



The COETF Annual Awards Program for 2010

The COETF received a total of 26 applications for awards in 2010. Of those 26 applications, 22 were granted at least partial funding for projects or research. In most cases, applicants are not given full funding as the total amount of funding requested greatly exceeds the money available for granting. Awards funding is based on the Trust Fund's interest earned over the previous year.

All award recipients are required to submit an interim report on their project and a final report upon completion. In an effort to recognize some of the projects and research being done by COETF award recipients, the Awards Committee will publish project reports in the Canadian Journal of Optometry (CJO) so that our members across the country can learn more about where COETF funding goes as well as highlighting exciting optometric research.

The COETF Annual Awards Program for 2010

SCHOOL OF OPTOMETRY,
UNIVERSITY OF WATERLOO
CANADIAN ASSOCIATION OF
OPTOMETRY STUDENTS (CAOS)
"The Canadian Handbook of
Optometry – online edition"

CIRA, D.
"Quantifying viability of human
corneal epithelial cells from non-
invasive cell collection techniques"
(Master's Degree Program)

HALL, B.
"Impact of contact lens care regimens
on the conformation of albumin"
(Master's Degree Program)

HUI, A.
"Development and Engineering of
Novel Contact Lens Materials for Drug
Delivery"
(Master's Degree Program)

KEECH, A.
"Evaluation of the TearLab nano-
osmometer for in-office use"
(Master's Degree Program)

LORENTZ, H.I.
"The efficiency of contact lens
cleaning solutions on lipid removal
using radiolabeled cholesterol"
(PhD Program)

LUENSMANN, D.
"Is the use of a single protein sufficient
to mimic the deposition profile on
contact lenses?"
(Post-doctorate)

McCANNA, D.
"Investigating the competitive binding
of lysozyme and albumin to contact
lenses"

MENZIES, K.
"In vitro analysis of the physical
properties of blister pack solutions of
silicone hydrogel contact lenses"
(Master's Degree Program)

MUSEUM OF VISUAL SCIENCE
"Historical Archive/Museum Exhibit"

OMMANI, A.: "Optical consequences of
diabetes mellitus"
(PhD Program)

OPTOMETRY LEARNING RESOURCE
CENTRE
"Continuance of 'Library Information
Resources & Services for Canadian
Optometrists' program"

QUICK FACTS

The Canadian Optometric Education Trust Fund (COETF) was created in 1976 by the members of the Canadian Association of Optometrists to assist programs in research, education and human resources development in the vision and eye care field in Canada.

Through its annual program of Awards, the COETF has supported faculty development, research and/or specialized education programs carried out by graduate students, and investigative projects conducted by undergraduate students and faculty at Canada's schools of optometry, as well as projects undertaken by independent practitioners or members of the public.

WOODS, J.: "Repeatability assessment of the 'Subjective evaluation of symptoms of dry eye' (SESOD) dry eye questionnaire"
(PhD Program)

ÉCOLE D'OPTOMÉTRIE,
UNIVERSITÉ DE MONTRÉAL (UM)
BITTON, E., JONES, D.:
"Canadian optometry student indebtedness"

CARCENAC, G., KERGOAT, H.
"Évaluation de la fonction visuelle chez la personne âgée vulnérable"
(PhD Program)

CHRIQUI, E., KERGOAT, H.
"Optimisation de la prise d'acuité visuelle chez les patients âgés ayant des difficultés importantes à communiquer ou collaborer lors de l'examen visuel."
(Master's Degree Program)

DUTRISAC, F.
"Élaboration d'un questionnaire de dépistage des hallucinations sensorielles liées à la défiance visuelle et auditive"
(Master's Degree Program)

DUTRISAC, C., KERGOAT, H.:
"Investigation neurovasculaire de la rétine lors d'un stress hypoxique systémique léger"
(Master's Degree Program)

HANSSENS, J-M.
"La stabilisation visuelle de la posture est-elle perturbée par des tâches cognitives complexes chez les personnes âgées"
(PhD Program)

HONG, Y., XIE, T., BITTON, E.:
"A novel technique for the analysis of human tears"

INDEPENDENT PRACTITIONER
LAM, N., LEAT, S.
"Investigating vision care in the low vision population"

PENNER, V.
"Collagen cross linking: A Canadian review"

APPLICATION SUMMARY

Total Waterloo School of Optometry Applications	14	\$68,750.00
Total Waterloo School of Optometry Awards	13	\$23,100.00
Total Montréal School of Optometry Applications	9	\$32,510.00
Total Montréal School of Optometry Award	7	\$11,100.00
Total Independent Practitioner Applications	3	\$130,600.00
Total Independent Practitioner Awards	2	\$4,100.00
Total Applications for 2010	26	\$231,860.00
Total Independent Practitioner Awards	22	\$38,300.00
Total Applications (since inception)		\$5,984,147.78
Total Awards		\$1,726,113.00

COETF REPORT * RAPPORT DU FFOCÉ

In an effort to highlight some of the projects and research by COETF award recipients, the COETF Trustees and Awards Committee have selected project reports to be published in the *Canadian Journal of Optometry · Revue canadienne d'optométrie*. Recognizing that many recipients intend to publish their work in cited journals, the reports are not considered to be clinical articles. COETF funded research, when completed and peer reviewed, may be published in CJO-RCO and other journals. The COETF reports are intended to provide relevant information for the benefit of our readers and to showcase the high caliber of optometric research funded by COETF, Canadian optometry's charity.

Research and academic support are vital to our profession. COETF is our charity, and needs our contributions, now more than ever. Please give generously and often. To donate online or download a donation form, visit: opto.ca/en/our-partners/coeft.htm

[Lien français
opto.ca/fr/our-partners/coeft.html](http://opto.ca/fr/our-partners/coeft.html)

Two Canadian Optometric Education Trust Fund Annual Interim Reports

FUNDING GRANTED – APRIL 2009-2010

APPLICANT: KARA L MENZIES, BSc, MSc CANDIDATE

In vitro analysis of the physical properties of blister pack solutions of silicone hydrogel contact lenses

This annual interim report describes the results from an *in vitro* experiment measuring the wettability of three daily disposable lenses: Proclear 1-Day (CooperVision), Focus Dailies with AquaComfort-Plus (CIBA Vision) and Acuvue TruEye (Johnson & Johnson).

Surface wettability of contact lenses is typically assessed *in vitro* by determining water contact angles (CAs) at the lens/fluid interface. A high CA indicates low wettability, or a relatively hydrophobic solid surface. A low CA, in which there is a smooth, continuous fluid film over the solid surface, signifies high wettability or a relatively hydrophilic surface. In this experiment, wettability was measured using two different methods: the sessile drop method and the Wilhelmy balance technique.

Before wettability measurements the lenses were placed in a “model blink cell.” The model blink cell mimics eye blinking in an *in vitro* setting. It is composed of a pump/

valve system, a “bath” which contains six pistons with convex surfaces, two sensors in the bath, a series of tubes for delivery of solutions, a container holding fresh solution and a container that holds waste solution (*Figure 1*).

Six contact lenses can be placed posterior side down on the top of the pistons at one time (*Figure 1*). A solution, such as saline or artificial tear solution, is brought up from the container holding the fresh solution and cycled through the model blink cell until a purge time is reached. The solution runs through the tubing, into the bath containing the pistons and contact lenses, and then back into the tubing. As solution is cycled through the model blink cell, the pistons move up and down, consequently moving the contact lenses in and out of the solution, to mimic blinking. The amount of time the contact lenses spend in and out of the solution is controlled by the experimenter by setting the time



Figure 1: The model blink cell, showing the pistons, valves, tubing series, pump and sensors

intervals on the control box resting on top of the model blink cell (*Figure 2*). Other settings that are controlled by the experimenter are the purge and refill time, as well as the temperature inside the model blink cell.

In this experiment, lenses were placed on the pistons in the model blink cell with only one type of lens placed on the pistons at one time. The lenses were then exposed to saline, a lysozyme

solution, and an artificial tear solution for five minutes, and for one, four and eight hour time intervals. During these time intervals the pistons moved in and out of the solution so the lenses would be in the solution for one second and out of the solution for five seconds to mimic blinking.

Wettability measurements were similar for the Proclear 1-Day and Acuvue TruEye lenses, after both types of lenses were exposed to all three solutions for five minutes, one hour, four hours, and eight hours. There was a slight decrease in contact angle measured by the sessile drop technique after the lenses had been exposed to the lysozyme and artificial tear

solutions. For the Focus Dailies with AquaComfortPlus lenses, there was a significant decrease in contact angle measured by the sessile drop technique after the lenses were exposed to the lysozyme solution for all time points. However, there was not a significant difference in contact angle after the lenses were exposed to the artificial tear solution, except after the eight hour time point.

The remainder of the in vitro contact angle analyses using the Wilhelmy balance method is currently being completed, in addition to the final statistical analysis for this project.



Figure 2: The control box sets temperature, purge and refill times, and the amount of time lenses are in and out of the fluid bath.

APPLICANTS: TONG, A., SIMPSON, T., AND BOBIER, W.R. / 2009 REPORT

Examining ocular dominance

Ocular dominance, the concept that one eye performs better than its fellow eye, can in some regards be compared to the concept of handedness, i.e. the ability to use one hand with more dexterity than the other. Ocular dominance has been shown to be task specific and is presently a poorly understood phenomenon. It has been defined on the basis of sighting (e.g. the eye

that is used for viewing through a camera eyepiece), sensory function (e.g. the eye with the better visual acuity), or persistence in a binocular rivalry situation (e.g. the more persistent image perceived in a dichoptic presentation). A recent report suggests that different types of ocular dominance are not in agreement and that sensory dominance (as measured

by resolution acuity, contrast sensitivity, and Vernier acuity) is insignificant in the normal visual system in most individuals with normal vision. However, it was suggested that different psychophysical methods of measuring ocular dominance or different criteria may yield different results.

To this end, we are interested in whether ocular dominance can be detected using a method that has been devised for assessing binocular function in amblyopic adults that has recently been developed by our collaborators (Robert Hess,

McGill University). Although it is traditionally thought that a history of amblyopia precludes binocular vision because the mechanisms that combine the information between the two eyes were absent, it was recently discovered that they are actually working but are suppressed by actively inhibitory signals from the non-amblyopic eye. This opens the way to a novel binocular approach for the restoration of normal binocular function and treatment of amblyopia by first measuring the degree of this inter ocular inhibition and using a simple binocular training regime to reduce it over time. This was shown by our collaborators have shown this to be effective in adults well beyond the age where such therapies are thought effective.

Further investigation is required to determine the full potential of this approach. At the present time, however, data from normal sighted individuals without strabismus or amblyopia was used as a point of comparison for visual behaviour in amblyopes observed by this psychophysical method.

This study was conducted in three phases. The first compared fellow eyes within individuals to determine the presence of dominance. The second phase involved inducing dominance by blurring the percept of one eye using a plus lens. The third phase similarly induces dominance in the fellow eye by reducing retinal luminance using a neutral density (ND) filters.

Ultimately, this protocol will be used with adult amblyopes to determine its effectiveness as a means of breaking suppression in the amblyopic eye. This is achieved by increasing the intensity of the visual stimulus in the amblyopic eye while blunting the stimulus in the preferred or fixing eye.

To date, an apparatus consisting of a set of computer gaming goggles capable of simultaneously displaying different inputs to each eye is being used for the experiment. This allows one eye to see the “signal” dots and the fellow eye to see the “noise” dots. Software has been established to present this stimulus in a consistent manner to the subject, enabling us to determine the balance point between noise and signal between the dominant eye and non-dominant eyes. Five normal sighted individuals and one amblyopic have partici-

pated in the study. Analysis of the results is in progress. Future work will determine whether dominance in the fellow eye can be trained using the similar methodology. For now, we have established a new means of determining ocular dominance for our studies.

This work provides important preliminary information on the capacity of the instrumentation to determine ocular dominance as a function of varying input differences set between the eyes. This information will serve as a precursor for the development of testing protocols for studies on amblyopes.

COETF funding is gratefully acknowledged in its provision of partial support for Ms. Adrienne Tong MSc who served as a research associate on this project.

Opportunity in Kenora, Ontario

Dr. Girard is retiring, leaving an opportunity for an optometrist to replace him. The office has been in the same, prime, Main St. location for 58 years and has a good clientele. The building is available for lease, is being renovated, and the owner is open to adding on space to accommodate a dual practice. The community of 15,000 and a large outlying area, has only one other office with two optometrists.

Kenora is located on Trans-Canada Highway near the Manitoba border on beautiful Lake of the Woods, a world renowned tourist destination and cottage country. The city is progressive and very accommodating. Visit www.kenora.ca <<http://www.kenora.ca/>>

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