

# Curriculum Vitae

Amy K. Hoover  
Institute of Digital Games  
University of Malta

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## EMPLOYMENT

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**Postdoctoral Researcher** Institute of Digital Games, University of Malta (2014-2015)

**National Science Foundation Graduate Research Fellow** , University of Central Florida (2009-2014)

## EDUCATION

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**Ph.D. Computer Science** University of Central Florida, 2014

Dissertation: Functional Scaffolding for Musical Composition: A New Approach in Computer-Assisted Music Composition

Advisor: Kenneth O. Stanley, Department of Electrical Engineering and Computer Science.

**M.S. Computer Science** University of Central Florida, 2014

Advisor: Kenneth O. Stanley, Department of Electrical Engineering and Computer Science.

**B.S. Computer Science, with University Honors** University of Central Florida, 2009

Honors Thesis: NEAT Drummer: Computer-Generated Drum Tracks

Advisor: Kenneth O. Stanley, Department of Electrical Engineering and Computer Science.

**B.S. Mathematics, with University Honors** University of Central Florida, 2009

## FELLOWSHIPS

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**National Science Foundation** Graduate Research Fellowship (2010)

Awarded: \$90,000

**University of Central Florida** Trustees Doctoral Fellowship (2009)

Awarded: \$36,000

## HONORS AND AWARDS

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**Dean's Presentation Award** University of Central Florida, Graduate Studies, for outstanding accomplishments and exemplary contribution to the graduate fellowship community (2011)

**Best Paper Award in Digital Entertainment Technologies and Arts (out of 21)** *Genetic and Evolutionary Computation Conference* (GECCO-2011, Dublin, Ireland) for Interactively Evolving Harmonies through Functional Scaffolding

**Best Undergraduate Student Award in Computer Science** University of Central Florida, School of Electrical Engineering and Computer Science (2009)

**Nominated for Order of the Pegasus** University of Central Florida, School of Electrical Engineering and Computer Science (2008)

**First Place at the Showcase of Undergraduate Research Excellence** University of Central Florida in the Physical Sciences, Mathematics, Computer Science and Engineering category (out of 30) (2008)

**Best Paper Award in Evolutionary Music and Art (out of 31)** *Sixth European Workshop on Evolutionary and Biologically Inspired Music, Sound, Art and Design* (EvoMUSART-2008, Naples, Italy), for Scaffolding for Interactively Evolving Novel Drum Tracks for Existing Songs.

**Scholarship Funded by AmazonLab 126** Grace Hopper Celebration of Women in Computing (2013, Minneapolis, MN)

**Scholarship Funded by the National Science Foundation** Grace Hopper Celebration of Women in Computing (2010, Atlanta, GA)

**Scholarship Funded By Upsilon Pi Epsilon** Jim Nolen Scholarship (2009)

PUBLICATIONS

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- Björn Þór Jónsson, Amy K. Hoover, and Sebastian Risi. “Interactively Evolving Compositional Sound Synthesis Networks.” *In Proceedings of the Genetic and Evolutionary Computation Conference (GECCO 2015)* (2015).
- Antonios Liapis, Amy K. Hoover, Georgios N. Yannakakis, Constantine Alexopoulos, and Evangelia V. Dimaraki. “Motivating Visual Interpretations in Iconoscope: Designing a Game for Fostering Creativity.” *In Proceedings of the Foundations of Digital Games (FDG 2015)* (2015).
- Amy K. Hoover, William Cachia, Antonis Liapis, and Georgios N. Yannakakis. “Towards Orchestrating Game Creativity Facets: Fusing Audio, Visuals and Gameplay.” *In* Adrian Carballal, Colin Johnson, and João Nuno (Editors), *Proceedings of the Fifth Conference on Evolutionary and Biologically Inspired Music, Sound, Art and Design (EvoMUSART 2015)* (Springer, 2015).
- Amy K. Hoover, Paul A. Szerlip, and Kenneth O. Stanley. “Functional Scaffolding for Composing Additional Musical Voices.” *Computer Music Journal* **38**, 80–99 (2014).
- Amy K. Hoover, Paul A. Szerlip, and Kenneth O. Stanley. “Implications from Music Generation for Music Appreciation.” *In Proceedings of the Fourth International Conference on Computational Creativity (ICCC 2013)* (2013).
- Amy K. Hoover, Paul A. Szerlip, Marie E. Norton, Trevor A. Brindle, Zachary Merritt, and Kenneth O. Stanley. “Generating a Complete Multipart Musical Composition from a Single Monophonic Melody with Functional Scaffolding.” *In Proceedings of the Third International Conference on Computational Creativity (ICCC 2012)* (2012). This paper is accompanied with a set of musical samples at <http://eplex.cs.ucf.edu/fsmc/iccc2012/>.
- Amy K. Hoover, Paul A. Szerlip, and Kenneth O. Stanley. “Interactively Evolving Harmonies through Functional Scaffolding.” *In Proceedings of the Genetic and Evolutionary Computation Conference (GECCO 2011)* (The Association for Computing Machinery, New York, NY, 2011). This paper is accompanied with a set of musical samples at <http://eplex.cs.ucf.edu/fsmc/gecco2011/>. **Winner of the Best Paper Award in the Digital Entertainment Technologies and Arts (out of 22 submissions).**
- Amy K. Hoover, Paul A. Szerlip, and Kenneth O. Stanley. “Generating Musical Accompaniment through Functional Scaffolding.” *In Proceedings of the Eighth Sound and Music Computing Conference (SMC 2011)* (2011). This paper is accompanied with a set of musical samples at <http://eplex.cs.ucf.edu/fsmc/smc2011/>.
- Amy K. Hoover and Kenneth O. Stanley. “Exploiting Functional Relationships in Musical Composition.” *Connection Science Special Issue on Music, Brain, & Cognition* **21**, 227–251 (2009). This paper is accompanied with a set of musical samples at <http://eplex.cs.ucf.edu/neatmusic>.
- Amy K. Hoover, Michael P. Rosario, and Kenneth O. Stanley. “Scaffolding for Interactively Evolving Novel Drum Tracks for Existing Songs.” *In* Mario Giacobini et. al. (Editor), *Proceedings of the Sixth European Workshop on Evolutionary and Biologically Inspired Music, Sound, Art and Design (EvoMUSART 2008)*, pp. 412–422 (Springer, 2008). This paper is accompanied with a set of musical samples at <http://eplex.cs.ucf.edu/neatdrummer>. **Winner of the Best Paper Award. (out of 31 submissions).**

GRANTS AND FUNDING

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- Significant Contribution to Funded Proposal.** National Science Foundation (NSF), CreativeIT Program, "Pilot: Assisted Musical Composition through Functional Scaffolding," August 2010 - August 2013, \$295,229. (PI Kenneth O. Stanley)

## WORKSHOPS AND INVITED PRESENTATIONS

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### Workshops

*Toward Procedural Music in Digital Games.* Phil Lopes, Amy K. Hoover, Antonis Liapis, and Georgios Yannakakis. Learning from Videogame Music. Ludomusicology Conference 2015.

*Exploring Musical Creativity with Functional Scaffolding.* Amy K. Hoover, Paul A. Szerlip, and Kenneth O. Stanley. Ph.D. Forum and New Investigators session at the Grace Hopper Celebration of Women in Computing. Minneapolis, MN, October 3, 2013.

*NextProf Future Faculty Workshop.* Competitively accepted at the University of Michigan NextProf workshop to encourage talented women in engineering and science to consider academia as a career. University of Michigan, College of Engineering, Ann Arbor, MI, September 25-27, 2013.

*Exploring Musical Creativity with Functional Scaffolding.* Amy K. Hoover, Paul A. Szerlip, and Kenneth O. Stanley. Creativity & Cognition 2013 Graduate Student Symposium. Sydney, Australia, June 17, 2013.

*Functional Scaffolding: A New Principle for Enabling Computational Creativity in Music.* **Invited Fellow at the Exploring the Mind through Music Conference (EMM-2011).** Houston, TX, June 16, 2011.

*Functional Scaffolding for Musical Composition.* Workshop in Algorithmic Music Composition (WACM-2010). Santa Cruz, CA, July 5, 2010.

### Invited Presentations

*Generating Music and Sound for Video Games.*] Invited Speaker for the Computer Science Annual Workshop (CSAW-2014). University of Malta, Malta, November 6, 2014.

*Music to My Ears: Creativity/Technology Discussion.*] Invited Speaker for the Diversify/Engage talk series by the Student Government Association at the University of Central Florida. Orlando, FL, October 30, 2013.

*Music and Artificial Intelligence.*] Invited Speaker for the Processing Orlando music technology group, Orlando, FL, October 29, 2013.

*Uncovering an Implicit Mathematical Property of Music Composition and Appreciation.* **Invited Speaker at the University of Arizona School of Information: Science, Technology, and Arts.** Tuscon, AZ, May 16, 2013.

*Exploring Music Artificial Intelligence.* Invited Speaker for the LEARN Academic Series. Orlando, FL, January 24, 2013.

*Exploring Music Artificial Intelligence.* **Distinguished Speaker at the Burnett Honors College Summer Institute (BHCSI-2012).** Orlando, FL, July 24, 2012.

*Composing Music with Functional Scaffolding.* Invited Speaker for the LEARN Academic Series. Orlando, FL, January 26, 2012.

*Interactive Evolution, Creativity, and You: Exploring Creativity through Computer Science.* **Distinguished Speaker at the Burnett Honors College Summer Institute (BHCSI-2011).** Orlando, FL, July 20, 2011.

*NEAT Drummer: Computer-Generated Drum Tracks.* Invited Speaker for the University of Central Florida Music Forum. Orlando, FL, February 19, 2009.

## RESEARCH EXPERIENCE

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**Postdoctoral Researcher** Institute of Digital Games, University of Malta, 2014 - present

Supervisor: Georgios N. Yannakakis

**Graduate Research Fellow.** University of Central Florida, 2009-2014

Advisor: Dr. Kenneth O. Stanley, Department of Electrical Engineering and Computer Science.

**Undergraduate Honors Thesis.** University of Central Florida, 2008

Title: NEAT Drummer: Computer-Generated Drum Tracks

Advisor: Dr. Kenneth O. Stanley, Department of Electrical Engineering and Computer Science.

**Undergraduate Researcher.** University of Central Florida, 2007-2009

Advisor: Dr. Kenneth O. Stanley, Department of Electrical Engineering and Computer Science.

**NSF REU in Machine Learning.** University of Central Florida, 2007

NEAT Drummer: Interactive Evolutionary Computation for Drum Pattern Generation

Advisors: Dr. Kenneth O. Stanley, Dr. Michael Georgiopoulos, Department of Electrical Engineering and Computer Science.

**Undergraduate Lab Assistant.** University of Central Florida, 2004-2005

Isolated DNA, sequenced *Agkistrodon piscivorus* (cottonmouth) mitochondrial DNA

Advisor: Dr. Christopher L. Parkinson, Department of Biology.

## PATENTS

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**Granted.** David D'Ambrosio, Sebastian Risi, Joel Lehman, Amy Hoover and Kenneth Stanley. *Means of Representing, Generating, and Incrementally Modifying Aesthetically Pleasing Digital Images of Flowers.* University of Central Florida

**Pending.** Amy K. Hoover, Michael Rosario, and Kenneth O. Stanley (Patent Pending since July, 2008). *System and Method for Evolving Music Tracks.* University of Central Florida

## SOFTWARE

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**MaestroGenesis** allows users to generate accompaniment for existing MIDI compositions through a breeding process similar to animal breeding. The result is that amateur musicians and non-musicians can create accompaniment without any musical expertise. The algorithm inside MaestroGenesis, which I co-invented, is called Functional Scaffolding for Musical Composition (FSMC), which builds on a prior approach called NEAT Drummer. I designed and implemented the original concept and design. MaestroGenesis is publicly available at: <http://maestrogenesis.org>.

## STUDENTS SUPERVISED

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### Graduate Students Co-Supervised

Mark Spiteri, Master's Thesis, Institute of Digital Games, University of Malta

Main Supervisor: Georgios N. Yannakakis

Phil Lopes, Doctoral Candidate, Institute of Digital Games, University of Malta

Main Supervisor: Georgios N. Yannakakis

### Undergraduates

Xavier Banks, Undergraduate Research Project, University of Central Florida, 10/14/13 - 04/12/14

Javon Walton, Undergraduate Research Project, University of Central Florida, 10/14/13 - 04/12/14

Bre'Ona Williams, Undergraduate Research Project, University of Central Florida, 10/15/12 - 10/23/13

Ricardo Angeli, Undergraduate Research Project, University of Central Florida, 10/21/11 - 04/19/12

## TEACHING EXPERIENCE

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**Graduate Instructor.** University of Central Florida, 2010

Course: Introduction to Artificial Intelligence and Neuroevolution

Designed and taught a course on artificial intelligence to specially selected high school students in the Burnett Honors College Summer Institute

**Undergraduate Instructor** University of Central Florida, 2008

Course: Introduction to Artificial Intelligence and Neuroevolution

Designed and taught a course on artificial intelligence to specially selected high school students in the Burnett Honors College Summer Institute

**Undergraduate Teaching Assistant.** University of Central Florida, 2007

Course: Intermediate Java

Main Instructor: Arup Guha, Department of Electrical Engineering and Computer Science.

**Mathlab Tutor.** University of Central Florida, 2004-2006

Tutored students in the following subjects: Finite Mathematics, Trigonometry, Geometry, College Algebra, Calculus, Differential Equations

## ACADEMIC SERVICE

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**Organizer for:**

Co-Chair of the Digital Entertainment Technologies and Arts Track (DETA) at the Genetic and Evolutionary Computation Conference (GECCO- 2015). Madrid, Spain, July 11-15, 2015.

Chair of Competitions at GECCO-2014. Vancouver, British Columbia, Canada, July 12-16, 2014.

Co-Chair of the Evolutionary Art, Design, and Creativity Competition at GECCO-2014. Vancouver, British Columbia, Canada, July 12-16, 2014.

Co-Chair of the Evolutionary Art, Design, and Creativity Competition at GECCO-2013. Amsterdam, The Netherlands, July 06-10, 2013.

Co-Chair of the Evolutionary Art, Design, and Creativity Competition at GECCO-2012. Philadelphia, PA, July 07-11, 2012.

**Reviewer for:**

16th International Society for Music Information Retrieval Conference (ISMIR 2015)

Foundations of Digital Games (FDG 2015)

AI and the Arts Track at International Joint Conference on Artificial Intelligence (IJCAI 2015)

21st International Symposium for Electronic Art (ISEA 2015)

Fifth International Conference on Computational Creativity (ICCC 2015, 2014)

Genetic and Evolutionary Computation Conference (GECCO 2014, 2013, 2012, 2011)

Genetic Programming and Evolvable Machines (2013).

International Conference on Evolutionary and Biologically Inspired Music, Sound, Art and Design (EvoMUSART 2015, 2014, 2013, 2012)

Transactions on Computational Intelligence and AI in Games (2011)

European Event on Evolutionary and Biologically Inspired Music, Sound, Art and Design (EvoMUSART 2010, 2009)

**Panelist for:**

*You're Graduating - Now What?* Women in Electrical Engineering and Computer Science, University of Central Florida. Orlando, FL, April 12, 2013.

*Internship and Undergraduate Research Workshop*, Women in Electrical Engineering and Computer Science, University of Central Florida. Orlando, FL, March 28, 2013.

*CRA-W/CDC Alliance Distinguished Lecture Series Graduate School Information Panel*, University of Central Florida, Florida Institute of Technology, and Rollins College. Orlando, FL, March 26, 2013.

POSTERS AND DEMONSTRATIONS

**Demo: A Computer-Assisted Approach to Composing with MaestroGenesis** at the First International Workshop on Musical Metacreation (MUME 2012). Palo Alto, CA 2012.  
Paul A. Szerlip, Amy K. Hoover, Kenneth O. Stanley

**MaestroGenesis: Computer-Assisted Musical Accompaniment Generation** at the Third International Conference on Computational Creativity. Dublin, Ireland 2012.  
Paul A. Szerlip, Amy K. Hoover, Kenneth O. Stanley

**Facilitating Musical Creativity with Artificial Intelligence** at the Computer Research Association-Women Grad Cohort. Seattle, WA 2012.  
Amy K. Hoover, Paul A. Szerlip, Kenneth O. Stanley

**Automatically Generating Drum Tracks for Existing Songs with a Computer** at the Showcase of Undergraduate Research Excellence, University of Central Florida, 2008  
Advisor: Kenneth O. Stanley, Department of Electrical Engineering and Computer Science.  
**1st place in Physical Sciences, Mathematics, Computer Science and Engineering (out of 30 submissions).**

**Snake Mitochondrial Genomics** at the Showcase of Undergraduate Research Excellence, University of Central Florida, 2005.  
Advisor: Christopher L. Parkinson, Department of Biology.

PROFESSIONAL AND GROUP MEMBERSHIPS

**Women in Electrical Engineering and Computer Science.** University of Central Florida, 2008 - 2014

**Evolutionary Complexity Lab.** University of Central Florida, 2007-2014

**Association of Computing Machinery at the University of Central Florida.** University of Central Florida, 2007 - 2009  
Position: UCF President 2007

**Upsilon Pi Epsilon: International Honor Society for the Computing and Information Disciplines**  
University of Central Florida, 2007 - present  
Chapter President 2013  
Chapter President 2012  
Chapter Vice President 2011  
Chapter Secretary 2009, 2010