\$29,970
Evaluation of the intubating laryngeal airway	Simon Whyte	2009	Canadian Anesthesiologists' Society	\$20,000





Project Title	PI	Year Awarded	Granting Agency	Amount Awarded
Closed-loop control of anesthesia	Guy Dumont	2008	Natural Sciences and Engineering Research Council of Canada/CHRP	\$412,400
Career Investigator Program: eVENT	Mark Ansermino	2006	Michael Smith Foundation for Health Research	\$555,000





## Anesthesia Fellows

<u>Name and Yrs. Supervised:</u>	<u>Dr. Katherine Brand, 2009 - 2010</u>
Title of Project:	Pharmacokinetics of oral morphine and pharmacogenomics of CYP2D6 and UGT2B7, in an urban pediatric population (2 – 6 years of age) presenting for elective surgery
Present Position:	Clinical Fellow (BCCH Dept of Anesthesia)
<u>Name and Yrs. Supervised:</u>	<u>Dr. John Chandler, 2008 - 2010</u>
Title of Project:	Relationship between respiratory induced variation in pulse oximetry plethysmogram and arterial pulse pressure waveforms in ventilated children, an observational study
Present Position:	Clinical & Research Fellow (BCCH Dept of Anesthesia)
<u>Name and Yrs. Supervised:</u>	<u>Dr. Amelia Pickard, 2009 - 2010</u>
Title of Project:	Comparison of an automated calculation of capillary refill time with a standard clinical measurement – a pilot study
Present Position:	Clinical & Research Fellow (BCCH Dept of Anesthesia)
<u>Name and Yrs. Supervised:</u>	<u>Dr. Emma Whyte, 2010 - Present</u>
Title of Project:	Naloxone infusion for the prevention of neuraxial opioid-induced pruritus: A double-blind, prospective, randomized, controlled study
Present Position:	Clinical Fellow (BCCH Dept of Anesthesia)
<u>Name and Yrs. Supervised:</u>	<u>Dr. Pamela Winton, 2010 - Present</u>
Title of Project:	Pharmacokinetics of oral morphine and pharmacogenomics of CYP2D6 and UGT2B7, in an urban pediatric population (2 – 6 years of age) presenting for elective surgery
Present Position:	Clinical Fellow (BCCH Dept of Anesthesia)

## Graduate Student Research Projects

<u>Name and Yrs. Supervised:</u>	<u>Chris Brouse, 2004 - Present</u>
Title of Project:	Skin conductance fluctuations and heart rate variability as measures of intraoperative nociception in children
Present Position:	PhD Candidate (UBC Dept of Electrical and Computer Engineering)
<u>Name and Yrs. Supervised:</u>	<u>Dustin Dunsmuir, 2006 - present</u>
Title of Project:	iKnow: An authoring tool for clinical decision support in anesthesia
Present Position:	MSc Candidate (SFU School of Interactive Arts & Technology)
<u>Name and Yrs. Supervised:</u>	<u>Sara Khosravi, 2009 – Present</u>
Title of Project:	Safe administration of propofol for sedation in children





Present Position:	PhD Candidate (UBC Dept of Electrical and Computer Engineering)
<u>Name and Yrs. Supervised:</u>	<u>Frank Kloprogge, 2010</u>
Title of Project:	Pharmacokinetic and pharmacodynamic modelling of remifentanyl
Present Position:	PhD Candidate - Netherlands
<u>Name and Yrs. Supervised:</u>	<u>Kiran Massey, 2007 - Present</u>
Title of Project:	Building a Model of Knowledge Interaction in Perinatal Care
Present Position:	MASc Candidate (UBC)
<u>Name and Yrs. Supervised:</u>	<u>John Maidens, 2010 - Present</u>
Title of Project:	The effect of a target controlled infusion of propofol on predictability in recovery from anesthesia in children
Present Position:	MASc Candidate (UBC Dept of Electrical and Computer Engineering)

## Medical/Undergraduate Research Projects

<u>Name and Yrs. Supervised:</u>	<u>Anton Chau, 2005 - Present</u>
Title of Project:	The effects of three effect-site-targeted propofol concentrations on dispersion of myocardial repolarization in children
Present Position:	Anesthesiology resident (UBC)
<u>Name and Yrs. Supervised:</u>	<u>Jeremy Daniels, 2006 - Present</u>
Title of Project:	The Bedside Observer: using patient and family observations to enhance patient safety
Present Position:	Medical student (UBC)
<u>Name and Yrs. Supervised:</u>	<u>Srinivas Raman (2010)</u>
Title of Project:	Development and Evaluation of a Wireless Pulse Oximeter on a Cell phone (iPleth), for safe Perioperative Care in Uganda
Present Position:	Medical student (UBC)
<u>Name and Yrs. Supervised:</u>	<u>Serena Shum (2010)</u>
Title of Project:	A quality assurance audit of pain management after discharge from day surgery
Present Position:	Medical student (Queen's)
<u>Name and Yrs. Supervised:</u>	<u>Jules Sleiman (2010)</u>
Title of Project:	Mobile Phone Pulse Oximetry: A usability study of iPleth
Present Position:	Medical Student





## Engineering Post-Doctoral Fellows

<b>Name and Yrs. Supervised:</b>	<u>Jin-Oh Hahn, 2009 – 2010</u>
<b>Title of Project:</b>	iControl: Interface Usability Evaluation
<b>Present Position:</b>	Engineering faculty (University of Alberta)
<b>Name and Yrs. Supervised:</b>	<u>Matthias Gorges, 2010 - Present</u>
<b>Title of Project:</b>	Anesthesiology Display Research
<b>Present Position:</b>	Post-doctoral Fellow (UBC Dept of Electrical and Computer Engineering)
<b>Name and Yrs. Supervised:</b>	<u>Walter Karlen, 2009 – Present</u>
<b>Title of Project:</b>	Development and Evaluation of a Wireless Pulse Oximeter on a Cell phone (iPleth), for safe Perioperative Care in Uganda
<b>Present Position:</b>	Post-doctoral Fellow (UBC Dept of Electrical and Computer Engineering)

## Research Personnel

<b>Name and Yrs. Supervised:</b>	<u>Joanne Lim, 2004 - Present</u>
<b>Title of Project:</b>	Development and Evaluation of a Wireless Pulse Oximeter on a Cell phone (iPleth), for safe Perioperative Care in Uganda
<b>Present Position:</b>	Research Manager (UBC Department of Anesthesiology, Pharmacology & Therapeutics)
<b>Name and Yrs. Supervised:</b>	<u>Chris Petersen, 2009 – Present</u>
<b>Title of Project:</b>	iControl: Interface Usability Evaluation
<b>Present Position:</b>	Research Engineer (UBC Department of Anesthesiology, Pharmacology & Therapeutics)
<b>Name and Yrs. Supervised:</b>	<u>Kate Hunc, 2009 – 2010</u>
<b>Title of Project:</b>	Pediatric caudal epidural anesthesia: Ultrasonic evaluation of local anesthetic spread
<b>Present Position:</b>	Nursing student (Langara College)
<b>Name and Yrs. Supervised:</b>	<u>Erin Cooke, 2009 – Present</u>
<b>Title of Project:</b>	Evaluation of the intubating laryngeal airway
<b>Present Position:</b>	Research Assistant (UBC Department of Anesthesiology,







Pharmacology & Therapeutics)	
<u>Name and Yrs. Supervised:</u>	<u>Dorothy Myers, 2009 – Present</u>
Title of Project:	Emergence delirium (ED) in children: total intravenous anesthesia with propofol-remifentanyl versus inhalational sevoflurane anesthesia
Present Position:	Research Assistant (UBC Department of Anesthesiology, Pharmacology & Therapeutics)
<u>Name and Yrs. Supervised:</u>	<u>Jennifer Gow, 2010 - Present</u>
Title of Project:	Development and Evaluation of a Wireless Pulse Oximeter on a Cell phone (iPleth), for safe Perioperative Care in Uganda
Present Position:	Grant Facilitator (UBC Department of Anesthesiology, Pharmacology & Therapeutics)
<u>Name and Yrs. Supervised:</u>	<u>Jonathan Stinson, 2010 - Present</u>
Title of Project:	iControl: Interface Usability Evaluation
Present Position:	Research Assistant (UBC Department of Anesthesiology, Pharmacology & Therapeutics)
<u>Name and Yrs. Supervised:</u>	<u>Parry Fung, 2004 – Present</u>
Title of Project:	Storage bank of monitored physiological clinical events
Present Position:	Software Consultant

