



Laboratoire de recherche
en pédagogie du piano

Piano Pedagogy
Research Laboratory

• Annual Report • 2005 - 2006

Milestones

- 06** In its first year of operation, over 350 guests visit the Piano Pedagogy Research Laboratory.
Routledge has accepted *Piano Pedagogy: A Research and Information Guide*, for publication. The book, developed by the lab's faculty and graduate students, is an annotated bibliography of a wide range of sources in piano pedagogy and the first reference book of its kind in the discipline.
- 05** Official opening of the laboratory.
- 04** Construction of the lab gets underway.
Undergraduate Certificate in Piano Pedagogy approved.
- 03** Funding from Ontario Innovation Trust (OIT) matching grant and other partners bring the lab's total financial support to \$1,246,642.
Graduate Certificate in Piano Pedagogy Research approved.
- 02** Canada Foundation for Innovation (CFI) grant approved for the creation of the Piano Pedagogy Research Laboratory.

Message from the Director



The construction of the Piano Pedagogy Research Laboratory began in 2004 and the official opening ceremonies for this unique facility took place in October, 2005. What a long way we've come since then!

I am proud to share this annual report with you; it is testament to the laboratory's creative ferment. The many multidisciplinary teams, the varied research projects, the scholarly publications and the research-oriented programs are indicators of the level of activity.

All these achievements are possible because we have researchers of the highest calibre who are interested in studying piano pedagogy and students who are well integrated into all research projects. I want to thank them all.

We will continue to work together to extend our knowledge in the field of piano pedagogy and develop the laboratory as the premier facility for this research work.

Gilles Comeau

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, 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 Lab.

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

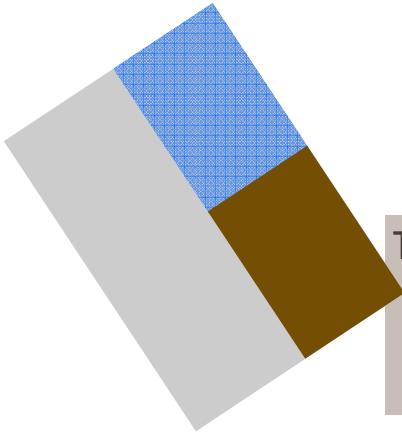
Vision

Become the foremost authority in piano pedagogy research and training.

Offer a world-class laboratory distinguished for its

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

A Unique Research Facility



The University of Ottawa has established a unique research laboratory specializing in piano pedagogy, thanks to a \$1.2 million grant from the **Canada Foundation for Innovation**, the **Ontario Innovation Trust**, and the **private sector**.

Two Principal Functions

- Advanced scientific research in piano pedagogy
- Specialized hands-on training in piano pedagogy research

A laboratory of this calibre and specialization is unique. The benefits from its accessibility to students, researchers and teachers in this field of research will be far reaching and significant.

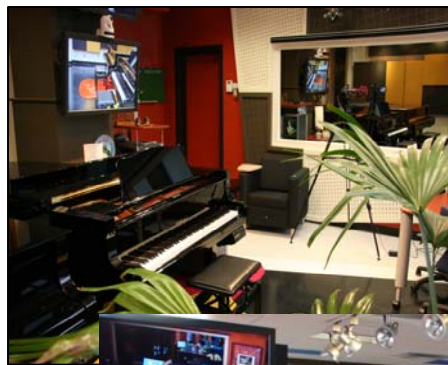
Studio

Equipment:

- Two 7'6" acoustic pianos with optical sensors and integrated MIDI operating systems (Disklaviers)
- Analog and digital video cameras
- Large LCD screens

Recording studio acoustics:

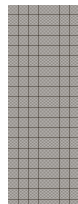
- Moveable acoustic panels allowing the customization of spatial resonance within the room



Conference Room

Multi-purpose environment ideal for:

- Seminars, lectures, workshops
- Video conferencing
- Distance education



Resource Centre

Large reference collection for researchers:

- Theses and research texts
- Piano teaching materials
- Scores
- Audiovisual materials



Multi-Media Control Centre

Analog and digital video equipment:

- Records piano lessons directly in VHS, DVD, or mini DV format
- Generates picture-in-picture and instant video replay

Video conferencing capacity:

- Connects international research teams by way of overseas MIDI transfer
- Facilitates two-way piano teaching between the laboratory and distant, often remote, locations

Production centre:

- Enables timely and cost-effective management of all audio and visual files—recording, editing, formatting, transferring

Period Instrument Studio

A selective collection of historic instruments:

- 6-octave Viennese Graf pianoforte (built by R. J. Regier)
- John Morley London clavichord (reproduction)
- Children's Butterfly piano (original instrument reconstructed by Don Côté)

Soon to arrive...

- Lindholm-Söderström clavichord (built by Andrew Lagerquist)

Academic Programs

Master of Arts with Thesis in Piano Pedagogy

Allows students to become familiar with existing research in the field and to train as researchers by participating in multidisciplinary research groups, working in depth on a specific project dealing with piano learning or piano teaching, and writing a dissertation.

Graduate Certificate in Piano Pedagogy Research

Focuses on the study of multidisciplinary research for a better understanding of the processes involved in learning to play the piano. This certificate enables piano teachers to incorporate scientific knowledge into their practice and develops highly qualified professionals with a strong interest in piano pedagogy research.

Undergraduate Certificate in Piano Pedagogy

Offers courses with a practical orientation for professional piano teachers who are already teaching in private studios and music schools. This program builds on their existing teaching skills and knowledge, and introduces the latest developments in the field of piano pedagogy.

Enrolment	
Masters	
	Completed 4
	In progress 6
Graduate Certificate	
	Completed 3
	In progress 3
Undergraduate Certificate	
	In progress 1

Courses Offered	
MUS 4158	Piano Pedagogy I
MUS 4159	Piano Pedagogy II
MUS 5902	External Research Practicum
MUS 6931	Topics in Musical Pedagogy
MUS 6932	Selected Topics in Piano Pedagogy
MUS 6994	Independent Studies in Musical Pedagogy
MUS 6995	Directed Readings in Musical Pedagogy

CONGRATULATIONS TO OUR 2005–2006 GRADUATES !

Master of Arts with Thesis in Piano Pedagogy

Line Morais (2003–2005). Development of a theoretical framework for understanding the use of analogy as a piano teaching strategy.

Ann Babin (2002–2005). Piano curriculum and examination requirements in canadian conservatories: Historical development and comparative analysis.



Graduate Certificate in Piano Pedagogy Research

Julia Brook (2005–2006)

Hoadan Brown (2005–2006)

Nisreen Jardaneh (2004–2006)

Scholarship Winners

Jason Ray OGS (2006)

Nisreen Jardaneh OGS (2006)

Jason Ray SSHRC (2005)

Students Enrolled

Music Students

Master of Arts

Julia Brook. *The effectiveness of an online video digital database for the professional development of piano teachers*

Nisreen Jardaneh. *Young piano students' perceptions of their practice strategies*

Alicia Desjardins. *Developing a theoretical framework for the critical analysis of beginner piano methods*

Catherine Lemay. *Music reading: A comparison of pre-existing sight reading evaluation models*

YiFei Liu. *A cross-cultural comparison of motivational levels of private piano students from China and North America*

Jason Ray. *Identification and codification of physical piano techniques*

Graduate Certificate in Piano Pedagogy Research

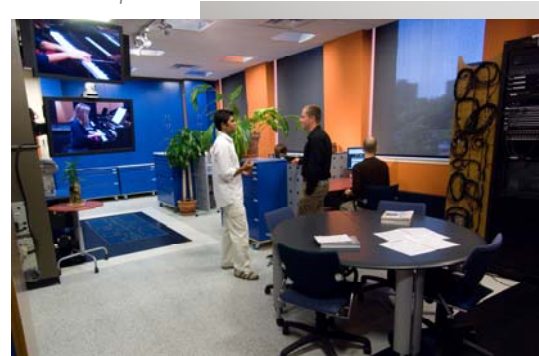
Leana Azerral

Erin Parkes

Mélina Dalaire

Undergraduate Certificate in Piano Pedagogy

Hiroko Nakagawa



Engineering Students

Doctorate

Christophe Herry. *Long-term study of the inflammatory processes and tension in the neuromuscular tissues associated with regular piano playing using infrared thermal imaging* (Systems and Computer Engineering, Carleton University)

Masters

Martin Côté. *Adaptive segmentation for human gesture analysis in unconstrained environment* (Applied Science Electrical Engineering, University of Ottawa)

Christy Vant. *Driving point impedance measurements at the wrist during piano playing* (Mechanical and Aerospace Engineering, Carleton University)

Silvain Beriault. *Camera calibration and 3D reconstruction for human gesture* (Applied Science Electrical Engineering, University of Ottawa)

Psychology Student

Runa Das. *Exploring muscle groups in piano performance* (Psychology, Carleton University)



Raising Awareness

Visitors

The piano lab was honoured to welcome over 350 visitors to the lab during the past year.

Distinguished guests

- Madame Aline Chrétien
- Maestro Pinchas Zukerman (Conductor and Artistic Director, National Arts Centre)
- Jon Kimura Parker (Concert Pianist)
- James Parker (Gryphon Trio)
- Toru Saruya (President of Yamaha Canada)
- Jun Fujimoto (Keyboard Division, Yamaha Canada)
- Robert Barg (Vice-President, Musical Instrument Group, Yamaha Canada)
- Françoise Regnard (Centre de formation des enseignants de la musique, Île de France, France)
- Madeleine Zulauf (FMR Zulauf, Suisse)
- Sylvain Jaccard (Haute École Pédagogique BEJUNE, Suisse)
- Suzanne Corbeil (Vice-President of External Relations, CFI)
- David Bogart (Vice-President, OIT)
- Barbara Reynolds (Senate Committee Clerk)
- Philip Steenkamp (Deputy Minister of Training, Colleges and Universities)
- Alastair Glass (Deputy Minister of Research and Innovation)
- Isabelle Peretz, (Co-director, BRAMS)
- Caroline Palmer (Sequence Production Lab, McGill University)
- Laurel Trainor (McMaster Institute for Music and the Mind)



Music organizations

- Ontario Registered Music Teachers' Association (ORMTA)
- Ottawa Suzuki piano teachers
- Ontario Music Educators' Association (OMEA)
- Music for Young Children (MYC)
- National Arts Centre Young Artists Program
- University of Ottawa Summer Enrichment Mini-Courses in music

Alumni

- University of Ottawa's Homecoming. September 2006. Visits to all 5 rooms and a demonstration of a distance teaching session with Finland via videoconferencing
- Alumni Breakfast hosted by the University of Ottawa Music Department



Raising Awareness

Virtual Tours and Presentations

- Using Videoconferencing and Internet to share data and conduct research. *College Music Society Conference*. University of Texas, San Antonio, Texas. September 2006. (By videoconference)
- Using the Internet and Internet2 in Music Performance, Research and Teaching. *Distance Learning Conference*, Madison, Wisconsin. August, 2006. (By videoconference)
- *Ontario Registered Music Teachers' Association (ORMTA)*. Provincial conference held in Ottawa. July, 2006.
- *Canada Foundation for Innovation*. Annual Banquet. Special invitation to represent the University of Ottawa. March, 2006.
- Canadian Initiatives in Music Performance, Research, and Teaching. *Internet 2 Music Symposium Indiana University*. March, 2006. (By videoconference)
- TAP pedagogical distance piano system between Ottawa, Canada and Kuhmo, Finland. *MegaConference VIII*. November, 2006. (By videoconference)

Visiting Professor

- Dr. William Budai (Director, IUPUI Music Academy, Indiana University School of Music)

After spending a week in residence at the Piano Lab in July 2006, familiarizing himself with the research infrastructure, Dr. Budai joined the lab as a research partner.

Publications

The Piano Pedagogy Research Laboratory is proud to have initiated two major publications that will give important visibility to our research activities.

- Comeau, G. (Ed.) (2006). *La Recherche multidisciplinaire en pédagogie du piano. Revue de recherche en éducation musicale*. Québec : Université Laval.

Publication of the proceedings of the Inauguration Symposium held at the opening of the Piano Pedagogy Research Laboratory. Music Department, University of Ottawa.

- Comeau, G. et al. (in preparation). *Piano pedagogy: A research and information guide*. New York: Routledge.

Routledge is well known for its Research and Information Guide series, which survey the resources available in various disciplines. This volume will be the first major annotated bibliography in the field of

Display Exhibits

piano pedagogy.

- The Piano Lab's 6-octave Graf pianoforte was featured in the Performance Practice Seminar: Beethoven's Sonatas, offered by special guest Richard Hester (Winter 2005).
- The Piano Pedagogy Research Laboratory showcased its facilities in Simard Hall, Faculty of Arts (Fall 2005). Five display cases highlighted major features of the laboratory, its history and areas of interest: Construction, Activities in the Lab, Multidisciplinary Research, Period Instrument Room, Resource Centre, and Media Coverage. This was a wonderful opportunity for the Piano Lab to gain public awareness and for students and faculty members to discover a unique, state-of-the-art research facility on campus.
- A special exhibit at the National Library of Canada, *The Piano Lesson*, was organized in honour of the opening of the Piano Pedagogy Research Laboratory (Fall 2004).



Conferences, Symposiums, Lectures, Workshops

The Piano Pedagogy Research Laboratory was responsible for organizing the following events:

June 2006 Music and the Brain Conference – Part II*

Presenters:

Isabelle Peretz – Psychologie, Université de Montréal
Caroline Palmer – Psychology, McGill University
Laurel Trainor – Psychology, McMaster University
Sylvie Hébert – École d'orphonie et d'audiologie, Université de Montréal

March 2006 Music and the Brain Conference – Part I*
Perspectives from the study of human motor control

Presenter:

Ramesh Balasubramaniam – Human Kinetics, University of Ottawa

January 2006 Alexander Technique Workshop**

Presenter:

Richard Albert, Founder of the Ottawa-Hull Centre for the Alexander Technique

November, 2005 Eutony Lecture and Workshop**

Presenter:

Ursula Stuber – Musique, Université Laval

October 2005 Multidisciplinary Research in Piano Pedagogy

Presenters:

Alain Desrochers – Psychology, University of Ottawa
Ramesh Balasubramaniam – Human Kinetics, University of Ottawa
Pierre Payeur – Engineering and Information Technology, University of Ottawa
Donald Russell – Engineering and Design, Carleton University
Bruno Emond – Éducation et Sciences cognitives, Université du Québec en Outaouais
Dmitry Gorodnichy – Information Technology, National Research Council of Canada



June 2005

Challenging 300 years of piano teaching practices with 21st century technology: New teaching and research tools in piano pedagogy. Round table session. Canadian University Music Society conference, London, ON.

Presenters:

Gilles Comeau – Music, University of Ottawa
Stephen Birkett – Engineering, University of Waterloo
Monique Frize – Systems and Computer Engineering, University of Ottawa
Christophe Herry – Systems and Computer Engineering, Carleton University
Pierre Payeur – Engineering and Information Technology, University of Ottawa
Donald Russell – Engineering and Design, Carleton University
Roger Knox – Bloorview MacMillan Children's Centre and Wilfrid Laurier University



June 2005 Masterclass on the Walter Fortepiano

Presenter:

Cynthia Floyd – Music, University of Ottawa

April 2005 1st & 2nd Conference on Music Pedagogy

Presenters:

Piano Pedagogy Graduate Students

December, 2004 Eutony and Multidisciplinary Research – Round Table, University of Ottawa.

Presenters:

Gilles Comeau – Music, University of Ottawa
Ursula Stuber – Musique, Université Laval
Christophe Herry – Systems and Computer Engineering, Carleton University
Monique Frize – Systems and Computer Engineering, University of Ottawa
Rafik Goubran – Systems and Computer Engineering, Carleton University

*In collaboration with the Music Department of the University of Ottawa

**In collaboration with students from the Music Department

A scientific approach to piano pedagogy, by its very nature, must bring art and science together. This convergence is not straightforward. It must be done within a multidisciplinary framework and bring together musicians who are interested in research and researchers who are interested in music. The piano lab is focusing on six main areas of research:

- ◆ A New Field of Research
- ◆ Motivation
- ◆ Music Reading
- ◆ Injury Prevention
- ◆ Physical Aspects of Piano Playing
- ◆ Video-Mediated Learning

A New Field of Research

Establishing the Field of Study for Piano Pedagogy Research

A theoretical examination to define the field of study for piano pedagogy so as to establish it as an independent area of research

Funding:

\$65,765 Social Sciences and Humanities Research Council of Canada (SSHRC)
(April 2003–March 2006)

Researcher:

Gilles Comeau – Music, University of Ottawa

Publications and Communications:

Comeau, G. (2006). (Ed.). Recherche scientifique et pédagogie du piano. *Revue de recherche en éducation musicale*, 24, 1–11.

Comeau, G. (2006, October). *Les nouvelles technologies comme outil de recherche en pédagogie du piano*. Journées francophones de recherche en éducation musicale, Université Laval, Quebec.

Comeau, G. (2006, October). *Pédagogie du piano : nouvelles perspectives*, Série de conférences, Université Laval, Quebec.

Desjardins, A. (2005, May). *Developing a theoretical framework for the critical analysis of beginner piano methods*. University of Western Ontario Graduate Student Symposium, London, ON.

Comeau, G. (2002, November). *Éducation musicale: nouvelles tendances*. University of Ottawa Discovery Series, Faculty of Arts, Ottawa, ON.



Piano Pedagogy: A Research and Information Guide

Development of a guide outlining the multidisciplinary resources available for research in piano pedagogy, with descriptive information on reference works and selected scholarly sources

Funding:

\$1,000 Routledge Press

Researchers:

Gilles Comeau – Music, University of Ottawa
Nisreen Jardaneh – Graduate Student, Music, University of Ottawa
Julia Brook – Graduate Student, Music, University of Ottawa
Catherine Lemay – Graduate Student, Music, University of Ottawa
Méline Dalaire – Graduate Certificate Student, Music, University of Ottawa
Ann Babin – Alumna, Music, University of Ottawa

Publication:

Comeau, G., et al. (in preparation). *Piano pedagogy: A research and information guide*. New York: Routledge.

Motivation

Relationship between Motivation and Piano Performance Indicators

Development of a psychometric scale that successfully measures the motivational levels of piano students

Researchers:

Alain Desrochers – Psychology, University of Ottawa
Gilles Comeau – Music, University of Ottawa
Nisreen Jardaneh – Graduate Student, Music, University of Ottawa
Isabelle Green-Demers – Psychologie, Université du Québec en Outaouais
William Budai – Music, IUPUI Music Academy, Indiana University

Publications and Communications:

Desrochers, A., Comeau, G., Jardaneh, N., & Green-Demers, I. (2006). L'élaboration d'une échelle pour mesurer la motivation chez les jeunes élèves en piano. *Revue de recherche en éducation musicale*, 24, 13–33.

Jardaneh, N. (2006, May). *The development of a scale to measure young piano students' degree of motivation*. The University of Western Ontario Graduate Student Symposium, London, ON.

Jardaneh, N. (2006, April). *The development of a scale to measure the degree of motivation for young piano students*. University of Ottawa Graduate Student Symposium, Ottawa, ON.

Desrochers, A., Comeau, G. & Jardaneh, N. (2005, October). *Assessing the motivation of young piano students*. Piano Pedagogy Research Laboratory Inauguration Symposium, Ottawa, ON.

Smith, J. (2004, October). *The motivation assessment scale of young piano students*. Poster Presentation. University of Ottawa, Ottawa, ON.



Cross-Cultural Analysis

Comparative analysis of the motivation levels of piano students from various cultural backgrounds, living in North America and abroad, with a corresponding investigation into parental styles and involvement

Researchers:

YiFei Liu – Graduate Student, Music, University of Ottawa
Gilles Comeau – Music, University of Ottawa
Alain Desrochers – Psychology, University of Ottawa
Nisreen Jardaneh – Graduate Student, Music, University of Ottawa
Hoadan Brown – Graduate Certificate Student, Music, University of Ottawa



Motivation and Practice Strategies

Examination of piano students' perceptions of their practice strategies and the relationship of these strategies to motivation

Researchers:

Nisreen Jardaneh – Graduate Student, Music, University of Ottawa
Gilles Comeau – Music, University of Ottawa
Alain Desrochers – Psychology, University of Ottawa



Music Reading

Detailed Inventory of Musical Symbols in Piano Method Books

Creation of a database tracking musical symbols in various collections of North American and European piano method books, as well as the pace at which these symbols are introduced and their frequency

Researchers:

Gilles Comeau – Music, University of Ottawa
Julia Brook – Graduate Student, Music, University of Ottawa
Jason Ray – Graduate Student, Music, University of Ottawa
Catherine Lemay – Graduate Student, Music, University of Ottawa
YiFei Liu – Graduate Student, Music, University of Ottawa
Hoadan Brown – Graduate Certificate Student, Music, University of Ottawa
Nisreen Jardaneh – Graduate Student, Music, University of Ottawa
Méline Dalaire – Graduate Certificate Student, Music, University of Ottawa



Coordination of Eye and Hand Movements while Reading Music at the Piano

Project to extend our fundamental understanding of music reading processes in young piano students and how these relate to the execution of motor actions in piano playing

Funding:

\$50,000 – Ann Southam Music Reading Fund

Researchers:

Ramesh Balasubramaniam – Human Kinetics, University of Ottawa
Gilles Comeau – Music, University of Ottawa
Alain Desrochers – Psychology, University of Ottawa



Publication and Communication:

Comeau, G. (2004, March). *Suzuki's mother-tongue approach: Supporting evidence for ear-playing*. University of Ottawa Conference Series, Ottawa, ON.

Comeau, G. (2002). La méthode Suzuki et l'approche de langue première. *Canadian University Music Review*, 22 (2), 113–126.

Information Technology Development: MIDlator Software

Development of a computer analysis tool to evaluate variations of dynamics and timing in piano students' performances

Funding:

\$10,000 – Development of Interdisciplinary Initiatives, University of Ottawa (July 2004–December 2005)

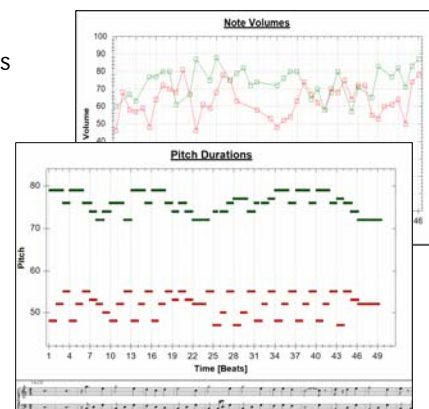
\$6,230 – Senate Committee on Teaching, University of Ottawa (July 2004–December 2005)

Researchers:

Shervin Shirmohammadi – Engineering and IT, University of Ottawa
Gilles Comeau – Music, University of Ottawa
Ali Khanafer – Undergraduate student, Engineering & IT, University of Ottawa
Mathieu Kühn – Undergraduate student, Engineering & IT, University of Ottawa
Michel Khoury – Undergraduate student, Engineering & IT, University of Ottawa
Hanieh Khamseh-Zadeh – Undergraduate student, Engineering, University of Ottawa

Publication:

Shirmohammadi, S., Comeau, G., & Khanafar, A. (2006). MIDlator: Analyzing students' piano performance. *Revue de recherche en éducation musicale*, 24, 35–48.



Injury Prevention

Piano Playing-Related Health Problems

New technological resources provide opportunities to apply scientific research methods that are effective in the diagnosis, treatment, and prevention of injuries related to piano performance

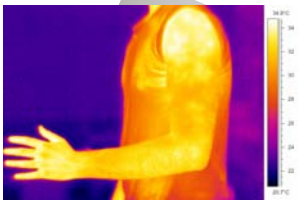
Researchers:

Donald Russell – Engineering and Design, Carleton University
Gilles Comeau – Music, University of Ottawa
Ursula Stuber – Musique, Université Laval
Elaine Keillor – Music, Carleton University
Christy Vant – Engineering and Design, Carleton University
Jason Ray – Graduate Student, Music, University of Ottawa
Julia Brook – Graduate Student, Music, University of Ottawa



Publications and Communications:

- Russell, D. (2006). Establishing a biomechanical basis for injury preventive piano pedagogy. *Revue de recherche en éducation musicale*, 24, 105–117.
- Russell, D. (2005, June). *Challenging 300 years of piano teaching practices with 21st century technology: New teaching and research tools in piano pedagogy*. Round table session. Canadian University Music Society Conference, London, ON.
- Comeau, G. et al. (2004, June). *Challenging 300 years of piano teaching practices with 21st century technology: Piano playing-related health problems*. Canadian Medical and Biological Engineering Society Conference, Quebec, QC.
- Stuber, S. (2004, November). *Eutony and ergonomics at the instrument*. University of Ottawa Lecture Series, Ottawa, ON.

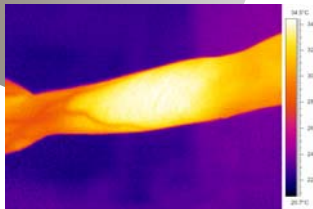


Thermal Imaging

Infrared video technology is used to monitor the temperature of a performer's hands, arms, shoulders, neck and face during piano playing, thereby enabling researchers to pinpoint underlying muscle tension and inflammation

Researchers:

Christopher Herry – PhD Candidate, Systems and Computer Engineering, Carleton University
Monique Frize – Engineering and Information Technology, University of Ottawa
Rafik Goubran – Systems and Computer Engineering, Carleton University
Gilles Comeau – Music, University of Ottawa



Publications and Communication:

- Herry, C. L., Frize, M., Goubran, R. A., & Comeau, G. (2006). Étude thermographique de pianistes lors d'une séance de travail : évolution de la température superficielle des muscles et première interprétation. *Revue de recherche en éducation musicale*, 24, 89–104.
- Herry, C. L., Frize, M., Goubran, R. A., Comeau, G. (2005). Evolution of the surface temperature of pianists' arm muscles using infrared thermography. *Proceedings of the 27th annual international conference of the IEEE Engineering in Medicine and Biology Society*, 1687–1690.
- Herry, C., Frize, M., & Goubran, R. (2005, June). *Collaboration between music and engineering researchers: A winning position*. Round table session. Canadian University Music Society Conference, London, ON.

Physical Aspects of Piano Playing

Vision-Based Monitoring of a Pianist's Movements

Development of a group of software tools designed to assist teachers to identify and analyze their students' patterns of movement in piano performance

Funding:

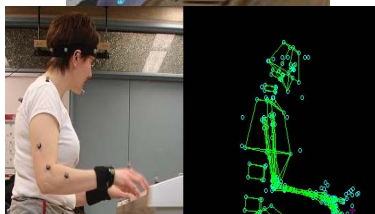
\$11,600 – Development of Interdisciplinary Initiatives, University of Ottawa
(December 2004–August 2005)

Researchers:

Pierre Payeur – Engineering and IT, University of Ottawa
Gilles Comeau – Music, University of Ottawa
Slivain Beriault – Graduate student, Engineering and IT, University of Ottawa
Martin Côté – Graduate Student, Engineering and IT, University of Ottawa

Publications and Communications:

- Payeur, P., Côté, M., & Comeau, G. (2006). Les technologies de l'imagerie au service de l'analyse du mouvement en pédagogie du piano. *Revue de recherche en éducation musicale*, 24, 61–87.
- Côté, M., Payeur, P., Comeau, G. (2006). Comparative study of adaptive image segmentation techniques for gesture analysis in unconstrained environments. *Proceedings of the IEEE International Workshop on Imaging Systems and Techniques*, 28–33.
- Payeur, P. (2005, June). *New trends in computer vision and artificial intelligence to assist in piano teaching and training*. Round table session. Canadian University Music Society Conference, London, ON.
- Payeur, P. & Comeau, G. (2005, February). *Modern sensing technologies for piano pedagogy and professional disease prevention*. University of Ottawa Research Showcase: Advanced Technologies for Better Health, Ottawa, ON.
- Payeur, P. (2005, October). *Computer vision technologies: An application for gesture monitoring and analysis in piano pedagogy*. Piano Pedagogy Research Laboratory Inauguration Symposium, Ottawa, ON.



3D Visualization of Piano Playing

A specialized motion capture system provides novice piano students with a 3D representation of a professional performance to help them visualize body posture at the piano

Funding:

\$19,620 – Interfaculty Collaborative Research Initiatives

Researchers:

Won-Sook Lee – Engineering and IT, University of Ottawa
Javier Mora – Graduate Student, Computer Sciences, University of Ottawa
Gilles Comeau – Music, University of Ottawa
Shervin Shirmohammadi – Engineering and IT, University of Ottawa
Abdulmotaleb El Saddik – Engineering and IT, University of Ottawa

Publication:

Mora, J., Lee, W. S., Comeau, G., Shirmohammadi, S., & El Saddik, A. (2006). Assisted piano pedagogy through 3D visualization of piano playing. *Proceedings of the IEEE International Workshop on Haptic Audio Visual Environment and their Applications*, Ottawa, ON.

Physical Aspects of Piano Playing

Measurement and Analysis of Piano Performance

Analysis and comparison of new technologies used to measure and evaluate the technical movements and expressive elements of pianistic interpretation

Researchers:

Jason Ray – Graduate Student, Music, University of Ottawa
Gilles Comeau – Music, University of Ottawa
Donald Russell – Engineering and Design, Carleton University



Analyzing Movement, Force, and Timing in Piano Performance

A sophisticated video-camera system is used to study the finger, hand, and arm movements of piano performers. Spatio-temporal and musical constraints in motor coordination during piano performance are also being studied

Funding:

\$10,000 – Development of Interdisciplinary Initiatives, University of Ottawa
(December 2006–August 2008)

Researchers:

Ramesh Balasubramaniam – Human Kinetics, University of Ottawa
Donald Russell – Engineering and Design, Carleton University
Gilles Comeau – Music, University of Ottawa
Runa Das – Psychology, Carleton University
Jason Ray – Graduate Student, Music, University of Ottawa
Julia Brook – Graduate Student, Music, University of Ottawa

Communications:

Balasubramaniam, R. (2006, March). *Perspectives from the study of human motor control*. Music and the Brain lecture series, University of Ottawa, ON.

Das, R. (2006, March). *Left behind: A literature review of left-hand piano performance*. University of Ottawa Lecture Series, Ottawa, ON.

Russell, D. & Balasubramaniam, R. (2005, October). *Understanding piano playing: Aspects of biomechanics, timing and sensorimotor coordination while interacting with a piano key*. Piano Pedagogy Research Laboratory Inauguration Symposium, Ottawa, ON.

Studying Piano Technique with Motion-Visualizing Software

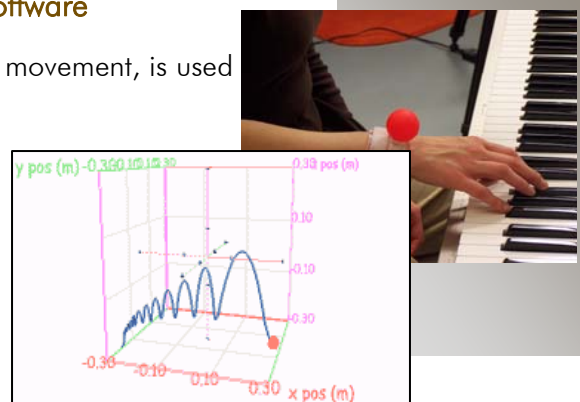
Motion-visualizing software, which graphically represents movement, is used to analyze technical movements at the piano

Researchers:

Gilles Comeau – Music, University of Ottawa
Donald Russell – Engineering and Design, Carleton University
Julia Brook – Graduate Student, Music, University of Ottawa
Christy Vant – Graduate Student, Engineering, Carleton University

Partners:

Alberti's Window, Watertown, MA.



Video-Mediated Learning

Video Monitoring in the Piano Studio

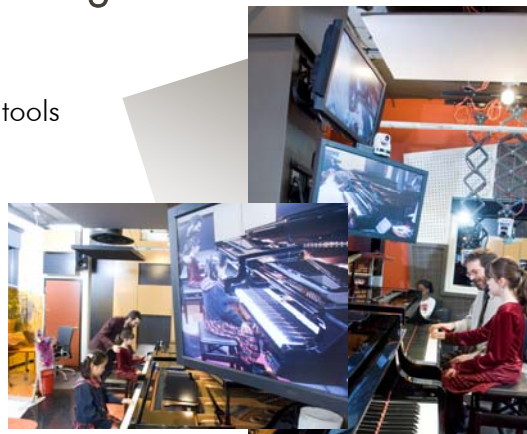
Examination of the efficient use of video cameras as teaching tools and research aids in the study of piano playing and learning

Researchers:

Martin Brooks – Computational Video, National Research Council of Canada
Gilles Comeau – Music, University of Ottawa
John Spence – Applications Technologies, Communications Research Centre of Canada

Communications:

- Comeau, G. (2006, March). *Canadian initiatives in music performance, research, and teaching*. Internet 2 Music Symposium, Indiana University.
- Comeau, G. (2005, June). *New teaching processes for innovative music learning and music teaching*. Round table session. Canadian University Music Society Conference, London, ON.
- Comeau, G., Brooks, M., & Spence, J. (2004, June). *Leveraging organizational and cultural diversity for increased learning outcome*. Society for Teaching and Learning in Higher Education (STLHE) Annual Conference, Ottawa, ON.
- Comeau, G., Brooks, M., & Spence, J. (2004, June). *Video and broadband video conference in professional development*. International Consortium for Educational Development (ICED) Biennial Conference, Ottawa, ON.
- Comeau, G. (2004, February). *New technologies and cognitive sciences: What have they to do with piano teaching?* ORMTA Lecture Series, Ottawa, ON.
- Comeau, G., Brooks, M., & Spence, J. (2004, February). *Visual and broadband-mediated learning with special emphasis on music education*. Teaching, Learning and Technologies Conference, McGraw-Hill Ryerson, Ottawa, ON.



Video Database as an Asynchronous Tool in Piano Pedagogy

Development of a set of technologies for video indexing that will be used in distance professional development for piano teachers

Researchers:

Julia Brook – Graduate Student, Music, University of Ottawa
Bruno Emond – Éducation et Sciences cognitives, Université du Québec en Outaouais
Martin Brooks – Computational Video, National Research Council of Canada
Gilles Comeau – Music, University of Ottawa

Publications and Communications:

- Emond, B., Barfurth, M., Comeau, G. & Brooks, M. (2006). Technologies d'annotation vidéo et leurs applications à la pédagogie du piano. *Revue de recherche en éducation musicale*, 24, 49-60.
- Brook, J. (2006, April). *Video reference database*. CRC – Virtuosi Video conference meeting with the Finnish TEKES delegation, University of Ottawa, ON.
- Brook, J. (2006, April). *Video reference database*. Music Graduate Symposium, University of Ottawa, ON.
- Emond, B. (2005, October). *VideoMidiSync: A research tool for piano pedagogy, and C-midi: Video-annotation of piano playing*. Piano Pedagogy Research Laboratory Inauguration Symposium, Ottawa, ON.



Video-Mediated Learning

Music Grid Project

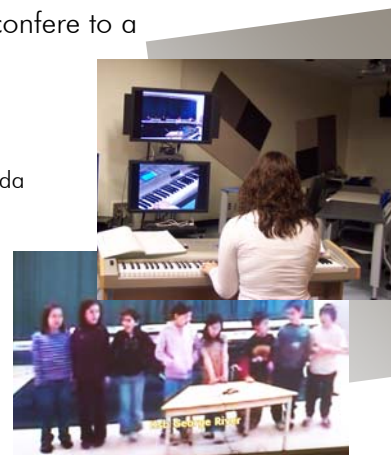
Participation in an intensive program that explores music teaching in the context of broadband videoconferencing. Keyboard lessons are provided via videoconference to a group of young children in Kangisualujuaq, Northern Quebec

Researchers:

Martin Brooks – Computational Video, National Research Council of Canada
John Spence – Applications Technologies, Communications Research Centre of Canada
Gilles Comeau – Music, University of Ottawa
Erin Parkes – Graduate Student, Music, University of Ottawa

Funding:

\$33,600 – Yamaha Canada (In-kind contribution)



Trans-Atlantic Piano Teaching: The Alliance of Technology and Pedagogy

Development of computer programs and software that will provide the essential technical interface and teaching tools for distance piano teaching

Funding:

\$40,000 – International Creative Research Awards, University of Ottawa
(Jan 2004–Dec 2006)

\$40,000 – Virtuosi - International Centre of Chamber Music, Finland
(Jan 2005–Dec 2006)

Researchers:

Philip Donner – Virtuosi – International Centre of Chamber Music, Finland
Gilles Comeau – Music, University of Ottawa
Bruno Emond – Éducation et Sciences cognitives, Université du Québec en Outaouais
Martin Brooks – Computational Video, National Research Council of Canada
Erin Parkes – Graduate Student, Music, University of Ottawa

Study of authentic distance learning environments using anthropologically derived research methods to analyze the responses of teachers and learners

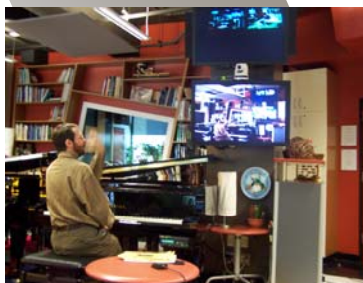
Researchers:

Philip Donner – Virtuosi – International Centre of Chamber Music, Finland
Elaine Keillor – Music, Carleton University
William Budai – Music, IUPUI Music Academy, Indiana University
Gilles Comeau – Music, University of Ottawa
Nisreen Jardaneh – Graduate Student, Music, University of Ottawa
Mélina Dalaire – Graduate Student, Music, University of Ottawa

Communications:

Jardaneh, N. (2006, April). *Use of audio-visual communication and piano teaching*. CRC – Virtuosi Video conference meeting with the Finnish TEKES delegation, University of Ottawa, ON.

Jardaneh, N. (2005, September). *Transatlantic piano teaching: Suzuki piano pedagogy*. Piano Pedagogy Research Laboratory Summer Research Symposium, Ottawa, ON.



Research Partners

Psychology Alain Desrochers (University of Ottawa) Isabelle Green-Demers (Université du Québec en Outaouais) Laurel Trainor (McMaster University)	Communication John Spence (Communications Research Centre)	Engineering Martin Brooks (National Research Council) Abdulmoteleb El Saddik (University of Ottawa) Monique Frize (University of Ottawa) WonSook Lee (University of Ottawa) Pierre Payeur (University of Ottawa) Matti Ruippo (Pirkanmaa Polytechnic, Finland) Donald Russell (Carleton University) Shervin Shirmohammadi (University of Ottawa)
Music Bill Budai (Indiana University) Philip Donner (Virtuosi, Finland) Francis Dubé (Université Laval) Elaine Keillor (Carleton University) Cynthia Floyd (University of Ottawa)	Neurosciences Ramesh Balasubramaniam (University of Ottawa)	
	Cognitive Sciences Bruno Emond (Université du Québec en Outaouais)	
	Health Sciences Ursula Stuber (Université Laval) Nadine Bressler (Epidemiology, Toronto)	

Student Involvement

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 Julia Brook
 Haodan Brown
 Mélina Dalaire
 Alicia Desjardins
 Nisreen Jardaneh
 YiFei Lui



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 Houman Khamseh-Zadeh
 Catherine Lemay
 Milada Medinić

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Pei Cao	Javier Mora
Martin Côté	Christy Vant
Christophe Herry	Mihir Sharma
Ali Khanafer	Arjun Yogeswaran
Hanieh Khamseh-Zadeh	Samira Zabihi

Alumni

Ann Babin
 Rosemary Harden
 Line Morais
 Jaclynne Smith

Research Funding

- Canada Foundation for Innovation (CFI)
- Ontario Innovation Trust (OIT)
- Virtuosi– International Centre of Chamber Music of Finland
- University of Ottawa
 - International Creative Research Awards
 - Interfaculty Collaborative Research Initiatives Fund
 - Development of Interdisciplinary Initiatives
 - Senate Committee on Teaching
 - Support Fund for Grant Recipients
 - Faculty of Arts, Associate Dean's Fund
 - Faculty of Arts for CFI Project
 - Central Administration for CFI Project



Total Funding (since 2002)

\$1,848,203

**External Funding
\$1,557,471**

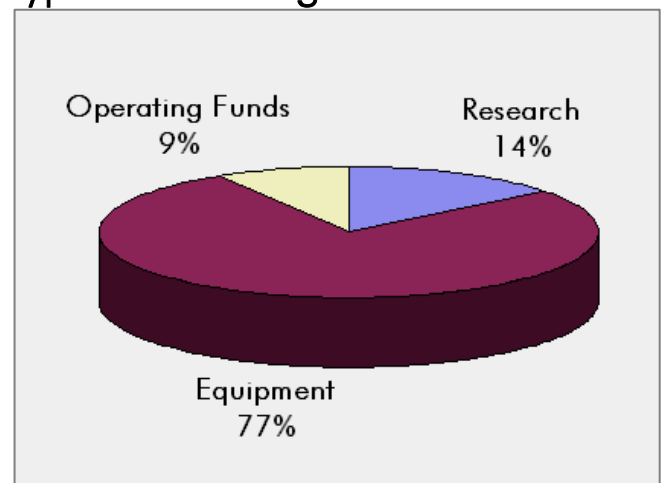
**Internal Funding
\$290,732**

- Private Sector
 - Yamaha Canada
 - Ottawa Pianos
 - Specs Audio
 - Librarie du soleil
 - Groupe Archambault inc.
 - Leading Note
 - Various music publishers (*Alfred, Mel Bay, Karl Fischer, Hal Leonard*)

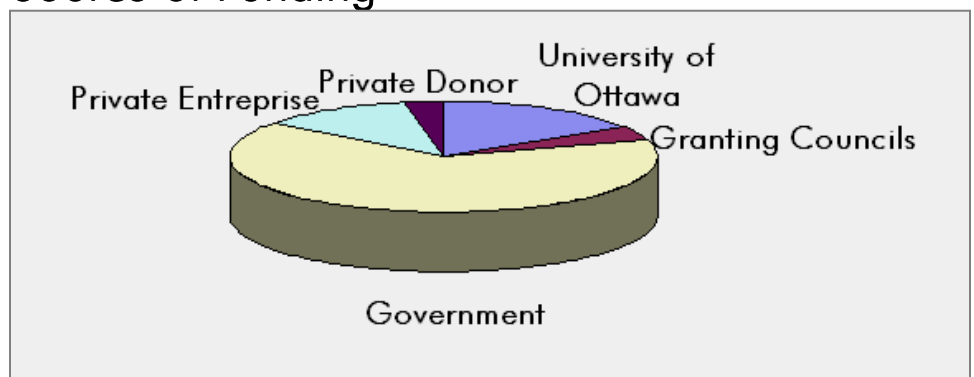
• Donors

Ann Southam
Donald Himes

Type of Funding



Source of Funding



Media Coverage

Newspapers

LE DEVOIR

Le pourquoi des fausses notes
March 2006

Un clavier bien mesuré
March 2006

LeDroit

Inuits au diapason d'Ottawa
January 2005

OTTAWA CITIZEN

Piano: Thermal imaging cameras
December 2005

Young pianist loves his lesson, but really hates to practise
December 2005

Professors tune in to musicians' pain: Carpal tunnel syndrome, other conditions could be eased using new imaging system
February 2005

Magazines & Newsletters

TIME

The finger fixer: Gilles Comeau
June 2005

U University Affairs Affaires universitaires

A high note for piano research
December 2005

Research Perspectives

Bridging the gap: Science serving music
Winter 2003

LABBUSINESS

Hitting the right notes: New scientific lab keys on piano pedagogy
Summer 2006

TABARET

Harmony in the laboratory
Spring 2005

gaze tte

Teaching piano playing in Kangiqsualujjuaq
January 2004.

The intelligent piano
December 2002

Television & Radio



Notes on the future - The Sunday Edition – CBC Radio
ONE
January 2006

Piano revolution - The National – CBC News
October 2005

Entretien avec Gilles Comeau - Bernier et Cie –
CBOF-FM
October 2005



Les mystères de l'apprentissage du piano
– Via TVA
February 2006



Piano "Keys" - Tech Now – CTV News
October 2005

Layout: Nisreen Jardaneh & Milada Medinić
Concept and Design: Tamar Dubuc & Nisreen Jardaneh