

Youngmoo Edmund Kim

Assistant Professor · Electrical and Computer Engineering · Drexel University

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Education

Ph.D.	Media Arts and Sciences	Massachusetts Institute of Technology (Media Lab)	2003
	Advisor: Barry L. Vercoe, Professor of Media Arts and Sciences		
	Thesis: <i>Singing Voice Analysis/Synthesis</i>		
M.S.	Electrical Engineering	Stanford University	1996
M.A.	Music (Vocal performance practice)	Stanford University	1996
B.S.	Engineering	Swarthmore College	1993
B.A.	Music	Swarthmore College	1993

Research and Teaching Interests

My primary research interests are machine understanding of audio for information retrieval, analysis and synthesis of music and audio, human-machine interfaces for creative expression (including humanoid robotics), and entertainment media technologies. I have developed a variety of graduate courses on music and audio processing as well as an introductory course on entertainment technologies (open to all majors). I have also taught undergraduate digital signal processing and introductory engineering design. I am also heavily involved with several K-12 educational outreach programs, and I direct the Summer Music Technology program at Drexel for area high school students.

Professional Appointments

2005 – present	Assistant Professor , Drexel University, Electrical and Computer Engineering Tenure-track appointment in the College of Engineering. Founding director of the Music and Entertainment Technology Laboratory (MET-lab), currently supporting 8 graduate students. Received NSF CAREER award entitled <i>Exploring Creative Expression through Music and Audio Technology</i> . Chair of the ECE Department's signal processing curriculum committee and member of undergraduate curriculum committee. Developed three new graduate courses: Psychoacoustics and Sound Modeling, Voice Processing, and Machine Listening and Music Information Retrieval. Current instructor for undergraduate digital signal processing.
2006 – present	Assistant Professor , Drexel University College of Medicine, Otolaryngology Courtesy appointment for collaborative clinical research on the detection of vocal pathologies and disorders. Department representative to College of Medicine's committee on advanced medical simulation technologies.
2003 – 2005	Senior Research Scientist , Nellymoser, Inc. (Arlington, MA) Led research and development of audio compression algorithms. Primary product was a sinusoidal speech compression solution for console video game developers that is the market leader for Xbox Live and PlayStation 2 voice-enabled online games. The system also provides voice-modification capabilities to alter voice quality and speaker identity. Other projects include low-bitrate and low-complexity codecs for over-the-air delivery of music to mobile handsets on existing wireless networks.

1995 – 1997 **DSP Software Engineer**, Digidesign, Inc. (Palo Alto, CA)
 Developer for DSP software plug-ins for Pro Tools digital audio workstation, including D-Verb (reverb) and Digidesign Intelligent Noise Reduction (DINR). Created algorithm for digital simulation of Focusrite analog equalizer. Assisted in the development of the AudioSuite host-based plug-in specification for Pro Tools. Lead developer for host-based time compression/expansion and multi-effects (D-fx) plug-ins for Pro Tools version 4.

Awards and Honors

NSF CAREER Award (2007)

Co-chair, 2008 International Conference on Music Information Retrieval (ISMIR)

Drexel College of Engineering 2009 Outstanding Teaching Faculty Award

Invited co-organizer for National Academy of Engineering 2010 Frontiers of Engineering Conference (for session on *Engineering and Music*)

External Research Support

2007–2012	NSF CAREER (PI, IIS-0644151): <i>Exploring Creative Expression through Music and Audio Technology</i>	\$500,000
2007–2010	NSF CAREER–REU and ROA supplements (PI): <i>Exploring Creative Expression through Music and Audio Technology</i>	\$110,000
2007–2010	NSF Discovery K-12 (co-PI, DRL-0733284): <i>Inquiry-Based Activities for Engaging Students of Creative and Performing Arts in STEM</i>	\$300,000
2008–2009	NAMM Foundation Grant (PI): <i>Evaluating the Impact of Music Video Games on Musical Skill Development</i>	\$27,500
2009–2011	CRA/CCC/NSF Computing Innovations Fellows Project (PI, postdoc mentor): <i>Computationally-Enhanced Instruments for Creative Musical Expression</i>	\$272,876
2009–2012	NSF CRI (co-PI, CNS-0854946): <i>MIMO Software Defined Communication Testbed for UWB Radio and Free Space</i>	\$677,384
2009–2013	NSF MRI (co-PI, CNS-0923003): <i>Development of Software Defined Communications Testbed for Radio and Optical Wireless Networking</i>	\$888,500
2010–2015	NSF Graduate STEM Fellows in K-12 Education (co-PI, DGE-0947936): <i>Catalyzing STEM Education via the NAE Engineering Grand Challenges</i>	\$2,915,695
2010–2015	NSF Major Research Infrastructure–Recovery & Reinvestment (PI, CNS-0960061): <i>Development of a Common Platform for Unifying Humanoids Research</i>	\$5,999,997
2010–2013	NSF Network Science and Engineering (co-PI, CCF-1016588): <i>Connections over Multiple Network Paths via Delay Mitigating Codes</i>	\$500,000

Publications

Refereed Conference Papers

- [1] Erik M. Schmidt and Youngmoo E. Kim. Prediction of time-varying musical mood distributions using kalman filtering. In *Proceedings of the International Conference on Machine Learning and Applications (ICMLA)*, Washington, DC, 12-14 December 2010.
- [2] Daniel M. Lofaro, Paul Y. Oh, Jun Ho Oh, and Youngmoo E. Kim. Interactive musical participation with humanoid robots through the use of novel musical tempo and beat tracking techniques in the absence of auditory cues. In *Proceedings of the IEEE-RAS International Conference on Humanoid Robots (Humanoids)*, 5-8 December 2010.
- [3] Alyssa M. Batula and Youngmoo E. Kim. Development of a mini-humanoid pianist. In *Proceedings of the IEEE-RAS International Conference on Humanoid Robots (Humanoids)*, 5-8 December 2010.
- [4] Youngmoo E. Kim, Alyssa M. Batula, David Grunberg, Daniel M. Lofaro, JunHo Oh, and Paul Y. Oh. Developing humanoids for musical interaction (invited paper). In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS): Workshop on Robotics and Musical Expression*, 18 October 2010.
- [5] Erik M. Schmidt and Youngmoo E. Kim. Prediction of time-varying musical mood distributions from audio. In *Proceedings of the International Society for Music Information Retrieval (ISMIR) conference*, Utrecht, The Netherlands, 9-13 August 2010.
- [6] Jeffrey Scott, Raymond Migneco, Brandon Morton, Christian M. Hahn, Paul Diefenbach, and Youngmoo E. Kim. An audio processing library for MIR application development in flash. In *Proceedings of the International Society for Music Information Retrieval (ISMIR) conference*, Utrecht, The Netherlands, 9-13 August 2010.
- [7] Derek Tingle, Youngmoo Kim, and Douglas Turnbull. Exploring automatic music annotation with “acoustically-objective” tags. In *Proceedings of the ACM SIGMM International Conference on Multimedia Information Retrieval*, Philadelphia, PA, March 29–31 2010.
- [8] Erik M. Schmidt, Douglas Turnbull, and Youngmoo E. Kim. Feature selection for content-based, time-varying musical emotion regression. In *Proceedings of the ACM SIGMM International Conference on Multimedia Information Retrieval*, Philadelphia, PA, March 29–31 2010.
- [9] Youngmoo E. Kim, Erik M. Schmidt, Raymond Migneco, Brandon G. Morton, Patrick Richardson, Jeffrey Scott, Jacquelin A. Speck, and Douglas Turnbull. Music emotion recognition: a state of the art review. In *Proceedings of the International Society for Music Information Retrieval (ISMIR) conference*, Utrecht, The Netherlands, 9-13 August 2010.
- [10] Brandon G. Morton, Jacquelin A. Speck, Erik M. Schmidt, and Youngmoo. E. Kim. Improving music emotion labeling using human computation. In *Human Computation Workshop (ACM SIGKDD Conference on Knowledge Discovery & Data Mining)*, pages 45 – 48, 25 July 2010.
- [11] Andrew P. McPherson and Youngmoo E. Kim. Toward a computationally-enhanced acoustic grand piano. In *28th ACM Conference on Human Factors in Computing Systems Extended Abstracts*, Atlanta, GA, 2010.

- [12] Andrew P. McPherson and Youngmoo E. Kim. Augmenting the acoustic piano with electromagnetic string actuation and continuous key position sensing. In *Proceedings of the 2010 International Conference on New Interfaces for Musical Expression*, Sydney, Australia, 2010.
- [13] Robert Ellenberg, David Grunberg, Paul Y. Oh, and Youngmoo E. Kim. Using miniature humanoids as surrogate research platforms. In *Proceedings of the IEEE-RAS Conference on Humanoid Robotics (Humanoids 2009)*, Paris, France, 7-10 December 2009.
- [14] Erik Schmidt, Kris West, and Youngmoo E. Kim. Efficient acoustic feature extraction for music information retrieval using programmable gate arrays. In *Proceedings of the International Conference on Music Information Retrieval (ISMIR)*, Kobe, Japan, 26-30 October 2009.
- [15] Travis M. Doll, Raymond V. Migneco, Jeffrey J. Scott, and Youngmoo E. Kim. An audio DSP toolkit for rapid application development in Flash. In *Proceedings of the IEEE International Workshop on Multimedia Signal Processing (MMSP)*, Rio de Janeiro, Brazil, 5-7 October 2009.
- [16] Raymond V. Migneco, Travis M. Doll, Jeffrey J. Scott, Christian Hahn, Paul J. Diefenbach, and Youngmoo E. Kim. An audio processing library for game development in flash. In *Proceedings of the IEEE Games Innovation Conference*, London, UK, 25-28 August 2009.
- [17] Travis M. Doll, Raymond V. Migneco, and Youngmoo E. Kim. Web-based sound and music games with activities for STEM education. In *Proceedings of the IEEE Games Innovation Conference*, London, UK, 25-28 August 2009.
- [18] David K. Grunberg, Robert Ellenberg, Youngmoo E. Kim, and Paul Y. Oh. Creating an autonomous dancing robot. In *Proceedings of the International Conference on Hybrid Information Technology*, Daejeon, South Korea, 27-29 August 2009.
- [19] David K. Grunberg, Robert Ellenberg, Youngmoo E. Kim, and Paul Y. Oh. From robonova to HUBO: Platforms in robot dance. In *Proceedings of the International Conference of Advanced Humanoid Robotics Research*, Incheon, South Korea, 16-18 August 2009.
- [20] Robert Ellenberg, David K. Grunberg, Paul Y. Oh, and Youngmoo E. Kim. Exploring creativity through humanoids and dance. In *Proceedings of the 5th International Conference on Ubiquitous Robotics and Ambient Intelligence*, Seoul, South Korea, 20-22 November 2008.
- [21] Lauren Mandilian, Paul J. Diefenbach, and Youngmoo E. Kim. Information overload: A collaborative dance experience. In *Proceedings of the 1st ACM International Workshop on Semantic Ambient Media Experience (SAME, part of ACM MM)*, Vancouver, Canada, 27-31 October 2008.
- [22] Youngmoo E. Kim, Erik Schmidt, and Lloyd Emelle. Moodswings: A collaborative game for music mood label collection. In *Proceedings of the International Conference on Music Information Retrieval (ISMIR)*, Philadelphia, PA, September 2008.
- [23] Travis M. Doll, Raymond Migneco, and Youngmoo E. Kim. Online activities for music information and acoustics education and psychoacoustic data collection. In *Proceedings of the International Conference on Music Information Retrieval*, Philadelphia, PA, 14-18 September 2008.
- [24] David Delaine et. al. Student run outreach programs for professional development and increased pre-collegiate (K-12) participation. In *Proceedings of the 7th Annual ASEE Global Colloquium on Engineering Education*, Cape Town, South Africa, 2008.

- [25] Youngmoo E. Kim, John MacLaren Walsh, and Travis M. Doll. Comparison of a joint iterative method for multiple speaker identification with sequential blind source separation and speaker identification. In *Proc. Odyssey: The ISCA Speaker and Language Recognition Workshop*, Stellenbosch, South Africa, 21-24 January 2008.
- [26] John MacLaren Walsh, Youngmoo E. Kim, and Travis M. Doll. Joint iterative multi-speaker identification and source separation using expectation propagation. In *Proc. IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, New Paltz, NY, 21-24 October 2007.
- [27] Yuanqing Lin, Jingdong Chen, Youngmoo E. Kim, and Daniel D. Lee. Blind channel identification for speech dereverberation using l_1 -norm sparse learning. In *Proc. Conference on Neural Information Processing Systems (NIPS)*, Vancouver, Canada, 3-6 December 2007. (one of 26 papers selected out of 975 submissions for oral presentation).
- [28] Yuanqing Lin, Jingdong Chen, Youngmoo E. Kim, and Daniel D. Lee. Blind sparse-nonnegative (BSN) channel identification for acoustic time-difference-of-arrival estimation. In *Proc. IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, New Paltz, NY, 21-24 October 2007.
- [29] Youngmoo E. Kim. A framework for singing voice analysis/synthesis. In *Proc. IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, New Paltz, NY, 19-22 October 2003.
- [30] Youngmoo E. Kim. Singer identification and transformation through dynamic modeling of vocal fold and vocal tract parameters. In *Proc. Stockholm Music Acoustics Conference (SMAC)*, Stockholm, SE, 6-9 August 2003. Royal Institute of Technology (KTH).
- [31] Youngmoo E. Kim and Brian Whitman. Singer identification in popular music recordings using voice coding features. In *Proc. International Symposium on Music Information Retrieval (ISMIR)*, Paris, France, 13-17 October 2002.
- [32] Youngmoo E. Kim. Excitation codebook design for coding of the singing voice. In *Proc. IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, New Paltz, NY, 21-24 October 2001.
- [33] Adam T. Lindsay and Youngmoo E. Kim. The MPEG-7 audio metadata standard (invited paper). In *Proc. International Symposium on Music Information Retrieval (ISMIR)*, Bloomington, ID, 15-17 October 2001.
- [34] Youngmoo E. Kim, Wei Chai, Ricardo Garcia, and Barry L. Vercoe. Analysis of a contour-based representation for melody. In *Proc. International Symposium on Music Information Retrieval (ISMIR)*, Plymouth, MA, 23-25 October 2000.
- [35] Youngmoo E. Kim. Structured encoding of the singing voice using prior knowledge of the musical score. In *Proc. IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, pages 47–50, New Paltz, NY, 17-20 October 1999.
- [36] Eric D. Scheirer and Youngmoo E. Kim. Generalized audio coding with MPEG-4 structured audio. In *Proc. of the AES 17th International Conference: High-Quality Audio Coding*, pages 189–204, Florence, Italy, 2-5 September 1999.

- [37] Keith Martin and Youngmoo E. Kim. Musical instrument identification: A pattern-recognition approach. In *Proceedings of the 136th Meeting of the Acoustical Society of America*, Norfolk, VA, 12-16 October 1996.

Archival Journal Papers

- [1] David Grunberg, Robert Ellenberg, In Hyeuk Kim, Jun Ho Oh, Paul Y. Oh, and Youngmoo E. Kim. Development of an autonomous dancing robot. *International Journal of Hybrid Information Technology*, 3(2):33–44, April 2010.
- [2] Lauren Mandilian, Paul J. Diefenbach, and Youngmoo E. Kim. Information overload: A collaborative dance experience. *IEEE Multimedia*, 17(1):8–13, January-March 2009.
- [3] Youngmoo E. Kim, Paul Y. Oh, and Odest Chadwicke Jenkins. The AAAI 2008 robotics and creativity workshop. *AI Magazine*, 30(1), Spring 2009.
- [4] Youngmoo E. Kim, Travis M. Doll, and Raymond V. Migneco. Collaborative online activities for acoustics education and psychoacoustic data collection. *IEEE Transactions on Learning Technologies*, 2(3), July-September 2009.

Book Chapters and Non-Refereed Articles

- [1] Mitsunori Ogihara and Youngmoo E. Kim. Mood and emotional classification. In Tao Li, Mitsunori Ogihara, and George Tzanetakis, editors, *Handbook on Signal Processing for Acoustics*. Chapman Hall/CRC, Boca Raton, FL, to be published in 2011.
- [2] Youngmoo E. Kim. Singing voice analysis, synthesis, and modeling. In David Havelock, S. Kuwano, and M. Vorländer, editors, *Handbook on Signal Processing for Acoustics*. Springer-Verlag, New York, NY, 2008.
- [3] Daniel P. W. Ellis and Youngmoo E. Kim. Best of the web. *IEEE Signal Processing Magazine*, May 2008.

Refereed Conference Abstracts

- [1] Alyssa M. Batula, David Grunberg, Daniel M. Lofaro, Jun Ho Oh, Paul Y. Oh, and Youngmoo E. Kim. Enabling humanoids to participate in musical performances. In *Proceedings of the International Society for Music Information Retrieval (ISMIR) Conference*, Utrecht, The Netherlands, 9-13 August 2010 (online abstract and poster presentation).
- [2] Erik Schmidt and Youngmoo E. Kim. Projection of acoustic features to continuous valence-arousal mood labels via regression. *International Conference on Music Information Retrieval (ISMIR)*, 26-30 October 2009 (online abstract and poster presentation).
- [3] Patrick Richardson and Youngmoo E. Kim. Evaluating the impact of music video games on musical skill development. *Society for Music Perception and Cognition Conference*, 3-6 August 2009.
- [4] Youngmoo E. Kim and Travis M. Doll. Employing sparsity for joint sound source and acoustic channel estimation. *International Conference on Machine Learning (ICML): Workshop on Sparse Methods for Music Audio*, 18 June 2009 (online extended abstract and presentation).

- [5] Daniel Perelstein and Youngmoo E. Kim. Real-time score tracking for personalization of live orchestral performances. *International Conference on Music Information Retrieval (ISMIR)*, 14-18 September 2008 (online abstract and poster presentation).
- [6] David K. Grunberg, Robert Ellenberg, Paul Y. Oh, and Youngmoo E. Kim. Realtime audio analysis for humanoid robotics and dance. *International Conference on Music Information Retrieval (ISMIR)*, 14-18 September 2008 (online abstract and poster presentation).
- [7] Youngmoo E. Kim, David K. Grunberg, Paul Y. Oh, and Robert Ellenberg. Blame it on the robonova: Exploring creativity through humanoid robotics and dance. In *Proceedings of the AAAI 2008 Robotics and Creativity Workshop*, Chicago, IL, 14-17 July 2008 (poster presentation and exhibit).
- [8] Youngmoo E. Kim. A computational model of singing voice identity. *Voice Foundation's 36th Symposium*, 29 May - 3 June 2007 (abstract and presentation).
- [9] Youngmoo E. Kim, Donald S. Williamson, and Sridhar Pilli. Towards quantifying the "album effect" in artist identification. *International Conference on Music Information Retrieval (ISMIR)*, 8-12 October 2006 (online abstract and poster presentation).

Unpublished Theses and Technical Reports

- [1] Youngmoo E. Kim. *Singing Voice Analysis/Synthesis*. PhD thesis, Massachusetts Institute of Technology, 2003.
- [2] Youngmoo E. Kim and Barry L. Vercoe. The future of audio entertainment. Technical report, Interep, Inc., New York, NY, 2000.
- [3] Youngmoo E. Kim. *An Analysis of Brahms' Op. 33: Die schöne Magelone, A Multimedia Song Cycle*. PhD thesis, Stanford University, 1996.

Patents (pending)

- [1] Robert J. McAulay, Robert A. Baxter, and Youngmoo E. Kim. Modification of acoustic signals using sinusoidal analysis and synthesis. Submitted to the U.S. Patent and Trademark Office, July 2004.

Invited Presentations and Panels

Technologies for Enhancing Musical Expression, Interaction, and Education Invited presentation for University of Delaware Signal Processing, Communications, and Controls (SPCC) Seminar, Newark, DE. 4 October 2010.

Technologies for Enhancing Musical Expression, Interaction, and Education Invited presentation for Princeton Music Department, Princeton, NJ. 28 April 2010.

Exploring Emotion and Expression through Music Technology Invited presentation for Princeton Computer Science Colloquium Series, Princeton, NJ. 27 April 2010.

What Will Perceptual Audio Coding Stand for 20 Years from Now? Invited panelist for workshop session at Audio Engineering Society Conference, New York, NY. 9 October 2009.

Ocean Sounds, Lullabies or Dark Side of the Moon: What Sounds Calm Us Down? Invited panelist for Sensation to Emotion Conference, New York, NY. 3 March 2009.

Finding Meaning & Feelings in Sound: Audio & Music Information Retrieval Invited presentation for University of Pennsylvania Computational Linguistics Seminar, Philadelphia, PA. 23 February 2009.

Engineering for Music Information Retrieval. Invited guest lecture for engineering seminar at Rowan University, Glassboro, NJ. 16 February 2009.

Interdisciplinary Opportunities in Voice Pedagogy. Invited panelist for Voice Foundation's 37th Symposium, Philadelphia, PA. 1 June 2008.

Exploring Creative Expression through Music and Audio Technology. The College of New Jersey, Ewing, NJ. 13 February 2008.

Engineering and Music. Invited annual guest lecture at Swarthmore College for Engineering Methodology class, 2005–present (most recently 10 November 2009).

Teaching Activities

Courses Developed (at Drexel University, Electrical and Computer Engineering)

ECES 558: Psychoacoustics & Sound Modeling (graduate)	2005, 2006, 2008, 2009
ECES 559: Processing of the Human Voice (graduate)	2006, 2007, 2010
ECES 660: Machine Listening & Music Information Retrieval (graduate)	2006, 2007, 2009
ECE 121: Introduction to Entertainment Engineering (undergraduate)	2010

Courses Taught (at Drexel University)

ENGR 101-103: Freshman Engineering Design (undergraduate)	2007–2008
ECES 434: Deterministic Signal Processing (undergraduate)	2007–2010
ECES 435: Statistical Signal Processing (undergraduate)	2008, 2010
ECES 436: Speech & Image Signal Interpretation (undergraduate)	2008

K-12 Education Activities

Founder & Director, Summer Music Technology Program (for grades 10 & 11) One-week program using music technology to catalyze interest in science technology, engineering, and mathematics (~20 students each year).	2007–present
Coordinator, GK-12 Summer Workshop (for Graduate and Teacher Fellows) Two-week training program for participants selected for Drexel GK-12 program from College of Engineering and School District of Philadelphia (10 graduate fellows & 10 high school teachers).	2010

University Service

Chair, Signal Processing Curriculum Committee (Electrical Engineering)	2007–present
Undergraduate Curriculum Committee (Electrical Engineering)	2008–present
Department Website Committee (Electrical Engineering)	2008–present
Advanced Medical Simulation Committee (College of Medicine)	2008–2009
Junior Faculty Advisory Committee (College of Engineering)	2008–2009
Human Cognition Enhancement Research Steering Committee	2009–present

Professional Activities

Co-organizer, 2010 NAE Frontiers of Engineering (FoE) Conference	2009–2010
Special session co-chair, 2010 ACM Multimedia Information Retrieval Conference	2009–2010
Program committee, International Society for Music Information Retrieval Conference	2009, 2010
Co-chair, 2008 International Conference on Music Information Retrieval (ISMIR)	2007–2008
Journal referee, EURASIP Journal on Applied Signal Processing	2006–present
Journal referee, IEEE Transactions on Audio, Speech, and Language Processing	2005–present
Journal referee, IEEE Transactions on Robotics	2010
Organizing Committee, IEEE WASPAA	2001, 2011
Program committee, IEEE WASPAA	2001, 2003
US Delegate, Moving Pictures Experts Group (MPEG)	1999–2002
Organizer, Workshop on Digital Expression and Intellectual Property (Berkman Center)	2001
Member, Association for Computing Machinery	2009–present
Member, Acoustical Society of America	1993–present
Member, Institute of Electrical and Electronics Engineers	1993–present
Member, Tau Beta Pi Engineering Honor Society	1993–present

Student Advising and Mentoring

Post-Doctoral Researcher

Andrew McPherson, Ph.D. (Music Composition, 2009), University of Pennsylvania
Computing Innovation Fellow (2009–present) 2009–2010

PhD Students

Travis Doll, Ph.D. Student (Electrical Engineering), Drexel University
Drexel/NSF GK-12 Fellowship (2007-2009) 2010

Erik Schmidt, Ph.D.. Student (Electrical Engineering), Drexel University 2011

Ray Migneco, Ph.D. Student (Electrical Engineering), Drexel University 2011

Jeffrey Scott, M.S. Student (Electrical Engineering), Drexel University 2012

David Grunberg, B.S. / Ph.D. “Supernova” Student (Electrical Engineering), Drexel University
NSF Graduate Research Fellowship (2010–present) 2012

Alyssa Batula, Ph.D. Student (Electrical Engineering), Drexel University 2013

Brandon Morton, Ph.D. Student (Electrical Engineering), Drexel University 2013

Jacqueline Speck, Ph.D. Student (Electrical Engineering), Drexel University 2013

PhD Thesis Committee Member

Vasileios T. Nasis, Ph.D. (Electrical Engineering), Drexel University
A Novel Approach to Programmable Imaging Using MOEMS 2007

Yuanning Yu, Ph.D. (Electrical Engineering), Drexel University
Blind Identification of Possibly Under-determined Convolutional MIMO systems 2007

Yuanqing Lin, Ph.D. (Electrical & Systems Engineering), University of Pennsylvania
 l_1 -Norm Sparse Bayesian Learning: Theory and Applications 2008

Kashma Rai, Ph.D. (Electrical Engineering), Drexel University
Study of Spectral Sensing using Electro-Optic Firms 2009

Elina Vitol, Ph.D. (Electrical Engineering), Drexel University
Nanopipette for single cell surface-enhanced Raman spectroscopy (SERS) 2010

Xin Liu (Electrical Engineering), Drexel University
Collision Resolution in Wireless Networks 2010

Yao Yu (Electrical Engineering), Drexel University 2010

Ciira wa Maina (Electrical Engineering), Drexel University
Approximate Bayesian Inference for Robust Speech Processing 2011

Masters Students

Donald Williamson, M.S. (Electrical Engineering), Drexel University <i>Automatic Music Similarity Assessment and Recommendation</i> NSF Bridge to the Doctorate Fellow (2005–2007)	2007
Alex Hrybyk, B.S./M.S Student (Electrical Engineering), Drexel University <i>Combined Audio and Video Analysis for Guitar Chord Identification</i>	2010
Justin Wilcott, M.S. Student (Digital Media), Drexel University <i>Music in Motion</i>	2010
Christian Hahn, M.S. Student (Digital Media), Drexel University <i>The Applications of Real-Time Music Analysis for Computer Gaming</i>	2010
Patrick Richardson, M.S. Student (Electrical Engineering), Drexel University	2010
Arjun Gupta, M.S. Student (Digital Media), Drexel University <i>Music in Images</i>	2010
Matthew Prockup, B.S./M.S Student (Electrical Engineering), Drexel University	2011
Brian Dolhansky, B.S./M.S Student (Electrical Engineering), Drexel University	2012

Undergraduate Students

Senior design team: Adheer Chauhan, James Congdon, Abrar Alam Hashmi, Aung Sann Oo, Rishi Parikh (Electrical Engineering), Drexel University <i>Wireless Position Tracking for an Interactive Media Performance</i> 3rd place, Drexel College of Engineering Design Competition	2006–2007
Senior design team: Vijay Balchandani, Eric Effinger, Jeevan Kotha, Pannha Prak, Joseph Romeo (Electrical Engineering), Drexel University <i>Simultaneous Multi-Touch Display</i> Award-winner, Electrical and Computer Engineering Department	2006–2007
Senior design team: Boris Block, Dan Hennessey, Zenko Klapko, David Millar, William Morgan (Computer Science), Drexel University <i>InfiniTouch: The Musical Multi-Point Touch Screen</i>	2006–2007
Senior design team: Russel Fellman, Arjuna Navaratna, Gabriele Palmas, Justin Tallent (Electrical Engineering), Drexel University <i>A Signal Processing Platform for Enhancing Creative Interaction with Music</i>	2008–2009
Senior design team: David Grunberg, Alex Hrybyk, Matthew Prockup (Electrical Engineering), Drexel University <i>Orchestral Performance Companion Using Real-Time Audio to Score Alignment</i> 2nd place, Drexel College of Engineering Design Competition	2009–2010

Nathalie Capati, Research Co-op (Electrical Engineering), Drexel University	2010–2011
Ashley Oudenne, REU summer student, Swarthmore College	2009, 2010
Jeff Eckert, STAR program, Drexel University	2010
Julian Kemmerer, Work-study & STAR program, Drexel University	2010
Andy Bastian, Lab intern, Swarthmore College	2010
Philip Koonce, Lab intern, Swarthmore College	2010
Garth Griffin, REU summer student, Swarthmore College	2009
Derek Tingle, REU summer student, Swarthmore College	2009
Brendan John, Lab intern, Swarthmore College	2009
Ryo Akasaka, REU summer student, Swarthmore College	2008
Daniel Perelstein, REU summer student, Swarthmore College	2007, 2008
Lloyd Emelle, Undergraduate researcher, Drexel University (Computer Engineering)	2007
Jules Scogna, STAR program, Drexel University	2007
Eric Woods, REU summer student, Drexel University (Music Industry)	2007
High School Students	
Akul Penugonda, Drexel CoE Summer Mentorship	2010
Zac Chelbi, Drexel CoE Summer Mentorship	2010
William Giguere, Summer intern	2009, 2010
Aboud Karzoun, Summer intern	2010
Michael Miller, Philadelphia Work-Ready (summer internship)	2009
Andy Michaels, Drexel CoE Summer Mentorship & Lab intern	2008, 2009
Melody Morris, Drexel CoE Summer Mentorship	2007
Jarrett Paige, Drexel CoE Summer Mentorship	2007
Alyssa Bellingham, Drexel CoE Summer Mentorship	2006
Michael Sehi, Drexel CoE Summer Mentorship	2006