

An Eye on Research

Pediatric Vision Science Research Group Newsletter
 Issue 3 • Spring 2008

EVOLUTION OF AN IDENTITY

You will notice in the banner of this newsletter an unfamiliar name: Pediatric Vision Science Research Group. This is the name that has recently been adopted to encompass the combined research efforts of the members of the IWK Health Centre Division of Ophthalmology, Eye Care Team and the joint IWK Health Centre / Dalhousie University Clinical Vision Science graduate program, housed at the IWK (see below – PVSRG Members).

There is a long tradition of research in the Division of Ophthalmology that has grown and developed over the years. The recent founding of the Clinical Vision Science Masters program with its graduate diploma in orthoptics and ophthalmic medical technology has boosted research activity and opened the door to a variety of productive collaborations with other researchers in Halifax and beyond. The growing group’s commitment to the future of their research efforts led them to hire a Research Associate in 2005 and seek improved facilities for research at the IWK (see below – Dedicated Research Space). It seemed fitting that the merging of these various researchers into a more cohesive team be formalized by the adoption of a collective identity: the Pediatric Vision Science Research Group (PVSRG).

By consolidating our efforts under one name, it is hoped that we can heighten the profile of research in the group and build a reputation of excellence in clinical research, improving our ability to attract collaborations and funding. In this way we hope to enhance

our effectiveness in advancing scientific knowledge and improving the level of care we provide to the members of the communities we serve. We think the research community will be hearing a lot more from the PVSRG in the years to come.



Table of Contents

- Evolution of an Identity 1***
- Research Feature 2***
- Clinical Research Practice Feature 3***
- Celebrating Success 4***
- Dedicated Research Space 5***
- Research Associate 6***
- PVSRG Members 7***
- Conferences & Meetings.... 7***
- Research Update 8***

RESEARCH FEATURE



Dr. David Westwood demonstrating eye tracking hardware

Dr. David Westwood is an Associate Professor in Dalhousie University's School of Health and Human Performance with affiliations in the Departments of Psychology and Psychiatry at Dalhousie

as well as the joint IWK Health Centre / Dalhousie University Clinical Vision Science Graduate Program. Dr. Westwood is also Scientific Staff at the IWK Health Centre, Division of Ophthalmology. As described on his website (www.ActionLab.ca), his research focuses on the production and control of skilled actions such as reaching/grasping using behavioural (motion analysis) and neurological (functional brain imaging) techniques. In addition to his excellent publication record, the success of Dr. Westwood's research efforts is evinced by his funding from NSERC, CFI, NSHRF and the IWK Health Centre, and his 2007 appointment as a CIHR New Investigator.



CVS Graduate Tara Harris

Dr. Westwood's affiliation with the Clinical Vision Science program stems from the intimate link between vision and skilled movements and began when a collaboration was formed in 2005. Dr. Westwood became the supervisor for Tara Harris' Master's thesis project entitled Reaching & Grasping with Reduced Stereoacuity: A Kinematic Analysis.

Tara's project asked the question "Do those with longstanding reduced or absent stereovision have altered reaching

and grasping kinematics as compared to those with normal stereovision?" Dr. Westwood's expertise in the measurement of reaching and grasping characteristics was paired with Tara's training as an orthoptist and the combination resulted in a successful study. They found that, in contrast to the decrease in reaching and grasping performance observed in individuals with normal stereovision under monocular conditions, individuals with longstanding impaired stereovision differed only slightly in their performance when compared to stereonormal individuals. This observation suggests the possibility of adaptation to the impairment in binocular stereovision, presumably by using other sources of depth information.

Following on the success of Tara's study, Maria Harvey began working with Dr. Westwood in the summer of 2006. Maria's project "Effects of pictorial illusions on binocular and monocular prehension tasks" aims at learning more about how actions like grasping can be insensitive to pictorial illusions that can skew an observer's perception about an object's characteristics, such as its size and location. Maria sought to learn whether binocular cues are important in this process by measuring the reaching / grasping kinematic characteristics in individuals faced with a situation prone to an Ebbinghaus-type perceptual illusion. Her results demonstrate that the visual illusion does not affect the grasping movement in binocular viewing conditions, but there was an effect when participants were limited to monocular cues by applying an eye patch during the task. Thus, it seems that binocular vision is very important for the accurate control of grasping. Maria is now in the final stages of preparing the results for publication.



CVS Graduate Student Maria Harvey

Most recently, Dr. Westwood has teamed with CVS second-year student Shannon MacDonald. Shannon's project will build on Tara's observations and look for a binocular advantage in individuals with normal stereovision compared with individuals with no stereovision in the same reaching and grasping experimental paradigm. Shannon will also probe the possibility of adaptation in the stereo absent group by comparing monocular performance in both groups in the same tasks. With REB approval now in hand, Shannon will soon start recruiting participants. She will need both stereonormal and stereo absent participants for the measurements, which take approximately one hour. If you're interested in learning more about the study please contact Shannon (slmacdo3@dal.ca).



*CVS Graduate Student
Shannon MacDonald*

Dr. Westwood's collaborations with the CVS program are an excellent example of interdisciplinary research that has resulted in a broadening of the research initiatives of both groups. The Pediatric Vision Science Research Group is actively fostering such interactions. Anyone interested in discussing research possibilities with the PVSERG should feel free to contact Steve Van Iderstine, Research Associate to the PVSERG (steve.van-iderstine@iwk.nshealth.ca), Karen McMMain, CVS Program Director (karen.mcmmain@iwk.nshealth.ca) or any of the researchers in our group (see below – PVSERG Members).

CLINICAL RESEARCH PRACTICE FEATURE

The right tool for the job

Clinical research can take many forms and, under the principles of Good Clinical Practice and the requirements of the IWK Health Centre, each type requires some level of ethical review and approval. Below is a summary of the different kinds of projects and their associated application & turnaround times. By choosing the right application for your project you may save yourself considerable effort and time.

Studies involving patient participation and medical intervention receive the most rigorous evaluation. They require detailed applications that take the longest to review. Application deadline is the 1st Tuesday of every month for Research Ethics Board (REB) meetings the 3rd Tuesday of the month.

Application: Standard REB application
Turnaround: 6-7 weeks from submission deadline

Studies involving patient participation but only "minimal risk" (typically no change to standard of care and no medical intervention) are reviewed by fewer members of the REB and don't need to wait for the full meeting.

Application: Expedited REB application
Turnaround: 2 weeks

Studies involving patient tissue or fluids are in a special category and include reviews of biopsy or surgically removed tissue.

Depending on the details of the study you may be able to submit this simple, 3-page form for an "arms length" ethical review.

Application: Tissue or Biological Sample for Research Purposes
Turnaround: days

Chart reviews. If the data you need can be collected entirely from patient records there is a short application that is approved by both

Research Services and Decision Support Services.

Application: Requisition for Patient Records Review

Turnaround: days

There are a wide variety of databases containing valuable information useful for research projects. These can range from smaller databases maintained by individual physicians, departments or the Health Centre itself, to very large databases maintained by government bodies, private institutes and research consortia. Any database project requires approval by Research Services, but you will also need permission from the database owners/administrators.

Application: Requisition for Database Review

Turnaround: days from REB but also need permission from database owner

Studies involving diagnostic imaging data may also qualify for expedited review.

Application: Diagnostic Imaging

Turnaround: days

NOTE: Applications other than the Standard and Expedited REB review all have caveats concerning patient privacy and confidentiality. If you need to work with or publish identifying information you will need to submit a Standard or Expedited application. Guidelines for each application are available with the forms at www.iwk.nshealth.ca > Research > Research Ethics Board > Application Materials and Forms. For more information contact Steve Van Iderstine (470-2741).

CELEBRATING SUCCESS

Publications

- 1 McMMain, K., Robitaille, J., Smith, I., Johnson, J., Wood, E., and Blake, K. "Ocular Features of Charge Syndrome." Journal of Association of American Pediatric Ophthalmologists, 2008, in press.

- 2 Tremblay, F & Parkinson J. Gradient of Deficit in Cone Responses in the Incomplete Form of Congenital Stationary Night Blindness revealed by Multifocal Electroretinography. Documenta Ophthalmologica, 2008, 116:41-47.
- 3 Parkinson J & Tremblay F. Obtaining a contact lens acquired electroretinogram in the presence of topical anesthetic hypersensitivity. Documenta Ophthalmologica, 2007 Nov 6, Epub ahead of print.
- 4 Walsh, Leah A.; Hahn, Erik K.; LaRoche, G. Robert . Stability of Visual Acuity after the Cessation of Amblyopia Treatment: Review of the Literature. American Orthoptic Journal, 2007, 57:89-98.

Award

Congratulations to Kristy Macleod for receiving the highest Canadian Orthoptic Council certification exam scores at the 2007 Canadian Orthoptic Society meeting.



Kristy Macleod

Grants

- 1 François Tremblay, Principal Investigator, US Highbush Blueberry Council, \$39,690 "Neuroprotection by blueberries in a rat model of light-induced retinopathy."
- 2 François Tremblay, Co-Applicant, Lincy Foundation, \$900,000 total, \$150,000 at Dalhousie "Increased OTX2/CRX and decreased CHX10 induce optimal functional photoreceptor differentiation from adult human retinal stem cells"
- 3 Vanessa Avellaneda-Chevrier, NSHRF Student Research Award, \$18,250 "Tracing retinal ganglion cell projecting to the contralateral retina"
- 4 Karen McMMain, Johane Robitaille, François Tremblay, Steve Van Iderstine - IWK Health Centre Research Associateship \$114,750 over 3 years to be shared with the

Department of Surgery (Natalie Yanchar, Daniel McNeely, co-applicants).

- 5 David Westwood, Karen McMMain, Robert LaRoche, IWK Health Centre Category B Grant, \$14,509 "Binocular vision and functional motor skills"



CVS Graduate Student
Vanessa Avellaneda-Chevrier

Presentations

- 1 Inoue T, Coles BLK, Tremblay F, Prusky G, Tano Y, van der Kooy D. "Human Retinal Stem Cells with Overexpression of OTX2/CRX and Suppression of CHX10 can Differentiate Photoreceptor in vitro and in vivo." E-abstract 4077. ARVO Annual Meeting, Fort Lauderdale FL, May 6-10, 2007.
- 2 LaRoche GR. "Adult Strabismus: Challenges and Standards of Care", Chair, American Academy of Ophthalmology and American Orthoptic Council Symposium on Strabismus, New Orleans LA, 2007.
- 3 LaRoche GR. Hidden Challenges of Mixed Amblyopia:, American Association of Certified Orthoptists Annual Scientific Meeting, New Orleans LA, 2007.
- 4 McMMain K. "A Case of Loss of Movement", Canadian Orthoptic Society Scientific Session, Montreal PQ, June 20-23, 2007.
- 5 Robitaille JM. "Review of the Genetics of Familial Exudative Vitreoretinopathy (FEVR).", Pathology Department Research Day, Dalhousie University, Halifax NS. May 15, 2007.
- 6 Robitaille JM. "Albinism In The 21st Century: A Historical Review." Department of

Ophthalmology Grand Rounds, Dalhousie University, Halifax NS, March 7, 2007.

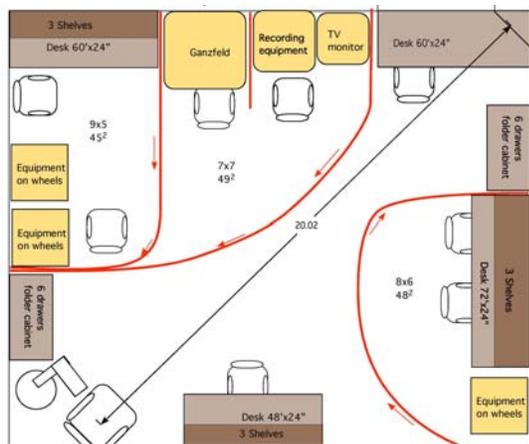
- 7 Sindi K, LaRoche GR, Tremblay F, Walsh L. "Myectomy of the Inferior Oblique Muscle in Unilateral Superior Oblique Palsy: A Comparative Analysis with Other Weakening Procedures", American Association for Pediatric Ophthalmology and Strabismus Meeting, Seattle WA, April 2007.
- 8 Windish R, Cruess AF, Tremblay F. "Modeling of the ON and OFF Interactions on the Photopic ERG Oscillatory Potentials." E-abstract 536. ARVO Annual Meeting, Fort Lauderdale FL, May 6-10, 2007.

DEDICATED RESEARCH SPACE

With the growth of the PVSRG and the increase in research activity, the facilities in the Eye Clinic have become limiting. We are excited to announce that we have now established a dedicated research space for our studies (see floor plan on p. 6).

The PVSRG Laboratory is located on the 4th floor, Children's Site, only two floors away from the clinic. With ~300 sq. ft. of space, it became functional at the end of 2007 and currently is home to Steve Van Iderstine, our Research Associate, desk space and computers for four other researchers, and secure storage for research records. The space will be equipped with various types of instrumentation, as need and resources dictate. The first instrumentation to be installed will be a miniBIRD motion tracking system for the conduct of Shannon MacDonald's reaching and grasping study and future studies of this nature (purchased with the aid of an IWK Operating Grant to D. Westwood, K. McMMain and R. LaRoche).

This space is an important step forward in expanding the capacity of the PVSRG to pursue research. We look forward to great productivity in the new facilities.



PVSRG Laboratory

RESEARCH ASSOCIATE

The first Research Associate to work with the Division of Ophthalmology & Eye Care Team was Ms. Gaétane Leblanc Cormier, who started in 2005. Gaétane left Halifax in February 2007 and returned to her home town of Moncton to accept an excellent position and start a family. The group would like to thank Gaétane for her excellent support during her tenure, and wish her well in her future endeavours.

In September 2007 Mr. Steve Van Iderstine was hired to take up the position and build on the momentum of the previous 2 years. Steve studied Biochemistry at the BSc (Mount Allison University) and MSc levels (Dalhousie University) and then worked in the field of lipoprotein metabolism at Toronto's



Research Associate
Steve Van Iderstine

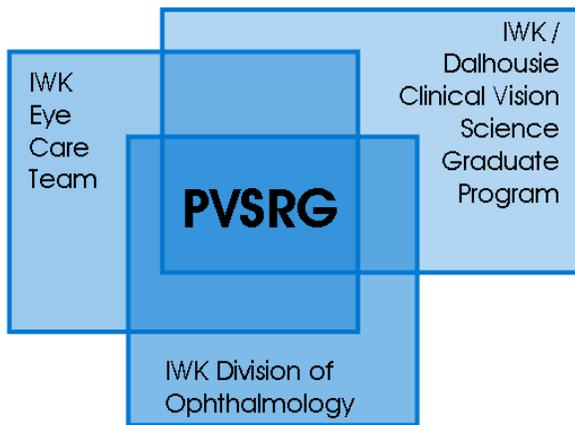
Hospital for Sick Children. Most recently he was the manger of a neuroscience lab at UBC's Brain Research Centre in Vancouver. Steve is very excited to expand his skills in the area of clinical research and contribute to the growing research program at the PVSRG.

Since September Steve has been busy setting up the new laboratory space. He has aided in securing REB approval for 5 new projects involving PVSRG staff and trainees (Fellows & CVS students). Steve has also developed several tools to aid researchers in preparing REB applications and obtaining informed consent from research participants. Currently, these tools are being made available in a newly deployed Research section of the Eye Care Team Blackboard Learning Systems (BLS) website. Other projects include the development of a database to track the research activities of the group and the organization of Research Rounds to increase discussion and awareness of research activities within the group.

In January 2008 Steve and supervisory applicants Johane Robitaille, Karen McMain and François Tremblay (from the PVSRG) and Natalie Yanchar and Daniel McNeely (from the Dept. of Surgery) were successful in securing an IWK Health Centre Research Associateship award to provide the majority of the funding for the associate position over the next 3 years. Steve's time will be divided between the two groups. He can be reached at [470-2741](tel:470-2741) or steve.van-iderstine@iwk.nshealth.ca and has his office in the PVSRG Lab on the 4th floor, Children's site. He would like to encourage anyone with questions about the group, or the research activities of the group, to contact him. He would also welcome feedback and suggestions for future issues of this newsletter.

PVSRG MEMBERS

The core of the PVSRG is formed by the IWK Division of Ophthalmology and Eye Care Team and the joint IWK/Dalhousie Clinical Vision Sciences graduate program. The group has already been fortunate to benefit from interactions with Dalhousie's Departments of Ophthalmology & Visual Sciences, Psychology and Psychiatry as well as the Faculty of Medicine's School of Health & Human Performance and Harvard University's Department of Ophthalmology. The researchers working with our group are listed below.



P V S R G M e m b e r s

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|---|---|
| Paul Artes
William Baldrige
Balwantray Chauhan
Linda Dagi
Kevin Duffy
Heather Fennell
Erik Hahn
Tara Harris
Robert LaRoche
Charles Maxner
Karen McMMain
Patricia McMullen
Donald Mitchell
Joan Parkinson
Johane Robitaille
Andrea Skeet
Stephanie Smith | François Tremblay
Steve Van Iderstine
Karin Wallace
Leah Walsh
David Westwood
<i>Trainees:</i>
Vanessa Avellaneda-Chevrier
Stephanie Dotchin
Hadil Eshtaya
Maria Harvey
Bo-Ram Hong
Shannon MacDonald
Sarah Mackinnon
Lesley MacSween
Sapna Sharan
Leah Wood |
|---|---|

CONFERENCES & MEETINGS

Watch for PVSRG members presenting their research at the following meetings & conferences.

Date	Location	Event (PVSRG presenters)
April 9	Lord Nelson Hotel, Halifax	Dalhousie University Department of Ophthalmology & Visual Sciences Research Day (Presentation by Vanessa Avellaneda-Chevrier)
April 27 - May 1	Fort Lauderdale, FL	The Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting (Presentation by Robert LaRoche. Poster by François Tremblay)
May 28 - 31	Antwerp, Belgium	International Orthoptic Association (IOA) XI International Orthoptic Congress (Presentation by Karen McMMain. Posters by Leah Walsh & Heather Fennell)
June 11-14	Whistler, BC	Canadian Ophthalmological Society (COS) Annual Meeting (Presentation by Robert LaRoche. Poster by Maria Harvey)

RESEARCH UPDATE

Investigator(s)	Study
Vanessa Avellaneda-Chevrier & Balwantray Chauhan	Tracing retinal ganglion cell projecting to the contralateral retina [§]
Stephanie Dotchin & Robert LaRoche	Cross sectional analysis of vision screening program in Nova Scotia
Hadil Eshtaya & Paul Artes	Visual field effects in long term migraine patients [§]
Maria Harvey & David Westwood	Effect of pictorial illusions on binocular and monocular grasping [§]
Bo-Ram Hong, Johane Robitaille & Paul Artes	Visual function in school-age children with a history of prematurity [§]
Robert LaRoche	Residual action of the inferior oblique muscle after myectomy
Robert LaRoche	Utility, disability and quality of life associated with adult strabismus
Robert LaRoche & David Gaskin	Microscopy of the inferior oblique structure
Robert LaRoche & Leah Walsh	Chart review on results of inferior oblique myectomy in patients with superior oblique palsy
Shannon MacDonald & David Westwood	An evaluation of prehension in individuals with absent stereoacuity: Is there a binocular advantage? [§]
Sarah Mackinnon, Linda Dagi, Karen McMMain & Robert LaRoche	The comparative results on ocular motility of two neurosurgical techniques for the treatment of unilateral coronal synostosis [§]
Lesley MacSween & Patricia McMullen	Form-from-motion processing in the intact dorsal cortex [§]
Johane Robitaille	Genetic analysis of Frizzled-4 (FZD4) and its influence on familial exudative vitreoretinopathy (ROP) and other associated retinal disorders
Johane Robitaille	National Retinoblastoma Strategy
Johane Robitaille	Genetic analysis and mutation effect on the variation of phenotype of autosomal dominant optic atrophy (ADOA)
Johane Robitaille	Genetic analysis and mutation effect on the variation of phenotype of Leber's Congenital Amaurosis
Johane Robitaille	Chart review- Patients with coloboma
Johane Robitaille	Genetic analysis and mutation effect on the variation of phenotype of congenital stationary night blindness
Johane Robitaille & François Tremblay	Clinical and genetic analysis of Presumed Pericentral Retinal Degeneration
Sapna Sharan & Robert LaRoche	Pediatric pseudotumor cerebri in Atlantic Canada: Is its incidence on the rise?

Investigator(s)	Study
Sapna Sharan & Robert LaRoche	Comparison of predictability of surgical outcomes of horizontal vs. vertical muscle surgery for strabismus in thyroid eye disease
Andrea Skeet & François Tremblay	An investigation of central vs. peripheral visual evoked potentials in amblyopia [§]
François Tremblay	Do blueberries improve vision and eye health?
François Tremblay	Does long-term feeding of blueberry anthocyanins affect night vision?
François Tremblay	Anthocyanins in the light-induced retinopathy rat
François Tremblay	Modeling of the ON and OFF interactions of the photopic ERG oscillatory potentials
François Tremblay	Stem cell retinal rescue
François Tremblay	Optic nerve damage in pigs
François Tremblay	NCKX2 mice ERGs
François Tremblay & Joan Parkinson	The effect of stimulus masking on pattern visual evoked potential and pattern electroretinogram
Leah Walsh & Robert LaRoche	The recurrence of amblyopia after the cessation of treatment [§]
Leah Wood, François Tremblay & William Baldrige	The impact of anesthesia on neuronal activity: an ex vivo retinal model looking at isoflurane, propofol and nitrous oxide [§]

[§] Clinical Vision Science MSc thesis project



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Inspiring Minds