

## Jean-Julien Aucouturier

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Born: June 14, 1979 (Montluçon, France)	Citizenship: French
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### EDUCATION

University of Paris VI, Paris, France, 2003–2006  
Ph.D. in Computer Science (Artificial Intelligence), *Trés honorable*, 2006  
Advisers: Dr. François Pachet, Prof. Jean-Pierre Briot

King's College University of London, London, UK, 2000–2001  
M.Sc. in Audio and Music Processing, *Distinctions*, 2001  
Adviser: Prof. Mark Sandler

Ecole Supérieure d'Electricité (Supélec), Rennes, France, 1999–2001  
Diplôme d'ingénieur (BSc + MSc Electronic Engineering), *Summa Cum Laude*, 2001

### TEACHING AND LEADERSHIP EXPERIENCE

**Assistant Professor of Computer Science and Director of the Maths and Science Program:** Undergraduate Program, Temple University, Japan Campus, Tokyo, Japan, Jan. 2008

- Tenure-track equivalent position on the Tokyo campus of Temple University, a public research I university in Philadelphia, Pennsylvania. Responsible for teaching several computer science classes at the undergraduate level as well as supervising research students. Responsible for the development of the Maths and Science course offerings on campus.
- Sample projects: <http://soundmindscapes.info/>, <http://sl-music.info/>

**Adjunct Faculty:** Undergraduate Program, Temple University, Japan Campus, Tokyo, Japan, Sept.–Dec. 2008

- Taught a undergraduate course on “Computers and applications” (2 sessions, 4 hours/week, 2 classes of 28). Syllabus notably covers basic mathematics and statistics (with MSEXcel), computer architecture and electronics.

**Lecturer:** Graduate School of Arts and Sciences, University of Tokyo, Japan, Oct. 2007–Jan. 2008

- Created and taught a graduate course on computer models of human audition (“Computational Hearing Systems”) in MSc in Complex System Studies (15 hours in 10\*1,5 hour modules, class of 12). Syllabus notably covers the mathematics of Fourier analysis.  
Course website: <http://www.jj-aucouturier.info/teaching/todai2007/>.

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**Lecturer:** Ecole Nationale Supérieure d'Electronique, Informatique et Robotique de Bordeaux (ENSEIRB), Bordeaux, France, Dec. 2005–Jan. 2006

- Developed and co-taught a graduate course on pattern recognition for musical audio signals (“Indexation Audio”) in MSc in Multimedia Technologies (24 hours in 6\*4 hour modules, class of 8).

Course website: <http://www.jj-aucouturier.info/teaching/enseirb2005/>.

**Technical manager:** SONY Computer Science Laboratory, Paris, France, 2003–2006

- Managed research for the IST 6th-FWP European Project *Semantic Hifi* (50 mm over 3 years, team of 3). G
- Produced regular technical and administrative reports and presentations to consortium and EU committee
- Co-organized several large-scale user-tests at a large national science museum (*Cité des Sciences*, Paris, France)

**Music teacher:** Mission Bretonne Tir Ar Vretonned, Paris, France, 2005–2006

- Taught diatonic accordion course for beginners (class of 10)

**Lab assistant:** King’s College, University of London, London, UK, Fall 2000

- Co-supervised lab sessions for an undergraduate module on *Introduction to Programming Languages*

## RESEARCH EXPERIENCE

**Visiting Scientist:** Okanoya ERATO Emotional Information project, Riken Brain Science Institute, Saitama, Japan, Dec. 2008–present (research adviser: Prof. Kazuo Okanoya)

- Development of computer algorithms to analyze the development of singing ability in birds, infant vocalization and gibbon monkey calls
- Only computer scientist in a team of ethologists, neurologists and molecular biologists

**Postdoctoral fellow:** Ikegami Lab, Graduate School of Arts and Science, University of Tokyo, Japan, Nov. 2006–present (research adviser: Prof. Takashi Ikegami)

- Development of computer algorithms and hardware to analyze the contents of soundscapes
- Integration of music recognition algorithms in entertainment robots
- Application of non-linear dynamical systems to control the motor behavior of a dancing robot
- Psychological experiments on auditory perception: importance of categorization in similarity judgments; emotional consequences of modified voice feedback (collaboration with NTT Communication Laboratory & Dept. of Cognitive Science, University of Tokyo)

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**Postdoctoral fellow:** Dept. of Music, School of Oriental and African Studies, University of London, London, UK, May 2006 (research adviser: Dr Keith Howard)

- Motion capture of dance gestures

**Assistant researcher / Ph.D. student:** SONY Computer Science Laboratory, Paris, France, Sept. 2002–April 2006 (research adviser: Dr François Pachet)

- Development of intelligent tools for internet music distribution (*Sony Music Browser*) based on automatic content-analysis of music files (“find me all the songs that sound the same as...”)
- Development and testing (through musical performance) of interactive music instruments (*Song Sampler*, *RingoMatic*) based on real-time audio transformations
- Transfer of such technologies in commercial products (Sony-Ericsson “Streamman” mobile services)

**M.Sc. student:** Dept. of Electronic Engineering, King’s College, University of London, London, UK, Sept. 2000–June 2001 (research adviser: Prof. Mark Sandler)

- Applications of speech-recognition algorithms to analyze music signals

## GRANTS AND FELLOWSHIPS

**Student Research grant:** CARAS Fellowship (5k USD), Office of the Provost, Temple University, 2009

**Research grant:** Grant-in-aid of Scientific Research (1,6M JPY, c. 15k USD), Japanese Society for the Promotion of Science, Japan, 2007–2008

**Postdoctoral fellowship:** Long-term Fellowship for Foreign Researcher, Japanese Society for the Promotion of Science, Japan, 2006–present

**Lectureship:** Department of Electronic Engineering, Queen Mary University of London, UK, 2006 (declined)

**Postdoctoral fellowship:** AHRC Research Centre for Cross-Cultural Music & Dance Performance, School of Oriental and African Studies, University of London, UK, 2006

**Graduate fellowship:** British Council, UK, 2000–2001

**Graduate fellowship:** Fondation Georges Besse (“Excellence in Engineering”), France, 2000–2001

## CONSULTING AND INDUSTRIAL COLLABORATIONS

### **SonicViz Inc. (Tokyo, Japan):**

- Research collaboration on music marketing in the virtual world of Second-Life, 2009
- Public exhibition and live performance, Design Festa Gallery, Tokyo, Japan, April 2009 (<http://sl-music.info/>)

### **ZMP Inc. (Tokyo, Japan):**

- Developed audio processing and dancing behavior for entertainment robot Miuro (<http://miuro.com/>), 2007
- Public demonstration held at Apple Store Ginza, Tokyo, Japan on May 31st, 2007

### **ORELIA Inc. (Paris, France):**

- Ongoing collaboration for teaching project at University of Tokyo

### **GOSTAI Inc. (Paris, France):**

- Developed tempo recognition module for a robot control library (2007–2008)

## ESTEEM INDICATORS

**Invited keynote speaker:** 2008 Biannual Joint Congress of the French Associations for Artificial Intelligence and Pattern Recognition (RFIA), Amiens, France, Jan. 2008.

**Invited workshop “animator”:** European Acoustics Association workshop for Soundscape research, Berlin, Germany, Jan. 2009 (forthcoming).

**Best paper award:** Workshop on Music and Artificial Life, European Conference on Artificial Life (ECAL), Lisbon, Portugal, Sept. 2007.

**Invited plenary addresses:** Workshop on Modelling Agency, 10th International Conference on the Simulation of Adaptive Behavior (SAB), Kyoto, Japan, Jul. 2008; Workshop on Intelligent Sound Processing, Copenhagen, Denmark, Jun. 2006; First IEEE Benelux Workshop on Model-Based Processing and Coding of Audio, Leuven, Belgium, Nov. 2002.

**Invited session speaker:** 19th International Congress on Acoustics, Madrid, Spain, Sept. 2007; 36th International Congress on Noise Control Engineering, Istanbul, Turkey, Aug. 2007.

**Program committee member:** Sound and Music Computing Conference (SMC'09), Workshop on Learning the Semantics of Audio Signals (LSAS'08), Paris, France, Jun. 2008; Workshop on Learning the Semantics of Audio Signals (LSAS'06), Athens, Greece, Dec. 2006.

**Ad-Hoc journal reviewer:** IEEE Multimedia Magazine; IEEE Intelligent Systems Magazine; IEEE Transactions on Audio, Speech and Language Processing; IEEE Transactions on Signal Processing; Pattern Recognition Letters; EURASIP Journal of Applied Signal Processing; EURASIP Journal on Audio, Speech and Music Processing; Journal of New Music Research.

## JOURNAL PUBLICATIONS

Aucouturier, J.-J. and Okanoya, K. *Different time scales for statistical and sequence learning in bird song development: A quantification by acoustic analysis*. Journal of the Acoustical Society of America (submitted, 2009).

Aucouturier, J.-J. and Ikegami, T. *The Illusion of Agency: Two Engineering Approaches to Compromise Reactivity and Autonomy in an Artificial System*. AdaptiveBehavior (submitted, 2009).

Aucouturier, J.-J. *A day in the life of a gaussian mixture model: Informing music pattern recognition with psychological experiments*. Journal of New Music Research (submitted, 2009)

Aucouturier, J.-J., Aurnhammer, M. and Pachet, F. *Using of image-texture features for sound-texture similarity*. Eurasip Journal on Audio, Speech and Music Processing (submitted, 2009)

Aucouturier, J.-J. *Re-inventing Fourier*. Leonardo Transactions (in press, 2009).

Aucouturier, J.-J. and Defreville, B. *Judging the similarity of soundscapes does not require categorization: Evidence from spliced stimuli*. Journal of the Acoustical Society of America, (in press, 2009)

Aucouturier, J.-J. and Pampalk, E. *From Genres to Tags: A little epistemology of Music Information Retrieval research*. Journal of New Music Research, vol. 32(7), 2008.

Aucouturier, J.-J. *The hypothesis of self-organization for musical tuning systems*. Leonardo Music Journal (MIT Press), vol. 18, pp. 63-69, 2008.

Aucouturier, J.-J., Ogai, Y. and Ikegami, T. *Using Chaos to Trade Synchronization and Autonomy in a Dancing Robot*. IEEE Intelligent Systems, vol. 23, No. 2, 2008.

Aucouturier, J.-J., Defreville, B. and Pachet, F. *The bag-of-frame approach to audio pattern recognition: A sufficient model for urban soundscapes but not for polyphonic music*. Journal of the Acoustical Society of America, 122(2):881-91, 2007.

Aucouturier, J.-J. and Pachet, F. *A scale-free distribution of false positives for a large class of audio similarity measures*. Pattern Recognition, vol. 41(1), pp. 272-284, 2007.

Aucouturier, J.-J. and Pachet, F. *The influence of polyphony on the dynamical modelling of musical timbre*. Pattern Recognition Letters, vol. 28 (5), pp.654-661, 2007.

Aucouturier, J.-J. and Pachet, F. *Jamming with plunderphonics: Interactive contatenative synthesis of music*. Journal of New Music Research, vol. 35(1), pp. 35-50, 2006.

Aucouturier, J.-J., Pachet, F. and Sandler, M. *The Way It Sounds: Timbre Models For Analysis and Retrieval of Polyphonic Music Signals*. IEEE Transactions of Multimedia, 7(6):1028-1035, 2005.

Pachet, F., La Burthe, A. and Aucouturier, J.-J. *Editorial Metadata in the Sony Music Browser: Between Universalism and Autism*. Journal of New Music Research, 34(2):173-184, 2005.

Pachet, F., La Burthe, A., Zils, A. and Aucouturier, J.-J. *Popular Music Access: The Sony Music Browser*. Journal of the American Society for Information Science, 55(12):1037 - 1044, 2004.

Aucouturier, J.-J. and Pachet F. *Improving Timbre Similarity: How high is the sky?*. Journal of Negative Results in Speech and Audio Sciences, 1(1), 2004.

Pachet, F., Aucouturier, J.-J., La Burthe, A., Zils, A. and Beurivé, A. *The Cuidado Music Browser: an end-to-end Electronic Music Distribution System*. Multimedia Tools and Applications, 2004.

Aucouturier, J.-J. and Pachet, F. *Representing Musical Genre: A State of the Art*. Journal of New Music Research, 32(1), 2003.

## BOOK CHAPTERS

Aucouturier, J.-J. *Sounds like Teen Spirit: Computational Insights into the Grounding of Everyday Musical Terms*. In (Minett, J. and Wang, W. eds.) Language, Evolution and the Brain, Frontiers in Linguistics Series, Taipei: Academia Sinica Press (in press, 2009).

Aucouturier, J.-J. *The hypothesis of self-organization for musical tuning systems*. In (E. Miranda, ed.) Music as It Could Be: New Musical Worlds from Artificial Life (Middleton: A-R Editions) (in press, 2009).

## EDITED SPECIAL ISSUES

Aucouturier, J.-J. (ed.) *Beyond Bag-of-frames: Future directions in the pattern recognition of non-speech audio*. Special Issue Pattern Recognition Letters, 2009 (in preparation).

Aucouturier, J.-J. and Pampalk, E. (eds.) *From genres to tags: Music Information Retrieval in the era of folksonomies*. Special Issue Journal of New Music Research, 2008 (in press).

Aucouturier, J.-J. (ed.) *Cheek to Chip: Dancing robots and the future of AI*, IEEE Intelligent Systems, Trends and Controversies, vol. 23, No. 2, March/April 2008.

## POPULAR PRESS

Aucouturier, J.-J. *Assignments that matter*. Chronicles of Higher Education, 2009 (submitted).

Aucouturier, J.-J. *Real music for a virtual world*. Real music for a virtual world. Japan Inc, n.86, June 2009.

## PEER-REVIEWED CONFERENCES

Aucouturier, J.-J. *What is it like to be a byte? Analysis of student self-reports after a role-playing learning activity*. Temple University Japan Linguistics Symposium, Feb. 2008.

Aucouturier, J.-J. and Defreville, B. *Differences in the cognitive processing of music and soundscapes revealed by performance on spliced stimuli*, Proceedings of the 10th International Conference on Music Perception and Cognition (ICMPC), Sapporo, Japan, August 2008.

Segnini, R., Aucouturier, J.J, Johansson, P., Hall, L. and Watanabe, K., *Feedback Effects of Emotional Voice Transformation on Self-Rated Emotion Experience*, International Conference of the Association for the Scientific Study of Consciousness (ASCC), Taipei, Taiwan, June 2008.

Aucouturier, J.-J., Ogai, Y. and Ikegami, T. *Making a robot dance to music using chaotic itinerancy in a network of FitzHugh-Nagumo neurons*. Proceedings of the 14th International Conference on Neural Information Processing (ICONIP), Kitakyushu, Japan, Nov. 2007

Aucouturier, J.-J. *The hypothesis of self-organization for musical tuning systems*. Proceedings of the European Conference on Artificial Life (ECAL), Workshop on Music and Artificial Life, Lisbon, Portugal, Sept. 2007.

Aucouturier, J.-J., Pachet, F., Roy, P. and Beuriv, A. *Signal + context = Better classification*. Proceedings of the International Conference on Music Information Retrieval (ISMIR), Vienna, Austria, Sept. 2007.

Aucouturier, J.-J. and Defreville, B. *Differences in the cognition of urban soundscapes and polyphonic music: a pattern-recognition point of view*. Proceedings of the 36th International Congress on Noise Control Engineering (INTER-NOISE), Istanbul, Turkey, 2007.

Aucouturier, J.-J. and Defreville, B. *Sounds like a park: A computational technique to recognize soundscapes holistically, without source identification*. Proceedings of the 19th International Congress on Acoustics (ICA), Madrid, Spain, Sept. 2007.

Aucouturier, J.-J. *Investigating embodiment mechanisms in music perception: The case of traditional dance music*. Proceedings of the 11th Japanese Auditory Research Forum, Shiga, Japan, Dec. 2006.

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Aucouturier, J.-J. *The cognitive implausibility of statistical pattern recognition algorithms for music*. Proceedings of the 11th Japanese Auditory Research Forum, Shiga, Japan, Dec. 2006.

Aucouturier, J.-J. and Pachet, F. *Ringomatic: A Real-Time Interactive Drummer Using Constraint-Satisfaction and Drum Sound Descriptors*. Proceedings of the International Conference on Music Information Retrieval (ISMIR), September 2005, London, UK.

Roy, P., Aucouturier, J.-J., Pachet, F. and Beuriv e, A. *Exploiting the Tradeoff Between Precision and Cpu-time to Speed Up Nearest Neighbor Search*. Proceedings of the International Conference on Music Information Retrieval (ISMIR), September 2005, London, UK.

Aucouturier, J.-J. and Pachet, F. *Tools and Architecture for the Evaluation of Similarity Measures: Case Study of Timbre Similarity*. Proceedings of the International Conference on Music Information Retrieval (ISMIR), October 2004, Barcelona, Spain.

Aucouturier, J.-J., Pachet, F. and Hanappe, P. *From Sound Sampling To Song Sampling*. Proceedings of the International Conference on Music Information Retrieval (ISMIR), October 2004, Barcelona, Spain.

Laburthe, A., Pachet, F. and Aucouturier, J.-J. *Editorial Metadata in the Cuidado Music Browser: Between Universalism and Autism*. Proceedings of the WedelMusic Conference, 2003, Liverpool, UK.

Aucouturier, J.-J. and Pachet, F. *Finding Songs that Sound the Same*. Proceedings of IEEE Benelux Workshop on Model-Based Processing and Coding of Audio, November 2002, Leuven, Belgium.

Aucouturier, J.-J. and Pachet, F. *Scaling up Music Playlist Generation*. Proceedings of IEEE International Conference on Multimedia and Expo (ICME), August 2002, Lausanne, Switzerland.

Aucouturier, J.-J. and Pachet, F. *Music Similarity Measures: What's the Use?*. Proceedings of the International Symposium on Music Information Retrieval (ISMIR), October 2002, Paris, France.

Aucouturier, J.-J. and Sandler, M. *Finding Repeating Patterns in Acoustic Musical Signals*. Proceedings of the 22nd International AES Conference on Virtual, Synthetic and Entertainment Audio, June 2002, Espoo Finland.

Aucouturier, J.-J. and Sandler, M. *Segmentation of Musical Signals Using Hidden Markov Models*. Proceedings of the 110th AES Convention, May 2001, Amsterdam, The Netherlands.

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Aucouturier, J.-J. and Sandler, M. *Using Long-term structure to Retrieve Music: Representation and Matching*. Proceedings of the International Symposium on Music Information Retrieval (ISMIR), October 2001, Bloomington (IN), USA.

Reiss, J., Aucouturier, J.-J. and Sandler, M. *Efficient Multidimensional Searching Routines for Music Information retrieval*. Proceedings of the International Symposium on Music Information Retrieval (ISMIR), October 2001, Bloomington (IN), USA.

## PATENTS

**US2008040362:** Hybrid Audio-visual Categorization System and Method (2008-04), with F. Pachet, P. Roy

**JP2006106754:** Mapped Meta-data Sound-Reproduction Device and Audio Sample Processing System Usable Therewith (2006-10), with F. Pachet

**WO2006037786:** A Content Management Interface (2006-03) with F. Pachet, P. Roy