

ANNUAL REPORT 2010-11

INTERNATIONAL COLLABORATION ON REPAIR DISCOVERIES

icord

message from the Acting Director

'Imaging the future' describes well our activities in 2010-11. ICORD researchers spent considerable time in strategic planning activities that led to our adopting our research platform as shown to the right. This research platform clearly highlights our dual research foci that address both a cure for SCI and enhanced quality of life for people with SCI. The arrow in this platform highlights the importance of partnerships to translate our research findings to the community. This brings us to the other activity on which we spent considerable time in the past year: working with our partners within the Blusson Spinal Cord Centre to envision how our three organizations can best collaborate to make a difference for people with SCI. These ongoing efforts represent a great opportunity to work with the VCH Clinic, the Rick Hansen Institute, and other community partners to make the BSCC a truly world-class centre of excellence!

This Annual Report summarizes very nicely the many diverse activities on which ICORD students, staff, and faculty were engaged in 2010-11. Our researchers produced a number of systematic reviews on different SCI topics (see page 5). These studies are a major contribution to the field and will surely be heavily cited in the years to come. Several of the studies were made possible by financial

support from the Rick Hansen Institute. It is this type of leadership that we can expect more in the future from the members of the BSCC.

In 2010-11, we established a Trainee Committee that has taken off with a great deal of enthusiasm. I'd like to thank the trainees for their positive energy and express my personal thanks to Ms. Leanne Ramer, Mr. Jason Plemel and Dr. Tania Lam for their leadership efforts. We also defined new categories of membership in ICORD that hopefully will create an environment where all of our team is aware of the benefits of being part of ICORD as well as the responsibilities (see page 4).

During the year, we welcomed three new Principal Investigators to ICORD: Drs. Sandra Hundza and Stephanie Willert from the University of Victoria and Dr. Carolyn Sparrey from Simon Fraser University. We look forward to having all three of our new members more involved in ICORD research efforts!

While a focus of the year was looking to our future, a major project saw us take a look back at what we have accomplished at ICORD. What began as a ten-year report became a brief history of ICORD from 1995-2010. The "ICORD Book", as it has come to be called, is a wonderful overview of our research centre and the paths we have travelled. I encourage you to go through it carefully as there are many jewels throughout.

I wish to conclude with a series of thank-yous. This was our first full year as a part of the UBC Faculty of Medicine and I am very appreciative of the very positive climate created by the Faculty and the significant support that we have received from their members. My heartfelt thanks to our ICORD Admin Team—Dr. Lowell McPhail, Ms. Cheryl Niamath, Mr. Jeremy Green, Ms. Lisa Larman, and Mr. Ben Nguyen—your dedication and excellence is a great model for us all.

It has been a great experience for me to learn about our community partners, I thank them for their support of ICORD, and I look forward to future collaboration.

I thank the Rick Hansen Institute for financial support of our communications and international initiatives.

The encouragement and support of the Rick Hansen Foundation is gratefully acknowledged, particularly from their Executive Vice-President Doramy Ehling and from CEO Rick Hansen. RHF's financial support of ICORD Operating enables us to tackle many projects that otherwise would be impossible.

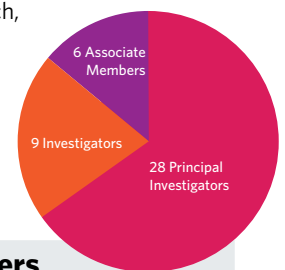
Finally, I am grateful to our ICORD researchers for their enthusiastic involvement in our strategic planning and other activities. ICORD is our Centre and will only become what we make it!

John McPhail

PROGRAM HIGHLIGHTS

Changes to ICORD membership

Over the past year, the ICORD executive worked with ICORD researchers to formalize three categories of ICORD membership: Principal Investigator, Investigator and Associate Member, with different levels of priority to access ICORD resources (see table below, and list on page 4). Existing ICORD members were asked to select the category that best matched their level of involvement in ICORD research, resulting in twenty four Principal Investigators, ten Investigators and six Associate Members. Going forward, the membership policy will allow potential new members to be celebrated and welcomed as key partners and collaborators, while ensuring that the roles and responsibilities of ICORD membership are clearly defined and agreed upon. The benefits of this formalization provide the larger ICORD membership with information about new members' background and expertise to facilitate integration and collaboration, and ensure that new members understand and are aligned with the ICORD vision, mission and research platform.



| Principal Investigators | Investigators | Associate Members |
|---|---|---|
| <ul style="list-style-type: none"> primary research programs are closely aligned with the Mission of ICORD | <ul style="list-style-type: none"> primary research programs are peripherally aligned with ICORD's Mission | <ul style="list-style-type: none"> conduct research in collaboration with ICORD Principal Investigators or ICORD Investigators |
| Benefits include: priority access to ICORD's research equipment, space, facilities and administrative support., in addition to priority access to funding support as available. | Benefits include: access to ICORD's research equipment, space, facilities and administrative support., in addition to access to funding support as available. | Benefits: same access to ICORD facilities and equipment as their collaborators |
| Responsibilities include: active engagement in ICORD's strategic planning and development and contribution to ICORD's Mission of conducting research and training in the area of SCI. ICORD PIs must be committed to the overall success of ICORD and must present themselves externally as ICORD Investigators, serving as ICORD ambassadors locally, nationally and internationally. | Responsibilities include: commitment to the overall success of ICORD which includes attending and promoting ICORD meetings and events, and whenever possible, presenting themselves externally as ICORD Investigators, serving as ICORD ambassadors locally, nationally and internationally, | Responsibilities: must report annually to the ICORD office on their collaborative research activities with ICORD partners. |

ICORD AT A GLANCE

Researchers: 43

PIs: 28

Investigators: 9

Associate Members: 6

Trainees: 304

Undergrads / other: 101

Grad students: 145

Postdoctoral fellows: 28

Residents: 30

Staff: 93

Technical/Research: 71

Clerical/Admin: 22

Publications: 196

Grant funding: \$17,526,269

SCI-related: \$6,722,086



ICORD's history celebrated with book

In April, 2011, copies of *From Cells to Community: Spinal Cord Injury Research at ICORD* arrived from the publishers. This fifty-page book, with contributions by many current and past ICORD researchers, trainees and staff, celebrates milestones in our history and highlights some exciting research projects undertaken by ICORD researchers over the years. Copies of this book are available from the ICORD Administrative Office.



World premiere performed at Blusson Spinal Cord Centre

The atrium of the Blusson Spinal Cord Centre was filled with delighted music-lovers on snowy February 26th. After excellent previews in the Georgia Straight and Vancouver Sun, there was standing-room-only for Cathedrals of Science, a concert for choir and orchestra performed by Vancouver Cantata Singers.

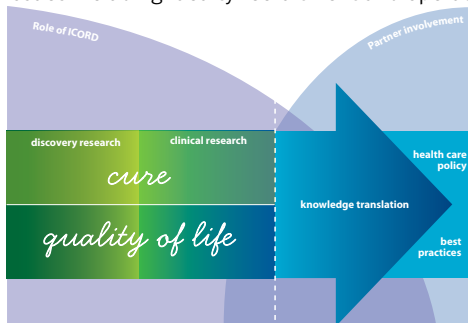
The concert featured the world premiere of two pieces composed by Jordan Nobles: *Processional* (with text taken from the Hippocratic Oath) and *Tombeau d'Ann Southam*. These works were commissioned by Vancouver Cantata Singers and composed especially for performance in the Blusson Spinal Cord Centre.

The concert was recorded by CBC Radio 2 and was broadcast on The Signal and Choral Concert. The concert is now available as part of CBC Radio 2's Concerts on Demand series.



Task force develops implementation plan

In the spring of 2010, Drs. Andrea Townson, Matt Ramer, Stacy Elliott, Peter Cripton and Bonnie Sawatzky volunteered to serve on a task force to outline a refined Vision, Mission, set of Values, and set of Strategic Directions for ICORD. The task force developed an Implementation Plan which was presented to and approved by ICORD researchers. The plan defines ICORD's research platform (see diagram, below) and addresses issues including faculty recruitment and operational funding support for research. It also outlines strategic initiatives that became the focus of the ICORD Executive for the remainder of the year: international and community partnerships, interdisciplinary research, external communications and leadership.



ICORD researchers take leading roles in Year of Science: Science and Health Expo

ICORD researchers played key roles in the Province's first signature event Year of Science, Health and Science Expo, held in late November



at the Fairmont Waterfront Hotel in Vancouver. The expo was designed to promote careers in health science, primarily among high school students, but open to all ages to attend for free. Dr. Jaimie Borisoff, a member of Dr. Gary Birch's ICORD research team, led an activity showcasing new wheelchair technology in sport and daily use. Dr. Borisoff has a PhD in neuroscience and is a gold and silver medal winning Olympian who invented the Elevation Wheelchair. ICORD PI and University of Victoria professor of Kinesiology, Dr. Paul Zehr, discussed the science behind the superhero and explore the possibility of "becoming Batman".

ICORD'S RESEARCHERS

ICORD's researchers are based at the University of British Columbia (UBC), Simon Fraser University (SFU) and the University of Victoria (UVic).

PRINCIPAL INVESTIGATORS

Dr. Gary Birch OC Neil Squire Society
Dr. Paul Bishop MD UBC Orthopaedics / VGH Spine
Dr. Victoria Claydon SFU Biomedical Physiology and Kinesiology
Dr. Peter Cripton UBC Mechanical Engineering
Dr. Marcel Dvorak MD, FRCPC UBC Orthopaedics / VGH Spine
Dr. Stacy Elliott MD UBC & VCH Urological Sciences / Psychiatry
Dr. Janice Eng UBC Physical Therapy / GF Strong Rehab Centre
Dr. Susan Forwell UBC Occupational Science & Occupational Therapy
Dr. Thomas Grigliatti UBC Zoology (Life Sciences Institute)
Dr. Andy Hoffer SFU Kinesiology
Dr. Sandra Hundza UVic Exercise Science
Dr. Piotr Kozlowski UBC & VCH Radiology / Urologic Sciences
Dr. Andrei Krassioukov MD, FRCPC UBC Physical Medicine & Rehabilitation
Dr. Brian Kwon MD, FRCPC UBC Orthopaedics / VGH Spine
Dr. Tania Lam UBC Human Kinetics
Dr. Bill Miller UBC Occupational Science & Occupational Therapy
Dr. Wayne Moore UBC & VCH Pathology
Dr. Mark Nigro UBC & VCH Urologic Sciences
Dr. Tom Oxland UBC & VCHRI Orthopaedic Engineering Research
Dr. Scott Paquette UBC Orthopaedics / VGH Spine
Dr. Matt Ramer UBC Zoology
Dr. Bonnie Sawatzky UBC & VCHRI Orthopaedics
Dr. Carolyn Sparrey SFU Mechatronics Systems Engineering
Dr. John Steeves UBC ICORD
Dr. Wolfram Tetzlaff UBC Zoology
Dr. Darren Warburton UBC Human Kinetics
Dr. Stephanie Willerth UVic Mechanical Engineering
Dr. E. Paul Zehr UVic Kinesiology

INVESTIGATORS

Dr. Hubert Anton MD, FRCPC UBC & VCH Physical Medicine & Rehabilitation
Dr. Mark Carpenter UBC Human Kinetics
Dr. Anita Delongis UBC Psychology
Dr. Tal Jarus UBC Occupational Science & Occupational Therapy
Dr. Tim O'Connor UBC Cellular & Physiological Sciences
Dr. Jane Roskams UBC Zoology
Dr. William Sheel UBC Human Kinetics
Dr. Andrea Townson UBC & VCH Physical Medicine & Rehabilitation / GF Strong Rehab Centre
Dr. David Wilson UBC Orthopaedics

ASSOCIATE MEMBERS

Dr. Michael Boyd UBC & VCH Orthopaedics / VGH Spine
Dr. Romeo Chua UBC Human Kinetics
Dr. Kerry Delaney UVic Biology
Dr. Timothy Inglis UBC Human Kinetics
Dr. Mike Negraeff VGH Anaesthesiology
Dr. Rhonda Wilms UBC Division of Physical Medicine & Rehabilitation / GF Strong Rehab Centre

NEW MEMBERS

Dr. Stephanie Willerth

Dr. Willerth's interest in biomedical engineering began as an undergraduate at MIT, and became increasingly focussed through her research at Washington University in St. Louis and UC Berkeley, ultimately bringing her to the University of Victoria with profound expertise in the field of tissue engineering. The research lab under Dr. Willerth's direction has been developing three-dimensional scaffolds to direct the behaviour of stem cells as they differentiate in neural tissue, an endeavour which provides insight into basic biological questions while also applying directly to eminently practical bio-engineering issues. These progressive scaffolding mechanisms are anticipated to provide a significant supplement to work already in progress at ICORD. Dr. Willerth's work, whether it is used to provide structure for existing advanced cell replacement, or as a delivery mechanism for medication to induce regeneration, is a welcome complement to the research and therapeutic approaches under development.



Dr. Carolyn Sparrey

Originally from Ontario, Dr. Sparrey undertook advanced study up and down the west coast of North America, from UBC to Berkeley and San Francisco, and back to Simon Fraser University. She brings an engineer's focussed practicality to her research, applying mechanical theories and methodologies to gain new insights into the mechanisms of SCI. She has also devoted attention to the integration of new patient-specific technologies in the diagnostic and therapeutic arenas. Dr. Sparrey anticipates combining her advanced computational methodologies with the clinical expertise of ICORD, to develop more advanced, patient-specific models from existing diagnostic images. Not only will these models serve to improve understanding and treatment of individual patients' injuries, but also the insights gained through the process will result in better modelling of injuries in general, assisting ICORD researchers focussing on the development of preventive, diagnostic, and therapeutic strategies.



Dr. Sandra Hundza

Dr. Sandra Hundza studied Physiotherapy at the University of Alberta and practiced clinically as a physiotherapist for twelve years, with particular attention to neurology. She later completed her graduate education at the University of Victoria where she studied the neural control of movement. Dr. Hundza continues to study the neural control of locomotion and balance, and applies this research to the development of rehabilitation strategies for improving mobility after trauma such as SCI or with aging. In particular, her research has been instrumental in gaining an understanding of the neural connections which coordinate arms and legs during locomotion, and of how these connections change with age or after neurotrauma. Dr. Hundza's work at ICORD will characterize the ideal strategies for retraining gait in people with SCI, with a particular emphasis on the neural mechanisms regulating trunk and limb movement during locomotion.



SHARING THE KNOWLEDGE

In the past year, ICORD researchers have enriched the world's cumulative SCI knowledge, synthesizing information that will be a great resource for other SCI researchers and clinicians for years to come. By writing systematic reviews, chart reviews and chapters for core reference books, ICORD researchers shared their expertise to help guide future pre-clinical and clinical studies and inspire new improvements in clinical care for people with SCI.

Drs. Brian Kwon and Wolfram Tetzlaff worked with twenty-six other scientists and clinicians to review more than 280 studies of three types of experimental treatments for SCI: cellular transplantation, biological interventions, and pharmacological therapies. They also created a scoring system for objectively evaluating pre-clinical studies being considered for clinical trials in people. The three systematic reviews and description of the grading system appeared in the *Journal of Neurotrauma* [vol 28, August 2011;]

Drs. Janice Eng and Bill Miller and their colleagues examined longitudinal studies published between 1980 and 2009 to produce an evidence-based review of aging of the body systems following SCI. Their findings indicated that premature aging of some body systems (such as the cardiovascular and endocrine systems) does appear to occur as a result of SCI, but recommended that additional longitudinal studies be performed to confirm this hypothesis. Their evidence-based review was sponsored by the Rick Hansen Institute and the Ontario Neurotrauma Foundation and was published in *Spinal Cord* [vol 49, 2011].

Drs. Stacy Elliott and John Steeves each contributed chapters to the second edition of *Spinal Cord Medicine* [2011, ed. VW Lin]. This is a comprehensive clinical guide that provides detailed information on topics ranging from general anatomy and imaging of the spinal cord to Dr. Elliott's chapters on sexual dysfunction in men and women with SCI and Dr. Steeves' discussion of considerations for clinical trials. A review of the first edition in the *New England Journal of Medicine* described this reference book as "an important resource for primary care and emergency room physicians, internists, neurologists, neurosurgeons, urologists, orthopedic surgeons, physical therapists, and others who care for patients with spinal cord injuries."

A list of selected publications by ICORD researchers in 2010-2011 is available at www.icord.org.

Other case studies and systematic reviews authored or co-authored by ICORD researchers include:

Lam T, Pauhl K, Krassioukov A, Eng JJ. Using robot-applied resistance to augment body-weight-supported treadmill training in an individual with incomplete spinal cord injury. *Phys Ther*. 2011 Jan;91(1):143-51.

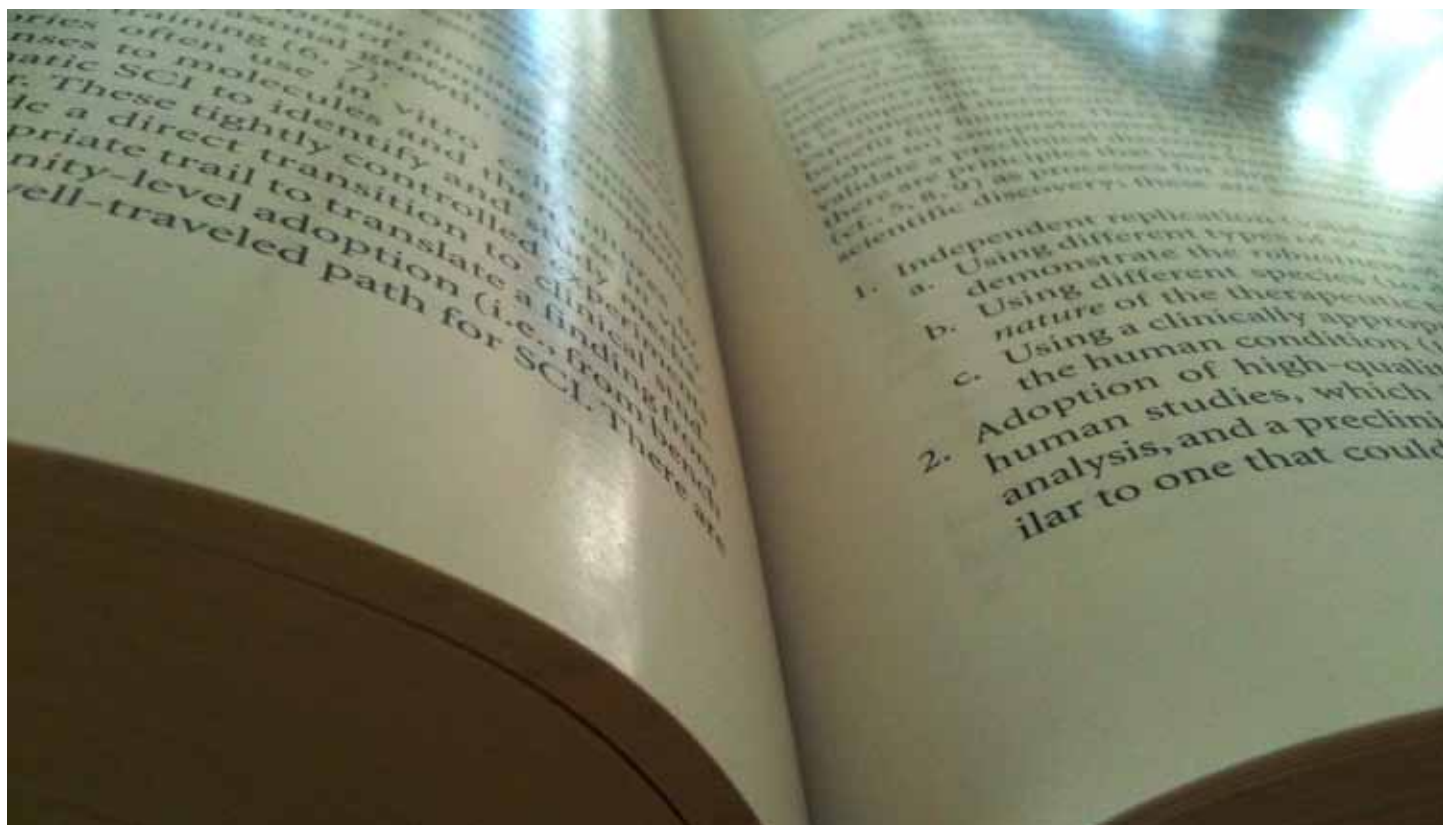
Krassioukov A, Eng JJ, Claxton G, Sakakibara BM, Shum S. Neurogenic bowel management after spinal cord injury: a systematic review of the evidence. *Spinal Cord*. 2010 Oct;48(10):718-33.

Biering-Sørensen F, Alexander MS, Burns S, Charlifue S, Devivo M, Dietz V, **Krassioukov A**, et al. Recommendations for translation and reliability testing of international spinal cord injury data sets. *Spinal Cord*. 2011 Mar;49(3):357-60

Dodwell ER, **Kwon BK**, Hughes B, Koo D, **Townson AF**, **Aludino A**, Simons RK, Fisher CG, **Dvorak MF**, and Noonan VK. Spinal Column and Spinal Cord Injuries in Mountain Bikers: A Thirteen Year Review. *American Journal of Sports Medicine* 2010 Aug;38(8):1647-52. Epub 2010 May 20.

Lee AKY, **Miller WC**, **Townson AF**, **Anton HA** and the F2N2 Research Group. Medication use is associated with fatigue in a sample of community-living individuals who have a spinal cord injury: a chart review. *Spinal Cord* 2010 May; 48: 429-433.

Phillips A, Cote A, **Warburton DER**. A systematic review of exercise as a therapeutic intervention to improve arterial function in persons living with spinal cord injury. *Spinal Cord* epub Feb 22, 2011.



NEW INTERNATIONAL OPPORTUNITIES

New Partnership with King Saud University

ICORD Investigators Drs. Tania Lam and Andrei Krassioukov received funding from King Saud University in Saudi Arabia for a collaborative research project with Saudi researcher Dr. Abdulaziz Al-Yahya. The title of the joint research project is "Pharmacological interventions and rehabilitation for spinal cord injury," and it was funded through King Saud University's Twinning Program, created to promote collaborations with other universities in order to raise their research capacity and reputation.

This collaboration will involve both faculty exchanges and graduate student training. Dr. Lam expects that the collaborative research will start with Saudi students coming to ICORD labs to learn techniques or complete aspects of the projects, and eventually lead to UBC graduate students going to Riyadh to work in their facilities.

Drs. Lam and Krassioukov, and ICORD Acting Director Dr. Tom Oxland, visited the King Saud University campus in Riyadh in October, 2010. There they gave presentations about ICORD research, and also met with the University Rector.

Dr. Lam is excited about the project. "My feeling is that when they see our commitment to work collaboratively with them, this collaboration could expand to include other groups at ICORD and UBC, depending on our initial success. So we really see this as a seed for basis of future larger collaborations," she said.



R-L: Dr. Oxland, Dr. Lam, KSU Dean of College of Pharmacy, Dr. Abdulaziz Al-Yahya & Dr. Krassioukov.

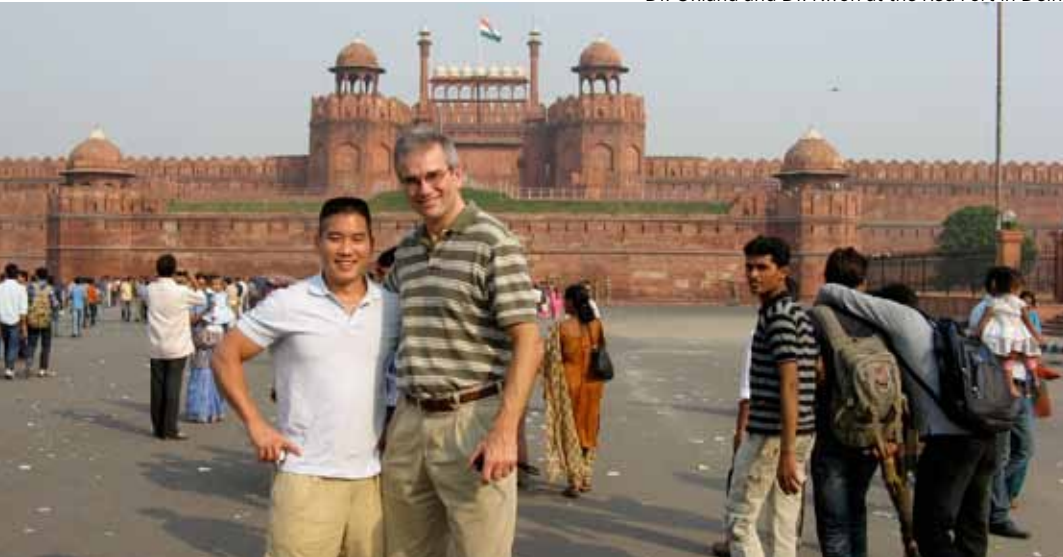
ICORD seminars in India

Several ICORD Principal Investigators travelled to Delhi, India, to present seminars on their research at the International Spinal Cord Society (ISCoS) Annual Meeting in October, 2010. The ICORD group was joined by Rick Hansen Institute CEO Bill Barrable, who presented a talk outlining the role of community partners in ICORD's mandate.

Drs. Tom Oxland, Tania Lam, Andrei Krassioukov, Brian Kwon, John Steeves and Stacy Elliott gave talks on topics ranging from basic science research including stem cell approaches to bioengineering research including the importance of injury mechanisms, rehabilitation research including robotic-assisted strategies for the recovery of walking, clinical research that includes cardiovascular function, sexual health post-SCI, and clinical trials.

Members of the ICORD delegation also met with leading Indian clinicians, Dr. H. Chhabra from New Delhi and Dr. S. Rajasekaran from Coimbatore to discuss opportunities for collaboration.

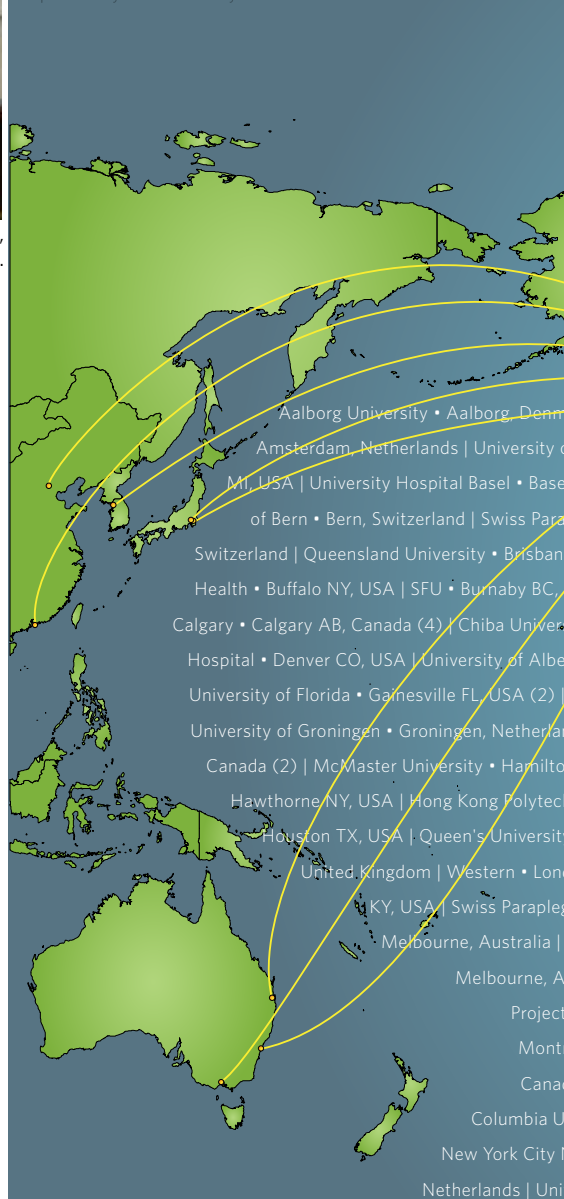
Dr. Oxland and Dr. Kwon at the Red Fort in Delhi



The value

Spinal cord injury affects many and varied global communities, with significant potential benefits for patients as well as trainee and staff education. SCI, including acute patients, will have an accelerator effect. As attests, ICORD researchers, funding provided by the... we look forward to even more

map courtesy of UBC Library GIS Lab



University • Palo Alto
 CA, USA | Thomas
 Jefferson University •
 Philadelphia PA, Canada | Drexel
 University • Philadelphia PA, USA | King
 Saud University • Riyadh, Saudi Arabia | UC
 San Francisco • San Francisco CA, USA (2)
 St. Mary's Hospital • San Francisco
 CA, USA | Yonsei University •
 Seoul, Korea | Brock
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 Catherines ON,
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 Institutet •
 Stockholm, Sweden |
 University of Sydney •
 Sydney, Australia |
 University of Western
 Australia • Sydney, Australia |
 Waseda University • Tokyo, Japan |
 Toronto Rehab Institute • Toronto ON, Canada (2) |
 University of Toronto • Toronto ON, Canada (5) | Bloorview Rehab
 • Toronto ON, Canada | University of Twente • Twente, Netherlands
 | Brunel University • Uxbridge, United Kingdom |

Mary
 Pack Arthritis
 Centre • Vancouver
 BC, Canada | UBC • Vancouver
 BC, Canada (29) | Stroke Recovery
 Assn • Vancouver BC, Canada | BC
 Children's Hospital • Vancouver BC,
 Canada | Centre for Drug Research
 and Development • Vancouver BC,
 Canada | Vancouver Coastal
 Health • Vancouver BC, Canada (2)
 | University of Victoria • Victoria BC,
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 Windsor ON, Canada | Balgrist Hospital •
 Zurich, Switzerland | University of New
 Mexico • Albuquerque NM, USA

mark | Vrije University •
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 Austin Health • Melbourne, Australia | Monash University •
 Australia | Geron Corporation • Menlo Park CA, USA | Miami
 to Cure Paralysis • Miami FL, USA (2) | McGill University •
 real QC, Canada | Centre for Rehabilitation • Montreal QC,
 da (2) | University of Montreal • Montreal QC, Canada |
 niversity • New York City NY, USA | New York University •
 NY, USA | Radboud University Medical Centre • Nijmegen,
 versity of Oxford • Oxford, United Kingdom (2) | Stanford

TRAINEE CONTRIBUTIONS

Trainees at ICORD (including undergraduate students, graduate students, and post-doctoral fellows) are instrumental to the research process as they take on and conduct research projects as part of their training. They are a diverse group, representing laboratories across a broad range of disciplines. Supervised by ICORD Principal Investigators, Investigators and Associate Members, ICORD trainees are responsible for planning and executing SCI research projects as well as disseminating research findings in the form of presentations or published manuscripts. Some interesting examples of trainee research projects are described on the next page. Trainees also conduct a wide range of other activities: they teach at UBC, attend international conferences to present their findings, and collaborate with SCI researchers around the world.

ICORD Trainee Committee

The ICORD Trainee Committee was established in June of 2010 to allow trainees to take a more active role in shaping their training environment. In its first year, the trainee committee has made substantial gains towards enhancing the ICORD trainee experience. The Committee turned four temporarily vacant offices into quiet study spaces for trainees and staff, organized several social events (including an Orientation Day for new students, a wheelchair basketball team in the BC Hoopfest Tournament and a monthly research seminar) and are planning an annual research meeting with high-profile plenary speakers.

2010/2011 Trainee Committee Executive

Trainee on ICORD Executive (the voice of the trainees in ICORD executive meetings): Leanne Ramer

Chair (chairs meetings and coordinates all activities of the trainee committee): Jason Plemel

Secretary (takes committee minutes and distributes to trainees; responsible for bookings and allocation of quiet rooms): Michelle Ng

Subcommittee Chairs:

Trainee Meeting Committee (organizes annual Trainee meeting): Jessica Inskip, Kip Kramer

Social Committee (organizes social events for trainees and other ICORD members): Tim Bhatnagar

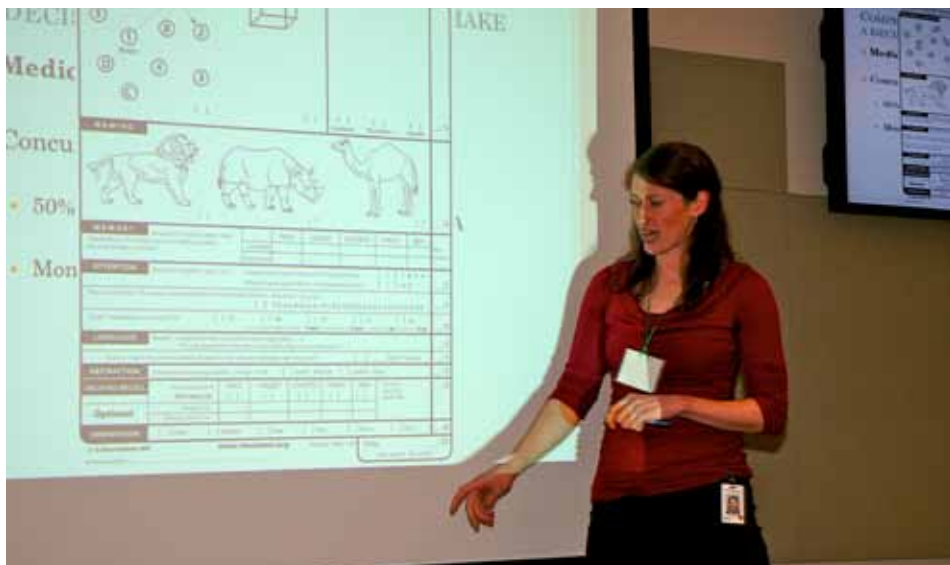
Communications Committee (responsible for communicating Trainee news, events and announcements to greater ICORD membership): Mark Crawford

Community Outreach Committee (works to foster a positive relationship between trainees and the larger community; coordinates Trainee-led tours of the Blusson Spinal Cord Centre): Peggy Assinck

Research Seminar Committee (organizes monthly seminars and arranges visiting speakers): Joe Sparling



The Trainee Committee organized **Team ICORD** for BC Wheelchair Basketball's **Hoopfest 2011**



PhD Candidate Jessica Inskip presents a research seminar to trainees, faculty and staff.

Monthly Research Seminars

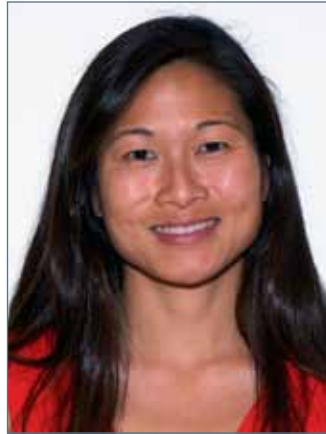
The ICORD Trainee Committee organizes and hosts monthly research seminars. These seminars have provided an excellent forum for trainees to exchange ideas on the leading edge of spinal cord injury research. Presentations are given by trainees from labs throughout the diverse disciplines of ICORD, including Engineering, Neurosciences, Human Kinetics and Rehabilitation. Question periods following presentations consistently spark lively discussion and debate.

ICORD Trainee Meeting

The Trainee Committee is planning a Research Meeting, scheduled for May 6, 2011. The meeting will include plenary talks by two renowned speakers: Dr. Mark Tuszynski, of the University of California San Diego (representing discovery research) and Dr. Milos Popovic, of the University of Toronto (representing clinical research). In addition, twenty-two ICORD trainees are scheduled to give presentations on their research.



Jason Plemel
PhD Candidate
Tetzlaff Lab



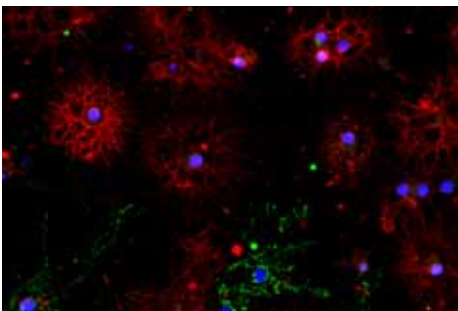
Shirley Wong
PhD Candidate
Krassioukov Lab



Tim Bhatnagar
PhD Candidate, Orthopaedic
& Injury Biomechanics Lab

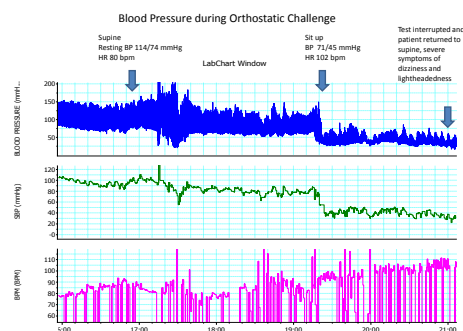
SPOTLIGHT ON TRAINEE RESEARCH PROJECTS

The central nervous system is comprised of a complex network of neural cells that each extends a process, or *axon*, over potentially great distances. In the spinal cord, these axons can span from the brain to the bottom of the spinal cord and carry sensory information up to the brain or motor information down to the legs and arms. To ensure that these electrical signals reach their destination quickly, a fatty substance called myelin wraps around long axons and acts as an insulator, allowing for faster and more efficient electrical impulses. Oligodendrocyte precursors (OPCs) can mature to become specialized neural cell called oligodendrocytes, which have the ability to myelinate (insulate) nearby axons. Following SCI, oligodendrocytes die. This results in the breakdown of myelin, often causing slower and/or incomplete electrical signals being relayed up and down the spinal cord. To produce new myelin (a process called remyelination), OPCs must move towards areas of damage and then mature into myelinating oligodendrocytes to help replace the lost myelin. This process is not perfect, and at times for unknown reasons, remyelination fails. My ultimate aim is to identify signals that improve growth of OPCs. I hope that understanding the signals involved in this process will contribute to new treatments for SCI that focus on enhancing remyelination.

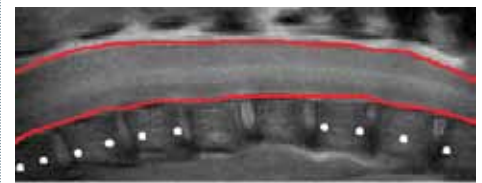


Commonly, the consequences of SCI are considered in terms of changes in motor function (e.g., the change in the ability to move and control movement of the arms and legs). However, SCI can also impact the body's automatic control of the cardiovascular system, and this is often and easily overlooked.

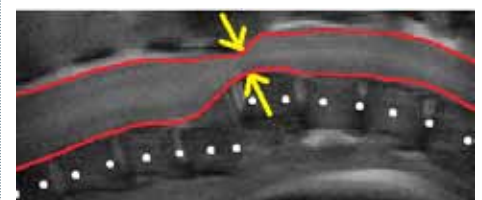
On a daily basis, people with SCI may experience low resting blood pressure or episodes of extreme high blood pressure which may be life-threatening, and both of these result from impaired cardiovascular control following SCI. My research aims to raise awareness about cardiovascular impairment following SCI and the associated management, and to look at how cardiovascular function changes following injury depending on the level and severity of SCI.



Traumatic spinal cord injury (SCI) often occurs during accidents that damage a person's spine. SCIs can occur via many different situations (motor vehicle accidents, collisions in contact sports, etc), which results in a large range of neurological problems in the patient, from mild effects to severe ones. Although this range of injury severity is seen clinically, the relationship between the initial mechanical trauma (ie motion of the spinal cord and what forces are on it) and the extent of neurological problems is not well-defined. The aim of my work is to quantify the relationship between the amount of deformation of the spinal cord during various different types of traumatic injuries and the ensuing biological damage, which is an indicator of neurological damage severity. This work involves a combined study of biomechanical engineering, neuroscience and medical imaging, truly exhibiting the multi-disciplinary approach that must be taken when researching spinal cord injury.



Spinal cord (outlined in red) before injury (above), and after injury (below)



ANNUAL RESEARCH MEETING

Our Annual Research Meeting is always a highlight of our year. This year's meeting, held February 21st and 22nd and attended by more than a hundred ICORD faculty, staff and trainees, featured plenary lectures by Drs. **Susan Harkema** from the University of Louisville and Dr. **Oswald Steward** from the Reeve-Irvine SCI Centre at the University of California-Irvine.

Dr. Harkema spoke about her leading work in SCI rehabilitation, some of which attracted the world's attention later in the year from her publication in **Lancet**.

Dr. Steward, author of the popular textbook **Functional Neuroscience**, delivered an exciting lecture on his team's promising results with p27—a possible route for neural regeneration.

Leaders of some of our various **community partners**, including the BC Paraplegic Association, BC Wheelchair Sports, the Sam Sullivan Disability Foundation, the Rick Hansen Institute, and the Rick Hansen Foundation, gave short talks about their organizations and then held an informative panel discussion with meeting participants.

Presentations by **ICORD researchers** Drs. Jaimie Borisoff, Stacy Elliott, Stephanie Willerth, Matt Ramer, Wayne Moore, Marcel Dvorak and Brian Kwon rounded out the day.

The **trainee poster competition** is an important component of every Annual Research Meeting. Travel prizes, funded by the ICORD Trainee Endowment, are awarded to the top posters by trainees at the Masters, PhD and Postdoctoral level. The quality of this year's posters was so impressive that judges found it difficult to award individual prizes for Masters and Postdoctoral posters. Jacqueline Cragg (Ramer Lab) and Colin Russell (OIBL) tied for the ICORD Prize for best poster by a trainee at the Masters Level. Peggy Assinck (Tetzlaff Lab) won the Aaron Moser prize for best poster by a trainee at the PhD level. Antoinette Domingo (Lam Lab) and Jose Zariffa (Steeves Lab) tied for the Gordon Hiebert Prize for best poster by a trainee at the Post-doc level.

Immediately following the ICORD meeting, 120 clinicians and researchers participated in the first-ever **International Autonomic Symposium**, led by Dr. Andrei Krassioukov, which focused on the latest research advances, as well as management of various autonomic dysfunctions that affect people with SCI. International experts Drs. **Larry Schramm** (Johns Hopkins) and **Fin Biering-Sørensen** (Rigshospitalet, Copenhagen) were among the invited speakers. Generous donations from the UBC Div. of Phys Med & Rehab and RHI, helped achieve the aim of increasing awareness and understanding of the devastating complications that result from injury to the autonomic nervous system.



Top: Trainee poster session and opening reception on February 21st. **Middle:** Dr. Wolfram Tetzlaff leads a lively discussion following a talk by Dr. Matt Ramer. **Bottom:** The winners of the trainee poster competition (L-R): Dr. Antoinette Domingo, Dr. Jose Zariffa, Mr. Colin Russell, Ms. Peggy Assinck, Ms. Jacqueline Cragg.

GALA SUCCESS

Spinal Chord puts "fun" in Fundraiser

Building on the success of the 2009 event, ICORD and the Vancouver Cantata Singers co-hosted the second annual **Spinal Chord** Gala on November 6, 2010. The 2010 event, generously presented by the Hong Kong Spinal Injury Fund, welcomed twice as many guests and included a live auction in addition to the silent auction. We received many generous donations and netted more than \$32,000. ICORD's share of the funding has been used to create a Community Resource Centre in the Blusson Centre atrium, set to open in the fall of 2011, as well as funding awards to recognize service and research excellence in ICORD staff. We are sincerely grateful for all the sponsorship we received, as well as for the effort and enthusiasm provided by our dedicated volunteers.



Spinal Chord 2011 will take place on Saturday 5 November: mark your calendar!



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VIBRANT PARTNERSHIP

ICORD is sincerely grateful to the **Rick Hansen Foundation (RHF)** and the **Rick Hansen Institute (RHI)** for their generous support of our programs over the past year. The funding they have provided helps to position ICORD for success as part of the broader vision for the partners at the Blusson Spinal Cord Centre, to retain and recruit researchers in spinal cord injury, establish a thriving researching environment for highly experienced investigators and a fertile ground upon to prepare junior colleagues to be future leaders of spinal cord injury research in Canada and beyond.

With the support of RHF and RHI, we were able to establish a number of new initiatives, including:

Operational Support for Research: with funding provided by Rick Hansen Foundation, ICORD hired a shared research assistant to provide technical support for all of the Discovery Science labs. In addition to this position, we plan to hire a shared technician for the Rehabilitation labs, an animal-care technician, a study coordinator for the clinical research teams, and a research grants facilitator within the next six months, to further enrich the research environment at ICORD. We were also able to hire a full-time administrative assistant to augment our small but efficient administrative team.

International initiatives: Rick Hansen Institute provided funding for international initiatives, including ICORD's participation in the ISCoS meeting in Delhi, India (see page 6). ICORD's International Affairs Committee has also created programs to fund visits to ICORD by international trainees and distinguished scholars in the next year.

CFI matching funds: ICORD Researchers were successful in receiving a Canada Foundation for Innovation grant for \$1.1 million to acquire important research infrastructure focused on human-based research studies (e.g. advanced robotics and virtual reality systems for rehabilitation interventions). RHF provided the 20 per cent match required in order to begin ordering the equipment.

We look forward to building on these initiatives and offering additional capacity-building programs in the coming years with the continued support of Rick Hansen Foundation and Rick Hansen Institute.

2010-11 support

Rick Hansen
Foundation



\$378,000



Rick Hansen Institute
Institut Rick Hansen

\$150,000



BSCC Town Hall Meeting

On January 25th, 2011, personnel from RHI, RHF, Brenda and David McLean Integrated Spine Clinic and ICORD got together in the Blusson Spinal Cord Centre atrium to learn about our various organizations' day-to-day activities, goals and aspirations. Rick Hansen started the event with an inspiring talk about the history of the Rick Hansen Foundation, and the afternoon ended with a screening of a short film created in honour of the 25th Anniversary of the Man In Motion World Tour

Thank you for reading ICORD's 2010-2011 Annual Report

It was **written by** Lowell McPhail, Tom Oxland and Cheryl Niamath, with **photography by** Lowell McPhail (cover, p10), J. Evan Kreider (p2, 11), Michelle Ng (p8, 9), and the Rick Hansen Institute (p12). Design, layout and additional photography were done by Cheryl Niamath, and the report was printed by EastVan Graphics.

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