MuSET

# The Music Systems Engineering Team

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## A Talk in Four 'Movements'

### I. Prelude

motivation, and context

### II. Fugue

team, funders, and collaborative partners

### **III. Theme and Variations**

projects, results, and outcomes

### IV. Finale

links to software engineering

Music systems are interesting from both *musical* and *engineering* standpoints.

Musical standpoint

large-scale, consistent music analysis

composition, performance, and sound creation

model aspects of human performance, creativity, and musical participation

### **Engineering standpoint**

complex systems with constraints including correctness, robustness, resilience, real-time decision-making, natural interfaces, trustworthiness formal languages for requirements and operation machine creativity

Why systems?

real-world application is important

integrated, usable, complete systems are necessary to gain adoption

cost is a relevant factor

Prior research?

much existing work focuses on the parts not the whole

### **Research Themes**



novel interfaces for direction and performance (LEAP/Kinect)

clustering applied to performance timing

capturing shape responses gathering real-time audience response information theoretic music analysis search-based melody generation dependence structures in music providing dynamic historical and cultural contexts distributed real-time architectures for music tracking on consumer devices executable score languages descriptor-driven synthesis source code sonification

II. Fugue

# **The Team** (part of CREST and SSE)

Members

Visitors

#### Alumni

Nicolas Gold

Samer Abdallah

Mateusz Dykiert

Christodoulos Aspromallis Pierre Donat-bouillud

#### Jihyun Han

Jessica Dussault

Rebecca Kleinberger

Octav-Emilian Sandhu

Sangita Ganesh

Julian Szafraniec

II. Fugue

### Funders





Engineering and Physical Sciences Research Council





Arts & Humanities Research Council



Current Projects

**MiCLUES** Arts Council England Jan 2014-Dec 2014

#### **Digital Music Lab**

AHRC Jan 2014-March 2015

Structural Music Analysis using Probabilistic Programming EPSRC CREST Platform Feb 2013-Aug 2014 Forthcoming Projects

An Integrated Audio-Symbolic Model of Music Similarity

> AHRC Sep 2014-Jul 2015

**Completed** Projects

#### Sounds Like DNA

with Penny Dreadful Productions

#### CHIPS

AHRC Digital Transformations 2012

PERSONAL TOUCH EPSRC 2007

*Aim:* To discover if motives originate in musical performance...



...a **motive** is a short, repeated melodic, rhythmic, and/or harmonic pattern...

...29 recordings of Chopin mazurkas, found **patterns of timing deformation** in the performances, allowing **new interpretations** of performance strategy.



### **Finding Performance Motives**

**Aim:** To discover similarity in music programs by analysing data-flow languages...

...parse patch structure, generate clone candidates, compare and classify...









...68 tutorial patches, found clone pairs under three criteria from new classification framework for dataflow language clones.

### **Detecting Clones in Music Programs**



**CHIPS** 





# IV. Finale

Links to Software Engineering

Domain Specific Language Definition / Analysis

**Interpretive Execution Semantics** 

Slicing and Transformation in DSLs

**Component Integration** 

**Reasoning over Component Properties** 

Information Theory

Testing Non-Deterministic, Interactive Programs More Information <u>bit.ly/1lwOzaG</u>