

December 4, 2018

## Donya Quick

Computer Music and Artificial Intelligence Researcher, Educator, and Composer.

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Personal website: [donyaquick.com](http://donyaquick.com)  
Online portfolio: [donyaquick.com/portfolio](http://donyaquick.com/portfolio)  
Code repositories: [github.com/donya](https://github.com/donya) and [github.com/Euterpea](https://github.com/Euterpea)

**Research area:** interdisciplinary work involving artificial intelligence, domain-specific programming language design, natural language processing, parallel programming, and music theory.

### EMPLOYMENT

*Research Assistant Professor*, June 2017 - present  
Stevens Institute of Technology, Hoboken, NJ  
Development of the MUSICA project for musical artificial intelligence.

*Visiting Professor*, August 2016 - May 2017  
Southern Methodist University, Dallas, TX  
Teaching interdisciplinary courses within the Center of Creative Computation.

*Researcher*, June 2016 - August 2016  
University of Arizona, School of Information, Tucson, AZ  
Development of the MUSICA project for musical artificial intelligence.

*Lecturer*, November 2014 - May 2016  
Yale University Department of Computer Science, New Haven, CT  
Teaching courses in computer music and supervising student research projects.

*Postdoctoral Research Associate*, September 2014 - October 2014  
Yale University Department of Computer Science, New Haven, CT  
Functional reactive programming language design and implementation.

*Software Development*, 2007  
Geotech Instruments, Dallas, TX  
Development of seismic database software using Java and MySQL.

### EDUCATION

*Doctor of Philosophy*, Computer Science  
Yale University, New Haven, CT, December 2014  
Advisor: Paul Hudak. Research: modeling music composition and score generation with aspects of programming languages, machine learning, abstract algebra, and linguistics.

*Master of Philosophy*, Computer Science  
Yale University, New Haven, CT, December 2011

*Master of Science*, Computer Science  
Yale University, New Haven, CT, December 2011

*Master of Science*, Computer Science  
Southern Methodist University, Dallas, TX, May 2008

Advisor: Margaret H. Dunham. Research: visualization and data mining of DNA/RNA sequences and seismic data sets.

*Bachelor of Science*, Computer Science and Environmental Science  
Southern Methodist University, Dallas, TX, May 2008, summa cum laude

*Associates of Arts, Science*  
Lord Fairfax Community College, Warrenton, VA, May 2005

## PUBLICATIONS AND POSTERS

Paul Hudak and Donya Quick. *The Haskell School of Music: from Signals to Symphonies*. Cambridge University Press, 2018.

Donya Quick and Clayton T. Morrison. Composition by Conversation. In *Proceedings of the International Computer Music Conference*, 2017.

Brian Heim and Donya Quick. Recursive Generation of Rhythmic Structures with PTGGs. In *Proceedings of the International Computer Music Conference*, 2017.

Donya Quick. Learning Production Probabilities for Musical Grammars. *Journal of New Music Research*, 2016.

Donya Quick. Composing with Kulitta. In *Proceedings of the International Computer Music Conference*, 2015.

Mark Santolucito, Donya Quick, and Paul Hudak. Media Modules: Intermedia Systems in a Pure Functional Paradigm. In *Proceedings of the International Computer Music Conference*, 2015.

Paul Hudak, Donya Quick, Mark Santolucito, and Daniel Winograd-Cort. Real-Time Interactive Music in Haskell. In *Proceedings of the ACM Workshop on Functional Art, Music, Modeling and Design*, 2015.

Donya Quick. *Kulitta: a Framework for Automated Composition (Dissertation)*. Yale University, August 2014.

Donya Quick and Paul Hudak. Grammar-Based Automated Music Composition in Haskell. In *Proceedings of the ACM Workshop on Functional Art, Music, Modeling and Design*, 2013.

Donya Quick and Paul Hudak. A Temporal Generative Graph Grammar for Harmonic and Metrical Structure. In *Proceedings of the International Computer Music Conference*, 2013.

Donya Quick and Paul Hudak. Computing with Chord Spaces. In *Proceedings of the International Computer Music Conference*, 2012.

Donya Quick. Generating Music Using Concepts from Schenkerian Analysis and Chord Spaces. Yale Technical Report, 2010.

Donya Quick. Applications and Parameter Analysis of Temporal Chaos Game Representation (Master's Thesis). Southern Methodist University, 2008.

Donya Quick and Margaret H. Dunham. TCGR: A Novel DNA/RNA Visualization Technique. *Symposium on Next Generation of Data Mining*, 2007.

Margaret H. Dunham, Donya Quick, Yuhang Wang, Monnie McGee, and Jim Waddle. Visualization of DNA/RNA Structure using Temporal CGRs. *IEEE Bioinformatics and BioEngineering*, 2006.

Donya Quick and Christopher Burrows. Empirical Evaluation of Kulitta (Poster). *Northeast Music Cognition Group*, 2015.

Donya Quick and Christopher Burrows. Empirical Assessment of Automated Composition Algorithms (Poster). *54<sup>th</sup> Meeting of the New England Psychological Association*, 2014.

### Talks and Demos

Donya Quick. Pattern-Based Algorithmic Music with Euterpea (Demo). ACM Workshop on Functional Art, Music, Modeling and Design, 2018.

Donya Quick. Algorithmic Music in Haskell (Invited Talk). Haskell Symposium at the International Conference on Functional Programming (ICFP), 2017.

### COMPOSITIONS, CONCERTS, INSTALLATIONS, AND COMMISSIONS

*Functional Art, Music, Modeling and Design Performance Night at ICFP*: performance of Dot Matrix, an algorithmic composition using Euterpea and Kulitta with live-generated visuals in Processing.

*Electronic Music Midwest*, three algorithmic compositions using Kulitta and Euterpea: Vesicularia (2016), Tandava (2017), and Dot Matrix (2018).

*Real-time audio-visual installations* outside the Center of Creative Computation in Meadows School of the Arts, SMU, 2016-2017.

*Paul Hudak Symposium Listening Room*, Yale University, April 2016. Concert organization and presentation of multiple original and algorithmic compositions using Euterpea and Kulitta.

*Automated Composition Commission for Gartner*, January 2016. Using Kulitta to produce performable piano compositions. Pieces were performed at Gartner's conferences.

*Euterpea Studio Concert*, Yale University, November 2015. Concert organization and presentation of an algorithmic composition using Kulitta.

*Music composition*: original compositions, algorithmic composition, and virtual instrument design. Online examples: [soundcloud.com/donyaquick](https://soundcloud.com/donyaquick)

### FUNDING SOURCES

*DARPA Grant W911NF-16-1-0567: Co-PI* (2016-present). PI: Kelland Thomas. Communicating with Computers program, the MUSICA project.

*NSF Grant SHF-1302327: graduate student researcher and postdoctoral research associate* (2013-2016). PI: Paul Hudak / Ruzica Piskac. FRP for Real: design and implementation of domain-specific functional reactive programming languages.

*NSF Grant CCF-0811665: graduate student researcher* (2013-2015). PI: Paul Hudak. Research on language design and implementation for functional reactive programming.

### SOFTWARE PROJECTS

*MUSICA researcher and contributor*, spring 2016 - present. DARPA-funded project focused on developing an artificial intelligence system for interactive improvisation and musical communication using natural language processing models.

*Kulitta*, creator and maintainer, spring 2009 - present. A Haskell-based framework for automated and algorithmic music composition. See [donyaquick.com/kulitta](http://donyaquick.com/kulitta) for more information. Source code repository: [github.com/donya/Kulitta](https://github.com/donya/Kulitta).

*Euterpea*, contributor and maintainer, fall 2009 - present. Development and maintenance of a Haskell library for representing and creating music. See [euterpea.com](http://euterpea.com) for more information about the project. Source code repositories: [github.com/Euterpea](https://github.com/Euterpea).

## SKILLS

*Programming languages:*

- Currently developing cross-platform libraries and real-time applications using Haskell, Python, Processing, Java, and C#.
- Past work with Pure Data, C, and C++.
- Familiar with PHP, SQL/MySQL, Assembly, and Verilog.

*Other skills:* parallel programming, repository management, L<sup>A</sup>T<sub>E</sub>X, algorithm engineering, and iterative software development with a programming team.

## TEACHING

*Visiting Professor at SMU*, August 2016 - present. Courses taught:

- Sound and Code, spring 2017. Virtual instrument design using Pure Data.
- Functional Creative Coding, spring 2017. Introduction to the Haskell programming language and functional concepts through musical applications.
- Creative Coding I, fall 2016 - spring 2017. Introduction to programming using Processing. Principles of computer science and programming explored through the creation of interactive audio-visual artwork and games.
- AI and Creative Composition, fall 2016. Artificial intelligence algorithms for analyzing and generating creative work. Topics surveyed span multiple areas of cutting-edge artificial intelligence research applied to creative domains, such as music composition.

*Lecturer at Yale*, November 2015 - May 2016. Courses taught:

- Programming Musical Applications, fall 2015. An introduction to programming concepts in a musical setting using the Python programming language. No prerequisites.
- Algorithmic and Heuristic Composition, spring 2015. Advanced computer music course focused on functional programming language principles, representations for score-level musical features, and algorithms for producing novel musical works.
- Sound Representation and Synthesis, spring 2016. Advanced computer music course focused on low-level issues of representing sound and programming with streams.

*Teaching Assistant at Yale*, fall 2009 - spring 2014. Courses: Object-Oriented Programming, Parallel Programming Techniques, Algorithmic and Heuristic Composition, Machine Learning, Cryptography and Computer Security, and Advanced Artificial Intelligence.

## **OTHER ACADEMIC ACTIVITIES AND SERVICE**

*Ad-hoc reviewer:* Journal of New Music Research (2016-2017), MDPI Mathematics (2017), and Journal of Visual Languages and Computing (2018).

*Program chair:* Workshop on Functional Art, Music, Modeling, and Design, 2018.

*Program committee member:* Workshop on Functional Art, Music, Modeling and Design, 2015 and 2017.

*Meadows Academic Policies Committee member,* 2016-2017.

*Paper Session Chair:* International Computer Music Conference, September 29, 2015.