

# Curriculum Vitae

**Tamara Smyth**

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## Education

**Stanford University**, Stanford, CA.

Ph.D., Computer-Based Music Theory and Acoustics, April 2004.

Ph.D. minor, Electrical Engineering.

**New York University**, New York, NY.

M.Mus., Music Technology, September 1998.

**McGill University**, Montreal, QC.

B.Mus., Piano Performance and Computer Applications to Music (Joint Honours), September 1996.

## Employment

*November 2004-current*: **Assistant Professor**.

School of Computing Science, Simon Fraser University, British Columbia, Canada.

*April 2004-November 2004*: **Technical Director and Lecturer (Musical Acoustics)**.

Center for Research in Music and Acoustics (CCRMA), Department of Music, Stanford University.

*September 2003-April 2004*: **Audio Software Consultant**.

Universal Audio Inc., Santa Cruz, CA.

*September 1998-2003*: **Teaching and Research Assistant**.

CCRMA, Department of Music, Stanford University.

Activities include teaching labs, tutoring students and assisting with course development.

*Summer 2000 and 2001*: **Audio Software Consultant**.

autodesk\*/discreet\* (formerly Discreet Logic), Montreal, QC.

*Summer 1999*: **Researcher in Computer Music**.

IBM Research, T.J. Watson Research Center, Yorktown, NY.

Activities include music/audio technology research/development, assisting with music concerts at the Computer Music Center.

**September 1997-September 1998: Software Developer.**

Discreet Logic, Montreal, QC.

Activities include developing audio software and integrating audio subsystem into special effects software.

**Summer 1997: Student Consultant.**

Academic Computing Facility, Arts and Technology Group, New York University.

Activities include maintenance of multimedia equipment and advising students on a wide range of multimedia and audio software.

**September 1993-May 1994: Choir Director.**

St. Patrick's Parish, Montreal, QC.

## Academic Activities

**Simon Fraser University Service:**

Graduate Program Committee (GPC), Member 2005, 2007-2009, 2011-current.

Faculty Search Committee (FSC), Member 2009-2012.

Undergraduate Program Committee (UPC), Member 2006, Member and FCAT Liaison 2009-current.

**Simon Fraser University Teaching:**

CMPT 889: Computational Modelling for Sound Synthesis (grad), *Fall 2005-07, 09, Spring 2012.*

CMPT 468/768: Computer Music Theory and Sound Synthesis (ugrad/grad), *Spring 2009-10, Fall 2011.*

CMPT 165: Introduction to the Internet and the World Wide Web (ugrad), *Fall 2011.*

CMPT 415: Special Research Project (ugrad), *Spring 2009.*

CMPT 894: Directed Reading (grad), *Spring 2008.*

CMPT 125: Introduction to Computer Science and Programming II (ugrad), *Spring 2009.*

CMPT 368: Computer Music Theory and Sound Synthesis (ugrad), *Spring 2007, 2008.*

CMPT 126: Introduction to Computer Science and Programming (ugrad), *Fall 2006, 2007.*

CMPT 318: Fundamentals of Computerized Sound (ugrad), *Spring 2005 and 2006.*

**Stanford University Teaching:**

MUS 150: Musical Acoustics, Stanford University (ugrad), *Spring quarter 2004.*

**Stanford University Teaching Assistant:**

MUS 320: Introduction to Digital Audio Signal Processing (grad), *Autumn 2002.*

MUS 151: Psychophysics and Cognitive Psychology for Musicians (ugrad), *Spring 2001.*

MUS 220b: Synthesis Techniques, Compositional Algorithms, Psychoacoustics and Spatial Processing (grad), *Winter 2001.*

CS 377b / MUS 250a: Computer-Human Interaction Technology (grad), *Autumn 2000.*

MUS 22: Elements of Music II (ugrad), *Spring 2000.*

MUS 21: Elements of Music I (ugrad), *Winter 2000.*

MUS 20: Jazz Theory (ugrad), *Autumn 1999.*

## Awards, Grants and Honours

**New Media Initiative.** Natural Sciences and Engineering Research Council of Canada (NSERC) with Canada Council for the Arts (CCA), *Interaction of acoustic and virtual musical instruments using synthesis models and their inversions*, 2010-2013 (\$213,350.00).

**Discovery Grant.** Natural Sciences and Engineering Research Council of Canada (NSERC),

*Modeling, extension, and parameter identification/estimation of vocal and musical instrument systems*, 2010-2015 (\$75,000.00).

**Discovery Grant.** Natural Sciences and Engineering Research Council of Canada (NSERC), *Physics-Based Sound Synthesis and Model Parameter Estimation*, 2008-2010 (\$32,000.00).

**Discovery Grant.** Natural Sciences and Engineering Research Council of Canada (NSERC), *Real-time Interactive computer Simulations of Acoustic Systems*, 2005-2008 (\$48,000.00).

**President's Research Grant.** Simon Fraser University.

*Analysis of the design and playing techniques of Southeast Asian Reed Instruments*, 2005 (\$10,000.00).

**Student Paper Award Competition, Second Prize.**

144<sup>th</sup> Meeting of the Acoustical Society of America, December 2002, Cancun, Mexico.

**Stanford University Fellowship**, 1998-2003.

## Professional Service and Activities

### Conference Committees:

- Scientific Committee, Sound and Music Computing Conference(s), 2009-2011.
- Program Committee, International Computer Music Conference (ICMC), 2006-2010.
- Program Committee, Haptic-Audio Interaction Design (HAID), 2010.
- Final Paper Selection Committee, International Computer Music Conference (ICMC), 2007, 2009.
- Special Session Co-Organizer (with Julius O. Smith), "Virtual Musical Instruments", 149<sup>th</sup> Meeting of the Acoustical Society of America (ASA) / Canadian Acoustical Association (CAA), May 2005.

### Paper Reviewer:

- International Computer Music Conference (ICMC), 2004-2012.
- Sound and Music Computing Conference, 2009-2012..
- Haptic-Audio Interaction Design, 2010.
- Eurographics (Tutorials program), 2009.
- IEEE Transactions on Audio, Speech and Language Processing, 2006 and 2007.
- Graphics Interface (GI), 2007.
- 123rd Audio Engineering Society (AES) Convention, 2007.
- International Conference on Digital Audio Effects (DAFx), 2006.
- IEEE Transactions on Speech and Audio Processing, 2004 and 2005.

### Grant Reviewer:

- NSERC, Discovery Grant, 2005-2008.
- Canada Council for the Arts and NSERC, New Media Initiative, 2006-2008.

### Invited Conference Talks:

- 2<sup>nd</sup> Pan-American/Iberian Meeting on Acoustics, Cancun, Mexico, November 2010.
- 155<sup>th</sup> Meeting of the Acoustical Society of America (Acoustics'08), July 2008, Paris, France.
- 19<sup>th</sup> International Congress on Acoustics, September 2007, Madrid, Spain.
- 152<sup>nd</sup> Meeting of the Acoustical Society of America, November—December 2006, Honolulu, Hawaii.
- *IEEE International Workshop on Multimedia Signal Processing*, October 2006, Victoria, British Columbia.
- 148<sup>th</sup> Meeting of the Acoustical Society of America, November 2004, San Diego, California.
- 146<sup>th</sup> Meeting of the Acoustical Society of America, November 2003, Austin, Texas.

## Additional Invited Talks:

- “Explorations in Convolutional Synthesis”, Vancouver Computer Music Meetings, Great Northern Way Campus, May 2009.
- “An Introduction to Computer Music and Sound Synthesis”, School of Interactive Arts and Technology (SIAT) Research Colloquium, Simon Fraser University, January 2007.
- “Expanding our Notion of Musical Instruments”, Grand Opening, Simon Fraser University, Surrey Campus, September 2006.
- *Computer Music Research Forum: Current and Future Research Trends in Computer Music*, Newstage Festival, Center for Computer Research in Music and Acoustics (CCRMA), Stanford University, April 2006, Stanford, California.
- “A General Reed Model for Computer Music Applications”, Human Communication Technologies Laboratory, Dept. of Electrical and Computer Engineering, University of British Columbia, October 2005, Vancouver, British Columbia.
- “Physical Modelling of Reed-based Musical Instruments”, University of British Columbia, Physics and Astronomy Dept. Colloquium, April 2005, Vancouver, British Columbia.
- “Virtual Musical Instruments”, Science One Program, University of British Columbia, March 2005, Vancouver, British Columbia.
- “Introduction to Physical Modelling Sound Synthesis”, Scientific I, Simon Fraser University, February 2005.
- **Radio Guest** on *Bunny Watson* hosted by Bill Richardson, CBC Radio, December 2004.

## Publications

- [1] Tamara Smyth and Srikanth Cherla, “Saxophone by model and measurement,” in *Proceedings of the 9<sup>th</sup> Sound and Music Computing Conference*, Copenhagen, Denmark, July 2012, p. 6 pages.
- [2] Matthieu Macret, Philippe Pasquier, and Tamara Smyth, “Automatic calibration of modified fm synthesis to harmonic sounds using genetic algorithms,” in *Proceedings of the 9<sup>th</sup> Sound and Music Computing Conference*, Copenhagen, Denmark, July 2012, p. 8 pages.
- [3] Tamara Smyth and Jonathan S. Abel, “Toward an estimation of the clarinet reed pulse from instrument performance,” *Journal of the Acoustical Society of America*, p. 12 pages, 2012, accepted March 2, 2012.
- [4] Tamara Smyth, “Estimation of clarinet mouthpiece reflection from measurement and the instrument’s produced sound,” in *162nd Meeting of the Acoustical Society of America*, San Diego, California, October/November 2011, presentation and published abstract.
- [5] Tamara Smyth and Frederick S. Scott, “Parametric trombone synthesis by coupling dynamic lip valve and instrument models,” in *Proceedings of the 8<sup>th</sup> Sound and Music Computing Conference*, Padova, Italy, July 2011, p. 6 pages.
- [6] Tamara Smyth and Frederick S. Scott, “Trombone synthesis by model and measurement,” *EURASIP Journal on Advances in Signal Processing*, vol. 2011, no. Article ID 151436, pp. 13 pages, 2011, doi:10.1155/2011/151436.
- [7] Tamara Smyth and Jonathan Abel, “Estimation of reed flow signal from instrument performance,” in *2nd Pan-America/Iberian Meeting on Acoustics*, Cancun, Mexico, October/November 2010, vol. 128, p. 2344, presentation by invitation, published abstract.

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- [8] Adam Kestian and Tamara Smyth, “Real-time estimation of the vocal tract shape for musical control,” in *Proceedings of the 7<sup>th</sup> Sound and Music Computing Conference*, Barcelona, Spain, July 2010, pp. 206–211.
- [9] Tamara Smyth and Jonathan Abel, “Estimating waveguide model elements from acoustic tube measurements,” *Acta Acustica united with Acustica*, vol. 95, no. 6, pp. 1093–1103, 2009.
- [10] Tamara Smyth and Jonathan Abel, “Estimating the reed pulse from clarinet recordings,” in *Proceedings of the ICMC 2009*, Montreal, Canada, August 2009, International Computer Music Conference, pp. 235–238.
- [11] Tamara Smyth and Andrew R. Elmore, “Explorations in convolutional synthesis,” in *Proceedings of the 6<sup>th</sup> Sound and Music Computing Conference*, Porto, Portugal, July 2009, pp. 283–287.
- [12] Tamara Smyth, “Review of *Musimathics: The Mathematical Foundations of Music, Vol. 2*, by Gareth Loy,” *Organized Sound*, vol. 13, no. 03, pp. 271–273, December 2008.
- [13] Tamara Smyth and Alireza Fathi, “Voice synthesis using the generalized pressure controlled-valve,” in *Proceedings of ICMC 2008*, Belfast, Ireland, August 2008, pp. 57–60.
- [14] Tamara Smyth and Jonathan Abel, “Extracting reed control parameters using acoustic measurements and inverse filtering,” in *155th Meeting of the Acoustical Society of America (ASA)*, Paris, France, June 2008, published abstract.
- [15] Tamara Smyth and Jonathan Abel, “Convolutional synthesis of wind instruments,” in *Proceedings of the IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA ’07)*, New Paltz, New York, October 2007.
- [16] Tamara Smyth and Jonathan Abel, “Modeling and measurement of wind instrument bores,” in *19th International Congress on Acoustics*, Madrid, Spain, September 2007.
- [17] Tamara Smyth and Jonathan Abel, “Extending the generalized reed model with measured reflection functions,” in *Proceedings of ICMC 2007*, Copenhagen, Denmark, August 2007, International Computer Music Conference, pp. 252–255.
- [18] Tamara Smyth and Jonathan Abel, “Observing the effects of waveguide model elements in acoustic tube measurements,” in *152nd Meeting of the Acoustical Society of America (ASA)*, Honolulu, Hawaii, November 2006, vol. 120, p. 3331, presentation by invitation, published abstract.
- [19] Tamara Smyth, Tom N. Smyth, and Arthur E. Kirkpatrick, “Exploring the virtual reed parameter space using haptic feedback,” in *Proceedings of the IEEE International Workshop on Multimedia Signal Processing (MMSP 2006)*, Victoria BC, Canada, October 2006, pp. 45–49, Invited paper.
- [20] Tamara Smyth, “A handheld acoustic filter bank for musical control,” in *Proceedings of NIME 2006*, Paris, France, June 2006, Conference on New Instruments for Musical Expression, pp. 314–317.
- [21] Tamara Smyth, Jonathan Abel, and Julius O. Smith, “A generalized parametric reed model for virtual musical instruments,” in *Proceedings of ICMC 2005*, Barcelona, Spain, September 2005, International Computer Music Conference, pp. 347–350.
- [22] Tamara Smyth, Jonathan Abel, and Julius O. Smith, “Musical effects of the digital pressure-controlled valve,” San Diego, California, November 2004, Acoustical Society of America, vol. 116, p. 2563, presentation by invitation, published abstract.
- [23] Tamara Smyth, Jonathan Abel, and Julius O. Smith, “The feathered clarinet reed,” in *Proceedings of the International Conference on Digital Audio Effects (DAFx’04)*, Naples, Italy, October 2004, pp. 95–100.

- [24] Gamhewage C. de Silva, Tamara Smyth, and Michael J Lyons, “A novel face-tracking mouth controller and its applications to bioacoustic models,” in *Proceedings of NIME 2004*, Hamamatsu, Japan, June 2004, International Conference on New Interfaces for Musical Expression, pp. 169–172.
- [25] Tamara Smyth, *Applications of Bioacoustics to Musical Instrument Technology*, Ph.D. thesis, Stanford University, April 2004.
- [26] Tamara Smyth and Julius O. Smith, “A musical controller based on the cicada’s efficient buckling mechanism,” *Journal of New Music Research*, vol. 32, no. 4, pp. 361–368, December 2003.
- [27] Tamara Smyth, Jonathan Abel, and Julius O. Smith, “Feathered collisions in beating reed simulation,” Austin, Texas, November 2003, Acoustical Society of America, vol. 114, p. 2325, presented by invitation. Press paper available at <http://www.acoustics.org/press/146th/Smyth.htm>.
- [28] Tamara Smyth, Jonathan Abel, and Julius O. Smith, “Discrete-time simulation of air-flow cut-off in pressure-controlled valves,” in *Proceedings of the IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA’03)*, New Paltz, New York, October 2003, pp. 229–232.
- [29] Jonathan Abel, Tamara Smyth, and Julius O. Smith, “A simple, accurate wall loss filter for acoustic tubes,” in *DAFX 2003 Proceedings*, London, UK, September 2003, International Conference on Digital Audio Effects, pp. 53–57.
- [30] Tamara Smyth, Jonathan Abel, and Julius O. Smith, “The estimation of birdsong control parameters using maximum likelihood and minimum action,” in *Proceedings of SMAC 03*, Stockholm, Sweden, August 2003, Stockholm Music Acoustics Conference, pp. 413–416.
- [31] Tamara Smyth and Julius O. Smith, “The syrinx: Nature’s hybrid wind instrument,” in *CD-ROM Paper Collection*, Cancun, Mexico, September 2002, Pan-America/Iberian Meeting on Acoustics, Student Paper Award.
- [32] Tamara Smyth and Julius O. Smith, “The sounds of the avian syrinx—are they really flute-like?,” in *DAFX 2002 Proceedings*, Hamburg, Germany, September 2002, International Conference on Digital Audio Effects, pp. 199–202.
- [33] Tamara Smyth and Julius O. Smith, “Creating sustained tones with the cicada’s rapid buckling mechanism,” in *Proceedings of NIME 2002*, Dublin, Ireland, May 2002, Conference on New Instruments for Musical Expression, pp. 112–115.
- [34] Patricio De la Cuadra, Tamara Smyth, Chris Chafe, and Han Baoqiang, “Waveguide simulation of neolithic Chinese flutes,” in *Proceedings of ISMA 2001*, Perugia, Italy, September 2001, International Symposium on Musical Acoustics, pp. 181–184.
- [35] Tamara Smyth and Julius O. Smith, “Applications of bioacoustics in physical modeling and the creation of new musical instruments,” in *Proceedings of ISMA 2001*, Perugia, Italy, September 2001, International Symposium on Musical Acoustics, pp. 267–270.
- [36] Tamara Smyth and Julius O. Smith, “A musical instrument based on a bioacoustic model of a cicada,” in *Proceeding of ICMC 2001*, Havana, Cuba, September 2001, International Computer Music Conference, pp. 174–177.

## Delays in Professional/Academic Activity

Maternity leave, March 2008—January 2009 and September 2010–May 2011.