

Nicolas BOUILLOT

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EMPLOYMENT

<i>Current</i> FEB 2017	Research codirector SOCIETY FOR ARTS AND TECHNOLOGY, Montreal, Metalab
<i>Current</i> JAN 2012	Research associate SOCIETY FOR ARTS AND TECHNOLOGY, Montreal, Metalab
FEB 2012 JAN 2010	Research associate & post-doctoral researcher MCGILL UNIVERSITY, Montreal, Centre for Interdisciplinary Research in Music Media and Technology (CIRMMT) Design and development of a streaming server delivering synchronized multichannel content to the web; participation to development and presentation of biannual demonstrations to <i>Canada's advanced research and innovation network</i> (CANARIE); network protocol tuning and monitoring for long distance transmission; organization and completion of experiment targeting automated audio analysis for musical gesture recognition; design and development of an audio/score alignment software; development of interactive web application; student supervision; scientific communication.
DEC 2009 SEPT 2007	Post-doctoral researcher MCGILL UNIVERSITY, Montreal, Centre for Intelligent Machines (CIM) Design and development of a low-latency audio streaming protocol; design and development of a packet rate congestion avoidance algorithm; architectural design and implementation of outdoor mobile multiuser applications; objective measure of streaming engines Quality of user Experience (QoE); live and simulated network performance evaluation; software integration for mobile devices; comparison of localization technologies accuracy; design and development of a mobile augmented guitar; demonstration of mobile interactive applications; scientific communication.
AUG 2007 SEPT 2005	Lecturer CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS, Paris, Centre d'étude et recherche en informatique et communication (CEDRIC) Design and development of a consistency service for a mobile multiplayer game; design and development of a distributed software enabling remote & synchronized musical interaction; design and completion of user experiment; public demonstrations of a multi-location distributed musical interaction system; university level course writing and teaching; student supervision; scientific communication.

AUG 2005 | Research Fellow
SEPT 2002 | CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS, Paris,
Centre d'étude et recherche en informatique et communication
(CEDRIC)
Design and development of a distributed musical interaction system; design of consistency models for distributed interactive application; performance evaluation of circular buffer in streaming application; design of consistency integration into multiplayer distributed games; organization and completion of a public demonstration at the *Institut de Recherche et Coordination Acoustique/Musique* (IRCAM); course writing and teaching; student supervision; scientific communication.

EDUCATION

- NOV 2006 | Ph.D. in COMPUTER SCIENCE, obtained with distinction
CONSERVATOIRE NATIONAL DES ARTS ET MÉTIERS,
Paris
Thesis: “Consistency in distributed interactive multimedia applications, from distributed musical interaction to online multiplayer games”
Advisor: Eric Gressier-Soudan
Reporters: Jeremy R. Cooperstock, Isabelle Demeure, Michel Raynal
Assessors: Sophie Chabridon, Gérard Florin, Cécile Leprado, Stéphane Natkin, Jean Vareille
- AUG 2002 | D.E.A. (equivalent to a Master degree) in COMPUTER SCIENCE, obtained with distinction
UNIVERSITÉ PIERRE ET MARIE CURIE - PARIS VI
Thesis: “The distributed orchestra: system and network constraints evaluation and prototyping”
Advisor: Eric Gressier-Soudan
- AUG 2001 | Maîtrise (4th year university degree) in COMPUTER SCIENCE, obtained with distinction
UNIVERSITÉ DENIS DIDEROT – PARIS VII
Thesis: “Implementing Consensus over Failure Detectors”
Advisors: Carole Delporte and Hugues Fauconier
- AUG 2000 | Licence (3rd year university degree) in COMPUTER SCIENCE, obtained with distinction
UNIVERSITÉ DENIS DIDEROT – PARIS VII
- AUG 1999 | D.E.U.G. (2nd year university degree) in MATHEMATICS, PHYSICS AND COMPUTER SCIENCE, obtained with distinction
at UNIVERSITÉ DENIS DIDEROT – PARIS VII, Paris

Journals

- [1] **Nicolas Bouillot**. Type mosaicing with consultables and delegates. *Overload Journal*, (130), 2015. 5 pages.
- [2] **Nicolas Bouillot**. Make and forward consultables and delegates. *Overload Journal*, (127), 2015. 5 pages.
- [3] Adriana Olmos, **Nicolas Bouillot**, Trevor Knight, Nordhal Mabire, Josh Redel, and Jeremy R. Cooperstock. A high-fidelity orchestra simulator for individual musicians' practice. *Computer Music Journal*, 36(2), 2012. 18 pages.
- [4] Romain Pellerin, **Nicolas Bouillot**, Tatiana Pietkiewicz, Mike Wozniowski, Zack Settel, Eric Gressier-Soudan, and Jeremy R. Cooperstock. Soundpark: Exploring ubiquitous computing through a mixed reality multi-player game experiment. *Studia Informatica Universalis journal, special issue: bests papers of the conference NOTERE 2009*, 8(3), 2010. 21 pages.
- [5] **Nicolas Bouillot**, Elizabeth Cohen, Jeremy R. Cooperstock, Andreas Floros, Nuno Fonseca, Richard Foss, Michael Goodman, John Grant, Kevin Gross, Steven Harris, Brent Harshbarger, Joffrey Heyraud, Lars Jonsson, John Narus, Michael Page, Tom Snook, Atau Tanaka, Justin Trieger, and Umberto Zanghieri. AES White Paper AESTD1003V1: Best Practices in Network Audio. *Journal of the Audio Engineering Society*, 57(9), September 2009. 13 pages.
- [6] **Nicolas Bouillot** and Eric Gressier-Soudan. Consistency models for distributed interactive multimedia applications. *ACM Operating Systems Review*, 38(4), October 2004. 13 pages.
- [7] **Nicolas Bouillot**. The auditory consistency in distributed music performance: a conductor based synchronization. *Info/com Sciences for Decision Making (ISDM)*, 8(4), February 2004. 8 pages.

International conferences

- [1] **Nicolas Bouillot**, Zack Settel, and Michal Seta. SATIE: a live and scalable 3d audio scene rendering environment for large multi-channel loudspeaker configurations. In *New Interfaces for Musical Expression (NIME'17)*, Copenhagen, Denmark, 2017.
- [2] Zack Settel, **Nicolas Bouillot**, and Michal Seta. Volumetric approach to sound design and composition using SATIE: a high-density 3D audio scene rendering environment for large multi-channel loudspeaker configurations. In *15th Biennial Symposium on Arts and Technology*, Ammerman Center for Arts and Technology at Connecticut College, New London, February 2016. 8 pages.
- [3] Trevor Knight, **Nicolas Bouillot**, and Jeremy R. Cooperstock. Visualization feedback for musical ensemble practice: A case study on phrase articulation and dynamics. In *SPIE Conference on Visualization and Data Analysis (VDA)*, San Francisco, January 2012. 8 pages.

- [4] **Nicolas Bouillot**, Marcio Tomiyoshi, and Jeremy R. Cooperstock. Extended user control over multichannel content delivered over the web. In *AES 44th Conference on Audio Networking*, San Diego, USA, November 2011. 5 pages.
- [5] Adriana Olmos, Mathieu Brulé, **Nicolas Bouillot**, Mitchel Benovoy, Jeff Blum, Haijian Sun, Niels Windfeld Lund, and Jeremy R. Cooperstock. Exploring the role of latency and orchestra placement on the networked performance of a distributed opera. In *12th Annual International Workshop on Presence*, Los Angeles, November 2009. 9 pages.
- [6] **Nicolas Bouillot**, Mathieu Brulé, and J.R. Cooperstock. Performance metrics for network audio systems: methodology and comparison. In *127th Audio Engineering Society convention*, New York, October 2009. 9 pages.
- [7] Zack Settel, M. Wozniowski, **Nicolas Bouillot**, and Jeremy R. Cooperstock. Audio graffiti: A location based audio-tagging and remixing environment. In *International Computer Music Conference (ICMC)*, Montreal, August 2009. 4 pages.
- [8] Romain Pellerin, **Nicolas Bouillot**, Tatiana Pietkiewicz, Mike Wozniowski, Zack Settel, Eric Gressier-Soudan, and Jeremy R. Cooperstock. Soundpark: Towards highly collaborative game support in a ubiquitous computing architecture. In Springer-Verlag Lecture Notes in Computer Science, editor, *9th IFIP international conference on Distributed Applications and Interoperable Systems (DAIS'09)*, Lisbon, Portugal, June 2009. 14 pages.
- [9] **Nicolas Bouillot** and Jeremy R. Cooperstock. Challenges and performance of high-fidelity audio streaming for interactive performances. In *New Interfaces for Musical Expression (NIME'09)*, Pittsburgh, 2009. 6 pages.
- [10] **Nicolas Bouillot**, Mike Wozniowski, Zack Settel, and Jeremy R. Cooperstock. A mobile wireless augmented guitar. In *8th International Conference on New Interfaces for Musical Expression (NIME'08)*, Genoa, Italy, June 2008. 4 pages.
- [11] Mike Wozniowski, **Nicolas Bouillot**, Zack Settel, and Jeremy R. Cooperstock. Large-scale mobile audio environments for collaborative musical interaction. In *8th International Conference on New Interfaces for Musical Expression (NIME'08)*, Genoa, Italy, June 2008. 6 pages.
- [12] Mike Wozniowski, **Nicolas Bouillot**, Zack Settel, and Jeremy R. Cooperstock. An augmented reality framework for wireless mobile performance. In *5th International Mobile Music Workshop*, Vienna, Austria, May 2008. 2 pages.
- [13] **Nicolas Bouillot**. nJam user experiments: enabling remote musical interaction from milliseconds to seconds. In *New Interfaces for Musical Expression (NIME'07)*, New York, June 2007. 6 pages.
- [14] **Nicolas Bouillot**. Fast event ordering and perceptive consistency in time sensitive distributed multiplayer games. In *7th International Conference on Computer Games (CGAMES'2005)*, Angoulême, France, November 2005. Q. Mehdi et N. Gough. 7 pages.
- [15] Julien Cordry, **Nicolas Bouillot**, and Samia Bouzefrane. Performing real-time scheduling in an interactive audio-streaming application. In *ICEIS'05, International Conference on Enterprise Information Systems*, Miami, May 2005. 10 pages.
- [16] Hans-Nikolas Locher, **Nicolas Bouillot**, Erwan Becquet, François Dechelle, and Eric Gressier-Soudan. Monitoring the distributed virtual orchestra with a CORBA based object oriented real-time data distribution service. In Springer-Verlag Lecture Notes in

Computer Science, editor, *DOA'03, International Symposium on Distributed Object Application*, Catania, Italy, November 2003. 12 pages.

Book

- [1] **Nicolas Bouillot**. *Cohérence et Applications Multimédia Interactives Distribuées: du concert réparti sur Internet aux jeux multi-joueurs en réseau*. Éditions universitaires européennes edition, 2010. ISBN: 978-6131511851. 220 pages.

Patent

- [1] Luc Courchesne, Bruno Roy, Emmanuel Durand, Mike Wozniowski, and **Nicolas Bouillot**. Method, system and apparatus for capture-based immersive telepresence in virtual environment, March 2015. WO Patent App. PCT/CA2014/050,888.

Workshop

- [1] **Nicolas Bouillot** and Michal Seta. Building distributed graph of live audio/video/data streaming with switcher/shmdata, puredata and your application. Linux Audio Conference, IEM, Graz, Austria, May 2013. (2 hours).

Conferences in French

- [1] Romain Pellerin, **Nicolas Bouillot**, Tatiana Pietkiewicz, Mike Wozniowski, Zack Settel, and Eric Gressier-Soudan. Soundpark: Exploring ubiquitous computing through a mixed reality multi-player game experiment. In *9^{ème} Conférence Internationale sur les Nouvelles Technologies de la Répartition, (NOTERE'09)*, Montreal, Canada, July 2009. 7 pages.
- [2] Julien Cordry, **Nicolas Bouillot**, and Samia Bouzefrane. Bossa et le concert virtuel réparti, intégration et paramétrage souple d'une politique d'ordonnancement spécifique pour une application multimédia distribuée. In *RTS'05, 13th International conference on Real time Systems*, Paris, April 2005. 26 pages.
- [3] **Nicolas Bouillot**. Le modèle de cohérence perceptive pour les applications multimedia interactive et distribuées. In *CDUR'05, Journées Francophones sur la cohérence des Données en Univers Réparti*, Paris, November 2005. 6 pages.
- [4] **Nicolas Bouillot**. Un algorithme d'auto synchronisation distribuée de flux audio dans le concert virtuel réparti. In *CFSE 3, Conférence Française sur les Systèmes d'Exploitation*, La Colle sur Loup, France, October 2003. 12 pages.
- [5] **Nicolas Bouillot**. Une architecture pour le jeu musical réparti avec jMax et RTP. In *MANifestation des JEunes Chercheurs en Sciences et Technologies de l'Information et de la Communication (MAJECSTIC'03)*, Marseilles, France, October 2003. 6 pages.

Other research papers

- [1] **Nicolas Bouillot**. *La cohérence dans les applications multimédia interactives : du concert réparti sur Internet aux jeux multi-joueurs en réseau*. PhD thesis, Conservatoire National des Arts et Métiers (CNAM), Paris, November 2006. 192 pages.
- [2] Samundeswary Ramachandra and **Nicolas Bouillot**. Diffusion multicast et cache multimédia pour le concert virtuel réparti : Expérimentations avec pastry/splitstream/past. Technical report, CEDRIC-CNAM, June 2006. 7 pages.
- [3] Remy Bonafous, **Nicolas Bouillot**, Hans-Nicolas Locher, Joël Berthelin, François Déchelle, and Éric Gressier-Soudan. The distributed virtual orchestra project. Technical report, CEDRIC-CNAM, 2003. 14 pages.
- [4] **Nicolas Bouillot**. Le transport du son produit en temps réel sur les réseaux best effort. Technical report, CEDRIC-CNAM, 2003. 37 pages.

Talks & Invited talks

- [1] François Ubald Brien, Emmanuel Durrand, Jérémie Soria, Michal Seta, and **Nicolas Bouillot**. In-situ editing for domes. Immersion Experience (IX) symposium, Montreal, Canada, June 2017. (20 minutes).
- [2] **Nicolas Bouillot**, Zack Settel, and Michal Seta. SATIE: dense real-time audio scene rendering environment with definable protocols and arbitrary audio display configuration. Immersion Experience (IX) symposium, Montreal, Canada, February 2016. (60 minutes).
- [3] **Nicolas Bouillot**. Waterfall music. Network Music Festival, Birmingham, United Kingdom, February 2013. (20 minutes).
- [4] **Nicolas Bouillot**. Musical interaction among a group of distributed participants. Colloque Informatique cognitive et sa place dans l'industrie, Montreal, June 2011. (45 minutes).
- [5] **Nicolas Bouillot**. Perceptive consistency for group collaboration among distributed participants. School seminar at Queen's University, Kingston, Canada, April 2011. (60 minutes).
- [6] **Nicolas Bouillot**. An overview of digital musical stand, score following, spatialization and music information retrieval for distributed musical education. Open Orchestra Seminary, Montreal, January 2010. (30 minutes).
- [7] Jeremy R. Cooperstock, **Nicolas Bouillot**, Mike Wozniowski, and Zack Settel. Multimodal streaming and distributed audio interaction. High Quality Audio over Networks Summit, (ANET II), Banff, Canada, April 2008. (60 minutes).
- [8] **Nicolas Bouillot**, Hans-Nikolas Locher, and Eric Gressier-Soudan. The distributed virtual concert. First European seminar on Free Software for Multimedia Streaming on Internet (FSMSI'04), Paris, June 2004. (45 minutes).
- [9] **Nicolas Bouillot** and Hans-Nikolas Locher. Le concert virtuel réparti sur l'Internet: vers une approche composant. Groupe de recherche Systèmes temps réel Qualité de Service (StrQdS), Paris, April 2004. (45 minutes).

PERFORMANCES

Telematic Art

- [1] **Nicolas Bouillot**, Emmanuel Durand, Michal Seta, Alexandre Quessy, and Zack Settel. Waterfall music (Montreal/Graz). Linux Audio Conference, IEM, Graz, Austria, May 2013. (17 minutes, composer & performer at Montreal).
- [2] **Nicolas Bouillot**, Emmanuel Durand, Michal Seta, and Alexandre Quessy. Waterfall music (Montreal/Birmingham). Network Music Festival, Birmingham, United Kingdom, February 2013. (17 minutes, composer & performer at Birmingham).

DISTINCTIONS

2009	selected among best papers at the 9 th Conférence Internationale sur les NOuvelles TEchnologies de la RÉpartition (NOTERE'09)
2003	best paper at the MANifestation des JEunes Chercheurs en Sciences et Technologies de l'Information et de la Communication (MAJECSTIC'03)
2002–2005	merit scholarship from French Ministry of Research and Technology (Ph.D.)
2001	merit scholarship (Master2)

SCIENTIFIC PARTICIPATION

REVIEW	<p>meta reviewer of the conference on New Interface for Musical Expression, NIME (2015)</p> <p>committee member of the conference on New Interface for Musical Expression, NIME (45 papers since 2009)</p> <p>Journal of the Audio Engineering Society (6 papers since 2012)</p> <p>IEEE Transaction on Multimedia (10 papers between 2005 & 2013)</p> <p>126th Convention of the Audio Engineering Society, 2009 (7 papers)</p> <p>French workshop on consistency issues in distributed systems, CDUR'09 (3 papers)</p> <p>5th Workshop on Network & System Support for Games, NETGAMES'06 (2 papers)</p>
ORG.	<p>president of the CDUR'09 workshop program committee (Consistency issues in distributed systems)</p> <p>Ph.D. Students representative substitute for CNAM-CEDRIC (elected from 2003 to 2007)</p> <p>organization committee member for UBIMOB'06 (French conference on Ubiquity and Mobility)</p> <p>organization committee member for JTRES'06 (4th International Workshop on Java Technologies for Real-time and Embedded Systems)</p>

SUPERVISION

	level	student name	title	supervision	defence
2011	Master1 Paris-Sud Univ.	Olivier Penin	Musical gesture recognition using noise extraction	100%	September
	Master2 Univ. of São Paulo	Marcio Tomiyoshi	Services for multimedia stream- ing	100%	July
2010	Master2 Supelec	Nordhal Mabire	Score/audio alignment with MATCH, VAMP and MusicXML	100%	September
2009	Master2 Univ. of Strasbourg	Mathieu Brûlé	Musical performance comparison and qualitative analysis of audio signals	100%	October
2005	Master2 CNAM	Vincent Roudaut	Deploying the distributed con- cert	100%	November
	Master2 Paris 6 Univ.	Samundeswary Ramachandra	Using multimedia caching and P2P for the distributed concert	75% (with E. Gressier)	October
2004	IIE-CNAM Engineer	Pierre-Antoine Baudrit	Visual communication support- ing distributed musical interac- tion	100%	September
	Master2 CNAM	Julien Cordry	Integrating the real-time engine jMax into BOSSA, a modular Linux kernel	50% (with S. Bouzefrane)	September
2003	Master2 CNAM	Jean-Marie Sama	Avatar dancing Kathak	100%	June
	CNAM En- gineer	Rémy Bonafous	IP multicast for the distributed concert	25% (with E. Gressier)	April 2005
	Licence3 CNAM	Hans Nikolas Locher	Prototyping a distributed mixing table based on industrial control standard TASE 2	25% (with E. Gressier)	January
		Samundeswary Ramachandra	Design and developpement of the RTP extension for the NTOP monitoring tool	25% (with E. Gressier)	June

TEACHING

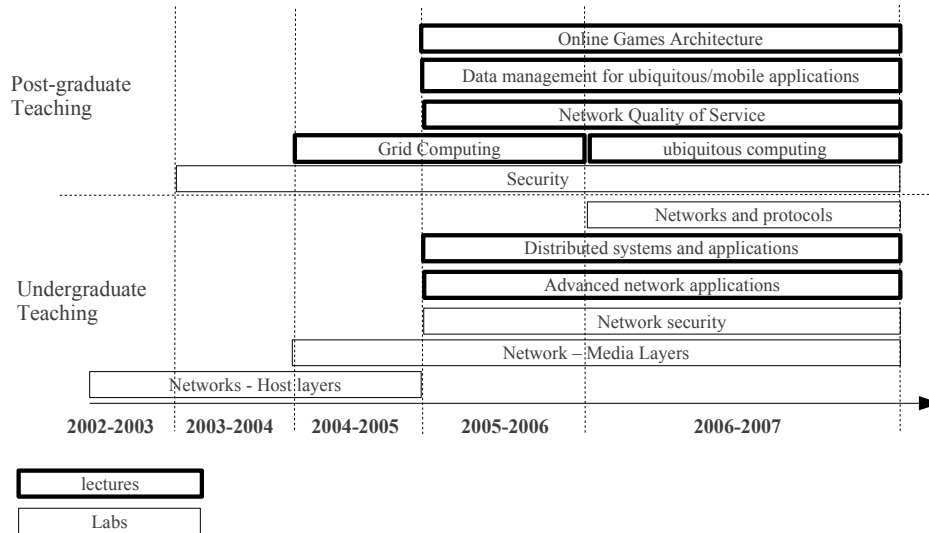
Universities and School

The **Conservatoire National des Arts et Métiers (CNAM)** is a Public Scientific, Cultural and Professional Institution, classed as a grand établissement, among France's top higher education establishments. Supervised by the Minister for Higher Education, the Cnam has a triple role: providing life-long training, undertaking research in technology and innovation and disseminating a culture of science and technology.

Pierre & Marie Curie University (UPMC) is the largest universities teaching science and medicine in France, and indeed in Europe, with 4 000 researchers and teaching academics/researchers, 180 laboratories, and some 30 000 students including 8 000 in postgraduate studies.

The **École Nationale du Jeu et des Medias Interactifs Numériques ENJMIN** is a public institute based on a partnership with the CNAM, the Universities of La Rochelle and Poitiers, the regional Poitou-Charentes CNAM, the national comics and image Centre (CNBDI), and businesses in the audio-visual and telecommunication technology and games sectors. The universities and the CNAM ensure the accreditation for the Master programmes.

Teaching time line



Supervised the Middleware/Ubiquitous Computing courses during the 2006-2007 year for the SAR Master2 (Distributed Systems and Applications) at the UPMC, including planning, introduction course, administrative task and exam. Wrote exams for the *Networks and Quality Of Service* and the *Grid Computing* courses.