



Norwegian University of  
Science and Technology



# Physical Computing Workshop

## Introduction

Anna Xambó

Department of Music, NTNU

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## Workshop Design Criteria

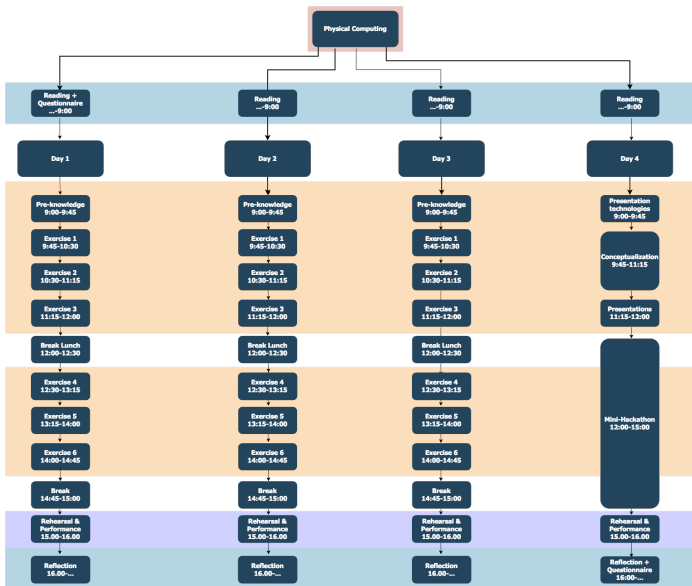


- Facilitate a hands-on workshop with available, low-tech technology (e.g. mobile phones, contact mics, arduinos, web audio).
- Explore individually and in group the fundamental concepts behind physical computing (e.g. tinkering, programming, making).
- Promote a sharing culture of code and discoveries (e.g. writing reflective blogposts, sharing the code on github).
- Contextualize the workshop to the broader context of interactive systems for music performance at both theoretical and practical levels (e.g. readings, concerts).

## What is the Workshop About?

- An intense 4-day workshop where you will explore physical computing and interactive systems.
- For the first three days, there will be a theme with paced exercises.
- At the beginning of each session there will be a warm-up discussion based on a relevant related reading.
- At the end of each session there will be a network music performance to showcase the own-built prototype.
- Each team will write a blog post about the challenges and opportunities of their own-built prototype.
- On the last day, there will be a mini-hackathon where you will develop an interactive system for music performance mixing technologies and techniques learned throughout the workshop.

# Schedule Diagram



## General Learning Outcomes



- Develop skills of computational thinking and programming.
- Explore how to create a prototype of an interactive system for music performance with low-tech technologies.
- Discover iterative design and the possibilities of network music by performing with own-built prototypes.
- Develop critical thinking skills applied to reflection on artistic practice and instrument building.

## General Approach



- This workshop should be seen a starting point to get interest with physical computing applied to music tech.
- It has been designed to be low tech, that is, using open source or consumer affordable gadgets, except for the last day.
- Daily attendance is expected, as well as the completion of assignments before and after class.

## What it is not



- An in-depth tutorial of a particular technology.
- A technical course: just enough to build things!
- A course about soldering.

However... related resources will be provided.

## Grading



- 40% Individual work  
*You need to participate in the discussion/quizzes about the readings and document your personal contributions in the code to get a positive grade.*
- 40% Group work  
*You will be expected to participate in the daily performance and blogpost to have a positive grade.*
- 20% Participatory assistance  
*An overall participatory attitude and regular assistance can improve the grade.*

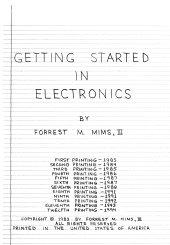
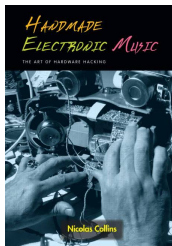


## Previous Knowledge / Preparation



- Every day you should check if there is a list of items that need to be brought to class.
- Every day you should check the suggested reading that will be discussed at the beginning of the class.
- It is not required, but if interested, you can start looking at the following hardware and web technologies: Handwaving.js, Arduino, P5.js, Tone.js, Flocking.js, LittleBits.
- For the mini-hackathon, you are allowed to bring / explore other technologies of your interest e.g. Myo bracelets, Bela platform, and so on.

# Recommended General Readings



- The book *Handmade Electronic Music* by Nicholas Collins [1].
- The book *Making Things Talk* by Tom Igoe [2].
- The book *Getting Started in Electronics* by Forrest Mims [3].

# References



- [1] Nicolas Collins. *Handmade Electronic Music: The Art of Hardware Hacking*. New York: Routledge, 2004.
- [2] Tom Igoe. *Making Things Talk: Practical Methods for Connecting Physical Objects*. " O'Reilly Media, Inc.", 2007.
- [3] Forrest M Mims. *Getting Started in Electronics*. Master Publishing, Incorporated, 1983.