

AJAY KAPUR

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Education

University of Victoria, Victoria, BC, Canada

Doctor of Philosophy in Interdisciplinary Studies combining Electrical and Computer Engineering, Computer Science, Mechanical Engineering, Music & Psychology, November 2007

- Ord and Linda Anderson Interdisciplinary Fellowship. (GPA:A+)
- Dissertation: Digitizing North Indian Performance: Extension and Preservation Using Multimodal Sensor Systems, Machine Learning & Robotics.

Princeton University, Princeton, NJ, USA

Bachelor of Science and Engineering in Computer Science, June 2002

- Graduated with Honors in Computer Science (CS GPA: A-)
- Elected to the Society of Sigma XI for excellence in research.
- Senior Thesis: Invented the Electronic Tabla MIDI Controller. Received the Calvin Dodd MacCracken Senior Thesis/Project Award.

Academic Positions

California Institute of the Arts Valencia, CA 9/2007 - Present

Professor/Director of Music Technology in the School of Music.

Victoria University of Wellington Wellington, New Zealand 7/2009 - Present

Lecturer of Sonic Arts in the New Zealand School of Music.

Awards & Grants

Canada Council of the Arts / National Sciences and Engineering Research Council of

Canada *New Media Initiative* "Intelligent Human-Computer Interaction in Multimedia Performance" Co-Principal Investigator. October 2009.

Research Fund New Zealand *Victoria University of Wellington* "Robotic Musical Design" Principal Investigator. November 2009.

Durfee Foundation Artists' Resource for Completion Grant "Machine Orchestra at SCREAM Festival 2010" Principal Investigator. December 2009.

Subito: American Composers Forum Advancement Grant "Karmetik Machine Orchestra at SCREAM Festival 2010" Principal Investigator. December 2009.

Publications

PUBLISHED BOOKS

Kapur, A., *Digitizing North Indian Music: Preservation and Extension using Multimodal Sensor Systems, Machine Learning and Robotics*. VDM Verlag Dr. Muller, Germany, 2008. ISBN-13: 978-3639060973.

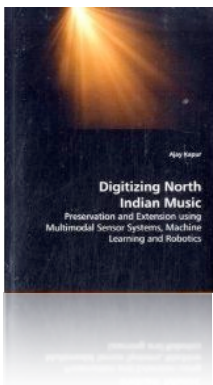
REFEREED JOURNAL PAPERS

Kapur, A., Eigenfeldt, A., Bahn, C. & W.A. Schloss, "Collaborative Composition for Musical Robots", *CITAR Journal of Science and Technology of the Arts*. 1(1) pp. 48-52, 2009

Tzanetakis, G., Kapur, A., Schloss, W. A., & M. Wright, "Computational Ethnomusicology", *Journal of Interdisciplinary Music Studies*. 1(2), pp. 1-24, 2007.

Kapur, A., Wang, G., Davidson, P., & P.R. Cook, "Networked Performance: A Dream worth Dreaming?", *Organised Sound*, 10(3), pp. 209-219, October 2005.

Kapur, A., Davidson, P., Cook, P.R., Driessen, P.F. & W.A. Schloss, "Preservation and Extension of Traditional Techniques: Digitizing North Indian Performance", *Journal of New Music Research*, 34(3), pp. 227-236, September 2005.



Kapur, A., Davidson, P., P.R. Cook, P.F. Driessen, & W.A. Schloss, "Evolution of Sensor-Based ETabla, EDholak, and ESitar", *Journal of ITC Sangeet Research Academy*, vol. 18, Kolkata, India, November 2004.

Kapur, A., Essl, G., Davidson, P. & P. R. Cook, "The Electronic Tabla Controller", *Journal of New Music Research*, 32(4), pp. 351-360, 2003.

REFEREED CONFERENCE PAPERS

Kapur, A. & M. Darling "A Pedagogical Paradigm for Musical Robotics," *Proceedings of the International Conference on New Interfaces for Musical Expression*, Sydney, Australia, June 2010.

Hochenbaum, J., Kapur, A., & M. Wright, "Multimodal Musician Recognition," *Proceedings of the International Conference on New Interfaces for Musical Expression*, Sydney, Australia, June 2010.

Vallis, O., Hochenbaum, J., & A. Kapur, "A Shift Towards Iterative and Open-Source Design for Musical Interfaces," *Proceedings of the International Conference on New Interfaces for Musical Expression*, Sydney, Australia, June 2010.

Hochenbaum, J., Vallis, O., Diakopoulos, D., Murphy, J. & A. Kapur, "On Designing Expressive Musical Interfaces for TableTop Surfaces," *Proceedings of the International Conference on New Interfaces for Musical Expression*, Sydney, Australia, June 2010.

Murphy, J., Kapur, A., & C. Burgin, "The Helio: A Study of Membrane Potentiometers and Long Force Sensing Resistors for Musical Interfaces," *Proceedings of the International Conference on New Interfaces for Musical Expression*, Sydney, Australia, June 2010.

Kapur, A., Darling, M., Wiley, M., Vallis, O., Hochenbaum, J., Murphy, J., Diakopoulos, D., Burgin, C., & T. Yamin, "The Machine Orchestra," *Proceedings of the International Computer Music Conference*, New York City, New York, June 2010.

Diakopoulos, D. & A. Kapur, "ARGOS: An Open Source Application for Building Multi-Touch Musical Interfaces," *Proceedings of the International Computer Music Conference*, New York City, New York, June 2010.

Diakopoulos, D., Vallis O., Hochenbaum J., Murphy, J., & A. Kapur, "21st Century Electronica: MIR Techniques for Classification and Performance." *Proceedings of the International Society on Music Information Retrieval Conference*. Kobe, Japan, October 2009.

Wiley, M. & A. Kapur, "Multi-Laser Gestural Interface: Solutions for Cost-Effective and Open Source Controllers" *Proceedings of the International Conference on New Interfaces for Musical Expression*, Pittsburgh, PA USA. June 2009.

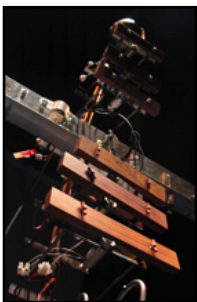
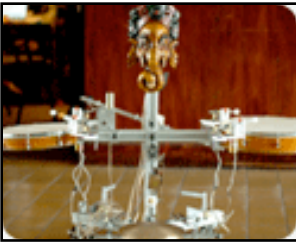
Vallis, O., Hochenbaum, J., & A. Kapur. "Extended Interface Solutions for Musical Robotics", *Proceedings of the IEEE International Symposium on Multimedia*. Berkeley, USA, December 2008.

Kapur, A., Eigenfeldt A., Bahn, C., & W.A. Schloss. "Collaborative Composition for Musical Robots", *Proceedings of the International Conference on Digital Arts, Porto, Portugal, November 2008*.

Eigenfeldt, A., & A. Kapur. "Multi-Agent Multimodal Performance Analysis", *Proceedings of the International Computer Music Conference*, Belfast, U.K., August 2008.

Eigenfeldt, A., & A. Kapur. "An Agent-based System for Robotic Musical Performance", *Proceedings of the International Conference on New Interfaces for Music Expression*, Genoa, Italy, June 2008.

Benning, M., Kapur, A., Till, B., and G. Tzanetakis. "MultiModal Sensor Analysis on Sitar Performance: Where is the Beat?" *Proceeding of the IEEE International Workshop on Multimedia Signal Processing*, Crete, Greece, October 2007.



Kapur, A., Percival, G., Lagrange, M., and G. Tzanetakis. "Pedagogical Transcription for Multimodal Sitar Performance," *Proceedings of the International Conference on Music Information Retrieval*, Vienna, Austria, September 2007.

Benning, M., Kapur, A., Till, B., and G. Tzanetakis. "MultiModal Sensor Analysis on Sitar Performance: Where is the Beat?" *Proceeding of the IEEE International Workshop on Multimedia Signal Processing*, Crete, Greece, October 2007.

Kapur, A., Percival, G., Lagrange, M., and G. Tzanetakis. "Pedagogical Transcription for Multimodal Sitar Performance," *Proceedings of the International Conference on Music Information Retrieval*, Vienna, Austria, September 2007.

Kapur, A., Trimpin, Singer, E., Suleman, A., and G. Tzanetakis. "A Comparison of Solenoid-Based Strategies for Robotic Drumming," *Proceeding of the International Computer Music Conference*, Copenhagen, Denmark, August 2007.

Benning, M., Kapur, A., Till, B., Tzanetakis, G., and P. F. Driessen. "A Comparative Study on Wearable Sensors for Signal Processing on the North Indian Tabla," *Proceedings of the IEEE Pacific Rim Conference on Communications, Computers and Signal Processing*, Victoria, Canada, August 2007.

Kapur, A., Singer, E., Benning, M. S., Tzanetakis, G. and Trimpin. "Integrating Hyperinstruments, Musical Robots, & Machine Musicianship for North Indian Classical Music," *Proceedings of the International Conference for New Interfaces for Musical Expression*, New York, USA, June 2007.

Kapur, A., Tzanetakis, G., Schloss, A., Driessen, P.F., & E. Singer, "Towards the One-Man Indian Computer Music Performance System," *Proceedings of the International Computer Music Conference*, New Orleans, USA, November 2006.

Kapur, A., Tindale, A.R., Benning M.S., & P.F. Driessen, "The KiOm: A Paradigm for Collaborative Controller Design," *Proceedings of the International Computer Music Conference*, New Orleans, USA, November 2006.

Kapur, A. & E. Singer, "A Retrieval Approach for Human/Robot Musical Performance," *Proceedings of the International Conference on Music Information Retrieval*, Victoria, Canada, October 2006.

Tzanetakis, G., Kapur A., & A.R. Tindale, "Learning Indirect Acquisition of Instrumental Gestures using Direct Sensors," *Proceedings of the IEEE Workshop on Multimedia Signal Processing*, Victoria, Canada, October 2006.

Kapur, A., "21st Century Ethnomusicology", *Proceedings of Music and the Asian Diaspora*, Princeton, New Jersey, April 2006. [Invited Keynote Speaker](#).

Tzanetakis, G., Kapur A., & R.I. McWalter, "Subband-based Drum Transcription for Audio Signals," *Proceedings of the IEEE International Workshop on Multimedia Signal Processing*, Shanghai, China, November 2005.

Kapur, A. "Past to Present: Evolution and Preservation of Traditional Techniques using Computer Music Theory", *MusicAcoustica*, Beijing, China, October 2005.

Kapur, A., Kapur, A., Virji-Babul, N., Tzanetakis, G. & P.F. Driessen, "Gesture-Based Affective Computing on Motion Capture Data", *Proceedings of the International Conference on Affective Computing and Intelligent Interaction*. Beijing, China. October 2005.

Kapur, A., Tzanetakis, G., Virji-Babul, N., Wang, G., & P.R. Cook, "A Framework for Sonification of Vicon Motion Capture Data", *Proceedings Of the International Conference on Digital Audio Effects*, Madrid, Spain, September 2005.





Kapur, A., McWalter, R. I., & G. Tzanetakis, "New Music Interfaces for Rhythm-Based Retrieval", *Proceedings of the International Conference on Music Information Retrieval*, London, England, September 2005.

Kapur, A., "A History of Robotic Musical Instruments". *Proceedings of the International Computer Music Conference*. Barcelona, Spain, September 2005.

Driessen, P., Schloss, W. A., Tzanetakis, G., McNally, K. & A. Kapur, "Studio Report: University of Victoria Music Intelligence and Sound Technology Interdisciplinary Centre (MISTIC)". *Proceedings of the International Computer Music Conference*. Barcelona, Spain, September 2005.

Kapur, A., Yang, E.L., Tindale, A.R., & P.F. Driessen, "Wearable Sensors for Real-Time Musical Signal Processing". *Proceedings of the IEEE Pacific Rim Conference*. Victoria, Canada. August, 2005.



Tindale, A.R., Kapur, A., Tzanetakis, G., Driessen, P.F., & W. A. Schloss, "A Comparison of Sensor Strategies for Capturing Percussive Gestures", *Proceedings of the International Conference on New Interfaces for Musical Expression*. Vancouver, Canada, May 2005.

Wang, G., Misra, A., Kapur, A., & P.R. Cook, "Yeah, CHUCK IT=> Dynamic, Controllable Interface Mapping", *Proceedings of the International Conference on New Interfaces for Musical Expression*, Vancouver, Canada, May 2005.

Tindale, A.R., Kapur, A., Tzanetakis, G., & W.A Schloss, "Indirect Acquisition of Percussion Gestures Using Timbre Recognition," *Proceedings of the Conference on Interdisciplinary Musicology*, Montreal, Canada, March 2005.

Kapur, A., Davidson, P., Cook, P. R., Driessen, P., & W. A. Schloss, "Digitizing North Indian Performance", *Proceedings of the International Computer Music Conference*, Miami, Florida, November 2004. [Winner of the Journal of New Music Research Distinguished Best Paper Award ICMC 2004.](#)

Tindale, A., Kapur, A., & I. Fujinaga, "Towards Timbre Recognition of Percussive Sounds", *Proceedings of the International Computer Music Conference*, Miami, Florida, November 2004.

Kapur, A., Benning, M., & G. Tzanetakis, "Query-By-Beat-Boxing: Music Retrieval for the DJ", *Proceedings of International Conference on Music Information Retrieval*, Barcelona, Spain, October 2004.

Tindale, A., Kapur, A., Tzanetakis, G., & I. Fujinaga, "Retrieval of Percussion Gestures Using Timbre Classification Techniques", *Proceedings of International Conference on Music Information Retrieval*, Barcelona, Spain, October 2004.

Kapur, A., Tzanetakis, G., & P.F. Driessen, "Audio-Based Gesture Extraction on the ESitar Controller", *Proceedings of Conference on Digital Audio Effects*, Naples, Italy, October 2004.

Kapur A., "Digitizing to Preserve Traditional North Indian Technique", *Society of Ethnomusicology Northwest Chapter Meeting*, Victoria, BC, February 2004. [Winner: Thelma Adamson Best Student Paper Award SEM 2004.](#)

Kapur, A., Lazier, A., Davidson, P., Wilson, R. S., & P.R. Cook, "The Electronic Sitar Controller", *Proceedings of the International Conference on New Instruments for Musical Expression*, Hamamatsu, Japan, June 2004.

Kapur, A., Essl, G., Davidson, P. & P. R. Cook, "The Electronic Tabla Controller", *Proceedings of the International Conference on New Interfaces for Musical Expression*, Dublin, Ireland, pp. 77-81. May 2002.



DISSERTATION

Kapur, A. "Digitizing North Indian Music: Preservation and Extension Using Multimodal Sensor Systems, Machine Learning and Robotics." *Doctor of Philosophy*, Interdisciplinary combining Departments of Computer Science, Electrical Engineering, Mechanical Engineering, Music & Psychology, University of Victoria, November 2007.

SENIOR THESIS

Kapur, A. "The Electronic Tabla Controller." *Senior Thesis*, Computer Science Department, Princeton University, May 2002. *Winner: Calvin Dodd MacCracken Senior Thesis/Project Award.*

E-JOURNAL PAPERS

Davidson, P., Kapur, A., & P. R. Cook, "A System for Generating Real-Time Visual Meaning for Live Indian Drumming", *Refractory: A Journal of Entertainment Media, Special Edition: The Sounds of Vision, Spectatorship and Aural Perception*, 2004.

Selected Festival / Conference Musical Performances

"KarmetiK Machine Orchestra at SCREAM Festival", REDCAT Walt Disney Concert Hall, Los Angeles, California, Directed by Ajay Kapur & Michael Darling, With Ustad Aashish Khan, Nyoman Wenten, Curtis Bahn, Perry Cook, Carl Burgin, Dimitri Diakopoulos, Jordan Hochenbaum, Jim Murphy, Owen Vallis, Meason Wiley. January 27, 2010.

"The MahaDeviBot Sessions: KarmetiK Collective", The Western Front, Vancouver, BC Canada, with Ajay Kapur, Curtis Bahn & Arne Eigenfeldt. March 13, 2009.

"Concert of NID", National Institute of Design, *Bangalore, India*, with Ajay Kapur (ESitar) & Curtis Bahn (ESitar, EDilruba), December 19, 2008.

"Rajas Gunas", International Conference on Digital Arts, *Porto, Portugal*, November 7, 2008.

"Twilight", Australasian Computer Music Conference, *Sydney, Australia*, July 12, 2008.

"KarmetiK Collective", International Jazz Festival, *Victoria, BC, Canada*, with Ajay Kapur (ESitar, MahaDeviBot), Curtis Bahn (ESitar, EDilruba), Jesse Brown (AstroPhonics), Manj Benning (Drums), June 28, 2008.

"MahaDeviBot Sessions", NUS International Arts Festival, *Singapore*, with Ajay Kapur (ESitar, MahaDeviBot), Curtis Bahn (ESitar, EDilruba), & Arne Eigenfeldt (KinetiK Engine), *February 24, 2008*.

"MahaDeviBot with E-Sitar & E-Dilruba", Carnival of e-Creatiity & Change-Agents Conclave, *New Delhi, India*, with Ajay Kapur (ESitar, MahaDeviBot) & Curtis Bahn (ESitar, EDilruba), February 16, 2008.

"Anjuna's Digital Raga", International Computer Music Conference, *Copenhagen, Denmark*, with Ajay Kapur (ESitar), August 27, 2007.

"KarmetiK Underground with the MahaDeviBot", International Jazz Festival, *Victoria, BC, Canada*, with Ajay Kapur (ESitar, MahaDeviBot), Satnam Minhas (Guitar, Sitar), Jesse Brown (AstroPhonics), Manj Benning (Drums, Bass), & Emily Brown (Vocals), June 30, 2007.

"Digital Sankirna for MahaDeviBot, ESitar and EDilruba", International Conference for New Interfaces for Musical Expression, *New York City, NY, USA*, with Ajay Kapur (ESitar, MahaDeviBot) & Curtis Bahn (ESitar, EDilruba), June 9, 2007.

"Digital Sankirna", NUS International Arts Festival, *Singapore*, with Ajay Kapur (ESitar, MahaDeviBot), March 11, 2007.

"Saraswati's ElectroMagic", International Conference for New Interfaces for Musical Expression, *Hamamatsu, Japan*, with Ajay Kapur (ESitar) Philip Davidson (Interactive Visuals), & Ari Lazier (Electronics), June 4, 2004.

"Saraswati's ElectroMagic", Listening in the Sound Kitchen International Computer Music Festival, *Princeton, NJ, USA*, with Ajay Kapur (ESitar) Philip Davidson (Interactive Visuals), & Ari Lazier (Electronics), November 14, 2003.

"Gigapop Ritual:" A Live Networked Performance Between Princeton University and McGill University, International Conference for New Instruments for Musical Expression, *Montreal, Canada*, with Ajay Kapur (Sitar, EDholak), Perry Cook (DigitalDoo), Ge Wang (EDholak), Philip Davidson (Interactive Visuals), Dan Trueman (Violin, RBow), Tae Hong Park (bass), & Manjul Bhargava (Tabla), May 23, 2003.