

# Dr. Johnty Wang

## Curriculum Vitae

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## Education

2014–2021 **McGill University**, *PhD in Music Technology*.

Thesis Title: Analysis of Wireless Interface Latency and Usability for Digital Musical Instruments  
My Phd research involves software mapping tools and sensor interfaces to facilitate the design of new digital musical instruments (DMIs). Part of this research was funded through an industrial collaboration from 2014–2017 with Infusion Systems, creator of the I-CubeX platform of digital sensing solutions for interactive art and media since 1997. Through research and development work I have created hardware, firmware, and software systems on a number of embedded and desktop platforms. The most recent product, the I-CubeX WiDig, is the world's first commercially available general purpose sensor interface that maps input to MIDI over Bluetooth Low Energy, allowing plug & play connections between custom sensor configurations and multimedia applications running on a large number of modern computing platforms. The thesis focused on the empirical evaluation of wireless protocols and their impact on end-to-end latency between sensor input and audio synthesis in the context of DMIs.

*Advisor:* Prof. Marcelo Wanderley [Marcelo.Wanderley@mcgill.ca](mailto:Marcelo.Wanderley@mcgill.ca) (Music Tech)

*Industry Partner (2014–2018):* Dr. Axel Mulder [Axel@infusionsystems.com](mailto:Axel@infusionsystems.com) (Infusion Systems)

2009–2012 **University of British Columbia**, *MASc in Electrical and Computer Engineering*.

*Thesis title:* Investigation of Gesture Control for Articulatory Speech Synthesis with a Bio-mechanical Mapping Layer

Development of a gesture controlled speech and singing synthesizer used for musical performance.

In order to improve the quality of synthesis, a force activated bio-mechanical mapping layer was implemented to drive an articulatory synthesizer, and the results were and compared with the existing mapping and synthesis system from both the performer and listener perspective. The results show that adding a complex, dynamic bio-mechanical mapping layer introduces more difficulty but allows a greater degree of expression to the performer that is consistent with existing work in the literature. To the novice listener, there is no significant difference in the intelligibility of the sound or the perceived quality.

Alongside the primary research, I worked with collaborators in moving gesture controlled singing synthesis to the mobile-phone space and founded Vox Tactum, an international group of engineers, performers and composers working together to create synthesized music centred around the chamber vocal ensemble metaphor.

*Advisor:* Prof. Sidney Fels [ssfels@ece.ubc.ca](mailto:ssfels@ece.ubc.ca) (ECE)

*Co-supervisors:* Prof. Robert Pritchard, [bob@mail.ubc.ca](mailto:bob@mail.ubc.ca) (School of Music), and Dr Nicolas d'Alessandro [nicolas@dalessandro.be](mailto:nicolas@dalessandro.be), (Project Lead/Visiting Researcher)

2003–2008 **University of British Columbia**, *BASc in Electrical and Computer Engineering*, Minor in Commerce.

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## Teaching Experience

- Fall 2015 **McGill University**, MUMT203 - *Introduction to Digital Audio*, Co-instructor.  
Fall 2018 **McGill University**, MUMT203 - *Introduction to Digital Audio*, Sole instructor.

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## Publications

### Refereed Conference Proceedings

Geise Santos **Johnty Wang**, Carolina Medeiros, Marcelo M. Wanderley, Tiago Tarvres, Anderson Rocha, 2021. "*Comparative Latency Analysis of Optical and Inertial Motion Capture Systems for Gestural Analysis and Musical Performance*". In *Proceedings of New Interfaces for Musical Expression (NIME2021)*

**Johnty Wang**, Eduardo Meneses, Marcelo M. Wanderley, 2020. "*The Scalability of WiFi for Mobile Embedded Sensor Interfaces*". In *Proceedings of New Interfaces for Musical Expression (NIME2020)*

Filipe Calegario, Marcelo M. Wanderley, João Tragtenberg, **Johnty Wang**, John Sullivan, Eduardo Meneses, Ivan Franco, Mathias Kirkegaard, Mathias Bredholt, Josh Rohs 2020. "*Probatio 1.0: collaborative development of a toolkit for functional DMI prototypes*". In *Proceedings of New Interfaces for Musical Expression (NIME2020)*

Filipe Calegario, João Tragtenberg, **Johnty Wang**, Ivan Franco, Eduardo Meneses, Marcelo M. Wanderley, 2020. "*Open Source DMIs: towards a replication certification for online shared projects of digital musical instruments*". In *Proceedings of the International Conference on Human-Computer Interaction (HCI2020)*

Filipe Verduo, Suzuka Kokubu, **Johnty Wang**, Marcelo M. Wanderley, 2020. "*MappEMG: Supporting Musical Expression with Vibrotactile Feedback by Capturing Gestural Features through Electromyography*". in *Proceedings of the International Workshop on Haptic and Audio Interaction Design (HAID2020)*

**Johnty Wang**, Joseph Malloch, Stephen Sinclair, Jonathan Wilansky, Marcelo M. Wanderley, 2019. "*Webmapper: A Tool for Visualizing and Manipulating Mappings in Digital Musical Instruments*". In *Proceedings of Computer Music Multidisciplinary Research (CMMR2019)*,

Eduardo Meneses, **Johnty Wang**, Sergio Freire, Marcelo M. Wanderley, 2019. "*A Comparison of Open-Source Linux Frameworks for an Augmented Musical Instrument Implementation*". In *Proceedings of New Interfaces for Musical Expression (NIME2019)*,

**Johnty Wang**, Axel Mulder, Marcelo M. Wanderley, 2019. "*Practical Considerations for Bluetooth Low Energy as a Wireless Interface*". In *Proceedings of New Interfaces for Musical Expression (NIME2019)*,

Alex Nieva, **Johnty Wang**, Joseph Malloch, Marcelo M. Wanderley, 2018. "*The T-Stick: Maintaining a 12 year-old Digital Musical Instrument*". In *Proceedings of New Interfaces for Musical Expression (NIME2018)*,

**Johnty Wang**, Joseph Malloch, Stéphane Huot, Fanny Chevalier, Marcelo M. Wanderley, 2017. "*Versioning and Annotation Support for Collaborative Mapping Design*". In *Proceedings of Sound and Music Computing (SMC2017)*,

**Johnty Wang**, Robert Pritchard, Bryn Nixon, Marcelo M. Wanderley, 2017. "*Explorations with Digital Control of MIDI-enabled Pipe Organs*". In *Proceedings of Sound and Music Computing (SMC2017)*,

Aura Pon, **Johnty Wang**, Laurie Radfordand, and Sheelagh Carpendale, 2015. "Womba: A Musical Instrument for an Unborn Child". In *Proceedings of New Interfaces for Musical Expression (NIME2015)*,

Ian Stavness, C Antonio Sánchez, John Lloyd, Andrew Ho, **Johnty Wang**, Sidney Fels, Danny Huang, 2014. "Unified skinning of rigid and deformable models for anatomical simulations". *SIGGRAPH Asia 2014 Technical Briefs*,

**Johnty Wang**, Nicolas d'Alessandro, Aura Pon and Sidney Fels, 2013. "PENny: An Extremely Low-Cost Pressure-Sensitive Stylus for Existing Capacitive Touchscreens". In *Proceedings of New Interfaces for Musical Expression (NIME2013)*,

**Johnty Wang**, Nicolas d'Alessandro, Sidney Fels and Robert Pritchard, 2012. "Investigation of Gesture Controlled Articulatory Vocal Synthesizer using a Bio-Mechanical Mapping Layer". In *Proceedings of New Interfaces for Musical Expression (NIME2012)*,

Nicolas d'Alessandro, Aura Pon, **Johnty Wang**, David Eagle, Ehud Sharlin and Sidney Fels, 2012. "A Digital Mobile Choir: Joining Two Interfaces towards Composing and Performing Collaborative Mobile Music". In *Proceedings of New Interfaces for Musical Expression (NIME2012)*

**Johnty Wang**, Vincent Tsao, Sidney Fels and Benny Chan, 2011. "Tippy the Teleconference Robot". In *Proceedings of the 10th international conference on Entertainment Computing (ICEC2011)*,

Nicolas d'Alessandro, **Johnty Wang**, Robert Pritchard and Sidney Fels, 2011. "Bringing bio-mechanical modelling of the OPAL complex as a mapping layer for performative voice synthesis". In *Proceedings of International Seminar on Speech Production (ISSP2011)*,

**Johnty Wang**, Nicolas d'Alessandro, Robert Pritchard and Sidney Fels, 2011. "SQUEEZY: Extending a Multitouch Screen with Force Sensing Objects for Controlling Articulatory Synthesis". In *Proceedings of New Interfaces for Musical Expression (NIME2011)*,

Nicolas d'Alessandro, Robert Pritchard, **Johnty Wang**, and Sidney Fels, 2011. "Ubiquitous Voice Synthesis: Interactive Manipulation of Speech and Singing on Mobile Distributed Platforms". In *Proceedings of the 2011 annual conference extended abstracts on Human factors in computing systems (CHI EA '11)*,

Robert Pritchard, Sidney Fels, Nicolas d'Alessandro, Marguerite Witvoet, **Johnty Wang**, Cameron Hassall, Helene Day-Fraser, and Meryn Cadell, 2011. "Ubiquitous Voice Synthesis: Interactive Manipulation of Speech and Singing on Mobile Distributed Platforms". In *Proceedings of the 2011 annual conference extended abstracts on Human factors in computing systems (CHI EA '11)*,

Zoltan Foley-Fisher, Vincent Tsao, **Johnty Wang** and Sidney Fels, 2010. "NetPot: easy meal enjoyment for distant diners". In *Proceedings of the 9th international conference on Entertainment Computing (ICEC2010)*,

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## Industry Work Experience

- Feb 2019 – Jun 2020 **Emotional Imaging, Incorporated, Software Developer.**  
Development and Integration of the Emotional Imaging Composer, a real-time environment for translating biosignals into an interactive environment. Debugged and implemented sensor interfaces, machine learning pipeline for emotion detection and end-user interface for composition and performance.
- Sep 2014 – Sep 2018 **Infusion Systems, Software/Hardware Developer, NSERC-IIS.**  
Hardware and software development for I-CubeX family of sensors used for digital interactive art. Circuit design, interface driver development, website design and promotional material generation (videos, photos), user configuration and application development, product shipping and customer service.

- Nov 2013 – Sep 2014 **HPlus Technology, Software Developer.**  
Developing middleware suite for new media researchers working with movement and gesture. Integration of sensing devices, recognition algorithms and output modules. Cross platform integration and testing.
- June 2012 – May 2013 **UBC Theatre Department, Software Developer (on contract).**  
Designed and implemented a prototype stage illumination system using multiple digital projectors with visual editing capabilities, cue management and MIDI/DMX interface to existing lightning equipment.
- May 2005–Aug 2005 **Electronic Arts Canada, Co-op Software Developer.**  
Developed an XML based audio game asset management system.
- May 2004–Dec 2004 **Harman/Becker Automotive Systems/Wavemakers, Co-op Software Developer.**  
Designed, implemented and tested a multiple waveform viewing and analysis application for speech synthesis and recognition research (C++/MFC). Integrated in-house DSP tools into application to allow processing and analysis of audio samples.

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## Patents

- 2021 **US Patent Pending**, Jordan Deitcher, Michel Benovoy, Johnty Wang - The Emotional Imaging Composer.
- 2015 **US10485436B2**, Aura Pon and Johnty Wang, Sound-Generating Device for In-Utero Interactions with a Developing Fetus.

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## Miscellaneous

- Jan 2013–May 2013 **Mentorship**, *Mentor for Mellon Student Artist in Residence Grant recipient developing a gesture controlled vocal effects processor for musical performance*, Colorado College.
- Aug 2012–Sep 2012 **Artist in Residence**, *CitySonics Festival*, City of Mons, Belgium, Designed and constructed an interactive sonic installation for the annual festival.
- Feb 2012 **Finalist**, *Margaret Guthman Music Instrument Competition*, Atlanta, GA, Presented the ChoirMob+Vuzik system, mobile phone choir mediated by a large screen display..

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## Concerts and Performances

Aura Pon, Nicolas d'Alessandro and **Johnty Wang**, 2012. Aura Pon - *Concordia Discors*, for Mixed Phase Synthesis and Mobile Phone Choir. *International Computer Music Conference (ICMC2012)*, Ljubljana, Slovenia.

Aura Pon, Nicolas d'Alessandro **Johnty Wang** and Martin Ritter, 2012. Aura Pon - *Intertwine*, for Vuzik and Mobile Phone Choir. *Sonic Boom Festival*, Vancouver, Canada.

Aura Pon, Nicolas d'Alessandro, **Johnty Wang** and Antoine Maisonhaute, 2012. Aura Pon - *Intertwine*, for Vuzik and Mobile Phone Choir. *Audio Mostly 2012*, Corfu, Greece.

Nicolas d'Alessandro and **Johnty Wang**, 2011. *Errances*, Improvisation for Gesturally Controlled Synthetic Voices. *VOX concert*, Vancouver, Canada.

Aura Pon, Nicolas d'Alessandro **Johnty Wang** and Martin Ritter, 2011. Aura Pon - *Intertwine*, for Vuzik and Mobile Phone Choir. *VOX concert*, Vancouver, Canada.

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## Other

### Professional Musical Experience

- Jan 2011 - Aug 2011 Theatre Under the Stars (Musical Production): Singing in the Rain. Rehearsal Pianist
- May 2011 - Aug 2011 Theatre Under the Stars (Musical Production): Singing in the Rain (Pit Musician: Piano and Synth
- May 2010 - Aug 2010 Theatre Under the Stars (Musical Production): Annie. (Pit Musician: Auxiliary Percussion and Synth
- 2003 - 2005 Private Piano Teacher: taught students up to RCM grade 5

### Amateur Musical Experience

- 2015 - 2017 The Church of St Andrew and St Paul, Montreal: Volunteer Chorister
- 2003 - 2014 Ryerson United Church, Vancouver: Volunteer Chorister; Piano/organ accompanist
- 2010 - 2011 West Coast Symphony Orchestra (Percussion)
- 2003 - 2005 UBC Symphonic Wind Ensemble (Percussion)

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### Certifications

- Industry Canada** Amateur Radio (Basic Qualification)
- Associated Board Royal Schools of Music** Advanced Certificate, Piano
- Trinity College London** Grade 6, Classical Guitar