



practice



product



participation

progress 2005-07

Bloorview
RESEARCH INSTITUTE



MESSAGE FROM THE DIRECTOR

The Bloorview Research Institute was formally launched in 2004, with a mission to enhance the quality of life of children with disabilities.

The foundation for the Institute is a \$25-million endowment from the Bloorview Children's Hospital Foundation. Scientists from a range of disciplines work together to evaluate care; develop assistive technologies that promote independence and inclusion; and examine the barriers facing children with disabilities and their families.

In many respects, November 2006 was a watershed month for the Research Institute. That month we partnered with the Canadian Institutes of Health Research and held a workshop to set a national childhood disability research agenda. The same month saw the move of our hospital site into our new state-of-the-art building – allowing greater collaboration between

scientists, clinicians and families. Last, we announced three new endowed research chairs in childhood disability with the University of Toronto.

The Bloorview Research Institute is in a growth phase. Accomplishments include external funding from national and international peer-reviewed funding agencies, important publications in high quality peer-reviewed journals, and national awards. Because of our integration within the hospital, the Institute offers a one-of-a-kind training ground for the next generation of rehabilitation scientists.

My sincere thanks to the scientists and support staff in the Research Institute, whose passion and commitment to children builds on Bloorview's long and illustrious history in clinical research and technology development.

A handwritten signature in black ink that reads "Colin Macarthur". The signature is written in a cursive, slightly slanted style.

Colin Macarthur, MBChB, PhD
Director, Bloorview Research Institute

BLOORVIEW RESEARCH INSTITUTE FACTS

Number of researchers: **15**

Number of trainees: **47**

Total external research funding 2005-2007: **\$3,365,354**

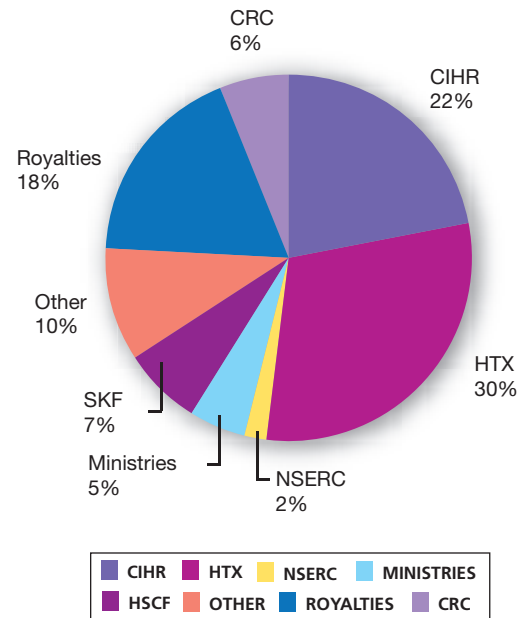
Number of funded projects: **33**

Total research budget 2005-2007: **\$7,390,493**

FUNDING BY SOURCE

(2005-2007)

Health Technology Exchange	30%
Canadian Institutes of Health Research	22%
Royalties	18%
Other	10%
SickKids Foundation	7%
Canada Research Chairs	6%
Federal and Provincial Ministries	5%
Natural Sciences and Research Engineering Council of Canada	2%



practice

DR. DARCY FEHLINGS

Clinician and senior scientist

Children with cerebral palsy have tight muscles that pull their arms and legs into unusual positions, making it difficult for them to walk and use their hands.

Dr. Darcy Fehlings – senior scientist in the Bloorview Research Institute – has made it her life’s work to study motor treatments in children with neuromuscular disorders, allowing them to relax their muscles, move more naturally and become more independent.

As head of the child development program at Bloorview, Dr. Fehlings pioneered the North American use and evaluation of Botox as a treatment for stiff-arm muscles.

Dr. Fehlings’ latest brainchild is a virtual-reality game that elicits repetitive movements in



children with one-sided weakness. The advantage? It’s fun, so kids want to do this therapy! Dr. Fehlings is lead investigator on a cross-disciplinary research team to see if home-use of the game results in improved function.

Dr. Fehlings teaches at the Hospital for Sick Children and the University of Toronto, trains the next generation of developmental pediatricians, and is a sought-after international speaker.

EVALUATION OF CARE SCIENTISTS

[Darcy Fehlings](#)

Jessica Brian
Kent Campbell
Lauren Dade
Roger Knox
Colin Macarthur
Cynthia Tam
Nancy Thomas-Stonell
Virginia Wright
Karl Zabjek

DR. TOM CHAU

Canada research chair in pediatric rehabilitation engineering

Imagine your child has multiple disabilities that prevent him from speaking or moving, making every day a guessing game as you try to intuit his needs.

Dr. Tom Chau – a biomedical engineer at the Bloorview Research Institute – is training a computer chip to decode changes in your child’s brain signals and breathing patterns, allowing your child to activate electronic speech or household devices by simply thinking about them or taking a deep breath.

Dr. Chau develops breakthrough technologies that enable children with disabilities to express themselves, control their environment and participate in regular childhood activities.

With his virtual instrument, children with severe disabilities in eight countries learn music using the Suzuki method –

waving their hands or blinking an eye to activate coloured balls on a screen, each sounding a different note. It’s often their first experience with music – and success.

Dr. Chau has been a lightning rod for cross-disciplinary research at Bloorview – bringing together diverse disciplines and attracting industry partners to collaborate in finding real-world solutions for kids with disabilities.

Dr. Chau’s unique training program at Bloorview attracts top graduate students from around the world.

Working in a rehab hospital gives the students “exposure beyond the academic dimension of disability,” says Dr. Chau, who is also director of the clinical engineering program at the University of Toronto.



INNOVATION AND DEVELOPMENT SCIENTISTS

[Tom Chau](#)

Jan Andrysek

Steve Ryan

Fraser Shein

David Wells

participation



PARTICIPATION SCIENTISTS

Patricia McKeever
Gillian King
Patty Rigby

DR. PATRICIA MCKEEVER

Senior scientist, sociologist,
professor of nursing

What if your child entered school through the back door and sat at the back of the class – because these were the only spaces that fit her wheelchair?

What if she had to decline birthday-party invitations because she couldn't get into her friends' homes?

"The design of places reflects who belongs and who is valued within them," says Dr. Patricia McKeever, a senior scientist at the Bloorview Research Institute.

"Instead of talking about special needs, we need to start talking about how children with disabilities have ordinary rights – to inclusion, pleasure and play."

Dr. McKeever was seconded from the

University of Toronto to Bloorview last year to study the physical, social and policy barriers to inclusion. She has authored over 50 peer-reviewed articles, co-directed a U of T research centre studying home care, and co-leads a graduate program looking at how technology and environments influence health and social care.

She will collaborate with scientists worldwide to study the barriers affecting children with disabilities.

"I would like every school, neighbourhood and home to be accessible – and every policy to be inclusive. Kids with disabilities are entitled to full citizenship and that means access to the experiences enjoyed by other Canadian children."

HIGH-IMPACT PAPERS, GRANTS, AWARDS

Peer-Reviewed Publications

Andrysek J, Naumann S, Cleghorn W.

Design and quantitative evaluation of a stance-phase controlled prosthetic knee joint for children. *IEEE Trans Neural Syst Rehabil Eng.* 2005; 13: 369-378.

Chau T, Ji JP, Tam C, Schweltnus H.

A novel instrument for quantifying grip activity during handwriting. *Arch Phys Med Rehabil.* 2006; 87: 1542-1547.

Chau T, Schweltnus H, Tam C, Lamont A, Eaton C.

Augmented environments for paediatric rehabilitation. *Technology & Disability.* 2006; 18: 167-171.

Chau T, Chau D, Casas M, Berall G, Kenny D.

Investigating the stationarity of paediatric aspiration signals. *IEEE Trans Neural Syst Rehabil Eng.* 2005; 13: 1-7.

Fehlings D.

The use of botulinum toxin in paediatric hypertonia. *J Paediatr Child Health.* 2005; 10: 379-381.

Khambalia AZ, Joshi P, Brussoni M, Raina P, Morrongiello B, Macarthur C.

A systematic review of risk factors for unintentional fall injuries in children birth to six years. *Inj Prev.* 2006; 12: 378-385.

McKeever P, Scott H, Chipman M, Osterlund K, Eakin J.

'Hitting Home': A survey of housing conditions of homes used for long term care in Ontario, Canada. *Inj J Health Serv.* 2006; 36: 521-533.

Oddson B, Rumney P, Johnson P, Thomas-Stonell N.

Clinical use of the Mayo Portland Adaptability Inventory in paediatric acquired brain injury. *Dev Med Child Neurol.* 2006; 48: 918-922.

Rigby P, Ryan S, Joos S, Cooper B, Jutai J, Steggles E.

The impact of electronic aids to daily living upon the lives of persons with cervical spinal cord injury. *Assist Technol.* 2005; 17: 62-70.

Ryan S, Campbell KA, Rigby P, Germon B, Chan B, Hubley D.

Development of the New Family Impact of Assistive Technology Scale (FIATS). *Int J Rehabil Res.* 2006; 29: 195-200.

Ryan S, Snider-Riczker P, Rigby P.

Community-based performance of a pelvic stabilization device for children with spasticity. *Assist Technol.* 2005; 17: 37-46.

Silva J, Heim W, Chau T.

A self-contained mechanomyography-driven externally powered prosthesis. *Arch Phys Med Rehabil.* 2005; 86: 2066-2070.

Thomas-Stonell N, Rumney P, Wright V, Johnson P, Oddson B.

An evaluation of the responsiveness of a comprehensive set of outcome measures for children and adolescents with traumatic brain injuries. *Journal of Paediatric Rehabilitation.* 2006; 9: 14-24.

Wright V.

Measurement of functional outcome with individuals who use upper extremity prosthetic devices: Current and future directions. *J Prosth Orth.* 2006; 18: 46-56.

Wright V, Boschen K, Jutai J.

Exploring the comparative responsiveness of a core set of outcome measures in a school-based conductive education program. *Child Care Health Dev.* 2005; 31: 291-302.

Wright V, Jutai J.

Evaluation of the use of the David Hart Walker Orthosis by Children with Cerebral Palsy: A three year prospective longitudinal evaluation. *Disabil Rehabil: Assist Technol.* 2006; 1: 155-166.

National Funding

Jan Andrysek

2006-2007

Design and development of a stance-phase controlled knee-ankle-foot-orthotic. Canadian Institutes of Health Research / Health Technology Exchange, \$100,000, Andrysek J. (PI), Popovic M, Hubbard S.

2005-2006

Design and testing of the SupPORT knee. Canadian Institutes of Health Research / Health Technology Exchange, \$84,173, Andrysek J. (PI)

Tom Chau

2004-2009

Intelligent systems in paediatric rehabilitation. Natural Sciences and Engineering Research Council, Discovery Grants – Individual, \$127,075, Chau T. (PI)

2005-2006

Development of a commercially available spirometer. Canada Institutes of Health Research, \$41,500, Chau T. (PI)

2003-2006

Investigation of communication modalities for paediatric patients during transient voicelessness through augmented environments. Natural Sciences and Engineering Research Council, Collaborative Health Research Projects, \$111,800, Chau T. (PI)

Colin Macarthur

2003-2008

From knowledge generation to knowledge translation: a systems approach to reducing the burden of injury in Canada. Canadian Institutes of Health Research, \$942,361, Macarthur C. (Co-PI)

Patricia McKeever

2005-2007

The pediatric hospital atrium: designers' intentions versus children's experiences. Canadian Institutes of Health Research, \$291,376, McKeever P. (Co-PI)

Steve Ryan

2006-2007

Commercialization of a multipurpose safety seat for school-age children with physical disabilities. The Health Technology Exchange/Canadian Institutes of Health Research, \$127,500, Ryan S. (PI)

Nancy Thomas-Stonell

2005-2007

Development of a new, functional speech and language outcome

measure for preschool children in their community. Sick Kids Foundation, \$130,000, Thomas-Stonell N. (PI)

Fraser Shein

2007-2008

Using TopicSense™ and GrammarSense™ to enhance WordQ® and to create ThoughtQ™ software. HTX-OCE-IRAP, \$400,000, Shein F. (Co-PI)

Honours, Awards & Accomplishments

Tom Chau

2006

Maclean's Magazine Honour Roll (Discoverers & Thinkers category)

2006

For Kids' Sake Award, Today's Parent Magazine

2005

Engineering Medal – Young Engineer (presented by Ontario Society of Professional Engineers and Professional Engineers Ontario)

Patricia McKeever

2006

Academic Excellence Award, Faculty of Nursing, University of Toronto

Darcy Fehlings

2005

Nomination for the Gayle Arnold Award (for best free paper at the 2005 Annual Meeting of the American Academy of Developmental Medicine and Cerebral Palsy)

Virginia Wright

2005

First prize, student poster competition, Health Research Methodology Research Day, McMaster University

Cynthia Tam

2006

Nominated for the Advancing Occupational Therapy Practice Research Award, University of Toronto

Bloorview

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