



Laboratoire de recherche
en pédagogie du piano

Piano Pedagogy
Research Laboratory

• Annual Report • 2008

Mission

Promote multidisciplinary research in the field of piano pedagogy in order to establish a better understanding of piano learning and piano teaching processes.

Goals

Establish a common field of interest and facilitate collaborations among researchers in a variety of disciplines: music, education, cognitive sciences, psychology, neuroscience, health sciences, engineering, and information technology.

Offer academic programs which will allow students to train in piano pedagogy research and actively participate in projects of the multidisciplinary teams associated with the Piano Laboratory.

Build significant partnerships with other research institutions, piano teachers' associations, and members of the private sector.

Vision

Become the foremost authority in piano pedagogy research and training.

Build a world-class laboratory distinguished for

- its quest for excellence
- the quality of its learning environment
- its passion for knowledge and innovative thinking

Message from the Director



Gilles Comeau

The year 2008 has been one of overseeing and encouraging the Piano Pedagogy Research Laboratory's continued growth. We have had a group of experienced research assistants who have broadened the Lab's research interests and added new projects. The reach of our distance education programs has been extended to bring adult students from across the country into our Certificate programs. Two students are pursuing advanced degrees in the new doctorates offered in partnership with the School of Human Kinetics and Université Laval.

Welcoming distinguished guests from around the world and engaging the local community have raised the Lab's visibility. We are grateful for the increased commitment and support from donors and the Friends of the Laboratory, and we look forward to another year of progress.

Honorary Co-Chairs



Special thanks to Jon Kimura Parker and Aline Chrétien for supporting the Piano Lab

2008 Highlights

Piano Pedagogy: A Research and Information Guide, written by the Piano Lab's faculty and graduate students, was submitted to Routledge for publication. It has just gone through the publisher's final editing process and will be available in April 2009.



For the first time this fall, the Piano Lab began to offer its Graduate and Undergraduate Certificate programs via audio-video-internet technology, extending its reach outside Ottawa to students across the country.



Dr. Gilles Comeau, Director, and Dr. Elaine Keillor, Adjunct Professor, presented a series of lecture-concerts on keyboard lessons in the era of period instruments at the official residences of three members of the diplomatic community in Ottawa—the British High Commissioner, the Jordanian Ambassador and the German Ambassador.



The 1806-model Lindholm-Söderstrom clavichord built by Andrew Lagerquist finally arrived in March. It had its first introduction at an intimate concert at the British High Commissioner's residence, and was formally presented to the public at a concert in Freiman Hall on November 22.

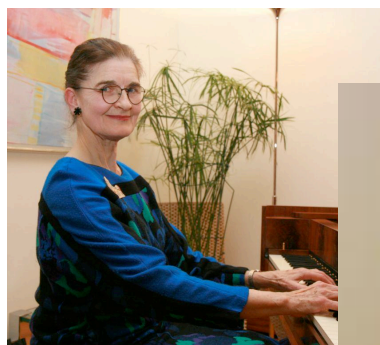


In partnership with the University of Ottawa Library, the Piano Lab has been developing a huge database of piano teaching video clips that will be made available to all students registered in our piano pedagogy programs.

Adjunct Faculty

Elaine Keillor

Elaine Keillor, Distinguished Research Professor Emerita at Carleton University, is an internationally known concert pianist and musicologist who has written extensively on Canadian music. Elaine was a big part of the lecture concert series on period instruments in the fall of 2008 and has a keen interest in several research projects including those involving health issues and the use of technology in piano teaching.



Elaine Keillor

Bruno Emond

Bruno is a Research Officer with Learning and Collaborative Technologies at the National Research Council. His research deals with broadband e-learning and issues related to the modelling of human learning.



Bruno Emond



Donald Russell



Ramesh Balasubramaniam

Donald Russell

An associate professor of mechanical and aerospace engineering at Carleton, Donald is an expert on limb biomechanics. He collaborates with other Lab researchers on projects dealing with the interaction between the finger and the piano keyboard, and health issues related to piano performing. He is also an accomplished organist and pianist.

Ramesh Balasubramaniam

Ramesh is a Canada Research Chair in Sensorimotor Neuroscience at McMaster University. He has been involved in the Lab's research using 3-D motion capture and eye-tracking technologies to study music reading and piano performance.

Visiting Professors



Dr. Louise Mathieu

Dr. Mathieu is a professor at Université Laval and a Dalcroze Eurhythmics specialist, whose research interests are in the area of music and movement. While she was in residence in the fall of 2008, she gave a series of Dalcroze classes for students in the Music department. She also acts as a co-supervisor for the Lab's graduate students, and is involved in developing a research project to study the impact of Eurhythmics on piano performance that will be carried out at the Lab. In addition, she is one of the main organizers of the Journées francophones de recherche en éducation musicale (JFREM) to be held at the University of Ottawa in May 2009.

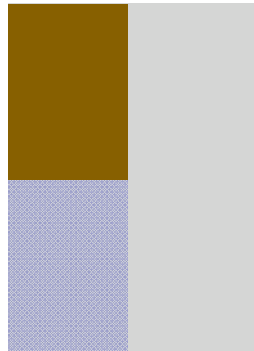
Dr. Daniel Landes

Dr. Landes, professor of music at Belmont University, Nashville Tennessee, spent a week in the Lab in June. He came to learn about the Lab and to familiarize himself with the Lab's research and the technology. While he was here, he presented his own research and shared the software he has developed.



Milada Medinić – Administrative Coordinator

Milada has been our administrator for almost two years now. In addition to managing the Lab's personnel and facilities, she also supervises the distance education programs, coordinates and supervises the production of audio-visual material, and is constantly updating our database of reference works on the university's network. She organizes all our special events, including fundraising activities and tours for distinguished guests, and is in charge of producing the Lab's promotional materials. On top of all that, Milada deals with all the day-to-day administrative details like correspondence, drawing up student contracts and ordering equipment and materials. Her commitment and her invaluable organizational skills are essential to the smooth operation of all the Lab's activities.



Michelle Vandal – Resource Centre Administrator and Conference Coordinator

A full-time student in the Faculty of Education, Michelle is in charge of the Resource Centre, which is home to the Piano Lab's collection of reference works, including theses and other academic works, piano scores, and one of the biggest collections of beginner piano method books in Canada. Michelle maintains the collection and keeps it up to date, ordering new books and coordinating the cataloguing when they arrive. Over the past year, she has also been helping with the two upcoming conferences, the Journées francophones de recherche en éducation musicale in May 2009, and the International Conference on Music Pedagogy Research in 2010. She has developed content for the conference websites and will be responsible for keeping them updated. She will also be responding to the organizing committee's needs and wants.

Baruyr Baghdasarian and Jonathan Neva – Technical Assistants

Lab's technical assistants are responsible for running and maintaining the high-tech equipment in the Lab, setting up the videoconferencing sessions, and editing the video clips. They also support the graduate students with all the technological aspects of their research. After being with the Lab for two years, Bar left in April 2008 when he graduated from his Engineering program and moved to Toronto. Jonathan, a graduate student in Music, has taken over from him.



Baruyr Baghdasarian



Jonathan Neva

Christian Delahousse – Webmaster

Christian, a full-time student at Carleton University, is responsible for maintenance and technical support on all the Lab's websites: the main website at www.piano.uOttawa.ca, and the two websites for the upcoming conferences, the one for JFREM at www.jfrem.uOttawa.ca and for the International Conference on Music Pedagogy Research at www.musicpedagogyconference.uOttawa.ca. He was instrumental in developing these latter two sites.



Christian Delahousse

Cécile Prud'homme

The University of Ottawa Library assigned Cécile as the primary resource person to assist the lab with the Research and Information Guide. Her extensive knowledge of research information tools and her skill in navigating the intricacies of reference databases has made her an essential partner in the Lab's research work, the multidisciplinary nature of which means that we must frequently go outside the domain of music. Cécile goes out of her way to be helpful to the Lab's graduate students on an ongoing basis.

Rosemary Covert

Rosemary Covert, the Lab's English-language reviser, is a freelance French-to-English translator and editor with a great deal of experience with various kinds of academic texts, from journal articles and theses to grant applications. She writes much of the Lab's English material and worked extensively on the recent Research and Information guide for Routledge. She is also available to help any of the grad students with their English papers and publications.

Students

Nisreen Jardaneh – PhD in Music (Concentration in Music Education)

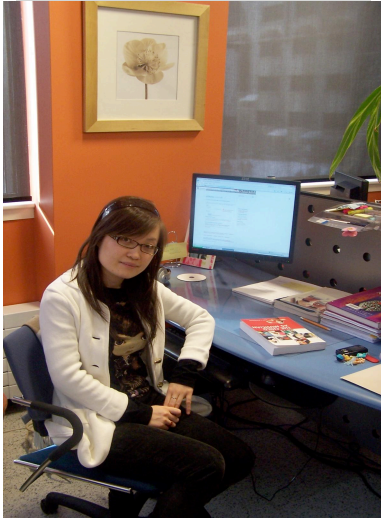
Nisreen is enrolled in the doctoral program at Université Laval and conducting her research at the Lab under Dr. Comeau's supervision, with Dr. Louise Mathieu of Laval as co-supervisor. Currently in midst of the comprehensive examination process, Nisreen will start work on her research project as soon as she has finished all the exams. She has also been on maternity leave for the last several months, but will be returning to the Lab soon.



Nisreen Jardaneh

YiFei Liu – PhD in Human Kinetics with a Research Topic in Piano Pedagogy

Having completed all her course requirements in the first year of her program, YiFei is preparing for her comprehensives. Her current research interests include the music reading and perceptual span project as well as her work on motivation, in which she has compared young Chinese piano students with North Americans. She is a research assistant in the Lab, continuing to be involved in the huge study on motivation.



YiFei Liu

Flora Nassrallah – Master of Science in Human Kinetics with Thesis in Piano Pedagogy

After finishing an honours BA in Music and a BS in Biochemistry, Flora began her master's program in the Lab last September with Dr. Comeau as supervisor and Dr. Isabelle Cossette of McGill as co-supervisor. Her research will study pianists' breathing patterns. Flora is also a research assistant in the Lab, supervising the inventory of musical symbols in piano method books and coordinating the video clip data base.



Flora Nassrallah

Shirley Ho – Graduate Certificate in Piano Pedagogy Research

Shirley has completed all the courses for the Certificate; all that remains is the oral examination. The most recent research project she was involved in dealt with performance practice in Baroque music.

Émilie Bertrand-Plouffe – Undergraduate Certificate in Piano Pedagogy

Émilie is a full-time Admissions Officer at the University of Ottawa who is interested in teaching piano. She has been a part-time student in the program for two years.

Paula Croucher – Undergraduate Certificate in Piano Pedagogy

Paula Croucher, an experienced piano teacher, registered as a part-time student in the undergraduate Certificate program last September.

Distance Education Students

This fall, the Lab began offering two of its programs in a totally new way. Courses leading to the Undergraduate Certificate in Piano Pedagogy or the Graduate Certificate in Piano Pedagogy Research are being offered via audio-video-internet technology.

The students registered in these classes sit at their home computers, log on through a high speed internet connection and watch a video of the professor's presentation, a webcam feed from the prof, and participate in the class discussion in real time by telephone. The group is a mixture of students from across the country: Vanessa Rektor is in the Vancouver area, Ilea Mark and Michele Wheatley-Brown live near Calgary, and Esther Jean-Charles telecommutes from Montreal.

Serge Blais, Director of Continuing Education, was instrumental in getting this program off the ground. Marc Villeneuve, Martin Fortin and Patrick Roy at Distance Learning Services helped to establish the new delivery method for the programs and they continue to provide the essential technical support.



CONGRATULATIONS TO OUR GRADUATES!

Catherine Lemay – Master of Arts with Thesis in Piano Pedagogy

Catherine graduated from the MA program in the spring of 2008. She studied three commonly used methods of assessing sight-reading performance to determine whether they produced equal assessments.



Mary Claire Lazure

Mary Claire Lazure – Graduate Certificate in Piano Pedagogy Research

Another spring graduate, Mary Claire worked on the eye-hand span of beginning and intermediate pianists, studying the impact of tonal versus atonal musical excerpts, and the effect of physical markers in the score, like slurs and rests.



Catherine Lemay

Alumni

Leana Azareal
Mélina Dalaire
Mary Claire Lazure
Erin Parkes

Ann Babin
Alicia Desjardins
Catherine Lemay
Jason Ray

Julia Brook
Rosemary Harden
YiFei Liu

Hoaden Brown
Nisreen Jardaneh
Line Morais

Distinguished Guests

- His Excellency Anthony Cary (British High Commissioner)
- Angela Cheng (concert pianist)
- Alan Fraser (author, pianist and professor, Novi Sad, Serbia)
- Eric Friesen (broadcaster, CBC)
- Angela Hewitt (concert pianist)
- Marc Jolicoeur (chair, Board of Governors)
- Aasta Levene (Chief Examiner Emeritus, Royal Conservatory of Music)
- Allan Merriam (President, Merriam Music)
- Roch Voisine (singer-songwriter)



Angela Hewitt

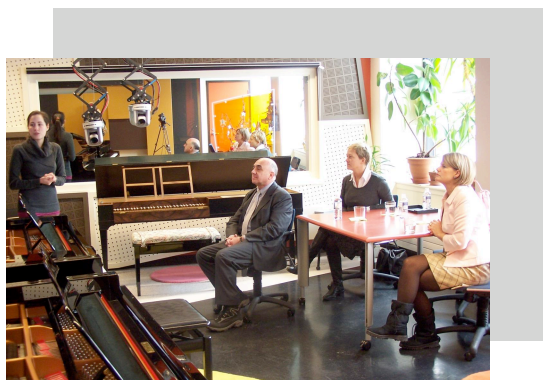


Denis Prud'homme (Dean, Faculty of Health Sciences), Gilles Comeau and Roch Voisine



Gilles Comeau, Angela Cheng and YiFei Liu

Regular Tours



The Piano Lab fulfills its responsibility to the university community by showcasing aspects of its innovative infrastructure and research, giving presentations, and providing guided tours to a few hundred visitors every year, both real and virtual.

Nisreen Jardaneh, one of the Lab's doctoral students, gave an illustrated talk in January to about 40 members of the Ottawa branch of ORMATA, the Ontario Registered Music Teachers Association. Her presentation highlighted the Lab and its research work, as well as the faculty and students involved.

In October, Dr. Comeau was on the program of the 23rd annual conference of the European Piano Teachers Association in Linz, Austria. Dr. Comeau's presentation via DVD introduced the Lab and its research to the European community.



Media Coverage

Radio-Canada's science program *Découverte* broadcast a documentary about the Piano Lab in March 2008. A team from the program's production staff was in the Lab for two days filming student Robert Lemieux as he worked with the graduate students using the Lab's experimental technologies, such as the eye-tracking apparatus and the 3D motion-capture system. The film was excellent coverage for the various research studies being done in the Lab—it was watched by 725,000 viewers, which made it one of the highest-rated shows of the year for *Découverte*.



Rideau Club

In February, the Lab's researchers and students participated in a Speaker of Influence Luncheon at the Rideau Club. In attendance was Aline Chrétien, Honorary Co-Chair of the Friends of the Piano Pedagogy Research Laboratory, along with more than 50 other Rideau Club members. Dr. Comeau introduced the Lab and its mission, and illustrated his talk with slides on the Lab's various research projects, as well as an interactive demonstration of eye-and motion-tracking technologies. Dr. Martin Brooks talked about video-mediated learning and distance education, and several of the graduate students presented their research.



Aline Chrétien, Jeanne d'Arc Sharp,
Gilles Comeau and Lori Burns



Team from the Piano Lab



Robert Lemieux, young performer



Gilles Comeau

Special Events

Lecture-Concert Series

In the fall of 2008, in cooperation with the Centre for Continuing Education, the Piano Lab offered a three-part series on the evolution of the keyboard lesson in the era of early instruments. The series took place in the official residences of three ambassadors to Canada: H.E. Anthony Cary, the British High Commissioner; H.E. Nabil Barto, the Ambassador of Jordan; and H.E. Matthias Höpfner, the Ambassador of Germany.



Guests and participants gather at the home of the Jordanian ambassador



Dr. Keillor performs at the residence of the German ambassador



The evening at Earnscliffe, home of the British High Commissioner

The evenings combined a lecture by Dr. Comeau with Dr. Elaine Keillor's musical illustrations on various keyboards from the Piano Lab's period instrument collection. For each period, Dr. Comeau highlighted the arts and social conditions, discussed the characteristics of the instruments, and illustrated the specific ways that piano teaching took place. Dr. Keillor played excerpts showcasing the repertoire of the period and the sound possibilities of the different instruments. The series concluded with a public concert on period instruments in Frieman Hall. Dr. Keillor played the Lindholm-Söderstrom clavichord and the Viennese Graf pianoforte; she was joined by cellist Joan Harrison.

All proceeds from the series went to the Piano Lab, and thanks are due to Serge Blais, Director of the Centre for Continuing Education. His support was invaluable for the success of this project.

Thanks also go to the three ambassadors who welcomed us graciously into their homes and so generously provided a lovely reception afterwards. Photographer Frank Scheme covered the events for *Diplomat* magazine and was kind enough to share his photographs.



Gilles Comeau and Elaine Keillor

Fundraising



Jeanne d'Arc Sharp

Madame Sharp has been an indefatigable ambassador for the Piano Lab. This year alone, her invaluable work on the Lab's behalf led to Angela Hewitt's visit, the presentation at the Rideau Club, the connection with Alan Merriam and the Merriam School, and Dr. Comeau's introduction to the British High Commissioner, a meeting from which the lecture-concert series grew.

Alan Merriam and the Merriam School

The Piano Lab has received a generous research grant establishing a partnership with Merriam Music in Oakville. The grant will enable the Lab to collaborate on three projects with the Merriam School. The first will take the form of both short and long-term studies of motivation with students in the Merriam School. It will compare results from students studying in different programs and in different learning environments. The second will provide us with the opportunity to continue our research into music reading with Merriam School students. The third will explore a pilot project for a distance education program to be instituted at the Merriam School.



Ann Southam

The Lab has received another major donation to the Music Reading Fund from Canadian composer Ann Southam in support of research studying the way piano students learn to read and express musical notation. Ann is fascinated with what we are learning about the relationship between the brain and music. Her inquiring mind and generous spirit make her one of the Lab's most supportive friends.

Donated Piano

Mr. John de la Mothe generously donated a baby grand piano to the Piano Lab in honour of his father.

Scholarship Fund

An anonymous donor contributed to the Lab's scholarship fund providing research fellowships for the Lab's graduate students.



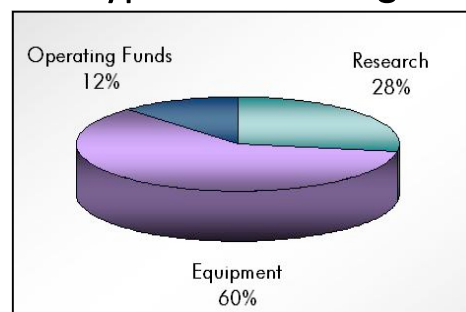
Total Funding (since 2002)

\$2,366,638

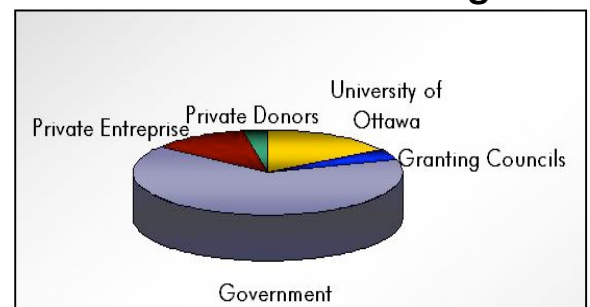
**External Funding
\$1,929,696**

**Internal Funding
\$436,942**

Type of Funding



Sources of Funding



Student Participation in Conferences and Symposia

5th Colloquium on Music Pedagogy

Seven of the Piano Lab's students made presentations at the 5th annual Colloquium on Music Pedagogy at the University of Ottawa in April 2008.

- Doctoral student Yi Fei Liu reported on the effects of notational complexity on the perceptual span in music reading.
- Master's student Flora Nassrallah discussed her work comparing the breathing of pianists at three levels of expertise in relation to four different tasks.
- Graduate Certificate student Mary Claire Lazure talked about the impact of a musical phrase's structural and physical cues on the eye-hand span.
- Shirley Ho, also in the graduate Certificate program, discussed her study analyzing eye movements to explore the difference between novices and experts in the perception of tonal and atonal patterns.
- Three undergraduate students presented papers as well: Bonnie Huor reported on the effects of musical texture on the eye-hand span, Stephanie Ahken spoke about the way the brain processes linguistic and musical syntax, and Catherine McNulty discussed the long-term effects on sight-reading of three different music reading approaches.



Neurosciences and Music: Disorders and Plasticity

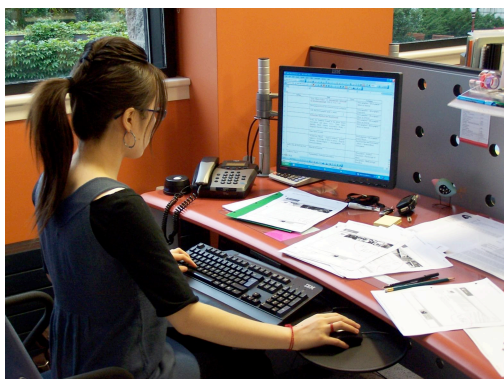
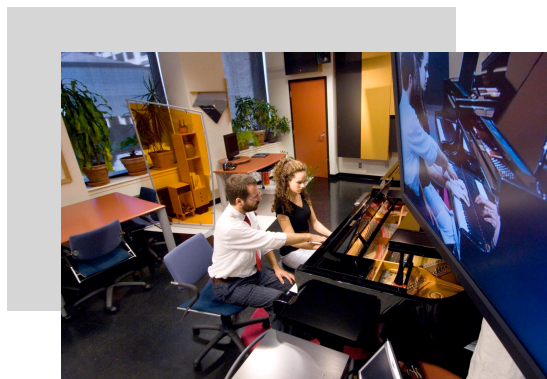
Three students gave poster presentations at the third Neurosciences and Music conference at McGill University, Montreal, June 2008.

- Catherine Lemay presented her research on the use of eye-tracking technology to measure the effect of illustrations in piano method books on the cognitive processing of musical notation by young students.
- YiFei Liu illustrated her work on the effects of notational complexity on perceptual span in music reading.
- Nisreen Jardaneh had a presentation on measuring young piano students' degree of motivation.

Defining a New Field

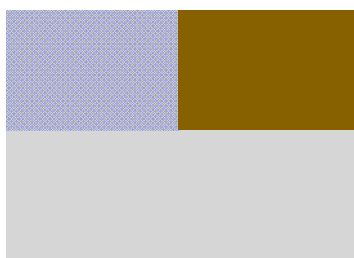
Piano Pedagogy: A Research and Information Guide

From the Piano Lab's earliest days, it became obvious that researchers and scholars in the field of piano pedagogy were lacking a major tool to facilitate access to resources for conducting multidisciplinary projects. A research and information guide in piano pedagogy seemed essential for the growth and development of this field of research. So it was with great pleasure that the Lab's faculty, staff and students received the news in 2006 that Routledge had agreed to publish *Piano Pedagogy: A Research and Information Guide*, a reference tool for faculty, students, librarians and others seeking information on subjects related to research on piano learning and piano teaching.



Under Dr. Comeau's supervision, a group of graduate students in Piano Pedagogy Research—Nisreen Jardaneh, YiFei Liu, Catherine Lemay, Mary Claire Lazure, Mélina Dalaire and Julia Brook—were involved in the preparation and writing of the guide. The book is intended as an introductory reference to varied bibliographical information, providing an outline of resources and some descriptive information on selected scholarly and educational sources. The guide directs its readers to comprehensive access points for research, like indexes, databases and bibliographies, as well as individual sources of research information, such as encyclopedias and dictionaries, journals and magazines, theses and dissertations, tests and measurement scales, and monographs.

The book has now been through the final editing process and will be available in April 2009. Everyone in the Lab is eagerly anticipating the arrival of the first copy.



Researchers

Gilles Comeau – Music, University of Ottawa
Nisreen Jardaneh – Graduate student, Music, Université Laval
YiFei Liu – Graduate student, Music, University of Ottawa
Catherine Lemay – Graduate student, Music, University of Ottawa
Mary-Claire Lazure – Certificate student, Music, University of Ottawa
Mélina Dalaire – Graduate student, Music, University of Ottawa
Julia Brook – Graduate student, Music, University of Ottawa

Publications

- Comeau, G. (2007). **Le laboratoire de recherche en pédagogie du piano.** *Revue de recherche en éducation musicale*, 26, 177–188.

Communications

- Comeau, G. (2007, April). **Le rôle de la recherche multidisciplinaire dans la pédagogie pianistique.** *Pianistes d'aujourd'hui*. Observatoire musical français, Université de Paris – Sorbonne. Paris, France.
- Comeau, G. (2007, March). **Science and piano pedagogy: The role of multidisciplinary research.** Schulich School of Music, McGill University, Montréal.
- Comeau, G. (2007, October). **La recherche en pédagogie du piano : méthodologies et approches multidisciplinaires.** Université Laval, Québec.

Music Reading

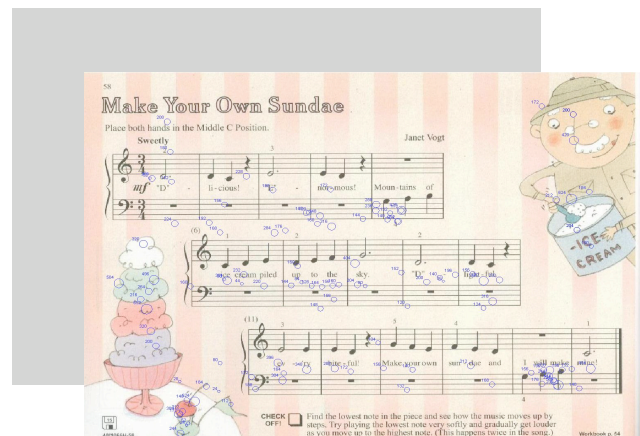
Inventory of Musical Symbols in Piano Method Books

There is no clear consensus on how many musical symbols a student must be able to read to become musically literate. Every method book uses a different approach to introduce the different symbols piano students must recognize while learning to play piano. In our work on this project over the last two years, we have created a database tracking musical symbols as they are introduced in various method books. Our analysis shows that the number of symbols introduced to students by the time they have finished a complete method ranges from 62 to 262. Some methods present a symbol many times before the student is expected to have learned it while others show it once and expect the student to remember, so we are also analyzing the sequencing of the symbols, the pace at which they are introduced and the way they are reinforced. We have now analyzed the more popular method book collections in North America, and are starting to analyze European method books.



Effects of Illustration in Music Books

Piano method books are among the principal tools for the instruction of young beginners. Many of these books have a large number of colourful illustrations raising significant questions from a music-reading perspective: what is the impact of these colourful sketches on music reading and does their presence lower the quality of performance? We used eye-tracking technology to study the number and duration of the fixations on the picture zone relative to the music zone. The highest number of fixations recorded in the picture zone was approximately 20%, indicating that, in some cases, illustrations present a severe cognitive distraction from the musical notation.



Music Reading

Comparing Different Methods of Sight-Reading Assessment

An essential component of music reading research is the measurement, quantification, and evaluation of accuracy in sight-reading performance. The various methods used by researchers to assess music reading have never been compared for equality of their assessments. We compared three commonly used methods using 1) an adaptation for piano of a performance scale for wind instrumentalists, 2) a scoring algorithm, and 3) three expert examiners. Each assessment method was used to analyze the sight-reading performances of eight piano students on five exercises composed for use in this project. We found that these three methods differed greatly in their assessment procedures as well as in their assessment of the subjects' sight-reading performance.

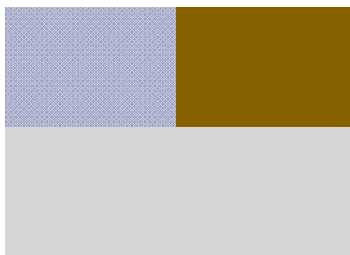
Observable Eye-Movement Patterns during the Processing of Linguistic and Musical Syntactic Incongruities

A possible link has been suggested between the way the brain processes the syntax of language and music. We are using eye-tracking technology to investigate the presence and significance of readers' eye-movements during the processing of musical and linguistic syntactic incongruities. Participants' eye movements are measured as they read syntactically congruent or incongruent linguistic sentences aloud, and sight-read syntactically congruent or incongruent musical sequences, and the fixation duration is analyzed. This study is part of a growing body of research on music and linguistic syntactic integration and may help to expand our current knowledge of the underlying mechanisms of such processes in the brain.



Sight Reading and Perceptual Span

Various studies on music reading have looked at perceptual span: the region around fixation from which useful information is extracted. Our research was designed to study the effects of notational complexity on the perceptual span of university piano majors during sight playing by using the moving window paradigm: only a portion of the score around the fixation point was available to the reader and the music only appeared when the eyes were looking ahead. Reading skills and harmonic difficulties did not affect the span size: good sight readers and poor sight readers share similar size of perceptual span. However, notational complexity (the amount of visual information within certain region) did have an impact on eye movement during sight reading, and this effect might influence the perceptual span.



• Researchers:

Gilles Comeau – Music, University of Ottawa
Catherine Lemay – Graduate student, Music, University of Ottawa
Ramesh Balasubramaniam – Kinesiology, McMaster University
YiFei Liu – Graduate student, Human Kinetics, University of Ottawa
Stephanie Ahken – Undergraduate student, Sciences, University of Ottawa
Flora Nassrallah – Graduate student, Human Kinetics, University of Ottawa

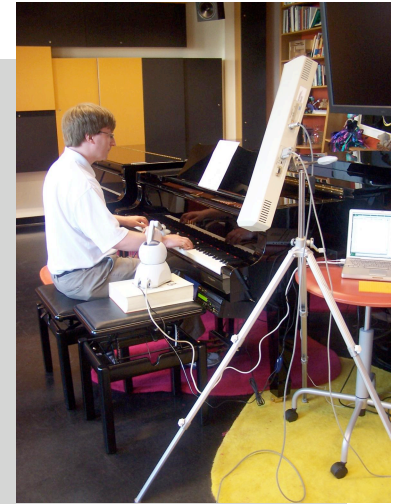
Communications

- Comeau, G., Lemay, C. (2007, May). **Music reading skills of young piano students: Taxonomy of the musical codes.** Canadian University Music Society, Montréal, Quebec.

Health Issues/Injury Prevention

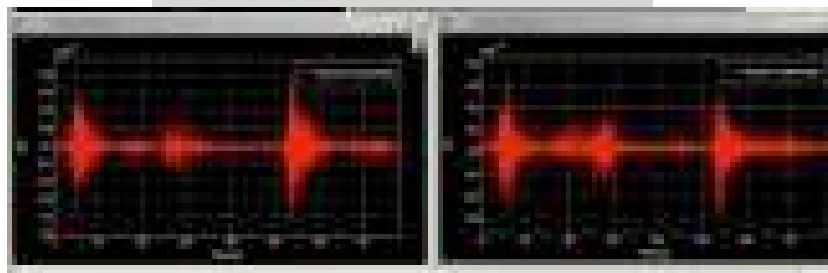
Thermal Imaging

We have used an infrared thermal-imaging camera to analyze the evolution of skin temperature of key regions on participants' arms and hands while playing the piano in order to determine the influence of such factors such as the type of music piece played, the order in which pieces were played and the use of a warm-up routine. Preliminary results seems to indicate several patterns of temperature evolution, but analysis is ongoing and final results from the current database should be available soon.



Pianists' Breathing Patterns

Many studies have looked at the respiratory behaviors of wind instrumentalists and singers; however, little is known about the breathing patterns of pianists. Since we are not sure whether a relationship exists between pianists' respiratory cycles and certain physical movements they make when playing, or between breathing and certain musical elements, the first goal of this study is to determine the observable relationship between breathing cycles and movement, rhythm, meter or phrasing of pianists performing various tasks on and off the piano. We are also investigating the effects of experience level on breathing patterns. It will be interesting to observe whether certain breathing patterns are more common with advanced pianists, making them better performers and interpreters of the music. Greater understanding of the pianists' breathing may also help prevent piano playing-related health injuries.



Health Issues/Injury Prevention

Wrist stiffness

Stiffness, relaxation, co-contraction and multi-joint issues are key concepts used in piano pedagogy that also have specific meaning in biomechanics. We examined the wrist movement of experienced pianists in reaction to small, short-duration forces acting on the wrist. The results indicate that measurable changes in wrist stiffness exist but that they are not easily related to musical features such as dynamics, tempo, and note duration.



EMG

Kathleen Riley came to the Piano Lab from New York to illustrate the use of surface electromyography (sEMG) to measure the tension in pianists' neck and shoulders when they play, giving a hands-on demonstration of her software. The Lab is following up on the use of her technology; there are plans to include it in future research projects.



• Researchers

Donald Russell – Engineering and Design, Carleton University
Gilles Comeau – Music, University of Ottawa
Flora Nassrallah – Graduate student, Human Kinetics, University of Ottawa
Isabelle Cossette – Music, McGill University
Christopher Herry – Postdoctoral fellow, Systems and Computer Engineering, Carleton University
Monique Frize – Engineering and Information Technology, University of Ottawa
Ursula Stuber – Music, Université Laval
Elaine Keillor – Music, Carleton University

Publications

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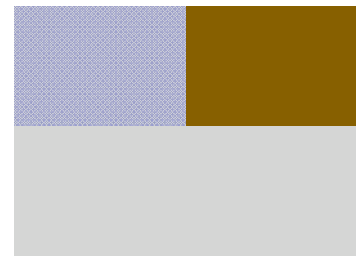
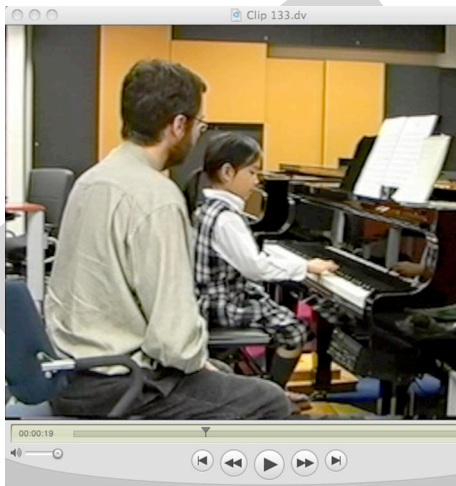
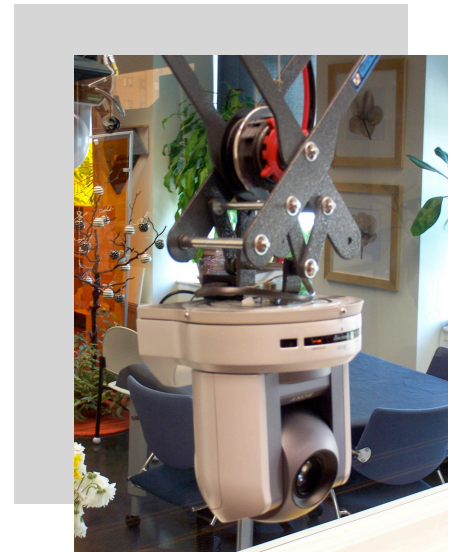
Communications

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- Bériault, S., Côté, M., Payeur, P., Comeau, G. (2007, May). **Multi-camera computer vision for human gesture monitoring and prevention of injuries.** OCRI Research Event. University of Ottawa, Ottawa.
- Das, R., Comeau, G., Balasubramaniam, R. (2007, May). **An exploration of the muscle groups used in piano performance.** Canadian University Music Society, Montréal.
- Russell, D., Vant, C., Ray, J., Brook, J., Comeau, G. (2007, May). **Biomechanical implications inherent in descriptions of piano technique.** Canadian University Music Society, Montréal.

Video-Mediated Learning

Video Database Development

We are in the process of completing a video clip database that will serve as a resource for students and piano teachers. Recordings of complete lessons were reviewed and clips that best represented specific teaching points were selected and then edited. In collaboration with the Piano Lab, Sam Popowich, the university's Emerging Technologies Librarian, has developed a search engine so that clips will be retrievable by keyword search. The database will contain clips on period instruments, the use of technology while teaching, and different teaching strategies. Most importantly, clips demonstrating various piano playing techniques such as drop-rolls or staccato playing will be available, as well as methods illustrating how to teach these skills.



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Publications

- Bériault, S., Payeur, P., Comeau, G. (2007). **Flexible multi-camera network calibration for human gesture monitoring.** *IEEE International Workshop on Robotics and Sensors Environments*, 12-13.
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- Comeau, G. (2007, November). **Les nouvelles technologies et la pédagogie du piano.** Fédération des associations de musiciens éducateurs du Québec, Drummondville.

Video-Mediated Learning

Distance Piano Teaching

This year, the Piano Lab conducted a research project to explore the methodology for starting a young student in piano via distance education. The challenges are many: there is no physical contact, no face-to-face interaction, and parental involvement may take on extra importance when there is no teacher in the room. In September 2007, two five-year-old girls in Indiana began weekly distance piano lessons with Dr. Comeau. Another five-year-old girl began piano lessons at the same time with Dr. Comeau in the Piano Lab, and the data from all three are being compared to see the effect of the different teaching environments. Currently, lesson videos are being analyzed using SCRIBE data mapping software to examine the behaviours of teacher, students and parents.

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Bruno Emond – Computational Video, National Research Council of Canada

Communications

- Budai, W., Comeau, G., Brooks, M., Dalaire, M. (2007, June). **Internet video-streamed performance: Disklavier connectivity**. Sixteenth Annual International Music Technology Conference and Workshop, Indiana University School of Music at IUPUI, Indianapolis, Indiana.
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- Comeau, G., Dalaire, M. (2007, May). **Ethnographic research design: Piano lessons and VC technology**. Canadian University Music Society, Montréal.
- Comeau, G., Dalaire, M. (2007, November). **Cross-border piano project**. McGraw-Hill Ryerson Higher Education Conference, Ryerson University, Toronto.
- Comeau, G., Jardaneh, N., Lemay, C., Dalaire, M., Parkes, E. & Brook, J. (2007, October). **New Technology and Piano Learning: Context of the Piano Pedagogy Research Laboratory**. Music Education Technology Symposium - FiSM The Finnish Society of Music Education. University of Jyväskylä, Finland.

Motivation

Comparative Analysis of Motivation Patterns between Two Different Cultural Groups

This study was designed to measure and compare the motivational level of young piano students in North America and in the People's Republic of China (PRC) using the Survey of Musical Interest. Participants in this study consisted of 65 Caucasian North American piano students and 50 Chinese piano students in the same age range living in the PRC. Additional information was collected from parents and piano teachers in two complementary questionnaires. The results indicated that the North American and Chinese students differ from each other in every category.

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Communications

- Jardaneh, N., Comeau, G. (2007, May). **Motivation: The challenge of young piano students**. Canadian University Music Society, Montréal.
- Jardaneh, N. (2007, November). **Piano students' perceptions of effective practice strategies**. Séminaire de recherche, Québec.

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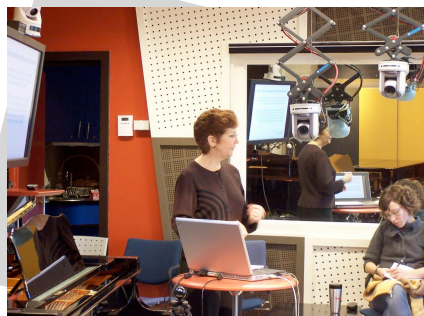
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