

MASSIMILIANO ROSSI

PERSONAL INFORMATION

Born in Italy, 2 November 1991

email massimiliano.rossi_01@univr.it

EDUCATION

- May-Sep. 2018* Research Group "Genome-Scale Algorithmics"
University of Helsinki, Helsinki (*Finland*)
- Visiting Ph.D Student*
2016-today Host: Simon J. PUGLISI
Department of Computer Science
University of Verona, Verona (*Italy*)
- Ph.D student in Computer Science*
2014-2016 Advisor: Ferdinando CICALÉSE
Co-Advisor: Zsuzsanna LIPTÁK
University of Verona, Verona (*Italy*)
- Master's degree in Computer Science and Engineering*
Final mark: 110/110 e lode (top grade with honors) · *Embedded System Specialization*
Thesis: *Methodology for behavioral inference on digital system for verification application and test sequence generation.*
Advisor: Graziano PRAVADELLI
- 2010-2014* Marche Polytechnic University, Ancona (*Italy*)
- Bachelor's degree in Computer and Automation Engineering*
Final mark: 105/110 · *Computer and Automation Specialization*
Thesis: *Methodology for design and reuse of peripherals drivers in embedded real-time operating systems for automation and control applications.*
Advisors: Massimiliano PIRANI, Andrea BONCI

WORK EXPERIENCE

- fall 2017* University of Verona
Teaching Assistant for the Bachelor course "Algorithms in Bioinformatics" held by Ferdinando CICALÉSE
- fall 2016* University of Verona
Teaching Assistant for the Bachelor course "Algorithms in Bioinformatics" held by Ferdinando CICALÉSE
- fall 2015* University of Verona
Teaching Assistant for the Bachelor course "Algorithms in Bioinformatics" held by Ferdinando CICALÉSE

PUBLICATIONS

- F. CICALÉSE, Zs. LIPTÁK and Massimiliano ROSSI, "Bubble-Flip—A New Generation Algorithm for Prefix Normal Words", *Theoretical Computer Science*, vol. **743**, pp. 38-52, 2018.
- F. CICALÉSE, Zs. LIPTÁK and Massimiliano ROSSI, "Bubble-Flip—A New Generation Algorithm for Prefix Normal Words", *In proceedings of International Conference on Language and Automata Theory and Applications (LATA 2018)*. LNCS, vol. **10792**, pp. 207-219, Springer, Cham, 2018.

F. CICALÉSE and Massimiliano ROSSI, "On the multi-interval Ulam-Rényi game: for 3 lies 4 intervals suffice", in *Proceedings of Italian Conference on Theoretical Computer Science (ICTCS 2017)*, vol. **1949**, pp. 39-50, CEUR-WS, 2017.

A. BONCI, M. PIRANI, Massimiliano ROSSI, E. M. GABBANINI, "Embedded system for a Ballbot robot." in *Proceedings of Intelligent Solutions in Embedded Systems (WISES)*, 2015 12th International Workshop on. IEEE, pp. 157-161, 2015.

ACCEPTED

F. CICALÉSE, Zs. LIPTÁK and Massimiliano ROSSI, "On infinite prefix normal words" (*accepted at SOFSEM 2019*).

UNDER REVIEW

F. CICALÉSE and Massimiliano ROSSI, "On the multi-interval Ulam-Rényi game: for 3 lies 4 intervals suffice", Journal Version (*submitted*).

OTHER ACADEMIC ACTIVITIES / EXPERIENCES

Conference Presentations

Bubble-Flip—A New Generation Algorithm for Prefix Normal Words Contributed talk at the 12th International Conference on Language and Automata Theory and Applications (LATA 2018)
April 2018 · Ramat Gan (*Israel*)

Bubble-Flip—A New Generation Algorithm for Prefix Normal Words Contributed talk at the Workshop on Words and Complexity
February 2018 · Villeurbanne (*France*)

On the multi-interval Ulam-Rényi game: for 3 lies 4 intervals suffice Contributed talk at the Italian Conference on Theoretical Computer Science (ICTCS 2017)
September 2017 · Naples (*Italy*)

Embedded system for a Ballbot robot Poster at the Workshop on Intelligent Solutions in Embedded Systems (WISES 2015)
November 2015 · Ancona (*Italy*)

Conference attended

European Symposium on Algorithms 2018 (ESA 2018)
August 2018 · Helsinki (*Finland*)

Workshop on Data Structures for Bioinformatics (DSB 2018)
May 2018 · Helsinki (*Finland*)

Summer Schools attended

Graph theory, algorithms and applications · Organized by Raffaele CERULLI, Andrew GOLDBERG, Giuseppe F. ITALIANO, Robert E. TARJAN · Erice (*Italy*), May 2017

PhD Modelling Week · Optimization in city-logistics · Organized by Luca DI PERSIO, Romeo RIZZI, Renata MANSINI, Marco CALIARI, Michele BONOLLO, Antonio MARIGONDA, Giandomenico ORLANDI · Verona (*Italy*), September 2016

PhD Courses attended

Introduction to SageMath · Peter BURCSI · 2018

Cryptography · Roberto SEGALA · 2018

Bio-inspired models of computation · Katalin Anna LÁZÁR · 2017

Special Topics in Artificial Intelligence · Maria Paola BONACINA · 2017

Logic, Automata and Games at the edge of Decidability · Pietro SALA · 2017

Computational Analysis of Genomic Sequences · Zsuzsanna LIPTÁK · 2017

Fundamental algorithms for bioinformatics · Ferdinando CICALÈSE · 2017

Grants

Programma di internazionalizzazione scuola di dottorato di scienze naturali ed ingegneristiche anno 2018 · Grant (total: 3500 €) · February 2018 · Verona (Italy)

Workshop on Words and Complexity · Student grant (grant covering accommodation) · February 2018 · Villeurbanne (France)

Languages

ITALIAN · Mother tongue

ENGLISH · good (written and spoken)

BRIEF DESCRIPTION OF RESEARCH INTERESTS

Introduction

I have focused on problems in three different areas of Combinatorial Search.

Fault tolerant search

The model used is the **Ulam-Rényi game** in which we have two players, Paul and Carole, that agree on two integer parameters: $m \geq 0$ and $e \geq 0$. Carole chooses a number x from the search space $\mathcal{U} = \{0, 1, \dots, 2^m - 1\}$, and keeps it secret to Paul. Paul wants to discover Carole's secret number x . To achieve his goal, Paul can ask questions to Carole of the form "Does x belong to Q ?" where Q is any subset of the search space. Carole can answer only *yes* or *no*. Carole's aim is to make Paul's search as long as possible. To do this, Carole can lie at most e times during the game. The Ulam-Rényi game has been extensively studied in various contexts including error correcting codes. In this field, a perfect strategy for the Ulam-Rényi game with e lies with the search space of size 2^m , provides a *fully adaptive* e -error correcting code. Furthermore, the Ulam-Rényi game has been applied in context such as learning, many-valued logics, wireless networks, psychophysics, and, principally, sorting and searching in the presence of errors.

Causality discovery

In Causality Discovery the aim is the discovery of causation relations from correlation. This is a major challenge in several areas, e.g. in economy, medicine, weather forecasting, social sciences, network security, just to mention a few. Consider two related phenomena A and B , for example, altitude and temperature, then the aim is to determine if the altitude determines the temperature or vice versa. If the phenomena are modelled as random variables, one can apply information theoretic tools to identify the causation direction. In particular, I am interested in the study of entropic measures for causality discovery.

Prefix normal words

Prefix normal words is a recently introduced class of binary words with the property that no factor has more 1s than the prefix of the same length. Initially motivated by the *Binary Jumbled Pattern Matching* problem, prefix normal words have proved to be of independent interest [Burcsi et al., "On prefix normal words and prefix normal forms", TCS 2017]. We developed a new generation algorithm for prefix normal words, which uses two operations on binary strings and exploit certain properties in a smart way. The algorithm could help in proving or disproving an open conjecture on prefix normal words from [Burcsi et al. CPM 2014]. The conjecture can be proved by showing that *the expected critical prefix length of a prefix normal word is logarithmic in n* .

Rossi Massimiliano

Verona, October 24, 2018