

# Tiny Trainable Instruments

by

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Submitted to the Program of Media Arts and Sciences  
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## **Abstract**

Tiny trainable instruments is a collection of instruments for media arts, using machine learning techniques and deployed in microcontrollers.

Thesis Supervisor: Tod Machover

Title: Muriel R. Cooper Professor of Music and Media



# Acknowledgments

UROPs Peter Tone, Maxwell Wang

Opera of the Future

Future Sketches

Family and friends



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# Chapter 1

## Introduction

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aliquam quis sollicitudin metus. Quisque quam ex, tincidunt et porttitor quis, tincidunt faucibus quam. Nulla facilisi. Nam a libero posuere, mattis leo ac, ultrices est. Nullam auctor lacus eu metus venenatis, gravida consectetur felis laoreet. Nam non ante felis. Maecenas id dignissim turpis, eget pulvinar nisl. Cras nec mauris feugiat, aliquam elit ac, blandit ex [1].

### 1.1 Section sample 1

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### 1.2 Section sample 2

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erat ultricies. Mauris convallis, risus efficitur gravida dapibus, lacus lorem malesuada ligula, eget porta diam felis non turpis. Nulla sed sem finibus, vehicula quam at, vulputate tellus<sup>1</sup>

### 1.2.1 Subsection sample

Pellentesque ac leo eget lorem vulputate mattis eu a nisl. Duis elit erat, consectetur vulputate ullamcorper a, finibus quis turpis. Vivamus tincidunt dui id purus bibendum malesuada. Fusce accumsan, ipsum quis feugiat sodales, enim est aliquet leo, ut ornare justo mauris quis ex. Sed eros magna, suscipit et blandit non, pretium id felis. Praesent a vehicula tortor. Donec blandit dolor a ipsum sodales, eget aliquet nisl fermentum.

1. Item 1.
2. Item 2.
3. Item 3.

### 1.2.2 Another subsection sample

Sed quis dapibus libero. Curabitur id finibus nulla, sed semper felis. Proin dapibus nulla interdum, bibendum tortor et, blandit sapien. Etiam pretium tristique tortor non lacinia. Aliquam dapibus turpis lorem, sit amet porta ex dignissim vitae. In neque felis, sagittis sed ullamcorper lacinia, lobortis ut turpis. Nam quis aliquet justo. Nam eros mi, aliquam vel massa ac, ornare dignissim erat. This is done by using some combination of

$$a_i = a_j + a_k$$

$$a_i = 2a_j + a_k$$

$$a_i = 4a_j + a_k$$

$$a_i = 8a_j + a_k$$

---

<sup>1</sup>Here is a sample footnote referencing figures B-1 and B-2.

$$a_i = a_j - a_k$$

$$a_i = a_j \ll mshift$$





# Chapter 2

## Background



## Chapter 3

### Early experiments



## Chapter 4

### Tiny trainable instruments



## Chapter 5

### Project evaluation





# Chapter 6

## Conclusion

This thesis project is a

### 6.1 Future work

#### 6.1.1 Education

New workshops, using multimedia outputs.

#### 6.1.2 Artist workflow

Training instead of programming.

#### 6.1.3 Packaging

PCBs and enclosures



# Appendix A

## Tables

Table A.1: Armadillos

|            |         |
|------------|---------|
| Armadillos | are     |
| our        | friends |



# Appendix B

## Figures

Figure B-1: Armadillo slaying lawyer.

Figure B-2: Armadillo eradicating national debt.

# Bibliography

- [1] L[eslie] A. Aamport. The gnats and gnus document preparation system. *G-Animal's Journal*, 41(7):73+, July 1986. This is a full ARTICLE entry.