

## *Curriculum Vitae et Studiorum*

### Contact Information

National Research Council of Italy (CNR)

Institute of Science and Information Technologies "A. Faedo" (ISTI)

Via G. Moruzzi 1, 56124 Pisa, Italy

Email [giulio.pibiri@di.unipi.it](mailto:giulio.pibiri@di.unipi.it)

Email [giulio.ermanno.pibiri@isti.cnr.it](mailto:giulio.ermanno.pibiri@isti.cnr.it)

Personal page <http://pages.di.unipi.it/pibiri>

### Personal Information

Place of birth Florence, Italy

Date of birth 13 July 1990

### Research Interests

Indexing, Efficiency, Data Compression, Algorithm Engineering

### Education

2015 – 2018 **PhD in Computer Science.**

- University of Pisa, Pisa, Italy
- Thesis: *Space- and Time-Efficient Data Structures for Massive Datasets*.  
Defended on 08/03/2019.
- Grade: Excellent.
- Supervisor: Rossano Venturini (<http://pages.di.unipi.it/rossano>)

2012 – 2014 **Master Degree in Computer Science & Networking.**

- University of Pisa and Scuola Superiore Sant'Anna, Pisa, Italy
- Thesis: *Dynamic Elias-Fano Encoding*.  
Defended on 06/03/2015.
- Grade: 110/110 *summa cum laude*.
- Supervisor: Rossano Venturini (<http://pages.di.unipi.it/rossano>)

2009 – 2012 **Bachelor Degree in Computer Engineering.**

- University of Florence, Florence, Italy
- Thesis: *Quantum Computation & Grover's Algorithm*.  
Defended on 09/10/2012.
- Grade: 110/110 *summa cum laude*.
- Supervisor: Gabriele Vezzosi (<http://www.dma.unifi.it/~vezzosi>)

2004 – 2009 **High School Diploma.**

- Liceo Scientifico Statale Guido Castelnuovo, Florence, Italy
- Grade: 100/100.

---

## Professional Employment

- 11/2018 – present **Postdoctoral Researcher in Computer Science.**  
Institute of Science and Information Technologies “A. Faedo” (ISTI), National Research Council of Italy (CNR), Pisa, Italy
- 11/2015 – 11/2018 **PhD Student in Computer Science.**  
University of Pisa, Italy
- 05/2018 – 10/2018 **Visiting PhD Student.**  
The University of Melbourne, School of Computing and Information Systems, Melbourne, Australia
- 04/2018 – 05/2018 **Visiting PhD Student.**  
RIKEN Advanced Intelligence Project (AIP), Tokyo, Japan
- 02/2016 – present **Teaching Assistant.**
  - Algorithmics and Laboratory (Bachelor Degree in Computer Science)
  - Competitive Programming and Contests (Master Degree in Computer Science)University of Pisa, Italy
- 06/2017 – 12/2017 **Software Developer at ISTI-CNR.**  
European project *Large-scale Indie Gaming Analytics*  
Pisa, Italy
- 04/2015 – 07/2015 **Software Engineering Intern at IBM.**  
Rome, Italy

---

## Awards and Grants

- 2017 *SIGIR Student Travel Grant* issued by ACM SIGIR.
- 2015 *PhD Scholarship* issued by the University of Pisa, Department of Computer Science.
- 2015 *Master Degree Award: Best Performance a.y. 2013/2014* issued by Scuola Superiore Sant’Anna.
- 2015 *Best Master Thesis Award in Theoretical Computer Science*, issued by the Italian chapter of the European Association for Theoretical Computer Science (EATCS).

---

## Publications

- 2019 Giulio Ermanno Pibiri and Rossano Venturini, **Techniques for Inverted Index Compression**. CoRR, <http://arxiv.org/abs/1908.10598>, pages 35.
- 2019 Giulio Ermanno Pibiri, **On Slicing Sorted Integer Sequences**. CoRR, <https://arxiv.org/abs/1907.01032>, pages 20.
- 2019 Raffaele Perego, Giulio Ermanno Pibiri and Rossano Venturini, **Compressed Indexes for Fast Search of Semantic Data**. CoRR, <https://arxiv.org/abs/1904.07619>, pages 19.
- 2019 Giulio Ermanno Pibiri and Rossano Venturini, **On Optimally Partitioning Variable-Byte Codes**. IEEE Transactions on Knowledge and Data Engineering (TKDE), pages 12.

- 2019 Giulio Ermanno Pibiri and Rossano Venturini, **Handling Massive N-Gram Datasets Efficiently**. ACM Transactions on Information Systems (TOIS), pages 41.
- 2019 Giulio Ermanno Pibiri, Matthias Petri, Alistair Moffat, **Fast Dictionary-based Compression for Inverted Indexes**. ACM Conference on Web Search and Data Mining (WSDM), pages 9.
- 2018 Giulio Ermanno Pibiri and Rossano Venturini, **Variable-Byte Encoding is Now Space-Efficient Too**. CoRR, <https://arxiv.org/abs/1804.10949>, pages 14.
- 2018 Giulio Ermanno Pibiri and Rossano Venturini, **Inverted Index Compression**. Encyclopedia of Big Data Technologies, pages 8.
- 2017 Giulio Ermanno Pibiri and Rossano Venturini, **Efficient Data Structures for Massive N-Gram Datasets**. ACM Conference on Research and Development in Information Retrieval (SIGIR), pages 10.
- 2017 Giulio Ermanno Pibiri and Rossano Venturini, **Dynamic Elias-Fano Representation**. Annual Symposium on Combinatorial Pattern Matching (CPM), pages 14.
- 2017 Giulio Ermanno Pibiri and Rossano Venturini, **Clustered Elias-Fano Indexes**. ACM Transactions on Information Systems (TOIS), volume 2, pages 33.

---

## Software

GitHub page <https://github.com/jermp>

**s\_indexes** The C++ library used for the experiments in the paper *On Slicing Sorted Integer Sequences*.

**rdf\_indexes** The C++ library used for the experiments in the paper *Compressed Indexes for Fast Search of Semantic Data*.

**dint** The C++ library used for the experiments in the paper *Fast Dictionary-based Compression for Inverted Indexes*.

**opt\_vbyte** The C++ library used for the experiments in the paper *On Optimally Partitioning Variable-Byte Codes*.

**tongrams** The C++ library implementing the compressed data structures and algorithms described in the papers *Efficient Data Structures for Massive N-Gram Datasets* and *Handling Massive N-Gram Datasets Efficiently*.

**clustered\_indexes** The C++ library used for the experiments in the paper *Clustered Elias-Fano Indexes*.

---

## Talks

07/06/2019 *Ordered Set Problems*. Seminar. ISTI-CNR, Pisa, Italy.

08/03/2019 *Space- and Time-Efficient Data Structures*. PhD thesis defense. The University of Pisa, Pisa, Italy.

12/02/2019 *Fast Dictionary-based Compression for Inverted Indexes*. WSDM conference presentation. Melbourne Exhibition Center, Melbourne, Australia.

01/02/2019 *Indexing Compressed Data for Fast Retrieval*. Talk. The University of Pisa, Pisa, Italy.

- 15/11/2018 *Space- and Time-Efficient Data Structures*. PhD research results. The University of Pisa, Pisa, Italy.
- 29/10/2018 *Effective Web Graph Representations*. Seminar. The University of Pisa, Pisa, Italy.
- 17/05/2018 *On Optimally Partitioning Variable-Byte Index Data*. Seminar. RMIT University, Melbourne, Australia.
- 10/04/2018 *Elias-Fano Encoding: a powerful tool for data structure design*. Seminar. RIKEN AIP, Tokyo, Japan.
- 10/10/2017 *Space- and Time-Efficient Data Structures*. PhD research results. The University of Pisa, Pisa, Italy.
- 10/08/2017 *Efficient Data Structures for Massive N-Gram Datasets*. SIGIR conference presentation. Keio Plaza Hotel, Tokyo, Japan.
- 06/07/2017 *Dynamic Elias-Fano Representation*. CPM conference presentation. University Library of Warsaw, Warsaw, Poland.
- 06/06/2017 *Efficient Data Structures for Massive N-Gram Datasets*. IIR conference presentation. Università della Svizzera Italiana, Lugano, Switzerland.
- 17/10/2016 *Space- and Time-Efficient Data Structures* PhD thesis proposal. The University of Pisa, Pisa, Italy.
- 21/06/2016 *Elias-Fano Encoding: succinct representation of monotone integer sequences with search operations*. Seminar. The University of Pisa, Pisa, Italy.

## Teaching Experience

- 02/2019 – present **Assistant for *Algorithmics and Laboratory***.  
Bachelor Degree in Computer Science, University of Pisa, Italy
- 10/2018 – 12/2018 **Assistant for *Competitive Programming and Contests***.  
Master Degree in Computer Science, University of Pisa, Italy
- 09/2017 – 12/2017 **Assistant for *Competitive Programming and Contests***.  
Master Degree in Computer Science, University of Pisa, Italy
- 10/2016 – 12/2016 **Assistant for *Algorithmics and Laboratory***.  
Bachelor Degree in Computer Science, University of Pisa, Italy
- 02/2016 – 06/2016 **Assistant for *Algorithmics and Laboratory***.  
Bachelor Degree in Computer Science, University of Pisa, Italy

## Professional Activities

- 2019 Member of the Program Committee of the 42-nd edition of the International ACM SIGIR Conference on Research and Development in Information Retrieval, (SIGIR 2019).
- 2019 Member of the Organizing Committee of the 30-th edition of the International Symposium on Combinatorial Pattern Matching (CPM 2019).

- 2018 Member of the Program Committee of the 2-nd edition of the Workshop on Knowledge Graphs and Semantics for Text Retrieval and Analysis (KG4IR), in conjunction with ACM SIGIR 2018.
- 2017 Member of the Organizing Committee of the 24-th edition of the International Symposium on String Processing and Information Retrieval (SPIRE 2017).
- 2016 Student volunteer for the organization of the 39-th edition of the International ACM SIGIR Conference on Research and Development in Information Retrieval, (SIGIR 2016).

## Professional Memberships

- 2019 – present IEEE Italy Section. Membership number: 95683551.
- 2017 – present Association for Computing Machinery (ACM SIGIR). Membership number: 6216262.

## Languages

- |         |   |                       |
|---------|---|-----------------------|
| Italian | <b>Native</b>   | <i>CEFR level: C2</i> |
| English | <b>Fluent</b>   | <i>CEFR level: C1</i> |
| 2018    | <b>TOEFL iBT in English.</b><br>100 (HIGH level)  |                       |
| 2008    | <b>First Certificate in English (Level B2).</b><br>University of Cambridge, Cambridge, United Kingdom |                       |

## Driving Licences

- 01/10/2010 Driving License of type B
- 23/01/2010 Driving License of type A

## Web

- Personal <http://pages.di.unipi.it/pibiri>
- GitHub <https://github.com/jermp>
- LinkedIn <https://www.linkedin.com/in/giulio-ermanno-pibiri-496ab3ab/>