Mark Thomas Godfrey

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EDUCATION

M.S., Music Technology, Georgia Institute of Technology, 2007-2008.
- GPA: 4.0/4.0
- Thesis: Hubs and Homogeneity: Improving Content-Based Music Modeling
- Focus: Music Information Retrieval, Machine Musicianship, Digital Signal Processing
- Selected Course Work: Computational Music Analysis, Machine Learning, Music Perception and Cognition, Digital Signal Processing for Music, Network Music

M.S., Electrical Engineering, Georgia Institute of Technology, 2005-2006.
- GPA: 3.81/4.0
- Focus: Digital Signal Processing, Music Technology
- Selected Course Work: Advanced Digital Signal Processing, Pattern Recognition, Fourier Theory, Speech Processing, Systems and Control

B.S., Electrical Engineering, Georgia Institute of Technology, 2001-2005.
- GPA: 3.91/4.0
- Graduated with Highest Honor
- Focus: Digital Signal Processing, Analog Electronic Design
- Selected Course Work: Fundamentals of Digital Signal Processing, Random Signals, Audio Engineering, Audio Power Amplifier Design

WORK EXPERIENCE

- **Co-founder, CTO**. Shred Video, Inc. San Francisco, CA. 2015-present
  - Primary developer of various technologies for mobile apps, including audio analysis, synthesis, and transformation software, algorithmic video creation tools, and collaborative network music software.
  - Y Combinator Summer 2015 batch.
- **Lead Engineer**. Khush, Inc. / Smule, Inc. Atlanta, GA / San Francisco, CA. 2011-2014
  - Primary developer of various technologies for mobile apps, including audio analysis, synthesis, and transformation software, algorithmic video creation tools, and collaborative network music software.
  - Over 17 million downloads of "Songify", an iOS and Android app that automatically transforms speech into song.
  - Over 8 million downloads of "AutoRap", an iOS and Android app that automatically corrects bad rapping and turns speech into rap.
- **Lead Engineer**. ZOOZ Mobile, Inc. Atlanta, GA. 2008-2011.
  - Led team in researching and developing music technology for mobile phones, including a fixed-point audio engine optimized for embedded processors.
  - Over one million downloads of the iPhone application "ZOOZbeat", a sequencer/sampler designed for novice musicians.

- Developed dynamic social-networking website for users to upload and share their musical creations from their mobile devices.
- Played key role in user experience and interface design, as well as graphical and musical content design.
- **Research Assistant**. Music Technology Group, Music Dept., Georgia Tech. 2006-2008.
  - Assisted Dr. Jason Freeman in the development of *Flock*, an interactive full evening performance piece.
- **Research Assistant**. Sonification Lab, School of Psychology, Georgia Tech. 2006.
  - Began the *Accessible Aquarium Project* under Dr. Bruce Walker for sonifying aquarium data for blind or low-vision visitors.
- **Teaching Assistant**. School of Electrical and Computer Engineering, Georgia Tech. 2005.
  - Assisted Dr. Faramarz Fekri with *Fundamentals of Digital Signal Processing*, a 4000level course.
- **Research Assistant**. Georgia Tech Research Institute. Atlanta, GA. 2002.
  - Assisted engineers and documented various projects in the Communications and Networking Division.
- **Contributing Author**. Lerner & Lerner, LCC. Fairhope, AL. 2001.
  - Researched, compiled, and authored an article for publication in the college textbook, *World of Computer Science*.

ACADEMIC RESEARCH

- **Content-Based Music Recommendation**. Experiments in utilizing audio analysis to build statistical models of musical recordings and compute similarities of these models, led by Dr. Parag Chordia. (2007-2008)
  - o Improved state-of-the-art "bag of frames" methods through a process of parametric model homogenization
  - o Explored the phenomena of "hubs" in music similarity, including potential origins and remedies
  - o Developed and assessed non-parametric techniques (e.g. kernel density estimation) for modeling and comparing musical recordings
  - o Expanded standard timbral models with pitch-based methods, particularly suited for Indian classical music
- **Flock**. A full evening performance piece by Dr. Jason Freeman for saxophone quartet and audience participation. Performed at the Adrienne Arsht Center for the Performing Arts in Miami, FL in Dec. 2007 and at the 01SJ Biennial in San Jose, CA in June 2008. (2006-2008)
  - o Developed particle-filter-based computer vision tracking system
  - o Assisted in software development for real-time music notation generation
- **Flou**. An interactive web application for exploring 3-D worlds containing musical loop and effects objects. Users are encouraged to create their own worlds and collaborate with other users through the web. Commissioned by New Radio and Performing Arts, Inc. for *Networked Music Review*. (2007)
  - o Developed custom audio engine
  - o Developed 3-D OpenGL environment

o Developed networking aspects, including uploading/downloading worlds to server and metadata management
- **Haile**. A perceptual robotic percussionist developed by Dr. Gil Weinberg that listens to live human players, analyzes musical elements, and accompanies in an acoustically rich manner. (2007)
  - o Adapted to play xylophone in a live jazz setting
  - o Developed software for music generation and interaction in Max/MSP, Java, and C++
- **Accessible Aquarium Project**. Sonification of live motion data from an aquarium, particularly for use with blind and low-vision visitors, under the supervision of Dr. Bruce Walker. (2006-2007)
- **Singer Identification**. A modification of popular artist identification algorithms, used found chunks of high singing-to-background-music ratio to classify songs. (2006)
- **Adaptive Removal of Heartbeat Noise**. An adaptive filter was developed to attenuate heartbeat noise from middle-ear audio recordings to better analyze movement of the stapedial muscle. (2005)
- **Filtering of Extracellular Neuron Signals**. A filter was developed to transform extracellular neuron signals back to their original, intracellular form. (2004)

PUBLICATIONS

- Freeman, J., Godfrey, M. "Creative Collaboration Between Audiences and Musicians in *Flock*." **Digital Creativity**, 2010. (forthcoming)
- Weinberg, G., Beck, A., Godfrey, M. "ZOOZbeat: a Gesture-based Mobile Music Studio." Proceedings of the **International Conference on New Interfaces for Music Expression** (Pittsburgh), 2009.
- Godfrey, M., Chordia, P. "Hubs and Homogeneity: Improving Content-Based Music Modeling." Proceedings of the **International Conference on Music Information Retrieval** (Philadelphia), 2008.
- Chordia, P., Godfrey, M., Rae, A. "Extending Content-Based Recommendation: The Case of Indian Classical Music." Proceedings of the **International Conference on Music Information Retrieval** (Philadelphia), 2008.
- Godfrey, M. **Hubs and Homogeneity: Improving Content-Based Music Modeling**. Master's Thesis, Georgia Institute of Technology, 2008.
- Freeman, J., Godfrey, M. "Technology, Real-time Notation, and Audience Participation in Flock." Proceedings of the **International Computer Music Co nference** (Belfast), 2008.
- Weinberg, G., Godfrey, M., Rae, A., Rhoads, J. "A Real-Time Genetic Algorithm In Human-Robot Musical Improvisation." **Lecture Notes In Computer Science**, Springer Press, 2007.
- Weinberg, G., Godfrey, M., Rae, A., Rhoads, J. "A Real-Time Genetic Algorithm In Human-Robot Musical Improvisation." Proceedings of the **International Computer Music Conference** (Copenhagen), 2007
- Walker, B., Godfrey, M., Orlosky, J., Bruce, C., Sanford, J. "Aquarium Sonification: Soundscapes for Accessible Dynamic Informal Learning Environments." Proceedings of the **International Conference on Auditory Display** (London), 2006.

MUSICAL EXPERIENCE

- **Nomen Novum**. Local experimental pop music act. Played electronics as well as audio-reactive video projections. 2005-2010.
- **Covey**. Interactive sound installation with live video. Responsible for sound design and computer vision software development. Premiered at *Georgia Tech Listening Machines* concert, Eyedrum Gallery, Atlanta, 2007 and performed in Miami and San Jose with *Flock*. Selected for inclusion at the *Spark Festival of Electronic Music and Arts*, Minneapolis, 2008.
- **Svobod**. Jazz piece for piano, saxophone, and Haile, a robotic xylophonist. Responsible for software development. Juried performance at the International Computer Music Conference, Copenhagen, 2007.
- **iltur for Haile**. Piece for jazz quartet and Haile, a robotic xylophonist. Played bass and developed software. Premiered at *Georgia Tech Listening Machines* concert, Eyedrum Gallery, Atlanta, 2007.
- **Sonic Generator**. Georgia Tech's contemporary music ensemble-in-residence. Stage manager and electronics operator for many pieces. Developed audio-reactive videos and ran live audio processing for *Ossi di seppia* by Marco Nardelli. Performances in Atlanta, 2006-2009.
- Proficient in guitar, bass, and voice, as well as writing and recording music in my home studio.

TECHNICAL SKILLS

- **Programming Languages:** C, C++, Objective-C, Java, Ruby on Rails, Python, PHP, Scheme
- **Science and Engineering Software:** MATLAB (inc. various toolboxes: netlab, MA toolbox, PRTools), Weka, Spice, Mathcad
- **Languages for Music/Multimedia:** Max/MSP/Jitter, Processing, jMonkey Engine, ChucK
- **Software Development Tools:** Xcode, Eclipse, Visual Studio
- **Music Production Software:** Reason, Logic, Live, SONAR, Audacity
- **Interactive Hardware:** General MIDI, MidiTron, Phidgets, Jitter computer vision
- **Electrical:** Soldering, prototyping, proficient with most lab equipment (multimeter, oscilloscope, function generator), constructed several audio components from scratch

HONORS

- **Outstanding Graduate Student Award**. Music Department, Georgia Tech. (2007)
- **Eta Kappa Nu**. Electrical Engineering Honor Society, Georgia Tech. (2002present)

ORGANIZATIONS

- **WREK 91.1 FM**. Georgia Tech's student-run radio station. DJ for shows "Atmospherics", featuring ambient music and soundscapes, and "Gharana Music", featuring North Indian classical music. (2004-2008)
- **Georgia Tech Musicians Network**. Operated live sound for touring music acts and open-mic nights in Georgia Tech's venue, Under the Couch. (2001-2005)
- **Audio Engineering Society**.