

## GroupLoops

Collaborative music composition software for the iPhone

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## Contents

### Research Problem, Question, Or Goal

Introduction	3
Problems with Music Composition Software for the Novice User	3
The Untapped Potential of the iPhone	4
Research Questions	6

### Literature and Landscape Review

Introduction	7
Comparative Analysis Chart	8
Literature and Takeaways	10

### Project Objectives

Overview and Concept	16
Project Phases	17

### Project Activity and Benefit of Collaboration

Research and Project Plan	19
Member Background and Project Roles	20

### Other Benefits of Collaboration

Contribution to Interdisciplinary Research	23
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### Special Equipment Needs

Overview	24
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## Research Problem, Question, or Goal

### Introduction

Learning how to play an instrument and compose music takes a long time and a lot of effort. Electronic devices lower the barrier to music creation by removing procedural technique from this learning curve. However, music composition software shares a different barrier with instruments: It's hard to learn how to make a musical work that sounds good.

Our research will explore how the iPhone and iPod Touch could teach music theory while participants collaborate on a group track. The experience might be similar to a jam session, but with digital instruments that fit in your pocket and don't require years of practice to play well. We'll use interaction design methods like contextual inquiry, prototyping, and user testing to research and develop an interface that's easy to use, instructional via constraints and recommendations, and fun.

Our goal is to develop a proof-of-concept for co-located, synchronous, and collaborative music composition software for the iPhone and iPod Touch that would educate and inspire creativity in music theory novices.

### Problems with Music Composition Software for the Novice User

**Advanced Hardware** - The "minimum" requirements for music composition software push most mass market computers to their limit and don't represent real-world demands on processing power. Users often need to limit even the most simple compositions because their systems aren't powerful enough.

**Collaboration at Different Places and at Different Times** - Desktops are better able and more cost-effective than laptops to handle the processing power required by music composition software. Collaborators that work apart from each other lose feedback in body language and vocal tone. Further, music composition software doesn't allow simultaneous collaboration. The richness of interaction is limited to review and revision, whereas co-located settings allow real-time response.

**Hard to Learn** - For novice users of music composition software, it's hard to figure out what to do. People may have an idea of how to create sound with an instrument, but that has little to do with how

to create sound on a computer. Pressing down on a real piano key is more intuitive than using a mouse and QWERTY keyboard to manipulate note pitch, duration, and arrangement.

**Music Theory Barrier** - Music composition software gives users a blank slate to create sound arrangements. It takes some knowledge of music theory to make a composition sound good, such as rhythm, key, and progression. Music composition software doesn't guide novices toward informed decision making about how to apply music theory to their work.

**Poor Usability** - Music composition software interfaces are overloaded with features for expert users that confuse novices. Poor organization of controls and crowded regions further disrupt the user experience.

**Expensive** - Prices range from \$100 to \$600 for PC music composition software. We surveyed five popular applications; four cost \$329 and above. These prices no doubt turns away novices that can't afford or aren't willing to pay a high entry fee. Demos cripple features and most don't allow saving work. Composition applications for the iPhone range from free to \$20. None offer the kind of real-time collaboration that we know to be technically feasible.

**Clunky Version Control** - Web browsers can save page history so users can easily rediscover information otherwise lost. Users of music composition software must save new versions of their work as a new file each time if they might want to retrace their steps. In a collaborative music environment, participants may save work without the consent of the group, wish to go back to an old version, or avoid experimentation so as to not accidentally erase someone else's work.

## The Untapped Potential of the iPhone

### *Overview*

Although the iPhone is called a phone, it is much more than just a phone. Additionally, it is the 2nd best selling phone of all time, putting it in the hands of millions and connecting them with thousands of third-party applications in the thriving App Store. There are many reasons why the iPhone has seen such massive adoption, such as the first consumer implementation of a multi-touch screen, it's slim form factor, networking abilities, third-party applications, and other interactions features. Below we have outlined some of the most important iPhone features relevant to our project and how we intend to use them.

**Multi-Touch Interface** - The multi-touch interface is one of the defining characteristics of the iPhone because it was the first consumer device to incorporate this cutting-edge technology. The iPhone's multi-touch abilities are not sufficient on their own, but rather need an interface that capitalizes on natural and intuitive gestures, which is where the iPhone really shines.

This provides an opportunity for us to create applications that capitalize on users' prior knowledge of how they interact with objects in the real world, such as playing chords on a piano or guitar. Developers are already creating applications that provide users with interfaces closer to their existing mental models, allowing users to quickly learn how to use the application and quickly start seeing the results of their efforts and creativity.

**Form Factor** - For such a powerful device, the iPhone is remarkably small and mobile. In general, the small size of today's mobile phones allows users to carry them everywhere they go, which provides us with an opportunity to use the mobile phone in alternative ways. For example, the mobile phone started as a voice communication device, but with use has expanded to other communication needs, such as calendars, email, instant messages, and text messages.

The iPhone keeps the same form factor but its technological advances allow developers to rethink the potential uses of a mobile phone. For example, many mobile phones allow users to take textual notes for recalling important information later. Imagine if we could do the same thing for music. The user is walking through a park and gets a burst of inspiration for a musical riff. The user quickly pulls out their iPhone, opens their musical notepad, plays the riff, perhaps annotating it, and saves it for later. The iPhone's small form factor gives users the ability to carry with them numerous musical instruments anywhere they go.

**Networking Capabilities** - The iPhone is a fully capable network device. The iPhone has the ability to communicate, share information, and collaborate with other nearby devices, such as other phones, wireless routers, and computers. We wish to use the iPhone's networking capabilities to connect users and facilitate an impromptu music collaboration session.

**Internet Connected** - The iPhone's networking capabilities allow it to be connected to the internet from virtually anywhere. This provides us with an opportunity to develop a central location for people to share their musical creations with others, and ideally, incentivize people to collaborate or build upon other user's musical creations. The iPhone's internet connection also allows us to provide a version control system for the music that users create, so their work is never lost.

**Accelerometer** - The iPhone has the ability to know its orientation in relation to the ground. It knows whether you are holding it vertically or horizontally, whether you are shaking it, or whether you jerk it in one direction. The accelerometer offers us the opportunity to incorporate realistic movements to interact with the software. For example, instead of pushing a button to trigger a drum sound, the user

could shake the iPhone as if it were a drum stick. Another example could be the way you share and collaborate on a music track, such as tossing the track to another person in your vicinity so they can modify and add to the track.

**Price is Right** - Much of the music software available for the desktop is extremely expensive, which creates a large barrier for those who may have an interest in creating music, but lack the knowledge and expertise to invest in that kind of software. On the other hand, Apple's App Store has created an environment where the applications are relatively inexpensive, with the majority of the applications ranging between \$.99 to \$2.99. The pricing distribution in the App Store will allow people with interest in creating music that may lack expertise to try our application with little investment and risk.

### Research Questions

With our backgrounds in sound engineering, music theory, and interface design, we would be excited to collaborate and learn about the following questions:

#### ***How can the iPhone and iPod Touch impact the learning process?***

The iPhone and iPod Touch are revolutionary devices for the general public. Notable features include ubiquitous internet access, a multi-touch screen, and a form factor small enough to fit in a pocket. Released just one year ago, their potential impact for learning is just starting to be explored.

In our initial search for literature, we observed a general lack of academic research about the iPhone and learning.

We will research how this emerging platform can facilitate learning, specifically for music composition through collaboration on a group track. We will also apply our findings to learning in other fields.

#### ***How can software instruct without instructive dialogue?***

We would like to research how a software interface can educate without tutorials or dialog boxes. This includes how to operate the software as well as educating the user about a topic, such as music theory. Our goal is to learn about how to keep people immersed in the flow of a creative activity while learning.

#### ***What is the "middle class" of music composition software?***

Music creation software is either very simple or very complex. Entry-level software such as Wii Music and Garage Band come with premade compositions and allow users control over their arrangement and

sound quality. Applications such as Reason and FL Studio allow MIDI composition but overwhelm the novice with complicated interfaces and features.

We hope our research will pave the way toward a "middle class" of music composition software. - with enough features that give novices room to grow (and educate along the way), but that also satisfy experts perhaps looking for a streamlined experience or a "notepad" for their musical ideas.

## Literature and Landscape Review

### Introduction

The present-day market for music creation software is large to say the least. There are many competing titles in very niche market segments. Some applications allow users to compose music, create scores, add soundtracks, record and multitrack songs, develop music theory skills, produce live songs, master albums, create synthesizers, and sing karaoke. Music creation software is even marketed to specific user groups: hip hop songwriters, studio producers, music theory students, garage bands, amateurs, children... and more.

One missing feature set is synchronous and co-located collaborative composition. There are hints of collaboration in certain titles, such as Sibelius' Scorch, where an online network of composers can share sheet music. In FL Studio, the collaborative composition feature is more synchronous: it allows two or more people to work on a song over the Internet. It works as an application add-on, and users in a "Collab" group share a project file. The system works similar to a version control system, and a user can "lock" and "unlock" the song if he or she is done editing. However, the collaborative composition is not synchronous.

Perhaps the closest implementation of such a truly collaborative composition environment is the upcoming Nintendo Wii video game, Wii Music. When playing, gamers use their game controllers to simulate playing a live instrument. Up to four people may join in on a musical karaoke session, with each "bandmember" able to improvise his or her track in live. Although the game allows group members the option to collaboratively rearrange pre-recorded songs, it does not allow for new song creation with multiple people.

Our landscape analysis below compares features between popular music creation applications on the market, as well as with the proposed features of GroupLoops.

# Comparison of Music Creation Software

Product	Platform	OS	Collaborative Composition	Synchronous Collaboration
<i>GroupLoops</i>	<i>Mobile Device</i>	<i>iPhone OS</i>	<b>Yes</b>	<b>Yes</b>
Band	Mobile Device	iPhone OS	<b>No</b>	<b>No</b>
Karajan	Mobile Device	iPhone OS	<b>No</b>	<b>No</b>
BtBX	Mobile Device	iPhone OS	<b>No</b>	<b>No</b>
BeatMaker	Mobile Device	iPhone OS	<b>No</b>	<b>No</b>
FL Studio	Desktop Laptop	Windows 2000+	<b>Yes</b>	<b>No</b>
Propellerheads Reason	Desktop Laptop	Windows XP Mac OS X	<b>No</b>	<b>No</b>
Apple Logic Studio	Desktop Laptop	Mac OS X	<b>No</b>	<b>No</b>
Sibelius	Desktop Laptop	Windows XP Mac OS X	<b>No</b>	<b>No</b>
Ableton Live	Desktop Laptop	Windows XP Mac OS X	<b>No</b>	<b>No</b>
Wii Music	Console	Wii	<b>No</b>	<b>Yes</b>



# Comparison of Music Creation Software

Product	Purpose	Hardware Requirements	Price
<i>GroupLoops</i>	Composition Education Virtual Instrument	iPhone iPod Touch	<i>tbd</i>
Band	Virtual Instrument	iPhone iPod Touch	\$4
Karajan	Education Virtual Instrument	iPhone iPod Touch	\$15
BtBX	Composition Virtual Instrument	iPhone iPod Touch	\$4
BeatMaker	Composition Virtual Instrument	iPhone iPod Touch	\$20
FL Studio	Composition Production Mixing	Intel P3/AMD Athlon XP 256MB RAM 200MB hard disk space Audio interface	\$99 to \$299
Propellerheads Reason	Composition Production Mixing	Intel P4/AMD Athlon XP 512MB RAM 2GB hard disk space DVD-ROM Windows-compatible soundcard MIDI controller (recommended)	\$499
Apple Logic Studio	Composition Production Multitrack Recording Mixing	1.25GHz PowerPC G4 1GB RAM 7GB hard disk space DVD-ROM Audio Interface	\$499
Sibelius	Composition Education	PC: Intel Pentium/AMD Athlon 1.4GHz Mac: PowerPC/Intel 512MB RAM 3.5 GB hard disk space DVD-ROM Audio interface	\$329
Ableton Live	Composition Production Multitrack Recording Mixing Live Production	PC: Intel/AMD 1.5GHz 512MB RAM DVD-ROM Audio Interface	\$599
Wii Music	Virtual Instrument Musical karaoke Education	Nintendo Wii	\$50

## Literature Review

### **Music Creation and Collaboration**

- Creative Collaboration: An "Eminence" Study of Teaching and Learning in Music Composition  
Margaret Barrett (2006)

#### Takeaway Points

- Students learn technique and theory by directly observing others with more experience engaged in the same activity.
- The act of composition imparts knowledge because it provides feedback about what does and doesn't work.
- Successful teaching strategies for music theory include: 1) Highlighting a unique "composer voice" 2) Immersing the student's work in a collaborative context provides a basis for comparison.

- Provoking The Muse: A Case Study of Teaching and Learning in Music Composition  
Margaret Barrett and Joyce Eastlund Gromko (2007)

#### Takeaway Points

- An individual's contribution to a creative work is the result of social influence - what people have enjoyed in the past as well as the quality of social feedback and expected reactions.
- In a collaborative activity with different levels of expertise, the potential complexity of joint work is set by the individual with less ability. The potential complexity of the work itself is set by the individual with more ability.

- The Sensoral Basis of Music Appreciation

Otto Ortmann (year unknown)

#### Takeaway Points

- Music appreciation is influenced by contextual factors on at least three levels beyond an auditory analysis: cultural, physiological, environmental.
- Compositions that are too complex or simple respectively overload or underwhelm the listener's cognition.

## Interface and Interaction Design

The HCI members on our team have read a lot about Interaction Design. These literature examples represent some of the concepts and processes that will guide our design, prototyping, and evaluation.

We acknowledge a need for more interaction design literature specifically for mobile devices. The resources we know of predate the iPhone (2007)

- *The Principles of Beautiful Web Site Design*

*Jason Beaird (2007)*

#### *Chapter Overview:*

*1) Layout and Composition - spatial relationships for placing modules and defining grids for 2D interaction*

*2) Color - how aesthetic and scientific color theory can be used to communicate information or emotion.*

*3) Texture - the impact of points, lines, and shapes*

*4) Typography - the uses of letterform to communicate information or emotion*

*5) Imagery - how photos, icons, and art can be used for storytelling, situating a user within processes, and conveying feedback*

- *About Face 3 - The Essentials of Interaction Design*  
*Alan Cooper and Robert Reimann (2007)*

*How to create and analyze user experience processes and artifacts such as:*

- Lo-Fi Prototype
  - Hi-Fi Prototype
  - Personas and Anti-Personas
  - Scenarios
  - User Testing
  - Mental Models
  - Navigation
  - Windows, Icons, Menus, Pointers (manipulation)
- Designing Interfaces  
*Jennifer Tidwell (2005)*

*How to understand user motivation, organize modules and elements, construct user friendly search rules and filters, handle errors, select the right element from a pattern library for a task, and abstract necessary complexity.*

- Don't Make Me Think (2<sup>nd</sup> Edition)  
Steve Krug (2005)

*How to make home page navigation and content useful, fun, and easy to search and navigate.*

- Rapid Contextual Design  
Karen Holtzblatt, Jessamyn Burns Wendell, and Shelley Wood (2004)

How to plan a contextual inquiry, identify the right people to interview, perform interpretation sessions, create work models (sequence, physical, communication, etc.), and build an affinity diagram.

## Mobile Devices and Learning

- Toward interactive mobile synchronous learning environment with context-awareness service  
Yueh-Min Huang, Yen-Hung Kuo, Yen-Ting Lin, Shu-Chen Cheng (2007)

### Takeaway Points

- Synchronous learning environments allow participants to raise questions, request feedback, and be observed - with an immediate response from a teacher or collaborator.
- Mobile devices are flexible learning tools for imparting knowledge in different environmental and social contexts.

- Unlocking the learning value of wireless mobile devices  
J. Roschelle (2003)

### Takeaway Points

- A good interface can't replace personalized feedback.
- Mobile devices are often with students most of the time, opening up the potential for impromptu learning outside of formal instruction time.

- Mobile interaction design: Integrating individual and organizational perspectives  
Peter Tarasewich, Jun Gong, Fiona Fui-Hoon Nah and David DeWester (2008)

### Takeaway Points

- People often multitask while interacting with mobile devices - conversing, working, observing - as well as change environments.
- Compared to PCs, mobile devices are limited in computing power, hold on user attention, and security.
- Due to limited attention, users will have less tolerance for performing tasks that require many operations to complete, as well as less cognitive space for keeping states in their short-term memory.

### Computer-Supported Cooperative Work

- Beyond Being There

Jim Hollan and Scott Stornetta (1992)

#### Takeaway Points

- Music composition with a mobile device can be better in some ways and worse in others than music composition with an instrument.
- One potential metric for the success of our project: People preferring to use our music composition software even when real instruments are around.

- Beyond Recommender Systems: Helping People Help Each Other

Loren Terveen, Will Hill (2001)

#### Takeaway Points

- One flaw of recommender systems is that the user can only positively rate the content and experiences he is exposed to - this may exclude the upper range of what the user would actually prefer.
- While recommendations are typically presented in ordered lists to highlight match strength, the right musical note to play doesn't have a "most right" answer (such as chord progressions).

- Using Social Psychology to Motivate Contributions in Online Communities

Gerard Beenen, Kimberly Ling, Xiaoqing Wang, Klarissa Chang, Dan Frankowski, Paul Resnick, Robert E. Kraut (2004)

#### Takeaway Points

- Members of a group are more likely to actively participate in creative work if they believe their contribution is unique.
- Members of a group are more likely to complete specific goals than non-specific goals.

**Product Development**

- Getting Real

37signals.com (2006)

Details the agile development process and philosophy.

- Figure out the right interface before creating software.
- Only provide critical features to maximize user experience.
- “When it comes to web technology, change must be easy and cheap. If you can't change on the fly, you'll lose ground to someone who can. That's why you need to shoot for less mass.”
- “When you solve your own problem, you create a tool that you're passionate about.”
- “Simple rules lead to complex behavior... Complex rules lead to simple behavior.”

## Project Objectives

### Overview and Concept

The GroupLoops team will investigate how the iPhone can augment the music composition process as well as how it can be used to facilitate collaboration and learning during music composition. Our project objective is to develop a better understanding of the music composition, learning, and collaborative process, and to develop an iPhone application that will ultimately lower barriers to the music composition process while increasing collaboration and the learning of music theory.

The GroupLoops team has identified a variety of end products that target different audiences. Due to the complexity and the length of time needed to implement an iPhone application, which we feel would be difficult to complete during the 2009 Winter term, we felt it necessary to develop different end products that will serve different purposes. Below is a list of our proposed end products and their audience.

### Concept Video

The concept video will be targeting the general audience and will identify the major features and processes found in our research. The concept video is meant to inspire and excite the general audience about our software without requiring a working demonstration.

For examples of similar concept videos, please refer to:

Nokia Morph - <http://www.youtube.com/watch?v=IX-gTobCJHs>

Mozilla Aurora - <http://www.adaptivepath.com/blog/2008/08/11/aurora-complete-video-without-commentary/>

### Hi-Fi Prototype

The Hi-Fi Prototype is targeting anticipated user of the system. This prototype will appear as the real thing, looking exactly like an implemented iPhone application by using many of the design patterns used in the iPhone Operating System, without running on the iPhone. This will reduce the amount of overhead and time invested to develop an interface that is high fidelity and testable. This prototype will be utilized to perform usability testing and as a model for the implemented iPhone application.



**Academic Paper**

The academic paper will be a scholarly account of our literature review, research methodology, findings, and future directions. This paper should be suitable for publication or a conference presentation.

*Software Concept*

We intend to create a virtual cooperative learning environment for the creation of music with a network of iPhone and iPod Touch devices. Participants could add, remove, and edit layers of music in the group's track, either at the same time or by taking turns. Each iPhone and iPod Touch has a built-in accelerometer which would permit the transfer of creation rights with natural hand motions, like playing catch.

We want to create this software for people who have limited knowledge of music composition, but have a desire to create music. Perhaps these users have had some experience with music software, but have been frustrated with the results. It may be the case that the barrier to creating music isn't knowledge, but accessibility to the extremely expensive music software. We want to create an environment that allows for learning through collaboration to facilitate the music composition process.

Project Phases

The project will have many different phases that will utilize different methods to meet our research needs. Below is a list of different methodologies that the team intends to use and their purpose.

**Literature Review** - We will examine existing literature in a variety of areas such as, music composition and collaboration, teaching and learning with mobile devices, product development, interaction design, and computer-supported cooperative work.

**Competitive Evaluation** - We will perform an exhaustive search for direct and tangential competitors by examining music composition applications, on both desktops and mobile devices. There are numerous instrument applications already in the iPhone App Store, although very few allow for collaboration, but will provide data in the form of current instrument interfaces and customer ratings.

**Contextual Inquiry** - We will perform numerous interviews to develop a better understanding of how users currently compose music, collaborate when creating music, and how users might use their phone to create music. We will analyze interview data by developing an affinity diagram to find the underlying needs and frustrations of current music composition software users.

**Personas** - We will develop personas based on our contextual inquiry findings that will help the team identify our user base and their behaviors, needs, motivations, and goals. The personas will guide the team through the design and development stages by keeping the team focused on our users unique characteristics.

**Scenarios** - We will develop scenarios that will provide a narrative account of what we envision users doing with our application. The scenario will provide details about the context, motivations, and goals concerning the use of our application.

**Lo-Fi Prototype** - The lo-fi prototype will be our initial attempt at applying our research findings to the user interface. This prototype will also allow the research team to conduct user testing, gather feedback, and make changes rapidly with little overhead.

**Hi-Fi Prototype** - The Hi-Fi Prototype will incorporate rich visual design and look more like a finished product suitable for usability testing. The team will conduct user testing, gather feedback, and redesign in an iterative approach.

**Usability Testing** - The team will conduct usability testing at different stages throughout the project, namely the lo-fi and hi-fi prototype stages. Usability testing will allow the research team to identify and fix usability issues prior to implementation.

## Project Activity and The Benefit of Collaboration

### Research and Project Plan

Below is a tentative research and project plan that will guide our the research and development of our concept.

Week 1: Conduct literature and iPhone SDK review

Week 2: Conduct competitive analysis

Week 3: Start contextual inquiry

Week 4: Continue contextual inquiry

Week 5: Complete contextual inquiry

Week 6: Start and complete personas and scenarios

Week 7: Start and complete lo-fi prototype development

Week 8: Conduct user testing with lo-fi prototype

Week 9: Iterate on lo-fi prototype and conduct testing

Week 10: Begin development of hi-fi prototype, concept video, and paper

Week 11: Continue development of hi-fi prototype, concept video, and paper

Week 12: Continue development of hi-fi prototype, concept video, and paper

Week 13: Continue development of hi-fi prototype, concept video, and paper

Week 14: Complete Hi-Fi prototype, concept video, and paper

You will notice that we are not planning on implementing the software within the semester, but plan to develop the application during the summer. The research team thinks this it would be too difficult to complete in one semester while also conducting the research.

## Member Background and Project Roles

### ***The GroupLoops Team as a Whole***

All team members bring unique and valuable experiences from a variety of disciplines that will help in the successful completion of this project. All team members are familiar with many of the methods described above, but in the event that one or more team members are not familiar with a method there is an opportunity to impart knowledge to one another that will contribute to everyone's personal, professional, and academic growth.

### **Jonathan Cohen**

School of Information, MSI in Human-Computer Interaction and Social Computing

*Project Role: Liaison between music and HCI fields with tech startup experience*

Jon's interest in music composition started in high school, with two years of coursework in a MIDI lab. He received a small college scholarship for an original classical music piece. While pursuing a B.A. in Comparative Literature at Binghamton University in New York, he enrolled in courses about classical music history and music theory, and spent a summer interning at EarGoo Recording Studio in Manhattan. Along the way he taught himself how to use music composition and multitracking software such as FL Studio, ProTools, and Cool Edit Pro.

As a graduate student, Jon's collaborated on over 10 team projects with a focus on interaction design, online communities, and the relationship between business and technology. This past summer he interned with the Interaction Design team at HUGE, a web design agency in Brooklyn. This semester he's taking a course at the music school - Electronic Music Composition - which explores the properties of and how to manipulate digital sound, as well as how to craft emotional experiences with electronic music. His group project in-progress for Computer-Supported Cooperative Work is an IRB-approved study about learning, teaching, and how people interact while playing the music video game Rock Band.

**Jacek Spiewla**

School of Information, MSI in Human-Computer Interaction

*Project Role: Audio Engineer with networking experience*

Jacek Spiewla has a BS in Electrical Engineering from Michigan Technological University (MTU). During his freshman year of college, Jacek began to compose electronic music and publish it to his website, and continues to do both hobbies today. After graduating from MTU, he worked as an audio engineer for Nissan, where he honed his testing skills in audio quality on Bluetooth hands-free telephone systems. He also greatly enjoyed working on usability studies and testing navigation, text-to-speech, and voice recognition systems.

Today, Jacek works as a Digital Signal Processing (DSP) software validation engineer at Cambridge Silicon Radio. In his job, he ensures that the embedded software that runs on Bluetooth chips, particularly audio processing software, passes audio quality and functionality tests before consumers use it in Bluetooth headsets, cell phones and other wireless audio devices. He also develops unique test software used to evaluate audio quality.

Jacek is pursuing Human-Computer Interaction at SI because he is interested in creating innovative user experiences through user interface design for stand-alone applications and web pages. He has a research interest in digital music archives and developing rich interfaces for educational software.

**Adam Torres**

School of Information, MSI in Human-Computer Interaction

*Project Role: iPhone developer with entrepreneurial experience and an extensive research background*

Adam has a BS in Psychology and an extensive research background that will help the team conduct the research it needs to create a well-informed iPhone application. He is also a 2nd year Masters student in the School of Information studying Human-Computer Interaction. He has gained experience in developing and evaluating user interfaces through numerous projects and work settings.

In addition to his academic experience, Adam started a mobile phone application company along with two other graduate students called Troubadour Mobile. Troubadour Mobile was backed by a local venture capital firm and focuses on developing location-aware applications for iPhone. His experience in developing interfaces for iPhone and mobile devices will play an integral part during the design phase.

Adam also has extensive web and graphic design experience, as well as web development experience, from previous work settings that will play a large role in developing the user interface.

For more information about Adam's current and past projects and work experience, please visit his online portfolio at <http://www.adamatorres.com>

### **David Fienup**

School of Music, Theater and Dance, MA Media Arts

*Project Role: Music theory expertise with sound engineering experience*

David was a member of the 2008 GROCS project Noteworks, which created a music composition program that challenged traditional composition using temporal networks. David Fienup has a BA in Music Performance from Albion College, with a minor in Economics & Management, and a concentration on music composition. He spent two summers composing music for Albion College's FURSCA program (Foundation for Undergraduate Research, Scholarship, and Creative Activities). He is currently working on a Master of Arts in Media Arts, specifically Sound Production for Music and Film.

David has a background in music theory, philosophy, and history. In addition he is familiar with several audio sequencing and editing programs including ProTools, Digital Performer, Final Cut, Soundtrack, Logic, Max/MSP, Peak, SoundHack, CSound, and Kontakt. Sound engineering, music production, and electronic music have been a focus for David. He currently works for Block M Records, and M-agination Films.

David has studied collaborative improvisation and performance through jazz, blues, "noise music", rock, and "jamming". He has also been in several rock bands where he collaborated on writing and performing songs.

David hopes to learn more about the potential for collaborative music software, and is interested in how "beginner" musicians could interact with one another through a simple digital application.

## Other Benefits of Collaboration

### Contribution to Interdisciplinary Research

The GroupLoops project stands to benefit our professional development as user experience specialists (Jon, Jacek, Adam) and a sound engineer (Dave). Further, we expect our findings and research will make a contribution to research in interdisciplinary fields, including Interface Design and Music Education. Through our learning process, we hope to identify more fields that may benefit from or work.

**Interface Design** – The functional design challenges of our application will enable us to contribute to the burgeoning field of interaction design for mobile devices. We would like to adapt and sharpen our techniques in contextual inquiry, lo- and hi-fi prototyping, and usability testing. An important aspect of collaboration will be the sharing of specialized design expertise.

**Multimedia Production** - With regard to our project's video deliverable, our team will collaborate to learn 3d modeling, animation, digital video production, and soundtracking to film. Our deliverable will expand upon the existing synergy between media arts and human-computer interaction.

**Music Education** – We expect our research will be relevant to the field of music education, specifically the interplay between collaboration, composition, and learning. In developing GroupLoops, our group will need to further expand our understanding of music theory, including notation and composition methods, as well as music pedagogy. During the early phases of the projects, our team will seek to better understand the social and psychological aspects of composing music in groups of people.

**Audio Engineering** – Our research into technical feasibility of features for the iPhone will explore its potential use of digital audio, signal processing, sound synthesis, and psychoacoustics. With this knowledge in hand, the team hopes to apply it to software development on the iPhone platform.

## Special Equipment Needs

### Hardware

iPod Touch (\$229) – at least 1 (max 3) - for user testing and prototyping

### Software

iPod Touch Music App Fund (\$100) - for evaluating music creation software, such as:

- Band (\$4) - <http://moocowmusic.com/Band/>
- Karajan (\$15) - <http://www.karajan-eartrainer.com/>
- BtBX (\$4) - <http://www.pureprofitcorp.com/btbx.shtml>
- BeatMaker (\$20) - <http://www.intua.net/products.html>

### Other

Web domain and hosting account

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Thank you for your consideration. If you have questions about our project, please email us at [grouploops@googlegroups.com](mailto:grouploops@googlegroups.com)