

# MARY B. PIETROWICZ

---

Postdoctoral Researcher  
Email: [Mary.Pietrowicz@ibm.com](mailto:Mary.Pietrowicz@ibm.com)  
Phone: (217) 766-6754  
<https://marypietrowicz.com>

IBM Thomas J Watson  
Research Center  
1101 Kitchawan Rd.  
Yorktown Heights, NY 10598

## EDUCATION

### University of Illinois at Urbana-Champaign

*Advisors:* Mark Hasegawa-Johnson and Karrie Karahalios

*Committee Members:* Jennifer Cole, Julia Hockenmaier,

Jerome McDonnough, and Gina-Anne Levow

*Studied Music Composition with:* Philipp Blume, Guy Garnett,

Heinrich Taube, Stephen Taylor, and Reynold Tharp.

### Ph.D. Computer Science

2017

### Florida Atlantic University

Degree completed while working full time in industry.

### Master of Computer Science

1994

### Purdue University

### B.S. Electrical Engineering

1986

## TEACHING EXPERIENCE

### Interactive Computer Graphics: 2015, 2016, & 2017, Teaching Assistant

Taught computer graphics programming sections two hours per week to grad students and advanced undergrads. Developed course content. Graded student projects and exams, and advised students on their class projects.

### Multimedia Signal Processing: 2016, Teaching Assistant

Taught lectures pertaining to programming projects to grad students and advanced undergrads. Graded homework, and advised students.

### User Interfaces: 2014, Teaching Assistant

Developed course content, graded student projects and exams, and advised students at all levels in office hours.

*Student quote: "I really enjoyed your teaching since it is very clear and helpful."*

## INDUSTRY EXPERIENCE

### IBM Thomas J Watson Research Center

2017-current

Postdoctoral researcher studying human expression and speech in the context of health and wellness. Investigating the relationships among behavioral signals, expressive speech,

Mary Pietrowicz

biological data, medical history, traumatic events, and the detection and prediction of mental and physical illness. Exploring human development and wellness monitoring.

**W.W. Grainger, Inc.** 2015-2016

Intellectual Property researcher and software development engineer, focusing on IoT technologies.

**National Center for Supercomputing Applications (NCSA), & Institute for Advanced Computing Applications and Technologies (IACAT)** 2006-2011

Research programmer, developer, and performer for virtual worlds projects, interactive art performances, and cyber-infrastructure development. Composed and performed interactive creative works, explored novel interfaces for interactive creativity platforms, and developed machine models for human motion quality based on Laban movement analysis. Explored multimodal creativity in the context of live and machine-generated sound, live motion, virtual worlds, and physical device interactions. Developed electronic dashboards for monitoring watershed environments.

**Informatics Research Institute at IUPUI** 2006

Consultant and engineer for continuing Pervasive Technology Labs projects.

**Pervasive Technology Labs at Indiana University** 2002-2005

Senior engineer specializing in location tracking, RFID, and tangible user interface applications. Developed location tracking systems for a museum digital docent and a building navigation system. Developed a tangible interface for teaching nutrition to children, which used RFID-instrumented food models and the USDA foods database. The finished system simulated the process of selecting foods from a school cafeteria line and placing them on a tray, with nutrition content provided on an overhead display.

**University of Illinois, Department of Computer Science** 2001-2002

Research programmer for explorations in smart environments. Explored applications and infrastructure for a cluster-driven tiled display wall and various sensors and devices. Did the initial research for the location tracking system which was deployed at the Supercomputing 2002 conference.

**Personal Genie** 2000-2001

Senior engineer specializing in smart device control.

**dChain Commerce** 1999-2000

Chief research and development engineer for electronic trading hub projects. Designed database architecture and Java service architecture for B2B commerce.

**National Center for Supercomputing Applications (NCSA)** 1995-1999

Research programmer specializing in scientific workbenches, synchronous and asynchronous collaborative systems, early web portals, and notification systems.

Mary Pietrowicz

**Motorola, Inc.** 1993-1995  
Computer-aided software engineering (CASE) engineer.

**Ungermann-Bass** 1991-1993  
Software engineer for network management projects.

**Motorola, Inc.** 1986-1991  
Software engineer for embedded radio software and radio service software (RF tuning and software configuration of police radios). Also managed an array of radio service software projects and contracts.

## **LEADERSHIP & SERVICE**

**Journal of Artificial Intelligence Research (JAIR):** reviewer 2018.

**Undergraduate Mentoring Program at the University of Illinois:** research supervisor and mentor 2016-2017.

**Journal of the Acoustical Society of America (JASA):** reviewer 2015, 2016, 2017.

**iConference:** reviewer 2015.

**Creativity & Cognition:** Graduate Student Symposium Committee, 2015.

**CHI:** WIP Program Committee, 2014.

**ASSETS:** Mentor, 2014 (resulted in successful publication for 1<sup>st</sup>-time authors).

## **AWARDS**

Qualcomm Innovation Fellowship Finalist 2014-2015

University of Illinois Department of Music, Composition Division Award, 2007

## **PROJECT HIGHLIGHTS**

**Voice Analysis for Human Health and Wellness** 2017-2018

IBM: Center for Computational Biology, Thomas J Watson Research Center

Developed analytic methods and software for the detection of physical and mental health conditions, including Amyotrophic Lateral Sclerosis (ALS) and Autism Spectrum Disorder (ASD). Developed software to infer selected emotional intelligence parameters from acoustic and interactive conversational qualities in the voice. Exploring relationship among paralingual elements in speech, such as emotion, voice quality, prosody, and non-vocal expression.

Exploring automated analysis of child speech, movement, and interactive behavior for health assessments. *See publications list below for project papers.*

**Perception-grounded Analytics for Vocal Expression** 2013-2017

UIUC: Departments of Computer Science and Electrical and Computer Engineering

Developed transformative research methods for exploring the perception of human vocal expression. These methods enabled 1) the discovery and description of naturally-occurring expressive dimensions in human speech, and 2) the discovery of relationships among emotion, voice quality, prosody, and nonverbal quality. Also developed machine listening software to

recognize these dimensions, along with lower-level voice qualities, in both scripted and unscripted speech. Demonstrated that whispering, breathiness, modal speech, and resonant speech lie on a continuum, both perceptually and acoustically (they are not unrelated, discrete states). Methods applied here are recommended for all researchers interested in 1) exploring any form of human expressive modality (not just speech), 2) discovering relationships among different expressive modalities, and 3) producing applications which support natural interaction which is correctly aligned with human perception. *See publications list below for project papers.*

**CrowdBand**

2013

*UIUC: Department of Computer Science*

Developed software for automated, crowdsourced sound composition. This project demonstrated the potential of using crowdsourced systems for the creation of complex, creative works. *See publications list below for project paper.*

**Astral Convertible**

2010-2011

*National Center for Supercomputing Applications (NCSA)*

Developed interactive gesture-tracking software for remade version of original groundbreaking Trisha Brown/John Cage piece, which was performed at the Krannert Center for the Performing Arts. *See the press release: <https://news.illinois.edu/blog/view/6367/205733>.*

**Kinetic Flame**

2011

*UIUC: Departments of Music and Dance*

Interactive piece for dancer, percussion, motion sensors, electronics, lighting, and video, performed at the Krannert Art Museum, University of Illinois. I composed the piece, rendered the sound electronically, developed gesture tracking software, and used the dancer's gestures to modulate the sound, visuals, and lighting in real time. Incorporated the stage set for Astral Convertible into the piece. *See a recording at: <https://vimeo.com/23083695>.*

**Location-aware Museum Guide: ArtXplore**

2004-2005

*Pervasive Technology Labs (PTL) at Indiana University*

Developed wifi-based, location-tracking software for a handheld museum guide, which was demonstrated at the Indianapolis Museum of Art (IMA) during its 2005 re-opening. This project was influential in the future technology directions at the IMA, and indirectly, at other museums. *See the press release: <http://newsinfo.iu.edu/news-archive/2129.html>.*

**Make-a-Meal System for Health Education**

2003-2004

*Pervasive Technology Labs (PTL) at Indiana University*

Developed an engaging, child-appropriate, RFID-instrumented physical object interface for teaching nutrition (part of the required curriculum) to thousands of Indiana school children at the Ruth Lilly Health Education Center in Indianapolis, IN. The interface allowed a class to build meals by placing instrumented food models on a cafeteria tray for nutrient analysis. The system automatically detected the selected foods, analyzed the nutrient content, and displayed the results.

**NCSA Joule & NCSA Habanero**

1995-1998

*National Center for Supercomputing Applications (NCSA)*

Developed early internet tools for synchronous and asynchronous collaboration. Joule, the asynchronous collaboration system, was an early interactive web portal package created before the term “web portal” had been coined, and before web infrastructure was generally available (created with pre-serialization versions of Java). Also wrote the subscription-based notification system for Joule (also in pre-serialization Java). Developed an object database interface for Habanero (the primarily synchronous platform), and extended its infrastructure to support a blended synchronous-asynchronous collaboration infrastructure for the collaboration platform.

***See the Wall Street Journal Article for NCSA Habanero:***

<http://www.wsj.com/articles/SB833398067192005000>

**Radio Service Software Toolkits**

1986-1988

*Motorola, Inc.*

Developed field service software packages for the electronic tuning/programming of police radios. Also managed a range of software contracts and contractors in this application domain.

***Motorola service shop engineers and field technicians worldwide used this software.***

**PUBLICATIONS**

**CONFERENCE PAPERS & POSTERS (PEER-REVIEWED)**

- [1] Perna Agarwal, Anupama Ray, Gunkirat Kaur, Priyanka Halli, **Mary Pietrowicz**, Elif Eyigoz, Gargi B DasGupta, Subham Atreja, and Guillermo Cecchi, “Multi-modal Analysis to Infer Emotional Intelligence of an Adolescent Counselor,” submitted to AAAI Conference on Artificial Intelligence, currently under review, 2018.
- [2] Raquel Norel, **Mary Pietrowicz**, Carla Agurto, Shay Rishoni, and Guillermo Cecchi, “Detection of Amyotrophic Lateral Sclerosis (ALS) via Acoustic Analysis,” INTERSPEECH 2018.
- [3] Jonah Casebeer, Hillol Sarker, Murtaza Dhuliawala, Nicholas Fay, **Mary Pietrowicz**, and Amar Das. “Verbal Protest Recognition in Children with Autism,” International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2018.
- [4] **Mary Pietrowicz**, Mark Hasegawa-Johnson, and Karrie Karahalios. “Discovering Dimensions of Perceived Vocal Expression in Semi-structured, Unscripted Oral History Accounts,” International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2017.
- [5] **Mary Pietrowicz**, Mark Hasegawa-Johnson, and Karrie Karahalios. “Acoustic Correlates for Perceived Effort Levels in Expressive Speech,” INTERSPEECH 2015 (poster presentation).
- [6] **Mary Pietrowicz** and Karrie Karahalios. “Visualizing Vocal Expression,” CHIEA 2014 (poster presentation).

Mary Pietrowicz

- [7] **Mary Pietrowicz** and Karrie Karahalios, “Sonic Shapes: Visualizing Vocal Expression,” International Community for Auditory Display (ICAD) 2013.
- [8] **Mary Pietrowicz**, Danish Chopra, Amin Sadeghi, Puneet Chandra, Brian Bailey, and Karrie Karahalios. “CrowdBand: An Automated Crowdsourcing Sound Composition System,” Human Computation and Crowdsourcing (HCOMP) 2013.
- [9] **Mary Pietrowicz** and Karrie Karahalios. “Phonetic Shapes: An Interactive, Sonic Guest Book,” CHIEA 2012 (poster presentation).
- [10] Guy Garnett, Robert E. McGrath, and **Mary Pietrowicz**. “mWorlds: novel human interaction with virtual worlds,” Mardi Gras 2009: Virtual Worlds: New Realms for Culture, Creativity, Commerce, Computation, and Communication, 2009.

#### JOURNAL ARTICLES

- [11] Hillol Sarker, **Mary Pietrowicz**, and Amar Das, “Cross-language generalizability of vocal protest detection in children with autism,” Submitted to Journal of the Acoustical Society of America (JASA) Express Letters, currently under review, 2018.
- [12] **Mary Pietrowicz**, Mark Hasegawa-Johnson, and Karrie Karahalios. “Acoustic correlates for perceived effort levels in male and female acted voices,” Journal of the Acoustical Society of America (JASA), 2017.

#### BOOK CHAPTERS

- [13] “Special Edition, Using Java,” First Edition, Que Publishing, 1996.

#### WORKSHOP PAPERS (PEER-REVIEWED)

- [14] **Mary Pietrowicz** and Karrie Karahalios. “Paralingual Analysis, Voice Visualization, and Mobile Devices as Enabling Technologies,” HCIC 2014.
- [15] Jennifer Kim, Melinda Snodgrass, **Mary Pietrowicz**, Karrie Karahalios, and Jim Halle. “Visual Analytics for Behavioral and Physiological Data,” VAHC 2013.
- [16] **Mary Pietrowicz**, Robert E. McGrath, Guy Garnett, and John Toenjes. “Multimedia Gestural Interaction in Performance,” Whole Body Interfaces Workshop, CHI 2010.
- [17] Robert E. McGrath, **Mary Pietrowicz**, Ben Smith, and Guy Garnett, “Transforming Human Interaction with Virtual Worlds,” Workshop on Computational Creativity Support, CHI 2009.

## PRESENTATIONS

- [18] **Mary Pietrowicz**, Mark Hasegawa-Johnson, and Karrie Karahalios, “Discovering Dimensions of Perceived Vocal Expression in Semi-Structured, Unscripted Oral History Accounts,” Midwest Speech and Language Days (MSLD) 2017 (presentation).
- [19] **Mary Pietrowicz**, Mark Hasegawa-Johnson, and Karrie Karahalios, “Acoustic Correlates for Perceived Effort Levels in Male Scripted Speech,” Midwest Speech and Language Days & Midwest Computational Linguistics Colloquium (MSLD & MCLC) 2016 (presentation).
- [20] **Mary Pietrowicz**, Mark Hasegawa-Johnson, and Karrie Karahalios, “Acoustic Correlates for Perceived Effort Levels in Expressive Speech,” Midwest Speech and Language Days (MSLD) 2015 (poster).
- [21] **Mary Pietrowicz** and Karrie Karahalios. “Visualizing Vocal Expression,” for NSF Expeditions project: “Collaborative Research: Computational Behavioral Science: Modeling, Analysis, and Visualization of Social and Communicative Behavior,” 2013 (presentation).
- [22] John Toenjes, Thecla Schiphorst, and **Mary Pietrowicz**, Interactive Workshop on Laban Movement, 2009 (accelerometer-based, interactive motion analysis demonstration and presentation).
- [23] **Mary Pietrowicz** and Polly Baker, “Location Aware Multimedia Delivery in an Art Museum,” I-Light Symposium Presentation, Indianapolis, IN, 2005 (presentation).
- [24] Robert Comer, Verlyn Wilson, and **Mary Pietrowicz**, “Make-A-Meal Interface for Nutrition Education,” National Association of Health Education Centers, Philadelphia, PA, 2003 (demonstration and presentation).

## INTERACTIVE ART PERFORMANCES

- [25] **Air Tropes** Sept, 2014  
A sonification of soybean growth data, which emphasized differences between CO<sub>2</sub>-enhanced and Ozone-enhanced environments for plant growth. Part of the “Sounds of Science” collaboration between artists and scientists at the University of Illinois, at the Krannert Art Museum, University of Illinois.
- [26] **Kinetic Flame** April 2011  
Interactive piece for dancer, percussion, motion sensors, electronics, and video, at the Krannert Art Museum, University of Illinois.  
Available at: <https://vimeo.com/23083695>

- [27] **Dark Star** April 2011  
Interactive piece for dancer, percussion, motion sensors, electronics, and electronic lighting, at the Krannert Art Museum, University of Illinois.  
Available at: <https://vimeo.com/63711846>
- [28] **Remembering** October 2010  
Composed piece for 4 voices and chamber orchestra, based on WWII oral history texts, at Smith Hall, University of Illinois.
- [29] **Voltage** July 2010  
Composed piece for flute, piano, and electronics, at Smith Hall, University of Illinois.
- [30] **Astral Convertible** (motion tracking software component) February 2009  
Developed gesture-tracking, interactive software for remade version of original Trisha Brown/John Cage piece, at the Krannert Center for the Performing Arts.
- [31] **Edream and Be Merry** April 2009  
Interactive, improvised, distributed performance for violin, flute, percussion, and distributed virtual worlds display. Developed portions of the interactive software, and performed the flute part. At the HASTAC Blue Lights in the Basement event, Krannert Center for the Performing Arts. Available at: <https://vimeo.com/198106703>