

# Andrea Madotto

Email: [andreamad8@gmail.com](mailto:andreamad8@gmail.com)

Website: [andreamad8.github.io](http://andreamad8.github.io)

Tel: +82 5982 8001

Add: Hong Kong, Kowloon Bay

## EDUCATION

### University of Pisa, Italy

M.Sc. in Computer Science, 2015 - 2017

Final mark: 110/110 (Honours)

### Hong Kong Baptist University, Hong Kong

M.Sc. in Advanced Information Systems, 2014 - 2015

GPA: 3.86/4

### University of Perugia, Italy

B.Sc. in Computer Science, 2011 - 2014

Final mark: 110/110 (Honours)

## EXPERIENCE

### Teaching Assistant

Mar 2017 – Jun 2017

UniPi

Pisa, IT

Teaching Assistant of the Advanced Programming course of the M.Sc. in Computer Science held in University of Pisa.

- developed several seminars presented during the course, including lab exercises and class slides
- participated in the creation of writing assignments as well as grading the final exam

### Adjunct Lecturer

Jan 2017 – Mar 2017

UniPi

Pisa, IT

Taught Databases course in the Specialization School in Medical Physics of Pisa University.

- developed course material, including lab exercises and class slides
- created writing assignments
- evaluated student course work, as well as grading the final project

### Research Assistant

Aug 2015 – Feb 2016

HKBU

Hong Kong, HK

Conducted research on algorithms to predict disease spreading in Complex Networks.

- analysed Optimization Algorithms and basic Statistical Learning Theory
- designed and implemented novel algorithms for middle size Complex Networks
- deployed several data visualizations
- teacher assistant for several courses, mainly lab classes and paper grading

## PUBLICATIONS

Madotto, A. and Attardi, G. (2017). Question Dependent Recurrent Entity Network for Question Answering. arXiv preprint [arXiv:1707.07922](https://arxiv.org/abs/1707.07922).

Attardi, G., Carta, A., Errica, F., Madotto, A., and Pannitto, L. (2017). Fa3l at semeval- 2017 task 3: A three embeddings recurrent neural network for question answering. In Proceedings of the 11th International Workshop on Semantic Evaluation (SemEval-2017), pages 290295, Vancouver, Canada. Association for Computational Linguistics. URL: <http://www.aclweb.org/anthology/S17-2048>

Madotto, A and Liu, J. Super-Spreader Identification Using Meta-Centrality. Nature Scientific Report 6, 38994; DOI: [10.1038/srep38994](https://doi.org/10.1038/srep38994) (2016).

Chiancone, A. and Madotto, A., 2015. A Multistrain Bacterial Model for Link Prediction. In Proc. 11th International Conference on Natural Computation (ICNC'15).DOI: [10.1109/ICNC.2015.7378141](https://doi.org/10.1109/ICNC.2015.7378141). (Co-author and slides presentation)

## SKILLS

**Theoretical Background:** Algorithms • Statistical Learning • Optimization Methods • Natural Language Processing • Machine Learning

**Programming:** Python (Scipy, Numpy, Tensorflow, Theano, Keras, Pandas, SciKit

learn) • C++ •  $\text{\LaTeX}$  • JavaScript • Matlab (basic) • Java (basic)  
**Data bases:** SQL • MySQL • PostgreSQL • Xquery • neo4j  
**Operating Systems:** Unix • Linux • Windows • Mac OS.  
**Languages:** Italian (mother tongue) • English (IELTS 6.5) • Chinese (basic)

## PROJECTS

**SemEval:** A group project where we designed and implemented a model for Community Question Answering. This model has been used for SemEval-2017 Task 3.

- proposed a semantic decomposition of a dependency parse tree
- designed and implemented a Recurrent Neural Network model based on such decomposition
- wrote and submitted a description paper to SemEval-2017 conference

**Neural Network:** An implementation of a Feed-Forward Neural Network using Theano.

- implemented Momentum and L2 regularization
- benchmarked using MONKS datasets, and compared to a Keras implementation, a linear model and a SVM/SVR (using scikit-learn)
- implemented a K-cross fold validation

**Jacobi Method:** A parallel version of the Jacobi Iterative Method.

- implemented three versions of the code using C++: sequential, Pthread based, and using FastFlow library
- evaluated code version using different matrix sizes, and measures (e.g., Completion Time, Scalability, Speed up, and Efficiency).
- conducted experiments using a Xeon Phi coprocessor (60 cores 4 contexts)

**PythonITA:** A fork of the Cpython repository to use Italian keywords as native constructors.

- modified the language interpreter, such as: the EBNF grammar (i.e. adding new production), the AST, and the built-in functions.
- modified the IDLE to highlight and predict the new added words.

**Dynamic HTML render and a Recursive Descent Parser:** Implementation of a Web Components library similar to React.JS.

- implemented an efficient representation of a Virtual DOM
- optimised the DOM element render in the HTML page.
- implemented a recursive descent parser to express components in JSX.

**TagCloud Sentimental Analysis:** A data visualization challenge organised by FWD Hong Kong.

- designed a Tagcloud visualization based on Google Books Ngram.
- showed the word size based on chronological relevance, and displayed the words polarity (positive or negative sentiments) with colours.

**Others** have a look on my personal [website](#) and my [GitHub](#).

## THESIS

**Question Dependent Recurrent Entity Network for Question Answering:** Master degree thesis: a memory network model for question answering that requires reasoning.

- extensive literature review of question answering models.
- modified and improved the core component of the original Recurrent Entity Network.
- experimented the proposed model in bAbI task and CNN news article datasets.
- improved state-of-the-art in bAbI tasks (1K setting)

**Human Mobility and Disease Spread Simulation:** Master degree final project: a disease spread simulation based on SIR model.

- implemented a computational model for contact social network.
- experimented with countermeasures to control the propagation, with a focus on the individual vaccination decision.
- simulated human mobility by flights to analyse how diseases spread in the world.

**Facility location problem in a bi-dimensional mesh:** Bachelor degree thesis: finding the optimal position of one or more facilities in a bi-dimensional mesh, using the Manhattan distance.

- found the optimal position of a maximum of two facilities with a closed formula
- placed three facilities using two heuristic algorithms: one finds an almost optimal solution with a quadratic cost, and the other one finds a good approximation with a linear cost

## **VOLUNTEER ACTIVITIES**

### **Mentor**

Feb 2016 – Jun 2017

CODERDOJO

Pisa, IT

A volunteering activity to teach programming languages to children (mostly Scratch and Python). Pisa CoderDojo is part of the CoderDojo international initiative. I was also one of the organizers of the first [Toscana DojoCon](#) held in Pisa.