

Lonce L. Wyse

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Singapore 595001

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Education:

Ph.D., Cognitive and Neural Systems
Boston University, USA, August 1993

B.S., (summa) Mathematics and Computer Science
University of Hartford, USA, May 1986

H.S. Electroacoustic Music Composition major
Interlochen Arts Academy, USA, May 1978

My research interests are in conceptual and computational techniques for the analysis and the creation of media, particularly music and sonic arts.

Summary and Highlights: Awards include a 3-year US National Graduate Fellowship and a Fulbright Fellowship at Taiwan National University to study perceptual models of sound and musical pitch processing. I developed and teach a course for the Scholars Program at the National University of Singapore entitled "Sonic Arts and Sciences". I developed sound modeling technology which was successfully transferred to industry in 1999. In 2001 I developed a pure Java sound synthesizer for real-time interactive sound and music creation, licensed in 2006. My current research focus is on new musical ensemble structures, and compositional and listening strategies for electroacoustic music. My current creative work is in interactive audio/video media.

Appointments:

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| 8/2006-present | <i>Associate Professor</i> , Communications and New Media Programme, Faculty of Arts and Social Sciences, National University of Singapore.
<i>Director</i> , Arts and Creativity Lab, Interactive and Digital Media Institute. |
| 8/2006-present | <i>Technology Advisor</i> , Sonoport Pte. Ltd. – sound effects creation and internet distribution. |
| 7/2003-7/2006 | <i>Adjunct Assistant (Associate since 2004) Professor</i> , University Scholars Program, National University of Singapore. Sonic Arts and Sciences. |
| 2001-8/2006 | <i>Lead Scientist</i> , I2R: Institute for Infocomm Research, a Singapore national research laboratory. Sound representation, Independent Component Analysis, sound analysis & synthesis. |
| 1999-2001 | <i>R & D Director</i> , Mindmaker Pte Ltd, Singapore (& USA). Conducted R&D in real-time embedded sound synthesis, supervised staff in sound and speech synthesis. Market strategy and business development. |
| 1994-1999 | <i>Research Associate</i> , Kent Ridge Digital Labs (now I ² R). Developing audio analysis for automatic media content labeling. Sound synthesis algorithm development. |
| 1993-94 | <i>Fulbright Foundation Fellow</i> . Developing a computational auditory model for speech processing systems at Taiwan National University. |

- 1992-93 *Research Assistant*, Boston University. Neural network & cognitive approach to vision and auditory modeling.
- 1989-92 *National Defense Science & Engineering Fellow*, Boston University. Awarded 3 years of graduate research funding.
- 1986-87 *A.I. Software Engineer*, Cognitive Systems Inc., New Haven, CT. Developed a Natural Language interface for database queries.
- 1988-89 *Software Engineer*, Dr. T's Music Software, Newton, MA. Developed music applications software for PC's.
- 1985 *Teaching Assistant in Artificial Intelligence*, University of Hartford.
- 1982-1985 *Recording Studio Engineer, Event Production*, Real Art Ways (at the time, the 4th largest "alternative arts" space in the US).

PUBLICATIONS

Journals

X.L. Zhu, G. Beaugard, and L. Wyse (2007) "Real-time Spectrogram Inversion with Look-ahead," *IEEE Transactions on Audio, Speech and Language Processing*. 15:5, July 2007.

Menaka Rajapakse, Lonce Wyse, Bertil Schmidt, Vladimir Brusica (2005), "Deriving Matrix of Peptide-MHC Interactions in Diabetic Mouse by Genetic Algorithm", *Lecture Notes in Computer Science*, Volume 3578, Jun 2005, Pages 440 – 447.

S. Grossberg, K. Govindarajan, L. Wyse, and M. A. Cohen (2004), "ARTSTREAM: A neural network model of auditory scene analysis and source segregation," *Neural Networks*, Elsevier. 17:511-536.

Lonce Wyse (2003), "Free Music and the Discipline of Sound," *Organized Sound*, 8:3, 237-247. Cambridge University Press.

Lonce Wyse and Peter Kellock (1999), "Embedding Interactive Sounds in Multimedia Applications," *Multimedia Systems Journal*, 7:1 48-54.

M. Cohen, S. Grossberg and L. Wyse (1995), "A Spectral Network Model of Pitch Perception," *J. Acoust. Soc. Am* 98(2), Pt. 1.

S. Grossberg and L. Wyse (1991), "A Neural Network Architecture for Figure-Ground Separation of Connected Scenic Figures", *Neural Networks*, 4:723-742. Also published as a chapter in "Nonlinear Vision: Determination of Neural Receptive Fields, Function, and Networks," Robert B. Pinter and Bahram Nabet (Eds.), CRC Press, Boca Raton, 1992.

Conferences

Nanayakara, SC, E.A. Taylor, L.L. Wyse and S.H. Ong, Towards building and experiential music visualizer. *6th International Conference on Information, Communications and Signal Processing* (10-13 Dec 2007, Singapore).

Gilnert, E. and Wyse, L. (2007) AudiOdyssey: An Accessible Video Game for Both Sighted and Non-Sighted Gamers. *Proceedings of the 2007 conference on Future Play FuturePlay* 251-252 (Toronto, Nov 14-17, 2007). ISBN:978-1-59593-943-2

Wyse, L. (2007) Sound Models in the Construction and Analysis of All-sound Music. *Electroacoustic Music Studies, 2007* (De Montfort University, Leicester, UK)

- Wyse, L. (2006) Real-time synchronization of independently controlled phasors. *Proceedings of the International Computer Music Conference 2006*, New Orleans, Louisiana, USA.
- C. Pendharkar, M. Gurevich and L. Wyse, (2006) "Parameterized Morphing as a Mapping Technique for Sound Synthesis." *Proceedings of the International Conference on Digital Audio Effects (DAFx-06)*, Montréal, Canada 2006: 45-48.
- X.L. Zhu, G. Beaugard, and L. Wyse (2006) Real-time Spectrogram Inversion with Look-ahead. *Proceedings of the International Conference on Multimedia and Expo (ICME)*, Toronto, CA.
- G. Beaugard, X.L. Zhu, X.L. and L. Wyse (2005), "An Efficient Algorithm for Real-time Spectrogram Inversion," *Proceedings of the Conf. on Digital Audio Effects (DAFX-05)*, 345-349, Madrid, Spain.
- Lonce Wyse (2005), "Generative Sound Models," *Proceedings of the Multimedia Modeling 2005 Conference*. Melbourne, Australia, 370-377.
- M. Rajapakse, and L. Wyse (2005), "Generic Audio Analysis using a Hybrid Model based on GMMs and HMMs," *Proceedings of the Multimedia Modeling 2005 Conference*, Melbourne, Australia, 53-58.
- Lonce Wyse (2004), "Contour Hierarchies, Tied Parameters, Sound Models and Music," *Proceedings of the International Computer Music Conference 2004*, Florida, USA, 144-147.
- X.L. Zhu, X.L. and L. Wyse (2004), "Sound texture modeling and time-frequency LPC," *Proceedings of the Conf. on Digital Audio Effects (DAFX-04)*, Naples, Italy, 345-349.
- L. Wyse, Y. Wang, X.L. Zhu (2003), "Application of a Content-based Percussive Sound Synthesizer to Packet Loss Recovery in Music Streaming," *Proceeding of the 11th ACM International Conference on Multimedia*, Berkeley, CA, 335-339.
- Lonce Wyse (2003), "A Sound Modeling and Synthesis System Designed for Maximum Usability," *Proceedings of the International Computer Music Conference 2003*, Singapore, 447-451.
- Menaka Rajapakse, Lonce Wyse (2003), "NMF vs ICA for Face Recognition," *Third International Symposium on Image and Signal Processing and Analysis*, SPIE, Rome, Italy, 605-611.
- Menaka Rajapakse, Lonce Wyse (2003), "Face Recognition with Non Negative Matrix Factorization," *IEEE Visual Communications and Image Processing*. Lugano, Switzerland, 1838-1847.
- P. Gao, E.C. Chang, and L. Wyse (2003), "Blind Separation of Fetal ECG from a Single Mixture using SVD and ICA," *Fourth International Conference on Information, Communication and Signal Processing / Fourth IEEE Pacific-Rim conference on Multimedia*, Singapore 3A4.2.
- W. Huang, S. Lau, T. Tan, L. Li, L. Wyse (2003), "Audio Event Classification Using Hierarchical Structure," *Fourth International Conference on Information, Communication and Signal Processing / Fourth IEEE Pacific-Rim conference on Multimedia*, Singapore, 3A1.1.
- Lonce Wyse (1997), "Flexible Sound Effects," *Proceedings of the International Computer Music Conference*, Thessaloniki, Greece.

Lonce Wyse (1996), "Some Whats and Wheres about CSound," *ARRAY*, International Computer Music Association, 1996.

S. Grossberg, K. Govindarajan, Lonce Wyse and M. A. Cohen (1995), "A Neural Model of Auditory Scene Analysis and Source Segregation," *Proceedings of the Acoustical Society of America*, St.. Louis.

Lonce Wyse and Stephen W. Smoliar (1995), "Toward Content-Based Audio Indexing and Retrieval," *Proceedings of the International Joint Conference on Artificial Intelligence*, Montreal, Canada.

M. Cohen, S. Grossberg and Lonce Wyse (1992), "A Neural Network of Synthesizing the Pitch of an Acoustic Source," *Proceedings of the International Joint Conference on Neural Networks*, Baltimore, MD.

M. Cohen, S. Grossberg and Lonce Wyse (1992), "Harmonic Weighting Functions in a Neural Network Model of Pitch Detection and Representation," *Proceedings of the International Joint Conference on Neural Networks*, Beijing, China,.

S. Grossberg and Lonce Wyse (1991), "Invariant Recognition of Cluttered Scenes by a Self-organizing ART Architecture: Figure-Ground Separation," *Proceedings of the International Joint Conference on Neural Networks*, Seattle, WA. July 8-12, 1991. (Also presented at the 2nd Governmental Neural Network Applications Workshop)

S. Grossberg and Lonce Wyse (1990), "Automatic Figure-Ground Separation by an Iterated Boundary Segmentation and Filling-in Network," *Proceedings of the Wang Institute Neural Network Conference*.

Book Chapters

Ed Altman and Lonce Wyse (2004), "Emergent Semantics from Media Blending," in (Srinivasan and Nepal Eds.) *Managing Multimedia Semantics*. The Idea Group Inc. Ch. 16, 363-390.

Lonce Wyse and Stephen W. Smoliar (1995), "Toward Content-Based Audio Indexing and Retrieval and a New Speaker Discrimination Technique," in Hiroshi G.Okuno David Rosenthal (Eds.) *Computational Auditory Scene Analysis Workshop at the International Joint Conference on Artificial Intelligence*, Montreal, Canada: Erlbaum.

S. Grossberg and L. Wyse (1992), "Figure-Ground Separation of Connected Scenic Figures: Boundaries, Filling in and Opponent Processing," in G.A. Carpenter and S.Grossberg (Eds.) *Neural Networks for Vision and Image Processing*, Cambridge, MA: MIT Press.

Invited Lectures and Essays

Frequent guest lectures on Sound & Music (interactive, combined with other media, 20th century history in music and the arts, use in games, audio on mobile devices)

Additional articles published in periodicals including the Asia-Pacific I.T. Times and the U.S. ONR Scientific Information Bulletin.

Patents

Method for Constructing Audio Signals from Spectrograms. Gerald Beauregard and Lonce Wyse. Provisional filing September, 2005. (I2R/Z/01070).

A synthesis-based method for packet loss recovery of transients in music streaming. Lonce Wyse and Ye Wang. Provisional filing, June 23, 2003, International Publication WO 2204/114134 A1. 29 Dec. 2004.

Method for Text-Labeling Sound Effects. Lonce Wyse and Gurminder Singh. (International Application #PCT/SG 99/00010, Filing Date Jan 20, 1999), Filed under the IPT. Awarded: Singapore Patent #82337.

[An Interactive Sound Effects System and Method of Producing Model-Based Sound Effects.](#) Lonce Wyse and Peter Kellock. (Application #9703500-0, Filing Date: Setp. 23, 1997). Awarded in Singapore, Pending in Europe and the US.

Student Supervision

Independent Study

Lu Kiet - MetaFluid, Interactive Caustics and Sound Installation
Joel Ong – Sound Installations

Honors Thesis

Satra Ghosh - Chaotic Chua Oscillator for sound synthesis
Lam Hui Ling Ivy – New Technologies and traditional arts

Masters

Zhu XingLei – Spectrogram Inversion
Jozssef Vamosi – Interactive 3D elements in Theater

PhD (current)

SriKumar Karaikudi Subramanian – Music Notation
Tanja Todorovic – Space and New Media
SarangaNanayakkara – Music Visualization
Cisy Liu – Listening Strategies for Electroacoustic Music

Funding Awards

- (1) New Music and the Networked Ensemble
PI: Lonce Wyse
CO-PI: Kevin McGee (NUS CNM), Ho CheeKong (NUS YST)
AMOUNT: SD\$538,478
DURATION 3 yrs, 2008.01.01 to 2010.12.31

- (2) Listening Strategies for New Media; Experience and Expectation
PI: Lonce Wyse
CO-PI: Trevor Penny (NUS PSYCH)
AMOUNT: SD\$250K
DURATION 2 yrs, 2008.01.01 to 2009.12.31

- (3) Interactive Audio in Games
PI: Lonce Wyse
AMOUNT: \$100K
DURATION 2 yrs, 2008.01.01 to 2009.12.31

Video Game: AudiOdyssey

Release Date: August 2007

Download: <http://gambit.mit.edu/loadgame/>

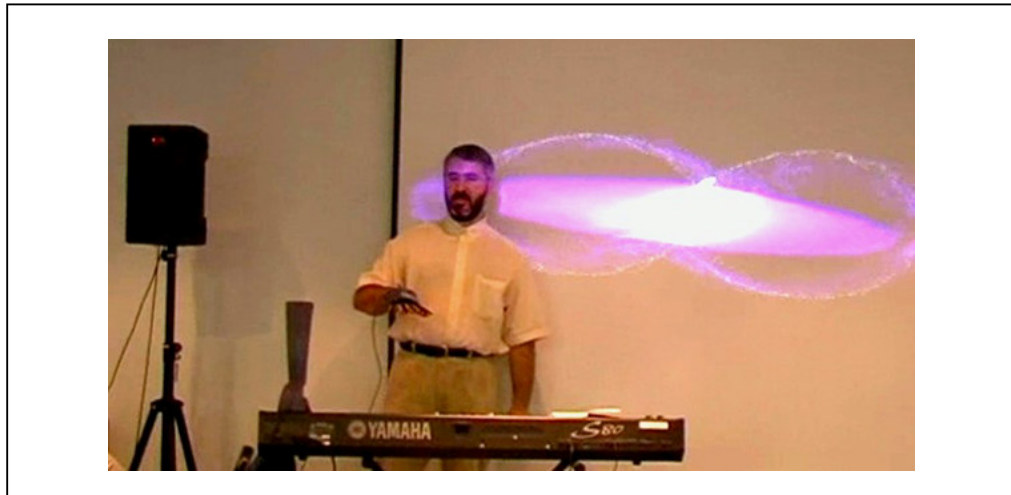
Role: Project Co-owner

Game Description: An experimental computer game designed to be accessible to both the visually impaired and mainstream gamers. Players take on the role of a DJ in a nightclub, and interact with the game via a Wiimote to lay down rhythmic tracks in synch with music to keep club goers dancing.

Development Role: Concept creation, design & development of embedded interactive audio system.

SELECTED MEDIA WORK

Made by Hand



- The P5 Glove has 3 positional degrees of control, plus 5 finger bend controls. The glove controls our software synthesizer, accompanied in the photo by the Yamaha synthesizer.
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Interactive Art for the Walls



- This is an interactive "painting" in which video sequences and the continuous evolution of the soundscape are determined by the amount of motion in the viewing area sensed through processing video camera input. (HD flatscreen display with sound system and camera).

Lonce Wyse: Media interactivity and sound design.

Yang Tien: Imagery and video.

POSITIONS, AWARDS, AFFILIATIONS

Editorial

- 2007 Co-curator, DVD of Computer Music, "Far and Wide", for the Computer Music Journal
- 2005-present Associate Editor, *Computer Music Journal*. Current events.
- 1997 Invited Guest Editor, *ACM Multimedia Systems Journal*. Special Issue on Audio and Multimedia.

Awards

- 1993-94 *Fulbright Fellowship*. One year spent at Taiwan National University.
- 1989-92 *U.S. National Defense Science & Engineering Graduate Fellowship*
- 1983 *Outstanding Mathematics Achievement Award*, University of Hartford
- 1978 *Interlochen Arts Academy Scholarship*, Music Composition

Conference Organization

- 2009 Program Committee (Papers), International Conference on Computer Music; Korea.
- 2008 Organizing Committee, International Symposium on Electronic Arts.
- 2006-8 Program Chair, Artist in Residence Program for the 2008 International Symposium on Electronic Arts.
- 2007 PC, audio track – IEEE Multimedia, Taiwan
- 2006 Co-Program Chair, Interactive Arts. *ACM Multimedia, Santa Barbara*.
- 2006 Co-Curator, Interactive Arts Exhibition. *ACM Multimedia, Santa Barbara*.
- 2005 Program Committee Interactive Arts, *ACM Multimedia, Singapore*
- 2003 Program Committee, International Conference on Computer Music; Singapore.

Professional Membership

- International Computer Music Association,
Audio Engineering Society
- 1984-1987 *Member*, New England Computer Arts Association. Producing performances of new media artworks.