



# ICORD Annual Report

April 2019 to  
March 2020



THE UNIVERSITY OF BRITISH COLUMBIA




# ICORD ANNUAL REPORT 2019-20



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## ICORD at a glance:



### People

<b>Researchers: 76</b>	<b>Trainees: 269</b>	<b>Staff: 87</b>
PIs: 48	Undergrads: 107	Technical: 80
Investigators: 11	Masters: 72	Admin: 7
Associate Members: 14	PhD: 61	<b>Volunteers: 134</b>
Emeriti: 3	Postdocs: 27	
	Residents: 2	



### Funding

**Competitively-funded research grants held by PIs: \$15,232,900** (including \$12,180,400 for SCI-related projects)

**Blusson Integrated Cures Partnership:** \$1,235,000

**UBC:** \$300,000



### Publications

**Total publications: 454**  
(including 301 peer-reviewed journal articles, and 72 papers with multiple-ICORD authors)

# ICORD ANNUAL REPORT 2019-20

## Introduction

It is my pleasure to present this annual report, covering ICORD's accomplishments from April 1, 2019, to March 31, 2020.

Looking back on the year has been more bittersweet than usual, as we face the global COVID-19 pandemic. Lockdown was imposed just a few weeks before our fiscal year ended. In fact, our annual research meeting (see page 6) was one of our last "normal" days together, with the pandemic being announced on March 11. This report is being published much later than usual because the ICORD administrative team is functioning virtually, from home, and was occupied for much of the summer in the creation of multiple phased return-to-research plans in order to allow some ICORD researchers and trainees to return to their work on site.

Before the world changed, ICORD was having a successful year. We welcomed five new faculty members as principal investigators (see pages 13-14), hosted some excellent research-related events (see pages 4 and 6), and brought in a full-time manager for PARC (see page 7). Based on pilot data developed using seed grants funded by the Rick Hansen Foundation, ICORD researchers received substantial research grants (see pages 11-12).

Our research took a hard hit during the early stages of the pandemic, causing a lot of uncertainty. I'm glad that research and training has been able to restart, although in a modified, socially-distanced way. Some researchers even continued to represent ICORD virtually at online meetings, and win awards!



I do look forward to the day when we can all be working together again to make spinal cord injury preventable, liveable, and curable. In the meantime, I hope you enjoy reading about our past year over the following pages. Stay healthy!

WOLFRAM TETZLAFF, MD, PHD  
DIRECTOR OF ICORD  
PROFESSOR, ZOOLOGY & SURGERY, UBC

*PS: All the photographs presented in this report were taken pre-COVID; please do not be alarmed by images of groups of maskless people standing close together.*



# Highlights from 2019-20:

## ICORD researchers collaborate on an adapted rowing ergometer



This project, initiated with seed funding for Drs. Carolyn Sparrey, Bonnie Sawatzky, and Jaimie Borisoff in 2018, originally aimed to develop adaptations that allow commercially-available rowing machines to be used by wheelchair users, thus making rowing an accessible, effective, and enjoyable exercise for people with spinal cord injury and other disabilities. The project has developed into a robust collaboration with visiting professor Dr. James Laskin of the University of Montana. The group was able to characterize the energetics of the adapted rowing ergometer (AROW)

with Dr. Laskin. They also explored the user response to the system and feedback for design revision, with new collaborator Dr. Ben Mortensen. The work was profiled in the Spring 2019 issue of Spinal Cord Injury BC's magazine, *The SPIN*.

## CSCIR

On April 8 and 9, SCI researchers and trainees from across the country converged on in Vancouver for the **Canadian Spinal Cord Injury Research** Biannual Meeting.

This was a continuation of a series initiated in 2006 by Dr. Karim Fouad of the University of Alberta and ICORD Director Dr. Wolfram Tetzlaff, and held alternately in Eastern and Western Canada. SCI researchers from across Canada and the US discussed topics including basic Science of the normal and injured spinal cord, inflammation, regeneration and repair, plasticity, rehabilitation, clinical interventions. In addition to the many ICORDians speaking, presenting posters, and participating in the conference, ICORD also provided space and logistical support for the event. Major funding for this conference was provided by Wings For Life, the Craig H. Nielsen Foundation, and the Ontario Neurotrauma Foundation.



# ICORD ANNUAL REPORT 2019-20

## Highlights from 2019-20

### **Biobank**

This past year, Dr. Brian Kwon and his colleagues continued to develop the International SCI Biobank (ISCIB), which includes a collection of full-length spinal cords from deceased individuals with SCI, as well as cerebrospinal fluid (CSF) and blood derivatives.

To date, ISCIB has acquired 11 spinal cords, approximately 15,700 CSF aliquots, and approximately 18,600 aliquots of blood derivatives from nearly 200 participants. Researchers from Sweden, the United States, England and Canada have requested sections of spinal cord tissue to examine specific histologic features, while CSF and blood derivatives have been requested by researchers in Belgium and the United States to examine specific biomarkers of SCI. The ISCIB is supported by the Rick Hansen Foundation.

### **Indigenous summer program**

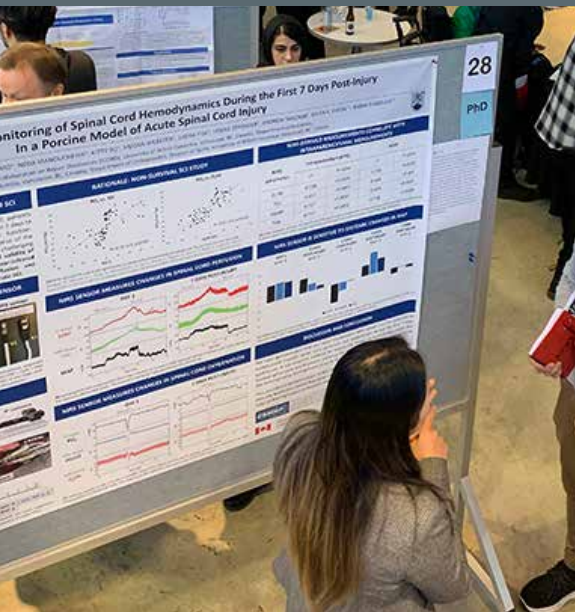
In 2018, ICORD launched a summer research program for Indigenous youth to explore SCI research. In the summer of 2019, we welcomed students Eliana Bond, Shana George, and Dean Mason. Each student focused on a different area in SCI. Dean assisted with projects in the Orthopedic and Injury Biomechanics lab, and Shana helped collect data for a research study using the Ekso suit (an “exoskeleton” suit that assists SCI patients in walking). Eliana worked with statistical software and classifying medications given in the acute care of SCI, as well as a study to quantitatively measure pain. Unfortunately, the 2020 Summer program had to be put on hold due to COVID-19, but we look forward to re-launching as soon as possible. Shana and Dean started UBC in the Fall, and both have received prestigious Presidential Scholars awards in recognition of their accomplishments and promise.







# ICORD ANNUAL REPORT 2019-20



## Highlights from 2019-20

### Annual Research Meeting

ICORD's 2020 Annual Research Meeting was held on March 10 and 11, 2020, at the Blusson Spinal Cord Centre. This year's conference featured Dr. Thomas Kessler (Balgrist University Hospital, Zürich) as visiting plenary speaker, 14 research talks by ICORD and Praxis researchers, and 56 poster presentations by ICORD staff and trainees from labs at UBC Vancouver, SFU, UBC Okanagan, and BCIT. Supported by the Rick Hansen Foundation through the Blusson Integrated Cures Partnership, the annual research meeting is an important opportunity for researchers, staff, and students to update each other on their progress, offer and receive feedback, and develop new collaborations.



### ICORD Trainee Symposium

On May 13, 2019, the ICORD Trainee Committee hosted their Trainee Symposium. This annual event is planned, organized, and executed by trainees, offering the organizing committee some excellent networking experience. With 108 participants the symposium also provided everyone with a great day of 9 research talks and 32 poster presentations. Supported by the Rick Hansen Foundation through the BICP, the 2019 Trainee Symposium featured plenary talks by Drs. Kathleen Martin Ginis of UBC-O, and Kristian Franze of Cambridge University in the UK.



# ICORD ANNUAL REPORT 2019-20



## PARC update:

The Yuel Family Physical Activity Research Centre (PARC) is ICORD's most successful community engagement initiative. People with SCI and other spine conditions visit for individual exercise, personal training, classes, and friendly companionship. Through PARC, ICORD researchers can connect with potential research participants and get feedback on the design of research projects. PARC is also reaching out to community centres in Metro Vancouver to offer guidance and support for the creation of adapted exercise programs in the community.

After overseeing all aspects of PARC and nurturing its growth since 2012, Faculty Advisor Dr. Tania Lam passed the leadership torch to new ICORD Principal Investigator, **Dr. Andrea Bundon**, who is an assistant professor in UBC's School of Kinesiology.

PARC rolled out a new personal training program in September, 2019, in addition to six other programs running (adaptive yoga, spin, boxercise, ping pong, wheelchair dance, and massage).

As an investment to better meet the needs of this growing program that includes more than 400 registered participants (with 80 to 150 visiting each week), six student Work Learn staff members, and 50 volunteers, **Milly Zaletelj** was hired as the full time manager of PARC in January. She is responsible for ongoing management and expansion of the facility and programs, and, along with Dr. Bundon, works closely with PARC's **Community Engagement Committee**, a group PARC participants who act as a bridge between researchers and PARC users, providing input, feedback on existing and future programs. Thank you to Community Engagement Committee members Jacques Courteau, Linda Hunt, Richard Juren, Derek Lunden, Kirsten Sharp, Brad Skeats, Sydney Spraggs, and Teri Thorson, for their energy, insight, and dedication.





# ICORD ANNUAL REPORT 2019-20

In the fall of 2019, PARC participants raised more than \$14,000 in the first-ever **PARC-a-Thon** to support programs and student staff. Thank you to everyone who donated to PARC in 2019-2020, including:

## **\$1000+**

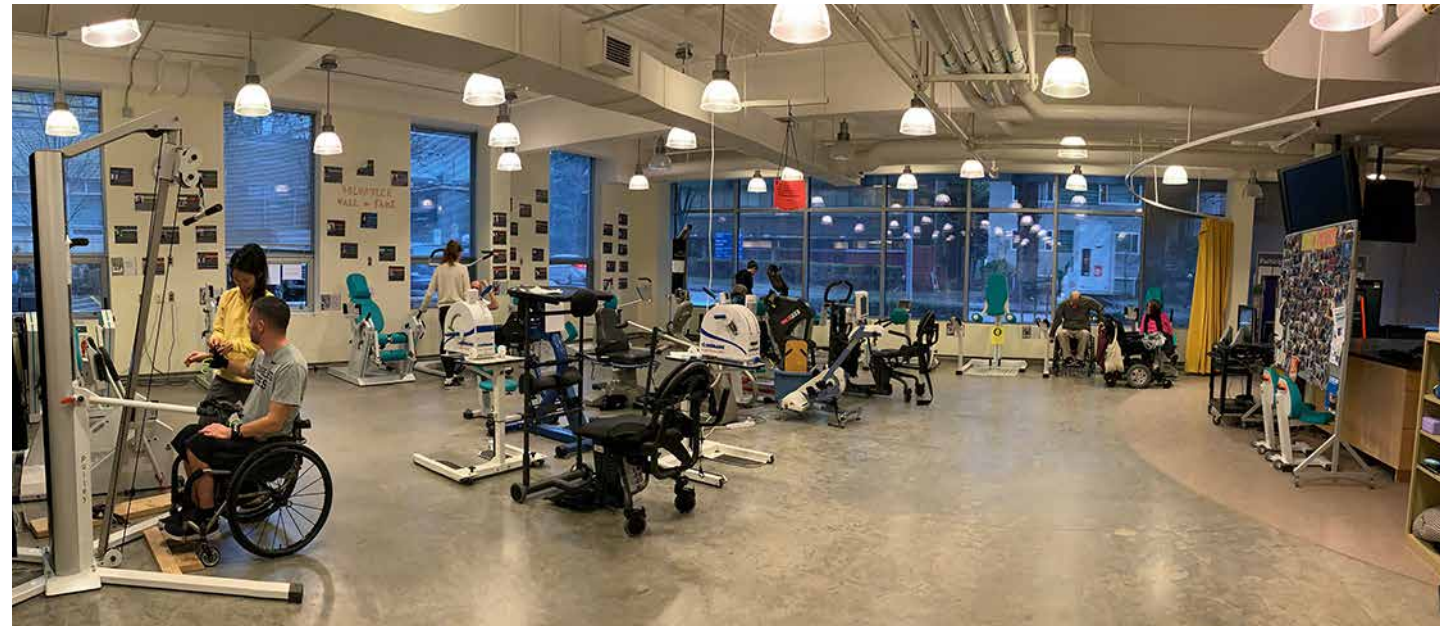
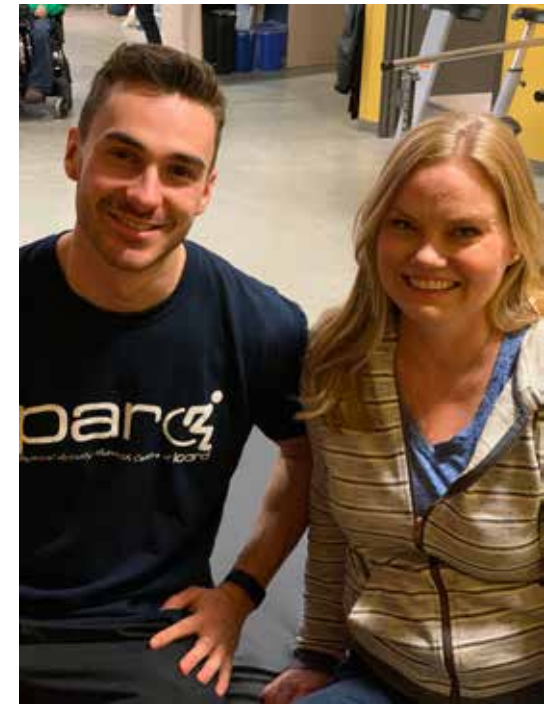
Stephanie Lett & Bing Yee  
Russell Gueguen  
Stephanie & David Williams

## **\$500-999**

Phil Parker  
Rosemarie Alvaro  
Betty Jung  
Carolee Duttchen  
Hal Industries / Donna Harco

## **\$200-\$499**

Gordon Chan  
Connie MacDonald  
John Day  
Mark Vestergaard  
Marney Smithies  
Peter Lee





# ICORD ANNUAL REPORT 2019-20

## Publication highlights:

Kevin Liu, a PhD student with Dr. Corree Laule and Dr. John Kramer, published an MRI-based *in vivo* normative atlas of myelin content in the spinal cord. The atlas can be used as a reference for *in vivo* spinal cord studies that assess demyelination and inflammation, where data from individual patients can be compared to normal values to help identify areas of damage.

Liu H, Rubino C, Dvorak AV, Jarrett M, Ljungberg E, Vavasour IM, Lee LE, Kolind SH, MacMillan EL, Traboulsee A, Lang DJ, Rauscher A, Li DKB, MacKay AL, Boyd LA, Kramer JLK, Laule C. Myelin Water Atlas: A Template for Myelin Distribution in the Brain. *J Neuroimaging*. 2019 Nov;29(6):699-706.

Postdoctoral fellow Dr. Tom Nightingale, student Gurjeet Bhangu, and Dr. Andrei Krassioukov examined the associations between red blood cell distribution width and cardiorespiratory fitness in people with chronic SCI, and showed the importance of maintaining a high aerobic capacity following SCI to reduce secondary cardiovascular disease risk.

Nightingale TE, Bhangu GS, Bilzon JLJ, Krassioukov AV. A cross-sectional comparison between cardiorespiratory fitness, level of lesion and red blood cell distribution width in adults with chronic spinal cord injury. *J Sci Med Sport*. 2020 Feb; 23(2):106-111.

Dr. Jacquelyn Cragg and Dr. John Kramer and their colleagues published a study showing that the use of a muscle-relaxant in acute SCI is neurologically safe, and potentially benefits recovery.

Cragg JJ, Tong B, Jutzeler CR, Warner FM, Cashman N, Geisler F, Kramer JLK. A longitudinal study of the neurologic safety of acute baclofen use after spinal cord injury. *Neurotherapeutics*. 2019 Jul;16(3):858-867.

Dr. Babak Shadgan, Dr. Peter Cripton, and Dr. Brian Kwon and their colleagues showed that near-infrared spectroscopy (NIRS) is an effective, non-invasive way to measure real-time changes in spinal cord oxygenation.

Shadgan B, Macnab A, Fong A, Manouchehri N, So K, Shortt K, Streijger F, Cripton PA, Sayre EC, Dumont GA, Pagano R, Kim K-T, Kwon BK. Optical assessment of spinal cord tissue oxygenation using a miniaturized near infrared spectroscopy sensor. *Journal of Neurotrauma*. 2019; 36(21):3034-3043.

Dr. Peter Cripton and his team showed that the Pro-Neck-Tor device, mounted in a sports helmet, can reduce the severity of neck fractures and spinal cord injury during some types of head-first impacts.

Dressler DM, Dennison CR, Whyte T, Cripton PA. A novel helmet-mounted device for reducing the potential of catastrophic cervical spine fractures and spinal cord injuries in head-first impacts. *Clinical Biomechanics*. 2019;64:22-27.

Dr. Piotr Kozłowski and his colleagues showed that a special MRI technique can be used to distinguish between different types of SCI (contusion, dislocation, and distraction), which will be helpful in the testing of potential neuroprotective treatments.

Yung AC, Mattucci S, Bohnet B, Liu J, Fournier C, Tetzlaff W, Kozłowski P, Oxland T. Diffusion tensor imaging shows mechanism-specific differences in injury pattern and progression in rat models of acute spinal cord injury. *NeuroImage*, 186, 43-55 (2019).



# ICORD ANNUAL REPORT 2019-20

## Publication highlights

Dr. Brian Kwon and Dr. Chris West and their colleagues provided important information that can be used by medical professionals to more effectively manage the blood pressure of acute spinal cord injured patients.

Squair JW, Bélanger LM, Tsang A, Ritchie L, Mac-Thiong JM, Parent S, Christie S, Bailey C, Dhall S, Charest-Morin R, Street J, Ailon T, Paquette S, Dea N, Fisher CG, Dvorak MF, West CR, Kwon BK. Empirical targets for acute hemodynamic management of individuals with spinal cord injury. *Neurology*. 2019 Sep 17; 93(12):e1205-e1211.

Dr. Corree Laule and Dr. John Kramer's PhD student Kevin Liu developed a deep learning neural network algorithm to very quickly calculate myelin water fraction, the most specific MRI method currently available to measure myelin *in vivo*.

Liu H, Xiang Q-S, Tam R, Dvorak AV, Kolind SH, MacKay AL, Trabousee A, Vavasour IM, Li DKB, Kramer JK, Laule C. Myelin water imaging data analysis in less than one minute. *Neuroimage*. 2020 Apr 15; 210:116551.

In a randomized control trial, postdoctoral fellow Dr. Jasmin Ma showed that theory-based personal training and coaching, co-developed with nearly 300 stakeholders, had a positive effect on physical activity levels, aerobic fitness, and psychosocial predictors of physical activity among people with SCI.

Ma J. K., West, C. R., & Martin Ginis, K. A. (2019). The effects of a patient and provider co-developed, behavioral physical activity intervention on physical activity, psychosocial predictors, and fitness in individuals with spinal cord injury: A randomized controlled trial. *Sports Medicine*, 49, 1117-1131.

Dr. Ben Mortenson, Dr. Patricia Mills, and Dr. Bonnie Sawatzky consulted people with SCI and their caregivers (both formal and informal) to inform the development of a mobile app to deliver self-management interventions for SCI-specific secondary complications.

Mortenson B, Singh G, MacGillivray M, Sadeghi M, Mills P, Adams J, Sawatzky B. Development of a self-management app for people with spinal cord injury. *Journal of Medical Systems*. 2019 Apr 22; 43(6):145.

Using a specially-engineered injury model, Dr. Cheryl Wellington, Dr. Peter Cripton and their colleagues offered insight into the mechanisms by which repetitive traumatic brain injury (TBI) leads to post-traumatic psychiatric-like symptoms.

Vonder Haar C, Martens KM, Bashir A, McInnes KA, Cheng WH, Cheung H, Stukas S, Barron C, Ladner T, Welch KA, Cripton PA, Winstanley CA, Wellington CL. Repetitive closed-head impact model of engineered rotational acceleration (CHIMERA) injury in rats increases impulsivity, decreases dopaminergic innervation in the olfactory tubercle and generates white matter inflammation, tau phosphorylation and degeneration. *Exp Neurol*. 2019 Jul;317:87-99.

Dr. Lyndia Wu wrote an editorial for the British Journal of Sports Medicine in which she discussed the use of head impact sensors in the development of improved sports helmets and headgear.

Wu LC. Sports concussions - can head impact sensors help biomedical engineering to design better headgear? *British Journal of Sports Medicine*. 54(7):370-371. (2020).

See  
Appendix 1  
for detailed  
Publications  
list



## Building capacity through the Blusson Integrated Cures Partnership

In 2019-20, ICORD and Praxis (formerly the Rick Hansen Institute) continued to work together to identify new treatments for SCI and apply existing treatments for other neurological disorders, injuries, and diseases, to SCI. Funded by the Rick Hansen Foundation, the Blusson Integrated Cures Partnership (BICP) provided stable funding for several ongoing research projects including:

- Neuroprotective treatment of cervical spinal cord injuries (Dr. Wolfram Tetzlaff). This has been challenging and so far, no single or combinatorial treatment tested in this project has reached the efficacy of treatments with ketogenic regimen which is now in clinical trial in Birmingham, AB.
- Development of new clinically-relevant injury models (Dr. Thomas Oxland).
- The International SCI Biobank (Dr. Brian Kwon). The ISCIB holds eleven human spinal cords, approximately 18,600 blood product samples, and approximately 15,700 cerebrospinal fluid (CSF) samples from 187 participants as of March 31, 2020.

The BICP supported faculty member Dr. John (Kip) Kramer, who continued to make significant contributions to the field of SCI. Startup funding for two new ICORD faculty members, Dr. Mike Berger and Dr. Babak Shadgan, was also supported by the BICP.

Nine seed grants and 32 travel awards were awarded in 2019/20. Seed grants funded by the BICP since 2014 leveraged more than \$2.6M in competitively-funded research grants by the end of the 2020 fiscal year. In 2019-20 alone, seed grants were instrumental in the success of the following:

- Dr. Matt Ramer received a five-year CIHR grant of \$807,000 to study “Hypoxia mimicry for enhancing peripheral nerve regeneration.” In the absence of sufficient oxygen (i.e. during hypoxia), cells die. When oxygen levels are low but not lethal, cells can cope by changing how they metabolize nutrients. These oxygen-saving mechanisms are also partially engaged when nerves are injured, as they are in 2-3% of all injuries to any part

The cover image features a vertical split. The top half shows a sky with soft, colorful clouds in shades of blue, pink, and orange. The bottom half shows a modern building with a blue facade and large windows, illuminated at night. The text 'ICORD ANNUAL REPORT 2019-20' is overlaid in white on a dark grey background that spans across the middle of the image.

# ICORD ANNUAL REPORT 2019-20

of the body. Nerve injury leads to loss of function as well as to neuropathic pain. Often these consequences of nerve injury fail to resolve, prompting us to ask whether artificially engaging the hypoxia response can improve peripheral nerve regeneration and reduce neuropathic pain

- A seed grant awarded to Drs. Cheryl Wellington and Brian Kwon in 2018 was pivotal in generating pilot data for their successful US\$100,000 application to Paralyzed Veterans of America for their project, *Translating neurochemical biomarkers from TBI to acute spinal cord*. This project looks at blood and CSF biomarkers for SCI using the ultra sensitive Simoa analytical platform. Drs. Wellington and Kwon have made impressive progress on the work already. Their preliminary data are very promising and they will be preparing a first publication on the work this year.
- Dr. Aziz Ghahary received a Collaborative Health Research Project grant from the federal government in April, 2019. He and his colleagues Drs. Reza Jalili (ICORD / Surgery), Frank Ko (Biomaterials Engineering), and Dirk Lange (Urology), were awarded \$778,000 over three years from CIHR and NSERC for their project, *Therapeutic use of micro-sponge embedded nutritional liquid scaffold for treatment of non-healing wounds*. Preliminary findings Dr. Ghahary was able to gather using ICORD seed grants led to his success in this funding competition.
- Dr. Wolfram Tetzlaff used preliminary data generated by a BICP-funded research project to successfully apply for a US\$735,000 United States Department of Defense research grant to investigate a combination of clinically used drugs for their protective effects after acute cervical spinal cord injury in rodent models.
- Drs. Tania Lam and Lynn Stothers collaborated on a seed grant-funded project in 2016, which led to a successful three-year, \$623,476 CIHR operating grant for entitled *EXURCISE for improving URinary Continence in people with Spinal cord injury*, as well as a four-year Craig H Neilsen Foundation grant for Dr. Stothers entitled *Optical monitoring of neurologic lower urinary tract dysfunction using near infrared spectroscopy*. Improving bladder function is an important aspect of increasing quality of life for people with SCI.



# Research faculty

Five new faculty members joined ICORD as Principal Investigators in 2019-20.



## **Dr. Michael Berger**

Dr. Berger is a clinician-scientist in UBC's Department of Physical Medicine & Rehabilitation. His research investigates the downstream effects (e.g. changes and adaptations) of neurotrauma on the peripheral nervous system, including the neuromuscular and autonomic nervous systems, using a combination of human neurophysiological and imaging measurement techniques. Dr. Berger is currently researching the potential applications and outcomes of a surgical technique called nerve transfer, which is being used by plastic surgeons at VGH to help restore hand and arm function to patients with SCI and other nerve injuries.



## **Dr. Andrea Bundon**

Dr. Bundon is an assistant professor in UBC's School of Kinesiology. She is the Faculty liaison for the Yuel Family Physical Activity Research Centre (PARC). Dr. Bundon's research spans the sociology of sport and critical disabilities studies. Working from community-based, participatory research frameworks, she uses innovative (and often digital qualitative methods) to explore the intersections of sport, physical activity, health, disability and social inclusion.

# ICORD ANNUAL REPORT 2019-20

## Research faculty



### **Dr. Jacquelyn Cragg**

Dr. Cragg is an assistant professor in UBC's Faculty of Pharmaceutical Sciences. She is leveraging clinical and population "big data" sources and machine-based learning to identify novel, reliable predictors of spinal cord injury progression. She also researches other neurological diseases beyond spinal cord injury, such as Parkinson's disease, multiple sclerosis, and amyotrophic lateral sclerosis (ALS). Dr. Cragg has been an ICORD member since 2007, when she started as a directed studies undergrad student in Dr. Matt Ramer's lab. Most recently, she was a postdoctoral fellow with Dr. John Kramer.



### **Dr. Veronica Hirsch-Reinshagen**

Dr. Hirsch-Reinshagen is an assistant professor in UBC's Department of Pathology and Laboratory Medicine. She is a neurological pathologist with a research focus on glial cells in central nervous system disorders including traumatic spinal cord injury. Dr. Hirsch-Reinshagen has a dual role, looking after both the clinical and research aspects of being a neuropathologist.



### **Dr. Alex Kavanagh**

Dr. Kavanagh is a clinical assistant professor in UBC's Department of Urologic Sciences, with a special interest in neurogenic bladder and pelvic reconstructive surgery. Dr. Kavanagh's research focuses on leakage refractory to prior surgical therapy, treating pelvic organ prolapses, integration of laser sterilization of the urinary tract, and electrical stimulation of the central nervous system.



# ICORD ANNUAL REPORT 2019-20

## ICORD's Principal Investigators

New  
PI

**Dr. Michael Berger** | *Clinical Assistant Professor, Physical Medicine & Rehabilitation, UBC* | **Focus:** Electrical stimulation, electromyography, nerve transfer, peripheral nervous system, physiatry.

**Dr. Gary Birch** | *Executive Director, Neil Squire Society; Adjunct Professor, Electrical and Computer Engineering, UBC* | **Focus:** Ensuring assistive technology is accessible to people with disabilities.

**Dr. Jaimie Borisoff** | *Canada Research Chair in Rehabilitation Engineering Design; Research Director, British Columbia Institute of Technology; Adjunct Professor, Occupational Science and Occupational Therapy, UBC* | **Focus:** Increasing participation through improved accessible equipment design.

New  
PI

**Dr. Andrea Bundon** | *Assistant Professor, Kinesiology, UBC* | **Focus:** Community-based research, digital qualitative research, exercise, inclusion, paralympics, physical activity, qualitative methodologies, social participation, social support, sport.

**Dr. Victoria Claydon** | *Associate Professor, Biomedical Physiology and Kinesiology, SFU* | **Focus:** Impact of cardiovascular dysfunction on the quality of life of people with SCI.

New  
PI

**Dr. Jacquelyn Cragg** | *Assistant Professor, Pharmacology, UBC* | **Focus:** Data science, drug effectiveness, drug safety, epidemiology, SCI progression.

**Dr. Peter Crompton** | *Co-director, Orthopaedic and Injury Biomechanics Group, UBC; Professor and Associate Head - External, Mechanical Engineering, UBC; Associate Member, Orthopaedics, UBC* | **Focus:** Mechanical and computational models of SCI; injury prevention.

**Dr. Marcel Dvorak** | *Professor, Orthopaedics, UBC; Cordula and Günter Paetzold Chair in Clinical SCI Research, UBC; Senior Medical Director, Vancouver Acute Services, Vancouver Coastal Health* | **Focus:** Adult traumatic spine injury surgery; optimizing clinical decision-making in acute SCI.

**Dr. Stacy Elliott** | *Clinical Professor, Depts. of Psychiatry and Urologic Sciences, UBC; Medical Director, BC Centre for Sexual Medicine; Co-director, Vancouver Sperm Retrieval Clinic; Medical Director, Men's Sexual Assessment and Rehabilitation Service, Prostate Centre; Physician Consultant, GF Strong Sexual Health Rehabilitation Service* | **Focus:** Sexual health after SCI; autonomic dysfunction during sexual activity, pregnancy, and childbirth.

**Dr. Janice Eng** | *Professor, Physical Therapy, UBC* | **Focus:** Web-based technologies designed to provide the SCI community with information about recovery and evidence-based treatments.

# ICORD ANNUAL REPORT 2019-20

## ICORD's Principal Investigators

**Dr. Susan Forwell** | Associate Professor and Head, Occupational Science & Occupational Therapy, UBC | **Focus:** Fatigue, pain, mobility, and employment among the SCI and traumatic brain injury populations.

**Dr. Heather Gainforth** | Assistant Professor, Health and Exercise Sciences, UBC Okanagan | **Focus:** behaviour change; health promotion; kinesiology; knowledge translation.

**Dr. Aziz Ghahary** | Director, BC Professional Fire Fighters' Burn and Wound Healing Research Group; Professor, Surgery, Associate Member, Dermatology & Skin Sciences, UBC | **Focus:** Development of therapeutics for chronic non-healing wounds and autoimmune diseases.

**Dr. David Granville** | Professor, Pathology & Laboratory Medicine, UBC; Scholar of the Royal Society of Canada; Associate Director, BC Professional Firefighters' Burn and Wound Healing Research Laboratory, Plastic Surgery, UBC; Founder and Chief Scientific Officer, viDA Therapeutics Inc.; Adjunct Professor, Institute of Molecular Biology and Biochemistry, SFU | **Focus:** Role of granzymes in the healing of injured tissue, inflammation, and neuronal damage.

New  
PI

**Dr. Veronica Hirsch Reinshagen** | Assistant Professor, Pathology & Laboratory Medicine, UBC | **Focus:** Glial cells in CNS disorders including traumatic SCI.

**Dr. Andy Hoffer** | Professor, Biomedical Physiology and Kinesiology, SFU; Associate Member, Engineering Science, SFU; Founder and Chief Scientific Officer, Lungpacer Medical Inc. | **Focus:** Prevention of the loss of voluntary diaphragm function in acute SCI; restoring diaphragm in ventilator-dependent, chronic SCI patients.

**Dr. Reza Jalili** | Assistant Professor, Surgery, UBC | **Focus:** Management of pressure ulcers and other chronic, non-healing wounds; improving cell viability and functionality in tissue wounds with an optimal extracellular matrix.

New  
PI

**Dr. Alex Kavanagh** | Clinical Assistant Professor, Urology, UBC | **Focus:** neurogenic bladder, pelvic reconstructive surgery, electrical stimulation of the central nervous system.

**Dr. Piotr Kozlowski** | Associate Director, Magnetic Resonance Imaging Research Centre, UBC; Associate Professor, Radiology and Urologic Sciences, UBC; Associate Member, Physics and Astronomy, UBC; Research Scientist, Vancouver Prostate Centre | **Focus:** Magnetic resonance imaging for the measurement of white matter damage.

# ICORD ANNUAL REPORT 2019-20

Became  
President of  
the American  
Spinal Injury  
Association  
(ASIA)

Won the  
inaugural  
Turnbull-Tator  
Award in Spinal  
Cord Injury and  
Concussion  
Research.

## ICORD's Principal Investigators

**Dr. John Kramer** | Assistant Professor, Kinesiology, UBC; Scholar, Michael Smith Foundation for Health Research | **Focus:** Neuropathic pain medication and neurological recovery in SCI; open-access clinical trial data.

**Dr. Andrei Krassioukov** | Professor, Physical Medicine & Rehabilitation, UBC; Spinal Cord Injury Rehab Rehabilitation Chair and Associate Director, Rehabilitation Research, ICORD; Staff physician, Spinal Cord Program, GF Strong Rehabilitation Centre; President, American Spinal Injury Association (ASIA) | **Focus:** Management of autonomic dysreflexia after SCI; development and implementation of international Paralympic classifications.

**Dr. Brian Kwon** | Canada Research Chair in Spinal Cord Injury; Professor, Orthopaedics, UBC; Spine Surgeon, Vancouver Spine Program, Vancouver General Hospital; Associate Director, Clinical Research, ICORD; Director, Vancouver Spine Research Program, Marcel Dvorak Chair in Spine Trauma, Vancouver General Hospital | **Focus:** Proteomic, metabolomic, and genomic changes occurring after acute SCI; International SCI Biobank.

**Dr. Tania Lam** | Associate Professor, Kinesiology, UBC | **Focus:** Training functional community ambulation after SCI; robotic exoskeletons for rehabilitation.

**Dr. Cornelia Laule** | Associate Professor, Radiology and Pathology & Laboratory Medicine, UBC; Associate Director, Education, ICORD | **Focus:** Magnetic resonance imaging for quantitative measurements of myelin in the brain and spinal cord.

got  
tenure!

**Dr. Kathleen Martin Ginis** | Professor, Health & Exercise Sciences, UBC Okanagan; Director, SCI Action Canada; Principal Investigator, Canadian Disability Participation Project; Fellow, National Academy of Kinesiology | **Focus:** Physical activity behaviour change after SCI; increasing physical activity participation in the SCI community.

**Dr. William Miller** | Professor, Occupational Science & Occupational Therapy, UBC; Associate Dean, Health Professions Education, UBC | **Focus:** Optimizing mobility through the use of assistive technology.

**Dr. Patricia Mills** | Clinical Assistant Professor, Physical Medicine & Rehabilitation, UBC | **Focus:** Management of cardiovascular health and spasticity after SCI.

**Dr. Wayne Moore** | Clinical Professor, Pathology & Laboratory Medicine, UBC | **Focus:** Basic histopathology and immunopathology behind SCI; pathogenesis of multiple sclerosis.

**Dr. W. Ben Mortenson** | Associate Professor, Occupational Science & Occupational Therapy, UBC; Adjunct Professor, SFU | **Focus:** Community participation among those with SCI; scooter-skills training on safety and participation.

got  
tenure!



# ICORD ANNUAL REPORT 2019-20

Named  
to the Royal  
Society of  
Canada

Reappointed  
as ICORD  
Director for a  
second term

## ICORD's Principal Investigators

**Dr. Mark Nigro** | Director, Provincial Organ Retrieval Program; Surgical Director of Renal Transplant, Vancouver General Hospital; Co-Director, Vancouver Ejaculatory Dysfunction Clinic; Clinical Professor, Dept. of Urologic Sciences, UBC | **Focus:** Home monitoring to reduce urinary tract infections.

**Dr. Ipek Oruc** | Associate Professor, Dept. of Ophthalmology & Visual Sciences, UBC | **Focus:** Brain mechanisms behind higher-level vision; visual dysfunction caused by brain disorders (e.g., prosopagnosia, autism spectrum disorder).

**Dr. Tom Oxland** | Professor, Orthopaedics and Mechanical Engineering, UBC; Associate Director, Discovery Science, ICORD | **Focus:** Evaluation of mechanical parameters to predict the degree of damage from SCI.

**Dr. Matt Ramer** | BC Neurotrauma Chair, ICORD; Associate Professor, Dept. of Zoology, UBC | **Focus:** neuronal response to injury; repair mechanisms in the injured spinal cord.

**Dr. Bonita Sawatzky** | Associate Professor, Orthopaedics, UBC | **Focus:** Optimizing wheelchair functionality and use; longitudinal study of adults with Arthrogyrosis Multiplex Congenita.

**Dr. Babak Shadgan** | Assistant Professor, Orthopaedics, UBC; Scholar, Michael Smith Foundation for Health Research | **Focus:** bio-sensing; clinical biophotonics; musculoskeletal and sports medicine; near-infrared spectroscopy; neuroprotection; translational research.

**Dr. Carolyn Sparrey** | Associate Professor, Mechatronics System Engineering, School of Engineering Science, SFU | **Focus:** Improvement of animal injury models; wheelchair safety engineering.

**Dr. Lynn Stothers** | Professor, Urologic Sciences, and Member, Depts. of Healthcare and Epidemiology, and Anesthesiology, Pharmacology and Therapeutics, UBC | **Focus:** Improvement of bladder health after SCI.

**Dr. John Street** | Assistant Professor, Orthopaedics, UBC; Spine Surgeon, Vancouver Spine Program, Vancouver General Hospital | **Focus:** Minimization and accurate recording of adverse events in SCI population.

**Dr. Wolfram Tetzlaff** | John & Penny Ryan BC Leadership Chair in Spinal Cord Research; Professor, Zoology and Surgery, UBC; Director, ICORD | **Focus:** Protection against secondary neural damage after SCI; facilitation of neural repair.

**Dr. Darren Warburton** | Co-Director, Physical Activity Line; Co-Director, Physical Activity Promotion and Chronic Disease Prevention Unit, UBC; Professor, Kinesiology, UBC | **Focus:** Effects of physical activity, exercise, and training on cardiovascular health.

**Dr. Cheryl Wellington** | Professor, Pathology and Laboratory Medicine, UBC | **Focus:** Mechanisms of neurodegeneration and injuries to the central nervous system.

Now based at UBC-Okanagan

2019 Michael Smith Foundation for Health Research Scholar

# ICORD ANNUAL REPORT 2019-20

## ICORD's Principal Investigators

**Dr. Christopher West** | Assistant Professor, Cellular & Physiological Sciences, UBC; Scholar | **Focus:** Mechanisms of changes to cardiovascular health in response to SCI; physical activity and exercises to mitigate cardiovascular damage.

**Dr. David Whitehurst** | Assistant Professor, Faculty of Health Sciences, SFU | **Focus:** Health economics; quality-of-life assessments for SCI population.

**Dr. Stephanie Willerth** | Associate Professor, Mechanical Engineering and Div. Medical Sciences, University of Victoria; Member, Centre for Advanced Materials & Related Technology | **Focus:** Personalized neural tissue and biomaterial scaffolds for the treatment of neurological damage caused by SCI.

**Dr. David Wilson** | Associate Professor, Orthopaedics; Associate Member, Mechanical Engineering, UBC | **Focus:** Joint mechanics; improvement of surgical treatments for SCI.

**Dr. Lyndia Wu** | Assistant Professor, Mechanical Engineering, UBC; Scholar, Michael Smith Foundation for Health Research | **Focus:** concussion; head impact sensing; soft tissue biomechanics; traumatic brain injury.

**Dr. E. Paul Zehr** | Professor & Director, Centre for Biomedical Research, Division of Medical Sciences, School of Exercise Science, University of Victoria | **Focus:** Neural control of ambulation; science communication.

### Investigators

Dr. Phil Ainslie  
Dr. Hugh Anton  
Dr. Mark Carpenter  
Dr. Anita Delongis  
Dr. Tal Jarus  
Dr. Shannon Kolind  
Dr. Tim O'Connor  
Dr. Scott Paquette  
Dr. Jane Roskams  
Dr. William Sheel  
Dr. Andrea Townson

### Associate Members

Dr. Mike Boyd  
Dr. Romeo Chua  
Dr. Jens Coorsen  
Dr. Kerry Delaney  
Dr. Tim Inglis  
Dr. Mohamed Javan  
Dr. Andrew Laing  
Dr. Nan Liu  
Dr. Freda Miller  
Dr. Michael Negraeff  
Dr. Aaron Phillips  
Dr. Miriam Spering  
Dr. Paul van Donkelaar  
Dr. Rhonda Willms

### Emeritus Members

Dr. Tom Grigliatti  
Dr. Catherine Pallen  
Dr. John Steeves (Founding Director)



is a world-leading health research centre focused on spinal cord injury. From the lab-based cellular level of understanding injury to rehabilitation and recovery, our researchers are dedicated to the development and translation of more effective strategies to promote prevention, functional recovery, and improved quality of life after spinal cord injury. Located at Vancouver General Hospital in the Blusson Spinal Cord Centre, ICORD is supported by the Rick Hansen Foundation, UBC Faculties of Medicine and Science, and Vancouver Coastal Health Research Institute.



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### **Thank you for reading our 2019-20 Annual Report.**

Prepared by: Cheryl Niamath, Katie Ashwell, Rona Herzog, Martin Dee, Lowell McPhail.

**For additional copies of this report or any other ICORD publication,** please call 604-675-8844 or email [admin@icord.org](mailto:admin@icord.org).

### **Contact us:**

ICORD Administration  
Third Floor, Blusson Spinal Cord Centre  
818 W. 10<sup>th</sup> Avenue, Vancouver, BC V5Z1M9  
Telephone: 604-675-8810 | [www.icord.org](http://www.icord.org)



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