Curriculum Vitae
David Gerhard, Ph.D.

Professor and Head, Department of Computer Science
Associate Member, Faculty of Media, Art, and Performance
Director, Rough Music and Audio Digital Interaction Lab (aRMADILo)

University of Regina, Regina, SK Canada S4S 0A2

office:	College West 308.8
phone:	306.585.5227
web:	http://www.davidgerhard.ca
email:	david.gerhard@uregina.ca

Educational Background

Ph.D. 2003, Computing Science, Simon Fraser University, Burnaby, BC.
Thesis: *Computationally Measurable Differences Between Speech and Song.*

B.Sc.Comp.E. (Distinction) 1996, Computer Engineering, University of Manitoba, Winnipeg, MB.
Thesis: *Lossy Compression of Head and Shoulder Images Using Zerotrees of Wavelet Coefficients.*

Awards and Nominations

2018 and 2014 Paragon award of Innovation (University of Regina / Regina Chamber of Commerce)

2016 University of Regina Alumni Association Award for Excellence in Teaching.

2015 Nomination for the 3M National Teaching Fellowship.

2014 President's Award for Teaching Excellence (University of Regina)

2014 Award for Innovation in Teaching (University of Regina)

2013 with the Darke Hall Five: President's Awards for Service Excellence: Spirit Award (University of Regina)

Relevant Employment Experience

Department Head, Computer Science (2019–current) University of Regina.

Professor of Computer Science (2003–current), University of Regina. Associate member, Faculty of Media, Art, and Performance. 2003: Tenure granted 2007, promotion to Associate 2008, promotion to Full 2016.

Syndicated Columnist and Media Expert. (2006–current) TV, Radio, Print, Online. . Local and National.

Co-founder; Co-owner; Head of research and applied innovation. (2010–2018) Shiverware Interactive Software Developments, Inc (Startup Company, mobile apps, UX, IoT).

Sabbatical Leaves July 2017–December 2017; July 2009–December 2009

Parental Leave October 2008–March 2009

Research Funding: Awarded

President's Teaching and Learning Scholars Program *Virtual Reality in the classroom: Augmented Learning* D. Gerhard ($3971, 2019)

Private Donation *in support of Virtual Reality Research* D. Gerhard ($5000, 2019)

Public Works Canada and the Royal Canadian Mounted Police *Longitudinal Study of Operational Stress Injuries (OSIs) for RCMP.* R. N. Carleton and 17 others ($8.8 Million 2017-2021)

Own the Podium Innovations for Gold *Swimming Analytics.* J. Barden and D. Gerhard ($100,000 per grant, awarded in 2017, 2016, and 2015)

Canadian Institutes of Health Research (CIHR) *Enhancing internet-delivered cognitive behavioural therapy.* H. Hadjistavropoulos, 13 co-applicants ($971,552, 2017-2021)

Saskatchewan Health Research Foundation (SHRF) Collaborative Innovation Development Grant. *Developing and Evaluating Online Treatment for Children with Anxiety.* L. Loutzenhiser and 8 others ($39,455, 2016)

TD Friends of the Environment Foundation *High Altitude Balloon Experiment Program* D. Gerhard and S. Cheng ($10,000, 2016)

NSERC PromoScience *High Altitude Balloon Experiment Program.* D. Gerhard and S. Cheng ($10,500, 2014)

President's Teaching and Learning Scholars Program *Development of an Instructional On-line Homework and Test System for Introductory Organic Chemistry.* D. Gerhard and R. S. Murphy ($5000, 2014)

President's Teaching and Learning Scholars Program *Student Centred Self-Assessment for Computer-based Skills Development.* D. Gerhard and JT. Yang ($5000, 2014)

CBC Ideas production grant *3d printing: the revolution will be extruded.* D. Gerhard ($7500, 2013)

Independent Research Service Agreement *Fractal Harp/Cecile Denis.* ($7500, 2012)

SSHRC General Research Grant Fund with RV Knowles ($5000, 2011)

President's Teaching and Learning Scholars Program *iPad orchestra.* ($4000, 2012)

President's Teaching and Learning Scholars Program *Audio production software.* ($4000, 2012)

Natural Sciences and Engineering Research Council Discovery Grant *Audio signal processing* ($17,000 per year, 2004-2007; 2007-2012)

SSHRC General Research Grant Fund with J. Barden, R. Kell, and D. Malloy, Kinesiology ($5000) 2006

U of R Transdisciplinary Fund: Competition B: Small Projects (3 awards, $2500 each) 2005
- with C. Marsh, Music and C. Fox, Media Production and Studies
- with J. Barden, Kinesiology; D. Hepting, Computer Science; K. Irwin, Theater; A.K. Brown, Education; and R.V. Knowles, Visual Arts
- with P. Elliott, Journalism; P. Fong, Computer Science; D. Hepting, Computer Science; R. Petry, Philosophy and Classics (Luther); and C. Polster, Sociology

University of Regina Technology Enhanced Learning with D. Hepting ($32,000) 2005

Canadian Foundation for Innovation Ongoing New Opportunities Fund with D. Slezak ($59,655), 2004

Natural Sciences and Engineering Research Council Research Tools and Instruments with X.-D. Yang, D.H. Hepting, H. Hamilton and B. Yang ($44,594) 2004

Government of Canada Western Economic Diversification with X.-D. Yang, D.H. Hepting, and H. Hamilton ($97,000) 2004

Teaching Experience: Computer Science, University of Regina

(Complete teaching dossier and course evaluations available on request.)

For all courses I am the sole instructor (unless noted), often in charge of a teaching team consisting of lab instructors, teaching assistant/markers, and supplemental instruction facilitators.

Course	Number	Years taught	Notes
Core Courses			
Digital Systems Architecture	CS 301	2007, 2010–2020	§
Virtual Reality	CS 458	2020	⋆‡ ↺390AP
Introduction to Digital Systems	CS 201	2008, 2010, 2016–2019	§
Programming & Problem Solving for Natural Sciences	CS 110	2009, 2011–2017	
Risk & Reward in the Information Society	CS 280	2007, 2011, 2018	⋆
The iPad Orchestra	CTCH 202	2012–2016	co-taught (3)
Advanced Hardware Architecture	CS 401	2016	§
Building Interactive Gadgets	CS 207	2011–2014	⋆
Software Development Project	CS 476	2011, 2012	
Introduction to Computer Audio	CS 327	2008, 2010	⋆‡ ↺490BX
Elements of Computer Hardware and Software	CS 250	2005–2007	→ CS 201
Human Computer Communications	CS 305	2005	
Computer Architecture	CS 400	2004, 2005, 2006	→ CS 301
Special Topics Courses			
Topics in Virtual Reality	CS 390AP	2019	⋆
Interactive Hardware	CS 490CV	2012, 2017	⋆‡
Scientific Visualization	CS 491AA	2016, 2017	
Parallel Computer Architecture	CS 490AD	2016	
Mobile Development	CS 490CW	2012, 2014	⋆
Social and Ethical Implcations of Computing	CS 490BF	2012	⋆
Theatre Technology	CS 290AI	2011	⋆
Computational Models in Music	CS 490CQ	2008	⋆
Topics in Societal and Ethical Considerations	CS 290AG	2006	⋆
Computer Audio Topics	CS 490BX	2004–2007, 2010–2014	⋆‡
Graduate Courses			
Virtual Reality	CS 858	2020	⋆‡
Interactive Hardware	CS 890EH	2012, 2017	⋆‡
Interactive Hardware	CS 807	2013-2016	⋆ ↺890EH
Computer Audio	CS 827	2008, 2010, 2014	⋆‡ ↺890CG
Computer Audio Topics	CS 890CG	2004, 2007, 2011, 2014	⋆‡
Electronics for Interactivity	ART 820AH	2012	
Pattern Classification	CS 890DR	2008	
Pattern Recognition	CS 835	2004, 2006	

⋆ I created and developed this course
→ Course was replaced by an updated core coruse
↺ Reworking of a special topics course into a core course
§ I spearheaded the redevelopment of the computing hardware curriculum stream in 2010
‡ Graduate and Undergrad taught together

Most Significant Research Contributions

Signal Analysis using Periodicity applied to Sound, Motion, and Biometrics This work relates to the ongoing exploration of low-level analytical techniques to extract music information from acoustic signals, including [58] which has become a common reference for pitch detection, cited more than 200 times, and the primary reference for the "Pitch Detection Algorithm" article in Wikipedia.

Current projects include multi-pass adaptive frequency estimation, in which frequency adaptive analysis is used to reshape a second-pass analysis window for more accurate placement, size, and scale of partials [19, 30, 9]. This technique has been expanded to apply to non-audio periodic signals such as human swimming [8] and running [20], and is currently being applied to human biometrics such as ECG and trans-cranial doppler. Previous work in this area includes constraint-based guitar chord analysis [11, 36] and analysis of human vocal utterances [45, 46].This work is funded by NSERC discovery grants.

New Interfaces and Devices for Artistic Practice This work includes implementation of various interfaces to audio/musical and artistic software; creating new hardware and embedded creativity solutions; and studies of human-computer interactions with creativity interfaces, including how humans interact with artistic hardware and software. Recent publications relating to this work include a study and subsequent framework development relating to isomorphic keyboard layouts [22,23, 27, 33], now an iPhone and iPad app created through my start-up company (see also "Contributions to practical applications of knowledge"); the Instant Instrument Anywhere [31], an interactive electronic object based on the arduino platform which, when attached to a metal surface, uses that surface as a capitative touch sensor and as an acoustic resonator; a study and implementation of Focus-Plus-Context interfaces for audio editing [12, 39]; and a musical instrument and composition based on vocal analysis and synthesis [38].

Results from this work are also disseminated in alternative venues including traditionally artistic venues (see also in "Presentations, shows, and Lectures"). A suite of new musical instruments and interactions (for example, the Rainboard, which can be seen in my TEDxRegina talk from 2012 and won the University of Regina's 2014 Award of Innovation) are actively being developed based on this research. This research was initially funded by a 2004 CFI grant establishing the Rough Music and Audio Digital Interaction Lab (aRMADILo); NSERC discovery grants, and local grants from the University of Regina including the SSHRC president's fund and the President's Teaching and Learning Fund.

Collaboration Systems for Creativity Related to, but distinct from, the development of interactive interfaces, is the development of collaboration systems and techniques for use among artists of different disciplines, as well as between artists and technologists, and how this changes the nature of creativity [21]. Recent work includes a Q-learning-based adaptive collaborative composition system [26]; a system which allows for musical score distribution and annotation to digital music stands [32], as well as a system to track and measure the gestures of a conductor's baton using the Wii remote, either for training or performance applications [34, 35] . Additional work in this area includes a study of open-source collaboration [37], which is critical since a majority of art and technology collaboration techniques are released as open source. This work is funded by NSERC discovery grants.

The National High-Altitude Balloon Program, Canada-Wide Experiment This national program of Science promotion and science discovery started as a component of my CS 207 class, and has grown nation-wide as it has become associated with Science Rendezvous.

"Since 2013, a team of students at the University of Regina have been launching helium-filled stratospheric balloons, gathering data and taking photographs from the edge of space using easy-to- program do-it-yourself electronics. In the past, launching a space balloon (and retrieving the payload afterward) has been difficult and expensive. We have developed a kit and set of instructions to make it easy for anyone to perform this experiment. As an avenue for science promotion, participating in launching and retrieving a space balloon and analyzing the data and images has enormous potential. The National High Altitude Balloon Experiment (HABEX) program will enable elementary and high schools, science centers, and other organizations across Canada to explore the troposphere and the stratosphere and share their findings with each other and the world."

Research Contributions and Practical Applications

In the publication venues listed below, contribution is indicated by author order, with the first author typically contributing the most to the work. Students have first authorship when they have done more than half the work. All citation counts are from Google Scholar (2019). 750 citations; H-index 11; i10-index 18.

Most Cited Contributions:
[**57**] Sole author, cited by 314; [**58**] Sole author, cited by 53; [**54**] Sole author, cited by 41; [**34**] Two authors, cited by 26; [**51**] Sole author, cited by 25; [**55**] Sole author, cited by 24; [**33**] Three authors, cited by 16; [**36**] Three authors, cited by 14;

Documentaries

[1] D. Gerhard (2013) The Revolution will be Extruded. *CBC Ideas* 1-hour radio documentary on the history and future of 3d printing. Multiple airings across Canada and around the world on Sirius and PRI.

Journals and Book Chapters

[2] S. Cheng , D. Gerhard, F. Gendron, and V. Ziffle. (2019) Incorporation of High-Altitude Balloon Experiment in High School Science Classrooms. Creative Education, 10, 262-272. doi: 10.4236/ce.2019.102021.

[3] S. Cheng, F. Gendron, V. Ziffle, and D. Gerhard, (2019) Engaging Indigenous Youth in Science with the High-Altitude Balloon Experiment. Creative Education, 10, 319-331. doi: 10.4236/ce.2019.102026.

[4] J. Desnoyers-Stewart, D. Gerhard, and M. Smith. (2019) Augmenting Virtuality with a Synchronized Dynamic Musical Instrument: A User Evaluation of a Mixed Reality MIDI Keyboard. Lecture Notes in Computer Science 11265: 540–557.

[5] J.Desnoyers-Stewart, D. Gerhard, M. Smith. (2018) Augmenting a MIDI Keyboard Using Virtual Interfaces. JAES Volume 66 Issue 6 pp. 439-447. doi: 10.17743/jaes.2018.0034

[6] M. Brahms, Y. Zhao, D. Gerhard, J. Barden. Stride length determination during overground running using a single foot-mounted inertial measurement unit (IMU). Journal of Biomechanics. Volume 71, 11 April 2018, 302–305. doi: 10.1016/j.jbiomech.2018.02.003

[7] J. Ubbens and D. Gerhard (2015). Information Rate for Fast Time-Domain Instrument Classification. Lecture Notes in Computer Science 9617: 297–308.

[8] Y. Zhao, D. Gerhard, J. Barden (2015). Periodicity-based swimming performance feature extraction and parameter estimation. Sports Engineering. 18: 177–189.

[9] Y. Zhao, D. Gerhard (2014) Waveform-Aligned Adaptive Windows for Spectral Component Tracking and Noise Rejection. Lecture Notes in Computer Science 8905: 463–480.

[10] D. Gerhard (2014) Three Degrees of "G"s: How an Airbag Deployment Sensor Transformed Video Games, Exercise, and Dance. MC Journal of media and culture. 12/2013; 16(6).

[11] D. Gerhard, X. Zhang (2010) Chord Analysis Using Ensemble Constraints. *In* Advances in Music Information Retrieval. Ras, Zbigniew W. & Wieczorkowska, Alicja (Eds.) ISBN 978-3-642-11673-5.

[12] D. Gerhard, B. Park, and J. Ellis (2008). Focus-Plus-Context Audio Interaction Design. Computer Music Modelling and Retrieval, Lecture Notes in Computer Science. 453–477.

Articles in Refereed Conferences

[13] J. Desnoyers-Stewart, D. Gerhard, and M. Smith. (2017) Mixed Reality MIDI Keyboard. In Proceedings of the 13th International Symposium on CMMR, Porto, Portugal, 11 pages.

[14] J. Desnoyers-Stewart, D. Gerhard, and M. Smith. (2017) Mixed Reality MIDI Keyboard Demonstration. In Proceedings of AM 17, London, United Kingdom, 2017, 5 pages.

[15] J. Barden, D. Gerhard, O. Vila Dieguez, J. Ubbens and B. Park (2017). The Effect of Breathing Asymmetry on Stroke Periodicity in Competitive Front-Crawl Swimming (poster). Own the Podium SPIN summit 2017.

[16] H. Hu and D. Gerhard (2017). Appropriate Isomorphic Layout Determination Using 3-D Helix Lattices. 43rd International Computer Music Conference, Shanghai. Pages 472-475.

[17] H. Hu and D. Gerhard (2016). WebHexIso: A Customizable Web-based Hexagonal Isomorphic Musical Keyboard Interface. 42nd International Computer Music Conference, Utrecht.

[18] H. Hu, B. Park and D. Gerhard (2015). Mapping Tone Helixes to Cylindrical Lattices using Chiral Angles. 41st International Computer Music Conference, Texas.

[19] Jordan Ubbens and David Gerhard (2015). Information Rate for Fast Time-Domain Instrument Classification. 11th Annual Conference on Computer Music Multidisciplinary Research.

[20] C. Brahms, Y. Zhao, J. Barden, D. Gerhard (2015). Concurrent Validity of a Foot-Mounted IMU to Estimate Stride Length in Running. 20th Annual Congress of the European College of Sport Science.

[21] Jason Cullimore and D. Gerhard (2015). The Virtuoso Composer and the Formidable Machine: A Path to Preserving Human Compositional Expression. 12th Sound and Music Computing Conference.

[22] Hanlin Hu, Brett Park, David Gerhard. (2015) On the Musical Opportunities of Cylindrical hexagonal Lattices: Mapping Flat Isomorphisms Onto Nanotube Structures. Sound and Music Computing. 12th Sound and Music Computing Conference.

[23] Hanlin Hu, Brett Park, D. Gerhard (2015). Mapping Tone Helixes to Cylindrical Lattices using Chiral Angles. 41st International Computer Music Conference.

[24] Yang Zhao, Markus Brahms, David Gerhard, John Barden (2015). Stance Phase Detection for Walking and Running using an IMU Periodicity-Based Approach. International Symposium on Computer Science in Sport (225-232). Springer

[25] Stephen Cheng and David Gerhard (2015). The National High Altitude Balloon Experiment: Engaging High School Students to do Citizen Science. 2nd International Conference on STEM Education and Innovation. Saskatoon.

[26] J. Cullimore, H. Hamilton, D. Gerhard (2014). Directed Transitional Composition for Gaming and Interactive Music Using Q-Learning. First joint ICMC/SMC conference.

[27] B. Park, D. Gerhard (2013) Discrete Isomorphic Completeness & a Unified Isomorphic Layout Format. *SMC13*.

[28] B. Park and D. Gerhard (2013) Rainboard and Musix: Building dynamic isomorphic interfaces. 13th International Conference on New Interfaces for Musical Expression.

[29] R. Caines, D. Gerhard, P. Minevich (2013) The University of Regina iPad Orchestra: Engaging mobile audiovisual technologies in music teaching and learning. *Teaching and Learning to the Power of Technology.*

[30] Y. Zhao and D. Gerhard. Improved Spectral Analysis Using Waveform-Aligned Adaptive Windows. *2013 Computer Music Modelling and Retrieval* Marseille.

[31] D. Gerhard, Brett Park (2012). Instant Instrument Anywhere: A Self-Contained Capacitive Synthesizer. *12th International Conference on New Interfaces for Musical Expression (NIME12)*, Ann Arbor, Michigan. 516–519.

[32] Nathan Magnus, D. Gerhard (2012). Musician Assistance and Score Distribution (MASD). *12th International Conference on New Interfaces for Musical Expression (NIME12)*, Ann Arbor. 184–187.

[33] Steven Maupin, D. Gerhard, Brett Park (2011). Isomorphic Tessellations for Musical Keyboards. *Proc. Sound & Music Computing Conference.* 2011, Padova, Italy. 471–478.

[34] Lijuan Peng and D. Gerhard (2009). A Wii-based Gestural Interface for Orchestral Conducting Education. *First Int. Conf. on Computer Supported Education (CSEDU)*, Lisbon. 406–409.

[35] Lijuan Peng and D. Gerhard (2009). A Wii-based gestural interface for computer conducting systems. *Ninth International Conference on New Interfaces for Musical Expression (NIME)*, Pittsburgh, PA. 155–158.

[36] Xinglin Zhang and D. Gerhard (2008). Chord Recognition using Instrument Voicing Constraints. *International Conf. Music Information Retrieval (ISMIR)*, Philadelphia, 33–38.

[37] Daryl Hepting , Lijuan Peng, Tim Maciag, D. Gerhard and Brien Maguire. (2008). Creating synergy between usability courses and open source software projects. ACM SIGCSE Bulletin. ACM Press. 120–123. (Reviewed Professional Magazine article)

[38] D. Gerhard and Ellen Moffat (2007). convocare_consonare: A Duet in Four Voices. *International Computer Music Conference*, Copenhagen. 477–484.

[39] D. Gerhard and Jarrod Ellis (2007). Focus-Plus-Context Displays for Audio Interaction. *International Conference on Computer Music*, Copenhagen. 405–412.

[40] Brien Beattie, Garrett Nicolai, D. Gerhard, Robert J. Hilderman (2007). Pattern Classification in No-Limit Poker: A Head-Start Evolutionary Approach. *Canadian Conference on AI*. 204–215.

[41] JJ Nixdorf and D. Gerhard (2006). RITZ: A real-time tool for interactive spatialization. Proc. ACM Multimedia, Santa Barbara, pp 687–690.

[42] JJ Nixdorf and D. Gerhard (2006). Real-time sound source spatialization as used in *challenging bodies*: implementation and performance. *International Conference on New Interfaces for Musical Expression (NIME06)*, Paris, 318–321.

[43] D. Gerhard and Daryl H. Hepting (2005). A framework for personalization of interactive sound synthesis. International Computer Music Conference, Barcelona, Spain.

[44] Daryl H. Hepting, D. Gerhard, Joel Rathgaber (2005). Realtime interactive multimedia performance. ACM SIGGRAPH 2005, Los Angeles, California.

[45] D. Gerhard (2005). Multiresolution pitch analysis of talking, singing, and the continuum between. Rough Sets, Fuzzy Sets, Data Mining and Granular Computing), Lecture Notes in Artificial Intelligence (LNAI) 3642, Vol II, pp 294–303.

[46] D. Gerhard (2005). Pitch track target deviation in natural singing. Sixth International Conference on Music Information Retrieval (ISMIR) Queen Mary, U. of London, pp 514–519.

[47] Lu Meng and D. Gerhard (2005). Acoustic ray tracing for 3D environment simulation. Proc. Canadian Acoustical Assoc Acoustics Week in Canada, London, Ontario.

[48] D. Gerhard, Daryl H. Hepting, M. Mckague. (2004). Exploration of the correspondence between visual and acoustic parameter spaces. International Conference on New Interfaces for Musical Expression, Hamamatsu, Japan.

[49] D. Gerhard and Daryl H. Hepting (2004). Cross-modal parametric composition. International Computer Music Conference (ICMC04), Miami, Florida, IEEE. 505–512.

[50] D. Gerhard and Daryl H. Hepting (2004). Triangularhythmic. Digital Jukebox, International Computer Music Conference (ICMC04), Miami, Florida, IEEE.

[51] D. Gerhard (2002). Pitch-based acoustic feature analysis for the discrimination of speech and monophonic singing. Canadian Acoustics 30 (3), 152-153.

[52] D. Gerhard (2002). A human vocal utterance corpus for perceptual and acoustic analysis of speech, singing and intermediate vocalizations (abstract). J. Acoustical Soc. of America, 112(5):2264.

[53] D. Gerhard (2002). Perceptual features for a fuzzy speech-song classification (abstract). International Conf. on Acoustics, Speech and Signal Processing, volume IV, page 4160.

[54] D. Gerhard (2000). Audio signal classification: an overview. *Canadian AI*, 45:4–6, Winter 2000.

[55] D. Gerhard. Audio visualization in phase space. In *Bridges: Mathematical Connections in Art, Music and Science*, pages 137–144, Aug. 1999.

[56] D. Gerhard. Automatic interval naming using relative pitch. In *Bridges: Mathematical Connections in Art, Music and Science*, pages 37–48, Aug. 1998.

Non-refereed contributions

[57] D. Gerhard (2003). Pitch extraction and fundamental frequency: history and current techniques. Technical Report TR 2003-05, Univ. of Regina Computer Science. (26 pages).

[58] D. Gerhard (2003). Audio signal classification: history and current techniques. Technical Report TR 2003-06, Univ. of Regina Computer Science. (22 pages).

[59] D. Gerhard (1997) Computer music analysis. Simon Fraser Univ. School of Comput. Sci. Tech. Rep. CMPT TR, 97-13.

Contributions to practical applications of knowledge

In 2010 I founded Shiverware Interactive Software Developments Inc. From 2010-2018 I was co-owner and Head of research and applied innovation. I and two colleagues started shiverware to bring interactive media research to market. Based on the work published in [33] we have created an iPhone/iPad application (Musix Pro) and made it available for purchase, showing a direct influence of this technology development on the economy of Canada. To date more than 35,000 individual copies of the software have been downloaded or purchased for a nominal fee, and more than 2000 people use Musix Pro at least once a week. Shiverware has a half-dozen apps on the store, and works directly with private companies to develop mobile technology solutions. www.shiverware.com

In 2012 I co-founded of CrashBang Labs Inc, a registered non-profit hackerspace/makerlab based in Regina, SK. CrashBang Labs serves to bring together artists and DIY technologists in the local community, to find ways of supporting the growing Maker movement. www.crashbanglabs.net

Other Evidence of Impact and Contributions

Participation in Community, Consulting Activities

- Community Association Memberships: Computer Science Teachers Association of Saskatchewan, Association for Computing Machinery, Institute for Electrical and Electronics Engineers, International Computer Music Association, Canadian Acoustical Association, International Association for the Study of Popular Music.

- emcee, UR Change Makers 2019

- UR Rep, Sask Tech Education K-12 working group, (2015-2018)

- Head of research and applied innovation: Shiverware Interactive Software Developments Inc. (2010–2018)

- Publicity Chair, 2013 AI / GI / CRV conference.

- CrashBang Labs, Inc. Executive Team. Vice President (2012), President (2013)

- Consultant on Interactive Exhibits: Government of Saskatchewan (government house museum) and Museums of Saskatchewan. 2012

- Reviewer: the International Computer Music Conference (2004-current);the International Conference on New Interfaces for Musical Expression (2007-current), the International Conference on Music Information Retrieval (2005-current); the Computer Music Journal (2004-2008); Computational Statistics and Data Analysis (2006); Signal Image and Video Processing (2007); the Toronto Electroacoustic Symposium (2010-2012).

- Grant reviewer: NSERC Discovery Grants (2007, 2008); Strategic Projects (2010).

- Tutorials Chair, 2006 International Conference on Music Information Retrieval.

Presentations, Shows and Lectures

- Virtual Reality: Past failures, current hype and future vision. Science Pub Series (2019)

- Technology Education, University of Regina graduate teaching certificate. (2018)

- Computing and the Future of Everything. Invited Keynote speaker, STEMfest, Saskatoon, Canada. (2015)

- Space Balloons and Computer Science. Sciematics, Regina, Canada (2015)

- High Altitude Balloon Program, the Canada-Wide Experiment. Presentation to multiple groups including Science Rendezvous National and 4H National.

- 3D printing and modelling. Centre for Teaching and Learning Seminar, Regina, Canada. (2015)

- Information Rate for Fast Time-Domain Instrument Classification. CMMR 2015

- The Virtuoso Composer and the Formidable Machine. SMC 2015

- Cylindrical hexagonal Lattices. SMC 2015

- Creative Hacking. Regina Public Library Makerfaire (2014)

- Technology for the Classes. Centre for Teaching and Learning Invited Seminar (2014)

- Hacking and Meta-Creativity. Cognitive Informatics Invited Keynote (2013)

- Discrete Isomorphic Completeness. SMC 2013

- Rainboard and Musix: Building dynamic isomorphic interfaces. NIME 2013

- The University of Regina iPad Orchestra. TLT 2013

- Waveform-Aligned Adaptive Windows. CMMR 2013

- Rainboard: semi-finalist at the Guthman musical instrument competition, (2012)

- TEDx talk on interactive musical instruments (https://www.youtube.com/watch?v=r3kocjx69g4) (2012)

- Panel discussion on the future of telecom tech in Saskatchewan at the Sask3.0 summit (2012)

- Invited lectures on the Maker revolution and Arduino (2011-2012).

- The DIY robo-revolution. Science Pub series (2011).

- Invited keynote speaker for several conferences, including the Canadian Association of Science Centres and the Annual Canadian Science and Technology Awareness Network Conference.

- Collaboration with department of Music and the department of Theatre, presenting multimedia performances, including "Eurydice," by Sarah Ruhl, directed by Dan MacDonald (2011); "Landscapes of the Soul," choral concert with interactive multimedia projections. (2011); "DanceWorlds," a 3D Multimedia interactive dance performance using Wii gesture recognition. (2010); "Challenging Bodies," Interactive media f0r variously-abled performers (2006)

Public Awareness and Education

- Nationally syndicated technology columnist (CBC, Paid. 2006–current). Approx. once per month

- Organizer and regular presenter, "Science Rendezvous,"

- I regularly participate in career fairs extolling the benefits of a technology-based education, and representing CrashBang Labs, the Regina Makerspace.

- Research work featured in "Innovation Nation" TV show in 2010.

- Lectures and Workshops to schools, businesses, and non-profit organizations, including Canadian Information Processing Society, Lieutenant Governor's leadership forum, and Science Camps.

Service and Administration

- Computer Science committees including Curriculum, External Relations, Publicity, Co-Op, Seminars, Honours. (2003-current)

- University of Regina AVP hiring committee (2019)

- Student Appeals Committee, Faculty of Science (2007–2019, Chair for 2013–2019)

- Chair, Computer Science Search Committee; 2-year term lecturer (2019)

- Chair, Computer Science Search Committee; Masters of Health Information Management (2018)

- Dean's Representative, Faculty of Science search committee: Geology (2011), Biology (2011), Geology (2018)

- Dean's Representative, Faculty of Fine Arts search committee: Creative Technologies (2010); Choral Conducting (2012); Voice Instruction (2013)

- Science Representative, University-wide Teaching and Learning Advisory Committee (TLAG) (2013–2017)

- Judge, Regina Regional Science Fair (2003–current); Canada-Wide Science Fair (2017)

- Faculty Review committee, Faculty of Science (2010–2012, Chair for 2012)

- Faculty of Fine Arts Steering committee: Creative Technologies degree program (2010–2018)

- Branding Advisory Committee, University of Regina (2009–2010)

- Executive of Council, University of Regina (2006–2007)

Department Head 2019-current: Major Initiatives

- Creation of an Associate Head (Graduate) for Computer Science

- Implementation of regular evaluation process for Sessional Instructor

- Renewal of Market Supplements for Assistant Professors, Associate Professors, and Instructors.

Training of Highly Qualified Personnel

Supervised Student	Program	Status	Date	Notes
Jason Cullimore	PhD	Current	2013	Interdis., co-supervised with R. Caines (MAP)
Hanlin Hu	PhD	Current	2016	part time
Mikhail Shchukin	MSc	Current	2019	
Gideon Eromosele	MSc	Complete	2019	
John Desnoyers-Stewart	MSc	Completed	2016-2018	Interdis., co-supervised with M. Smith (MAP)
Jordan Ubbens	MSc	Completed	2012–2015	in PhD program
Hanlin Hu	MSc	Completed	2013–2015	in PhD program
Yang Zhao	PhD	Completed	2010–2015	Employed in Industry
Joel Rathgaber	MSc	Completed	2006–2012	Employed in Industry
Robert Bailey	MSc	Completed	2007-2011	Co-Supervised with Howard Hamilton
Hao Li	MSc	Completed	2007–2009	Employed in Industry
Xinglin Zhang	MSc	Completed	2007–2010	Employed in Industry
Wil Norton	BSc	Current	2018	Virtual Reality (NSERC USRA)
Jacob Sauer	BSc	Current	2018	Virtual Reality (NSERC USRA)
Oles Shnurovskyy	BSc	Completed	2017	Augmented Reality
Brian Hewitt	BSc	Completed	2016	High Altitude Balloon Project
James Spaleta	BSc	Completed	2016	High Altitude Balloon Project
Laura Teigrob	BSc	Completed	2016	High Altitude Balloon Project
Riley Reid	BSc	Completed	2015	Mobile App Development
Landon Rohatensky	BSc	Completed	2015	Mobile App Development
Kale Baiton	BSc	Completed	2015	Mobile App Development
Regan Meloche	BSc	Completed	2015	3d printing for rapid prototyping
Mhmoud Essalah	BSc	Completed	2014	High Altitude Balloon Project
Thomas Ogilvie	BSc	Completed	2014	High Altitude Balloon Project
Eden Rohatensky	BSc	Completed	2013	Mobile Technology
Joel Kreutzwieser	BSc	Completed	2012	Autonomous quadcopter
Jordan Ubbens	BSc	Completed	2012	iPhone psychology testing
Ryan Brown	BSc	Completed	2012	Real-time harp-controlled fractal
Stephanie Kos	BSc	Completed	2012	Copyright law and user-generated content
Ryan MacDougall	BSc	Completed	2012	Video game control using acoustic features
Nathan Magnus	BSc	Completed	2011	Musician Assistance and Score Distribution
Natasha Jaques	BSc	Completed	2011	Kinect music (NSERC USRA)
Tim Sample	BSc	Completed	2011	Analysis of Choral Music
Steve Maupin	BSc	Completed	2011	Isomorphic Tessellations
Robin Jastrzebski	BSc	Completed	2011	Analysis of accelerometer data
Colton Fink	BSc	Completed	2010	Arduino light and sound
Peter Dowdy	BSc	Completed	2010	Projections for Eurydice
Jed Hubic	BSc	Completed	2010	
Larry Yang	BSc	Completed	2010	NSERC USRA
Matt Haines	BSc	Completed	2010	

- External Thesis Examiner

  - Daniel Fleischhaker, MSc, 2019 (University of Regina, Mathematics, External Examiner)
  - Nick Ryan, PhD, 2017 (University of Regina, Kinesiology, I/E)
  - Andrew Godbout, PhD, 2016 (University of Calgary, External Examiner)
  - Diego Castro Hernandez, PhD, 2016 (University of Regina, Engineering, I/E)
  - Khurshid Shehryar, MSc, 2016 (Engineering, External Examiner)
  - Abbasali Dehghan Tezerjani, PhD, 2015 (University of Regina, Engineering, I/E)
  - Shaun Krueger, MSc, 2014 (University of Regina, Physics, External Examiner)

- Peter Nell, MSc, 2013 (University of Regina, Engineering, External Examiner)
  - George Shi, PhD, 2011 (University of Calgary, External Examiner)
  - Saeed Poozeh, MASc, 2011 (University of Regina, Engineering, External Examiner)
  - Guatam Mehta, MASc, 2010 (University of Regina, Engineering, External Examiner)
  - Yu Chen, MSc, 2009 (University of Regina, Engineering, External Examiner)
  - Rasem Suwan, MSc, 2008 (University of Regina, Computer Science, I/E)

- Thesis Committees:

  - Trevor Tomesh, PhD, 2019 (Computer Science)
  - Mustakim Al Helal, MSc, 2018 (Computer Science)
  - Bingyang Liu, MSc, 2018 (Computer Science)
  - Jesse Goddard, MFA, 2018 (Visual Art)
  - Radhika Gopi, MSc, 2017 (Computer Science)
  - Yu Shi, PhD, 2017 (Engineering)
  - Mohammad Nikravan, MSc, 2016 (Computer Science)
  - Imran Jawaid, MSc, 2016 (Computer Science)
  - Nicholas Ryan, PhD, 2016 (Kinesiology)
  - Ray Lei, MSc, 2015 (Computer Science)
  - Xaiofei Deng, PhD, 2015 (Computer Science)
  - Markus Brahms, MSc, 2014 (Kinesiology)
  - Katherine Sveinnson, MSc, 2014 (Kinesiology)
  - Wang Xiyuan, MSc 2014 (Computer Science)
  - Xiaofei Deng, PhD, 2014 (Computer Science)
  - Khaled Alshdokhi, PhD, 2014 (Kinesiology)
  - Mike Barker, MSc, 2013 (Kinesiology)
  - SoJung Kim, MSc, 2013 (Computer Science)
  - Diego Castro Hernandez, PhD, 2012 (Engineering)
  - Abbas Dehghan, PhD, 2012 (Engineering Internal/External)
  - Jihad Rasheed, PhD, 2012
  - David Wild, PhD, 2008 (Engineering Internal/External)
  - Salman Aljaroudi, MSc, 2012
  - Richard Dosselmann, PhD, 2012
  - Brian Fitzgerald, MASc 2012 (Engineering Internal/External)
  - Saeed Poozesh, PhD, 2009 (Engineering Internal/External)

Other Interests

- Baritone: University of Regina Chamber Singers (2003–2011); Wascana Voices (2017–current)

- Drums, vocals: "Darke Hall Five" University leadership team blues/rock fundraising band (2015–2019, tens of thousands of dollars raised for various charities)