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**Contact:** Dr. Claude Fortier or Kathryn Savage

**State Of The Art Acoustik Inc.** specializes in Architectural Acoustic design, Audio-Visual/Multi-Media system design, Mechanical (HVAC) noise control and Environmental noise control. The firm is a member of the National Council of Acoustical Consultants, one of only four in Canada.

Expertise backed by experience is provided to our clients for various types of rooms including auditoriums, exhibition, justice, theatre and reconfigurable spaces. In the design of facilities for public assembly, we concentrate on providing high speech intelligibility combined with excellent acoustics. As mechanical noise reduces intelligibility, we can provide a detailed computer analysis of this aspect, as well as detailed three-dimensional acoustic modeling of the physical space using EASE, BOSE Modeler and our own custom software.

Our specialized knowledge led us to be chosen to collaborate on numerous multi-media projects such as the North Grenville Community Complex, the Ottawa Heart Institute, Nortel Networks, and the various churches. We believe in driving architectural quality while maintaining cost control.

**State Of The Art Acoustik Inc.** has made an international reputation in the design of audio and video studio facilities. This is the most demanding acoustic and audio-visual environment, where the latest technologies in AV equipment and systems were first introduced. This experience allows us to develop familiarity with the technology which is applied in various environments and thus assures our clients of seamless technology integration into their projects.

We have designed mix theatres, one of which was specifically designed to do the IMAX sound track for the film “At The Max” with the Rolling Stones, and subsequently used to produce “Super Speedway” with Mario Andretti. We have designed a full THX approved digital mix theatre, one of very few in the world.

# Methodology

**Audio-visual design**

We have extensive knowledge with the field of AV design in the preparation of tender packages for Multi-Media presentations and broadcast studios. AV designs include full tender packages, detailed system drawings, product descriptions, quality specifications and commissioning. These allow the competitive tendering of AV equipment and provide the client with full documentation and system manuals. The client can define their needs for system maintenance, performance and scalability. Full documentation gives the control of performance to the client and allows adjustment and expansion of the systems to be accomplished without the participation of the original contractor.

**Architectural Acoustics**

The completion of the design for diverse facilities is an interactive process. We create our first models based on the Architect's initial concept. From the initial models, we then make recommendations to adapt the geometry and finish materials to optimize the acoustic behaviors. Often, the plane surfaces have to be broken up to provide adequate diffusion of sound, or angled to direct reflection to diffusive surfaces. The finish materials are chosen based on both the designer's vision and the acoustic requirements. Sound isolation is reviewed with the architect to ensure that there are no conflicts in space due to transmitted noise, and that speech privacy is provided where identified by the client.

**Noise control**

Our acoustic design services are supported by a complete range of test and measurement equipment, including both conventional and computer based analysis and modeling systems. We undertake, in conjunction with the architectural professional, the development of programs, plans and specifications with the aim of enhancing the acoustic performance of built space. This includes satisfying requirements of speech intelligibility, acoustic privacy, restriction of unwanted sound transmission and the achievement of overall auditory comfort. Our company has developed a particular expertise in recording studio design. Close collaboration with industry and research organizations have allowed us to lead the consulting industry in this highly demanding acoustical field. We pride ourselves in carefully integrating acoustical solutions into the architectural aesthetic of the spaces we help design.

**Research**

We have developed a database of thousands of materials and their detailed acoustic characteristics to aid in our acoustic design for reverberance, diffusion and speech intelligibility. As a science based practice, we work closely with the National Research Council of Canada to benefit from their experimental work in the field of acoustics.

Design Professionals

**Dr. Claude Fortier** President, State Of The Art Acoustik Inc.

**Ph.D.** (Particle Physics) University of Ottawa, l984
Research performed at Lawrence Berkeley Laboratory,
Berkeley, California, and at Fermilab National Accelerator Lab,
Batavia Illinois

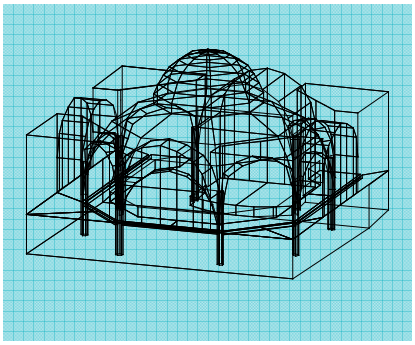
Dr. Fortier began his career in acoustics and audio-visual design in the research and design of loudspeakers. He was extensively involved in the Audio Engineering Society, presenting many papers on loudspeaker research and chairing technical sessions at North American conventions of the society. His achievements in this area included the design of a loudspeaker system which was awarded the Class A rating, the highest Level awarded by Stereophile magazine. Dr. Fortier is the only Canadian designer to ever achieve this result. He was also awarded a patent for an electronic loudspeaker crossover filter system that is currently in use in products all over the world.

Dr. Fortier was also the founding president of the Canadian Audio Research Consortium, an industry-NRC research consortium inaugurated by the Minister of Science and Technology. The consortium was formed for the purpose of developing active loudspeakers and interactive audio room environments using digital signal processing. He was also elected its technical director and presented a paper to the Canadian Acoustical Association about speaker room response improvements from the CARC/DSP technology. This area of investigation led into architectural acoustics and the interactions of acoustic and electroacoustic behaviors in built space.

Dr. Fortier extended his interest in electro-acoustic systems into the area of multimedia systems design, and has designed and supervised the installation of several highly complex AV systems incorporating audio and video tele-conferencing, multi-media presentations and complete room control systems design, for clients such as Nortel, Department of National Defense, La Cite Collegiale, JDS Uniphase, the Department of Justice and others.

Dr. Fortier taught a graduate course in acoustic measurement for the McGill University seminar courses at the Banff School of Fine Arts and is qualified as an expert witness in the field of acoustics by the Supreme Court of Ontario and the Ontario Municipal Board. He is uniquely qualified in acoustics, noise control and audio-visual design, combining a broad based theoretical background in physics, acoustics and electronics with experience in every aspect of practice as an acoustical consultant.

**Professional Memberships: CAA, ASA, AES, INCE, NCAC**



**Kathryn Savage** Vice-President, State Of The Art Acoustik Inc.

**B.Arch**. Graduate of the Faculty of Architecture of Carleton University with High Distinction (1986) summa cum laude.

Undergraduate thesis on the architectural aspects of theatre

Participant at the NAB, INFOCOMM and AES meetings

Two years study in the field of Interior Design, University of Manitoba, 1976-78 (Dean's Honor List).

A co-founder of the company in 1986, Ms Savage has participated in the design of every major project undertaken by the company in that time. She is an expert in Architectural Acoustics and especially in interior acoustic design for critical listening and performing spaces.

Ms. Savage provided the acoustic design for the Technicolor Creative Services studio headquarters in Toronto, the largest privately owned studio complex in North America at the time. This design included interior acoustics and sound isolation for eight recording suites. These suites included two mix theatres, one equipped with a fifty seat audience area. The large mix theatre is the only facility in North America to be approved to mix both IMAX and THX sound tracks. The other mix theatre was designed for use by The Rolling Stones for the mixing of their “At the Max” Imax film.

As well, Ms. Savage completed the acoustic design of “The Music Room” in Halifax that was featured in Canadian Architect, September 2004. This highly rated new performance space for the Scotia Festival provides a venue for intimate recitals and recording by Canada’s finest musicians.

Ms. Savage is a frequent speaker on the topic of architectural acoustics to students of the Faculty of Architecture at Carleton University, Dalhousie University, and for meetings of the Audio Engineering Society both locally and internationally. She has been invited to address society meetings in Seattle, Vancouver and New York.

As one of the very few architecturally trained professionals working in the field of acoustic and audio-visual design, Ms. Savage contributes an extensive knowledge of building practice and architectural aesthetic sensitivity to each acoustic installation.

**Professional Memberships: AES, NCAC**

# Design Projects

**Queens School of Business, 2009**
Design with The Ventin Group
Audio Visual design of a large expansion to a heritage school. System includes a future-ready design for high-definition video and classroom capture for web-casting of lessons.

**Kingston Regional Sports and Entertainment Centre, 2007**
Design with EllisDon Project Management
Environmental noise control for a new sports arena for the City of Kingston. Studies include the impact of mechanical equipment and generator, as well as indoor concert noise to the surrounding residential and commercial neighbourhood. State of the Art Acoustik also completed the interior acoustic design.

**McGill University, Schulich School of Music, 2006**
Prime Consultant: State of the Art Acoustik Inc.
Interior acoustic design, mechanical noise control and audio-visual design of six studio spaces for a high-profile Centre for Interdisciplinary Research in Music Media and Technology. High requirements to meet specific reverberation times and specific interior acoustic quality for playing, recording and editing of music media. Custom design of AV installations to allow total flexibility in the usage of each space.

**Algonquin College, Department of Nursing, Centre for Excellence, Video Conference Classroom, 2006**
Design with GRC Architects
Audio-Visual design, interior acoustic design, sound isolation planning and mechanical noise control for a state of the art video conferencing classroom that will connect to the eighteen hospitals on the Eastern Ontario Telehealth Network. Specific design of room absorption, wall partitions and mechanical layouts to control background noise and provide an optimum video conferencing environment. Advanced AV system design to provide high quality audio and video transmission for favorable conferencing conditions.

**St. Thomas University, McCain Hall, New Brunswick, 2006**
Design with Fellows & Co. Ltd.
Acoustic design and mechanical noise control for a Music Recital Hall and 400-seat Lecture Theatre. Emphasis placed on creating a critical music listening environment in the Recital Hall, whereas the Lecture Theatre was customized for both presentations and music listening.

Algonquin College, V-C Classroom

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**North Grenville Community Centre & Arena, 2005**
Design with Edmundson Matthews Architects
We provided the audio-visual, lighting and acoustic design for this multi-purpose facility that accommodates two sports arenas, a theatre, municipal offices and a community centre. Control of the HVAC noise to maintain a quiet ambiance was fully considered, as was satisfying the concerns of nearby residents.


University of Ottawa, Piano Lab

**University of Ottawa, Piano Pedagogy Lab, 2005**
Acoustic, mechanical noise control and audio-visual design for an extensive renovation to one of Canada's leading music schools. Includes distance learning capabilities, audio and video recording and the first fire-wire network on campus. State of the Art was also the Project Manager for the renovation and oversaw all sub consultants, including interior design and mechanical and electrical engineering.

**University of Ottawa, Desmarais Building, 2005**
Design with Moriyama Teshima Architects
The acoustic design of a multi-disciplinary studies building that includes large lecture theatres on the ground floor, seminar and multi-media rooms above and the lecture theatres for the MBA Program.

**Greenboro Community Centre & South Central District Library, 2004**
Design with Shoalts & Zaback Architects Ltd.
Sound Isolation, Interior Acoustic design, and Mechanical & Environmental Noise control for a new library and expansion of an existing Community Centre to be constructed by the amalgamated City of Ottawa. The new district library is approximately 3,000 square metres and includes design features such as adaptable gathering spaces and a self checkout system, that increases efficiency and promotes access and use.

**Ottawa Heart Institute, Ottawa, 2004**
Design with LOEW Architects
The audio-visual and acoustic design of a public education facility that includes large lecture theatres linked by video to operating rooms and intra patient endoscopy to educate doctors, medical students, staff and patients on operating technique and procedures as well as post-op care for cardiac surgery, cardiology and other medical specialties.

**National Archives of Canada, Ottawa 2002**
Prime Consultant: State of the Art Acoustik Inc.
A studio design for Canada's sound archivist, designed to ITU standards for reverberation to allow critical listening of archived material in all formats.

**La Cité collégiale, amphitheater, Ottawa, 2002**
Design with GRC Architects
A dividable room for multi-media presentations. Several scenarios can be accommodated, from a full-sized amphitheater to multiple 70-seat classrooms. This consisted of a very large control room to allow link-ups to other colleges and universities for distance learning overseas. Presentations, broadcast, TV network connections are being provided, with the anticipation of complete operation in digital video, HDTV format. We provided acoustical and AV design services for this prestigious project, which is actually a renovation of a chapel, retained in the building of the college's new campus near the Airport Parkway.


Music Room, Scotia Festival

**The Music Room, Scotia Festival, Halifax, 2002**
Design with Niall Savage Architect
This well regarded small hall has been received extremely well in the performing arts community. We recently presented a paper on its acoustic development at the Architecture/Music/Acoustics conference in Toronto in 2006.

**Carleton University, Azrieli Pavilion, Master's of Architecture and Lecture Complex, Ottawa, 2002**
Design with Moriyama & Teshima and Barry Hobin Architects
A new multi-auditorium facility incorporating the Master's of Architecture Program. Our services included the design for AV incorporating the latest technical teaching systems.

**Algonquin College Police Justice Training Facility, Ottawa, 2000**
Design with GRC Architects
Design of a gun range to meet MOE standards, including verification testing. Made recommendations and used modeling techniques to calculate the acoustic integrity required to meet NC and STC requirements on the project. Performed HVAC calculations and designs for silencers, diffusers and other system components. Worked on the project throughout the design and construction phase.

**Land Forces College, Fort Frontenac, Courcelles and Normandy Halls, Kingston, 1999**
Prime Consultant: Murray & Murray Architects
State of the Art undertook the acoustic design for the two major lecture halls and attendant rooms in this historic renovation, and designed the complex, multi-functional AV system that is required for the display and presentation of multiple signal types in battle simulations.
A transformation of an industrial building into a new digital radio station facility, including broadcast studios, control rooms and offices.

# Partial Client List

**Architectural Acoustic Designs:**
Bell Canada Conference Floor
Bell Canada Presidential and Executive Offices Floor
Canada Council Headquarters
Canadian Parliament, House of Commons, Railway Committee Chamber, Ottawa
Dept. of Defense Military Stores Building
Economic Development Corporation
Foreign Affairs Auditorium, Minister and Main Boardrooms
European Union
Gloucester City Hall
Governor General, Rideau Hall, Tent Room & Ballroom
Highway 407 Control Centre
Ministry of Natural Resources
Museum of Civilization
Ottawa Civic Hospital, Heart Institute
Queen's University, Dunning Auditorium
Regional Municipality of Ottawa Carleton, Festival Plaza
Rogers Cablevision Studios, Ottawa and Control Centre, Toronto
University of Ottawa DeCelles Auditoria

**Professional recording studios:**
Anchor Recording, Kingston, Jamaica
Louder Music, Toronto
Pirate Radio and Television Studio, Toronto
Radio Québec's New Audio Production Facilities
Solar Audio, Halifax
Sound Venture Productions, Ottawa
Sounds Interchange, Toronto
Technicolor Creative Services, Toronto
Twelfth Root Digital Productions Studio, Ottawa
TV Ontario's Audio Mixing Room, Toronto

**Video Production facilities:**
Cable Parliamentary Channel Broadcast Headquarters
CTV-CJOH Main TV studio, Ottawa
TV Ontario's Daytime Production Facility, Toronto
TV Ontario La Chaine Française

**Music facilities:**
Cartier Square Military Bldg. Band Studio, Ottawa
Central Band Studios and Rehearsal Building, CFB Uplands
RCMP Band Studio, Ottawa
Vimy Band, CFB Trenton

**Theatrical facilities:**
Algonquin Media Arts Building, Ottawa
Ashbury College theatre, Ottawa
La Nouvelle Scène, Ottawa
Ottawa Little Theatre, Ottawa
Scotia Festival, Performance Hall, Halifax

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# Testing Capabilities

Airborne Sound Transmission
Audio Visual bandwidth and image testing
Distortion Measurement
Energy Time Curves
Frequency Domain Analysis
Frequency Response Measurement
Gated Tone-burst Response
Impulse Response and Fast Fourier Transform (FFT)
Initial Time Delay Gap
Maximum Length Sequence (MLS) Measurements
Noise Criteria (NC, RC) Level Determination
Noise Dose Exposure
Reverberation Time, Digital and Analog Measurements
Phase Response and Group Delay
Polar Response
Sound Absorption Measurement
Sound and Noise Level Analysis and LEQ
Sound Distribution Measurement
Speech Transmission Index, STI and RASTI
Time Domain Analysis
Transmission Loss & STC
Vibration Measurements, Accel., Vel., Displ.
Waveform Studies
3D Waterfall Curves
1/24, 1/12, 1/3 and full Octave Analysis

All measurements are performed with fully calibrated Brüel & Kjær, Larson Davis, MLSSA, Extron and other test equipment, in conjunction with computer based equipment as required.
Should special conditions require it, other more highly specialized measurements can be provided by special arrangement.

**STATE OF THE ART ACOUSTIK INC.** maintains an office in Ottawa with a staff of three and contract employees as required. **State of the Art Acoustik Inc.** is a wholly Canadian owned company. Our consulting services may be provided in either of Canada's two official languages.

State of the Art Acoustik has the following hourly rates for 2009:

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| **Design Principals:** | $130.00 per hour |
| **Design Professionals:** | $125.00 per hour |

# References

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Additional references will be supplied upon request.

*"Acoustical consultants are drawn from a wide array of disciplines including engineering, physics and architecture, industrial hygiene and performing arts, particularly music and entertainment.....they are designers, problem solvers, advisors, mediators and inventors practicing across a range of specialties"*

National Council of
Acoustical Consultants