

Francesco Silvestri

Curriculum vitae

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PERSONAL INFORMATION

First Name Francesco
Last Name Silvestri
Nationality Italy
Date of Birth August 15th, 1981
Place of Birth Asolo (TV), Italy
Gender Male

EDUCATION

- 04/2009 **Ph.D. in Computer Engineering**, *University of Padova*.
Supervisor: Andrea Pietracaprina; dissertation title: “Oblivious Computations on Memory and Network Hierarchies”.
- 09/2005 **M.S. in Computer Engineering** (“Laurea Quinquennale”), *University of Padova, summa cum laude*.
Supervisors: Andrea Pietracaprina and Geppino Pucci; thesis title “Simulation of D-BSP Parallel Programs on the Ideal Cache Hierarchy”.
- 06/2000 **Scientific Lyceum**, *Liceo Scientifico Statale “J. Da Ponte” (scientific-oriented high school)*, Bassano Del Grappa (VI), Italy, final grade: 98/100.

PROFESSIONAL APPOINTMENTS

- From 01/2015 **Postdoctoral Researcher**, *IT University of Copenhagen*, ERC Project SSS (Scalable Similarity Search), Host: Rasmus Pagh.
- 01/2011-12/2014 **Senior Postdoctoral Researcher**, *Department of Information Engineering, University of Padova*, Host: Andrea Pietracaprina.
- 10/2013-03/2014 **Part-time Lecturer and Visiting Scholar**, *IT University of Copenhagen*, host: Rasmus Pagh.
- 09/2011-09/2011 **Visiting Scholar**, *MADALGO-Center for Massive Data Algorithmics, Aarhus University*, host: Gerth Brodal.
- 02/2009-12/2010 **Postdoctoral Researcher**, *Department of Information Engineering, University of Padova*, Host: Andrea Pietracaprina.
- 10/2007-04/2008 **Visiting Scholar**, *Department of Computer Science, University of Texas at Austin*, host: Vijaya Ramachandran.
- 11/2005-12/2005 **Research assistant**, *Department of Information Engineering, University of Padova*.

TEACHING

Courses

- 2015 **Teacher of Advanced Algorithms Seminars**, *IT University of Copenhagen*.

- 2014, 2013 **Teaching assistant for *Data Mining***, University of Padova.
2013 **Teacher of *Algorithm Design II***, IT University of Copenhagen.
2010, 2008 **Teaching assistant for *Large Data Sets***, University of Padova.
- 2007 **Tutor for *Introduction to Probability***, University of Padova.
2006 **Teaching assistant for *Algorithms and Data Structures I***, University of Padova.
- Since 2011 **Co-supervised 7 master students.**
IT University of Copenhagen University (4 students), University of Padova (3 students).
- Pedagogical training**
- 2015 **Seminar on Flipped Learning**, IT University of Copenhagen.
2014 **University Teaching 101**, Johns Hopkins University.
2014 **Seminar for new teachers**, IT University of Copenhagen.
2013 **Exam seminar – develop you professional skills as an examiner**, IT University of Copenhagen.

AWARDS

- 04/2010 **Best Paper Award in the Algorithmic Track**, 24th IEEE International Parallel & Distributed Processing Symposium, USA.
Award for the paper: R. A. Chowdhury, F. Silvestri, B. Blakeley, V. Ramachandran, “Oblivious Algorithms for Multicores and Networks of Processors”
- 04/2008 **IEEE TCPP Travel Award**, Ph.D. Forum of the 22nd IEEE International Parallel & Distributed Processing Symposium, USA.
- 03/2007 **IEEE TCPP Travel Award**, 21st IEEE International Parallel & Distributed Processing Symposium, USA.

GRANTS AND PROJECTS

- 2015 **Co-Principal Investigator**, Progetto Cineca “MapReduce Approaches for Efficient and Rigorous Mining of Massive Graphs”.
- 2014-2017 **Task Leader of MIUR project AMANDA**, Leader of the task “Algorithms for Emerging Computational Models”.
- 2013, 2011 **Senior Research Grant**, University of Padova.
- 2013, 2011 **AWS in Education research grant**, Amazon Web Services (AWS) in Education.
- Since 2006 **Participation in the following projects**: ERC SSS (2014-2019), MIUR Projects AMANDA (2014-2017), ALGODEEP (2010-2012), MAINSTREAM (2007-2009), ALGONEXT (2004-2006); University of Padova Strategic Project STPD08JA32 (2010-2012); AURORA Project of Trento Province and INFN (2009-2011); European Project FET-IST FP6 AEOLUS (2005-2009).

PUBLICATIONS

Journal papers

1. L. De Stefani and F. Silvestri, “Exploiting non-constant safe memory in resilient algorithms and data structures”, *Theoretical Computer Science*, volume 583, pages 86-97, June 2015. DOI:10.1016/j.tcs.2015.04.003

2. A. Pietracaprina, G. Pucci, F. Silvestri, and F. Vandin, "Space-Efficient Parallel Algorithms for Combinatorial Search Problems". *Journal of Parallel and Distributed Computing*, special issue on irregular computations, volume 76, pages 58-65, February 2015. DOI:10.1016/j.jpdc.2014.09.007
3. L. L. Pilla, P. Rech, F. Silvestri, C. Frost, P. O. A. Navaux, M. Sonza Reorda, and L. Carro, "Software-Based Hardening Strategies for Neutron Sensitive FFT Algorithms on GPUs". *IEEE Transactions on Nuclear Science*, volume 61, issue 4, pages 1874-1880, August 2014. DOI:10.1109/TNS.2014.2301768.
4. R. A. Chowdhury, V. Ramachandran, F. Silvestri, and B. Blakeley, "Oblivious Algorithms for Multicores and Networks of Processors". Special Issue of *Journal of Parallel and Distributed Computing* dedicated to selected IPDPS'10 papers, volume 73, issue 7, pages 911-925, July 2013. DOI:10.1016/j.jpdc.2013.04.008.
5. S. Nasso, F. Silvestri, F. Tisiot, B. Di Camillo, A. Pietracaprina, and G. M. Toffolo, "An Optimized Data Structure for High Throughput 3D Proteomics Data: mzRTree". *Journal of Proteomics*, volume 73, issue 6, pages 1176-1182, 2010. DOI:10.1016/j.jprot.2010.02.006.
6. F. Silvestri, "On the limits of cache-oblivious rational permutations". *Theoretical Computer Science* special issue containing the extended versions of the best papers presented at the 2nd Symposium on Trustworthy Global Computing, volume 402, issue 2-3, pages 221-233, 2008. DOI:10.1016/j.tcs.2008.04.036.

Conference papers

1. M. Ceccarello and F. Silvestri. "Experimental Evaluation of Multi-Round Matrix Multiplication on MapReduce", *Proc. of 17th SIAM Meeting on Algorithm Engineering & Experiments (ALENEX)*, pages 119-132, San Diego (USA), 2015. DOI:10.1137/1.9781611973754. 11. Acceptance rate 28%.
2. H.M. Park, F. Silvestri, U Kang, and R. Pagh. "MapReduce Triangle Enumeration With Guarantees". *Proc. of 23rd ACM International Conference on Information and Knowledge Management (CIKM)*, 1739-1748, Shanghai (China), 2014. DOI:10.1145/2661829.2662017. Acceptance rate 21%.
3. F. Silvestri, "Subgraph Enumeration in Massive Graphs", *Proc. of Sixth Workshop on Massive Data Algorithmics*, Wroclaw, Poland, 2014.
4. R. Pagh and F. Silvestri, "The Input/Output Complexity of Triangle Enumeration", *Proc. of 33rd ACM Symposium on Principles of Database Systems (PODS)*, 224-233, Snowbird (USA), 2014. DOI:10.1145/2594538.2594552. Acceptance rate 33%.
5. M. Squizzato and F. Silvestri, "Communication Lower Bounds for Distributed-Memory Computations". *Proc. of 31st Symposium on Theoretical Aspects of Computer Science (STACS)*, LIPcs 25, 627-638, Lyon (France) 2014. DOI:LIPcs.STACS.2014.627. Acceptance rate 25.7%.
6. A. Pietracaprina, G. Pucci, F. Silvestri, and F. Vandin, "Space-Efficient Parallel Algorithms for Combinatorial Search Problems". *Proc. of 38th International Symposium on Mathematical Foundations of Computer Science (MFCS)*, LNCS 8087, 717-728, Klosterneuburg (Austria), 2013. DOI:10.1007/978-3-642-40313-2_63. Acceptance rate 35%.
7. P. Rech, L. Pilla, F. Silvestri, P. Navaux and L. Carro, "Neutron Sensitivity and Software Hardening Strategies for Matrix Multiplication and FFT on Graphics Processing Units". *Proc.*

of 3rd Workshop on Fault-Tolerance for HPC at Extreme Scale (FTXS), 13-20, New York (USA), 2013. DOI:10.1145/2465813.2465816.

8. P. Rech, L. Pilla, F. Silvestri, C. Frost, P. O. A. Navaux, M. Sonza Reorda, and L. Carro. “Neutron Sensitivity and Hardening Strategies for Fast Fourier Transform on GPUs”. *Proc. of 14th European Conference on Radiation and its Effects on Components and Systems (RADECS)*, Oxford (UK), 2013. DOI:10.1109/RADECS.2013.6937457.
9. G. Bilardi, M. Squizzato, and F. Silvestri, “A lower bound technique for communication on BSP with application to the FFT”. *Proc. of 18th International European Conference on Parallel and Distributed Computing (EURO-PAR)*, LNCS 7484, 676–687, Rhodes Island (Greece) 2012. DOI:10.1007/978-3-642-32820-6_67. Acceptance rate 32.9%.
10. A. Pietracaprina, G. Pucci, M. Riondato, F. Silvestri, and E. Upfal, “Space-Round Tradeoffs for MapReduce Computations”. *Proc. of 26th ACM International Conference on Supercomputing (ICS)*, 235–244, Venice (Italy), 2012. DOI:10.1145/2304576.2304607 Acceptance rate 22.3%
11. S. Caminiti, I. Finocchi, E. G. Fusco, and F. Silvestri, “Dynamic programming in faulty memory hierarchies (cache-obliviously)”. *Proc. of 31st Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS)*, LIPcs 13, 433–444, Mumbai (India), 2011. DOI:10.4230/LIPIcs.FSTTCS.2011.433. Acceptance rate 31.8%.
12. R. A. Chowdhury, F. Silvestri, B. Blakeley, and V. Ramachandran, “Oblivious Algorithms for Multicores and Network of Processors”. *Proc. of IEEE 24th International Parallel & Distributed Processing Symposium*, Atlanta (USA), 2010. DOI:10.1109/IPDPS.2010.5470354. Acceptance rate 24%.
13. P. Bertasi, A. Pettarin, M. Squizzato, and F. Silvestri, “A Novel Resource Driven Job Allocation Scheme for Desktop Grid Environments”. *Proc. of the 5th Symposium on Trustworthy Global Computing*, LNCS 6084, 268–283, Munich (Germany), 2010.
14. G. Bilardi, A. Pietracaprina, G. Pucci, and F. Silvestri, “Network-Oblivious Algorithms”. *Proc. of 21st IEEE International Parallel & Distributed Processing Symposium*, Long Beach (USA), 2007. DOI:10.1109/IPDPS.2007.370243. Acceptance rate 26%.
15. F. Silvestri, “On the Limits of Cache-Oblivious Matrix Transposition”. *Proc. of the 2nd Symposium of Trustworthy Global Computing*, LNCS 4661, 233–243, Lucca (Italy), 2006. DOI:10.1007/978-3-540-75336-0_15.
16. A. Pietracaprina, G. Pucci, and F. Silvestri, “Cache-Oblivious Simulation of Parallel Programs”. *Proc. of 20th IEEE International Parallel & Distributed Processing Symposium (Workshop on Advances in Parallel and Distributed Computing Models)*, Rhodes Island (Greece), 2006. DOI:10.1109/IPDPS.2006.1639555.

Submitted manuscripts

1. G. Bilardi, A. Pietracaprina, G. Pucci, F. Silvestri and M. Squizzato, “Network-Oblivious Algorithms” (journal version), arXiv:1404.3318, 2015. Accepted with minor revision at *Journal of the ACM*.
2. S. Caminiti, I. Finocchi, E. G. Fusco, and F. Silvestri, “Resilient dynamic programming”, 2015. Accepted with minor revision at *Algorithmica*.
3. R. Pagh, N. Pham, M. StÅ¼ckel, and F. Silvestri. I/O-efficient Similarity Join in High Dimensions. Submitted.

4. G. Bilardi, M. Scquizzato, and F. Silvestri, “A lower bound technique for communication on BSP with application to the FFT”, 2015 (journal version). Submitted.

Software packages

1. M₃, an optimal MapReduce matrix multiplication library implemented in Hadoop, 2015. Available at <http://www.dei.unipd.it/m3>
2. CTPP, an optimal randomized MapReduce algorithm for the enumeration of triangles in a graph; implemented in Hadoop, 2014. Available at <http://kdd.kaist.ac.kr/cttp>.
3. mzRTree, a Java library for 2D range queries of proteomics data, 2010. Available at <http://www.dei.unipd.it/mzrtree>.

Theses

1. F. Silvestri, “Oblivious Computations on Memory and Network Hierarchies”, Ph.D. Thesis, University of Padova, 2009. Supervisor: Prof. Andrea Pietracaprina.
2. F. Silvestri, “Simulazione di algoritmi paralleli per il modello D-BSP su una gerarchia di cache ideali” (in Italian), “Laurea quinquennale” thesis in Computer Science Engineering, 2005. Supervisors Prof. A. Pietracaprina and G. Pucci. University of Padova.

Other publications

1. F. Silvestri, “Review of Graph Theory and Interconnection Networks by Lih-Hsing Hsu and Cheng-Kuan Lin”. In *SIGACT News* 43(4), 30-34, ACM, 2012. DOI:10.1145/2421119.2421125
2. F. Silvestri, “An Oblivious Approach to Parallel Algorithms (poster)”, *PhD Forum of the 22nd IEEE International Parallel & Distributed Processing Symposium*, 2008.
3. F. Silvestri, “Network-Oblivious Algorithms (poster)”, in *Summer School on Algorithmic Data Analysis and Annual Hecse Poster Session. Abstract Proc.*, Helsinki University Printing House, 2007.

Patents

1. South Korea Patent (pending), “MapReduce Triangle Enumeration With Guarantees”, number 10-2015-0020455, 2015.

PROFESSIONAL EXPERIENCES

Scientific collaborations

IConsulting (consulting company), IT University of Copenhagen (Rasmus Pagh), Korea Advanced Institute of Science and Technology (U Kang), University of Delaware (Michela Taufer), Brown University (Eli Upfal), Universidade Federal do Rio Grande do Sul (Paolo Rech), Sapienza University of Rome (Irene Finocchi), University of Texas at Austin (Vijaya Ramachandran), Stony Brook University (Rezaul A. Chowdhury), University of Southern Denmark (Fabio Vandin), University of Padova (Andrea Pietracaprina).

Program and organizing committees

Program Annual European Symposium on Algorithms (Track B, 2015), ACM/IEEE Supercomputing Conference (Workshop selection: 2015, Poster selection: 2014, 2013), IEEE International Parallel & Distributed Processing Symposium (2015, 2013) Workshop on Massive Data Algorithmics (2014), International Conference on Advanced Engineering Computing and Applications in Sciences (2014), IEEE International Conference on Big Data (2013).

Organizing IEEE Cluster (Publicity co-chair, 2015), IEEE International Parallel & Distributed Processing Symposium (Publicity co-chair, 2015-2012), ACM International Conference on Supercomputing (Submission co-chair, 2012), European Summer School in Information Retrieval (2009).

Institutional services

2011-2012 **Representative of Postdoctoral Researchers**, *Department of Information Engineering, University of Padova.*

2008-2010 **Organizer and Co-Founder of the Ph.D. Student Group**, *Department of Information Engineering, University of Padova.*

Reviewer

Journals ACM JEA (2015,2014), ACM TOPC (2014), ACM TALG (2013), IEEE TPDS (2013,2009), TOCS (2011), JPDC (2009).

Conferences ESA (2015, 2013, 2012), ALENEX (2015,2011), ACM-SIAM SODA (2015,2012), ACM/IEEE SC (2014,2013), IEEE IPDPS (2013,2009), IEEE BigData (2013), ACM SPAA (2012,2011), ALGOSENSOR (2012), IEEE ICPADS (2011), SPIRE (2011), ACM ICS (2010), IEEE HiPC (2009), ACM SPAA (2008), FUN (2007), PACT (2007), SIROCCO (2007,2006).

Memberships

Since 2013 European Association for Theoretical Computer Science

Since 2007 Association for Computing Machinery

INVITED PRESENTATIONS

- 2014 *Workshop on Scalable Approaches to High Performance and High Productivity Computing (SCALPERF)*. Title: The Input/Output Complexity of Triangle Enumeration.
- 2014 *ENS de Lyon*. Title: The Input/Output Complexity of Triangle Enumeration.
- 2014 *University of Southern Denmark*. Title: The Input/Output Complexity of Triangle Enumeration.
- 2013 *IT University of Copenhagen*. Title: Space-Round Tradeoffs for MapReduce Computations.
- 2012 *Workshop on Scalable Approaches to High Performance and High Productivity Computing (SCALPERF)*. Title: Space-Round Tradeoffs for MapReduce Computations.
- 2011 *Workshop on Recent Advances in Data Structures (Chennai, India)*. Title: Resilient Data Structures.
- 2010 *Sapienza University of Rome*. Title: Obliviousness in the Parallel Settings.
- 2010 *Workshop on Scalable Approaches to High Performance and High Productivity Computing (SCALPERF)*. Title: Oblivious Algorithms for Multicores and Networks of Processors.
- 2007 *University of Texas at Austin*. Title: On The Limits Of Cache And Network-Oblivious Matrix Transposition.

SKILLS

Computer skills

Programming Java, C, C++, SQL, PHP, HTML, Matlab.

Editing T_EX, Open Office Suite, Microsoft Office Suite.

OS Linux, Windows.

Other Eclipse, PostgreSQL, MySQL, MPI Library, Hadoop MapReduce.

[Language skills](#)

Italian (mother tongue), English (advanced)

References

References available upon request