

Francesco Silvestri

Curriculum vitae

(last update October, 2011)

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PERSONAL INFORMATION

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

RESEARCH INTERESTS

My research interests encompass the design and analysis of efficient algorithms and data structures for massive datasets. My works have principally focused on I/O-efficient algorithms, models and algorithms for multicores, oblivious and aware computations. Recently, I have also been working on the design of algorithms for faulty memories and on the study of the MapReduce framework.

EDUCATION

- 2006 – 2009 **Ph.D. in Computer Engineering**, *University of Padova*.
Supervisor: Prof. Andrea Pietracaprina; dissertation title: “Oblivious Computations on Memory and Network Hierarchies”; defended on April 6th, 2009.
- 2000 – 2005 **“Laurea Quinquennale” in Computer Engineering (equivalent to a M.Sc)**, *University of Padova, summa cum laude*.
Supervisors: Prof. Andrea Pietracaprina and Prof. Geppino Pucci; thesis title “Simulation of D-BSP Parallel Programs on the Ideal Cache Hierarchy” (in Italian); defended on October 4th, 2005.
- 1995 – 2000 **Scientific High School Diploma**, *Liceo Scientifico Statale “J. Da Ponte”, Bassano Del Grappa (VI), Italy*, final grade: 98/100.

AWARDS AND GRANTS

- 3/2011 **AWS in Education research grant**, *Amazon Web Services (AWS) in Education supports selected research projects with grants that offer free access to AWS infrastructure services*.
- 4/2010 **Best Paper Award in the Algorithmic Track**, *24th IEEE International Parallel & Distributed Processing Symposium*, Atlanta, GA, USA.
Award for the paper: R. A. Chowdhury, F. Silvestri, B. Blakeley, V. Ramachandran, “Oblivious Algorithms for Multicores and Networks of Processors”
- 4/2008 **IEEE TCPP Travel Award**, *Ph.D. Forum of the 22nd IEEE International Parallel & Distributed Processing Symposium*, Miami, FL, USA.

3/2007 **IEEE TCPP Travel Award**, *21st IEEE International Parallel & Distributed Processing Symposium*, Long Beach, CA, USA.

PROFESSIONAL APPOINTMENTS

- 08/2011 – 09/2011 **Visiting Scholar**, *MADALGO - Center for Massive Data Algorithmics, Aarhus University, Denmark.*
- 01/2011 – now **Senior Postdoctoral Researcher**, *Department of Information Engineering, University of Padova.*
Research topic: models and algorithms for data-intensive processing.
- 02/2009 – 12/2010 **Postdoctoral Researcher**, *Department of Information Engineering, University of Padova.*
Research topic: relations between parallel algorithms and algorithms for memory hierarchies and data stream.
- 10/2007 – 04/2008 **Visiting Scholar**, *Department of Computer Science, University of Texas at Austin.*
Research topic: oblivious algorithms for multicores; supervision of Prof. Vijaya Ramachandran.
- 11/2005 – 12/2005 **Research assistant**, *Department of Information Engineering, University of Padova.*
Research topic: study of relations between locality of reference and submachine locality in parallel and hierarchical models.

TEACHING

- 05/2010 **Teaching assistant**, *University of Padova*, lectures on Data Stream within the course *Management and Processing of Large Data Sets*.
- 05/2008 **Teaching assistant**, *University of Padova*, lectures on Data Stream (6 hours) within the course *Management and Processing of Large Data Sets*.
- 04/2006 – 06/2007 **Teaching assistant**, *University of Padova*, Teaching assistant for the course *Introduction to Probability*.
- 01/2006 – 03/2007 **Teaching assistant**, *University of Padova*, Teaching assistant for the course *Introduction to Data Structures and Algorithms*.

PUBLICATIONS

Journal papers

- [1] Sara Nasso, [Francesco Silvestri](#), Francesco Tisiot, Barbara Di Camillo, Andrea Pietracaprina, Gianna Maria Toffolo, “An Optimized Data Structure for High Throughput 3D Proteomics Data: mzRTree”, *Journal of Proteomics* 73(6), 1176-1182, Elsevier B.V., 2010. ISSN:1874-3919. DOI:10.1016/j.jprot.2010.02.006.
- [2] [Francesco Silvestri](#), “On the limits of cache-oblivious rational permutations”, *Theoretical Computer Science* 402 (2-3) 221–233, Elsevier B.V., 2008. ISSN:0304-3975. DOI:10.1016/j.tcs.2008.04.036. Special Issue of Theoretical Computer Science for selected papers of the 2nd Symposium on Trustworthy Global Computing.

International conference/workshop papers

- [3] Andrea Pietracaprina, Geppino Pucci, Matteo Riondato, [Francesco Silvestri](#), Eli Upfal, “Space-Round Tradeoffs for MapReduce Computations”, in *Proceedings of 26th ACM International Conference on Supercomputing*, ACM, 2012.

- [4] Saverio Caminiti, Irene Finocchi, Emanuele Guido Fusco, [Francesco Silvestri](#), “Dynamic programming in faulty memory hierarchies (cache-obliviously)”, in *Proceedings of the 31st Conference on Foundations of Software Technology and Theoretical Computer Science*, Schloss Dagstuhl, 2011. ISBN: 978-3-939897-34-7, DOI: 10.4230/LIPIcs.FSTTCS.2011.433. Preliminary presented at the Third Workshop on Massive Data Algorithmics (MASSIVE), 2011.
- [5] Rezaul A. Chowdhury, [Francesco Silvestri](#), Brandon Blakeley, Vijaya Ramachandran, “Oblivious Algorithms for Multicores and Network of Processors”, in *Proceedings of the IEEE 24th International Parallel & Distributed Processing Symposium*, IEEE, 2010. ISBN: 978-1-4244-6443-5. DOI: 10.1109/IPDPS.2010.5470354.
- [6] Paolo Bertasi, Alberto Pettarin, Michele Squizzato, [Francesco Silvestri](#), “A Novel Resource-Driven Job Allocation Scheme for Desktop Grid Environments”, in *Proceedings of the 5th Symposium on Trustworthy Global Computing*, Lecture Notes in Computer Science, vol. 6084, 268–283, Springer, 2010. ISBN: 978-3-642-15639-7. DOI: 10.1007/978-3-642-15640-3_18.
- [7] Gianfranco Bilardi, Andrea Pietracaprina, Geppino Pucci, [Francesco Silvestri](#), “Network-Oblivious Algorithms”, in *Proceedings of the 21st IEEE International Parallel & Distributed Processing Symposium*, IEEE, 2007. ISBN:1-4244-0910-1. DOI:10.1109/ IPDPS.2007.370243.
- [8] [Francesco Silvestri](#), “On the Limits of Cache-Oblivious Matrix Transposition”, in *Proceedings of the 2nd Symposium of Trustworthy Global Computing*, Lecture Notes in Computer Science, vol. 4661, 233–243, Springer, 2006. ISBN:978-3-540-75333-9. DOI:10.1007/978-3-540-75336-0_15.
- [9] Andrea Pietracaprina, Geppino Pucci, [Francesco Silvestri](#), “Cache-Oblivious Simulation of Parallel Programs”, in *Proceedings of the 20th IEEE International Parallel & Distributed Processing Symposium (Workshop on Advances in Parallel and Distributed Computing Models)*, IEEE, 2006. ISBN:1-4244-0054-6. DOI:10.1109/IPDPS. 2006.1639555.

Posters

- [10] [Francesco Silvestri](#), “An Oblivious Approach to Parallel Algorithms”, *PhD Forum of the 22nd IEEE International Parallel & Distributed Processing Symposium*, 2008.
- [11] [Francesco Silvestri](#), “Network-Oblivious Algorithms”, in *Summer School on Algorithmic Data Analysis and Annual Hecse Poster Session. Abstract Proceedings*, Report B-2007-4, 72, Helsinki University Printing House, 2007.

Under submission

- [12] Gianfranco Bilardi, Michele Squizzato, [Francesco Silvestri](#), “A lower bound technique for communication on BSP with application to the FFT”, submitted 2012.

Theses

- [13] [Francesco Silvestri](#), “Oblivious Computations on Memory and Network Hierarchies”, Ph.D. thesis, University of Padova, 2009.
- [14] [Francesco Silvestri](#), “Simulazione di algoritmi paralleli per il modello D-BSP su una gerarchia di cache ideali”, master thesis, 2005 (in italian).

Other manuscripts

- [15] Rezaul A. Chowdhury, [Francesco Silvestri](#), Brandon Blakeley, Vijaya Ramachandran, “Oblivious Algorithms for Multicores and Network of Processors”, technical report TR-09-19, Department of Computer Science, University of Texas at Austin, 2009.

- [16] [Francesco Silvestri](#), “Data Stream”, notes for the course *Management and Processing of Large Data Sets* (in Italian), 2010.

PROFESSIONAL EXPERIENCES

Activities

- 09/2009 **Member of the Organizing Committee** of the *26th ACM International Conference on Supercomputing*.
- 09/2009 **Member of the Organizing Committee** of the *7th European Summer School in Information Retrieval*, University of Padova.
- 2008 – 2010 **Member of the Organizing Committee** of the *Ph.D. Student Group*, Department of Information Engineering, University of Padova.
- 2008 – now **Member of the ACM**.

Collaborations

- 2010 – now Department of Computer and System Sciences – Sapienza University of Rome.
- 2009–now Department of Computer Science – Brown University.
- 2010–2011 Edmund Mach Foundation – Trento (Italy).
- 2007–2010 Department of Computer Science – University of Texas at Austin.

Research projects

University of Padova Strategic Project STPD08JA32 (2010–now); MIUR Project ALGODEEP: Algorithmic Challenges for Data-intensive Processing on Emerging Computing Platforms (2010–now); AURORA Project of Trento Province and INFN (2009–2011); MIUR Project MAINSTREAM: Algorithms for Massive Information Structures and Data Streams (2007–2009); European Project FET-IST FP6 AEO-LUS : Algorithmic Principles for Building Efficient Overlay Computers (2005–2009); MIUR Project ALGONEXT: Algorithms for the Next Generation Internet and the Web (2004–2006).

Refereeing

- Journals Parallel Computing, Journal of Parallel and Distributed Computing, IEEE Transactions on Parallel and Distributed Systems.
- Conferences ACM-SIAM Symposium on Discrete Algorithms (SODA), International Conference on Parallel and Distributed Systems (ICPADS), ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), Colloquium on Structural Information & Communication Complexity (SIROCCO), Workshop on Algorithm Engineering and Experiments (ALENEX), Fun with Algorithms (FUN), IEEE International Parallel & Distributed Processing Symposium (IPDPS), ACM International Conference on Supercomputing (ICS), International Conference on High Performance Computing (HiPC), Parallel Architectures and Compilation Techniques (PACT).

Invited talks

- 12/2011 *Workshop on Recent Advances in Data Structures*, The Institute of Mathematical Sciences, Chennai, India. Talk title “Resilient Data Structures”.
- 08/2011 *MADALGO seminars*, Aarhus University. Talk title “Resilient Dynamic Programming”.

- 10/2010 *Interdepartmental Seminar on Algorithmics*, Sapienza University of Rome. Talk title "Obliviousness in the parallel settings".
- 09/2010 *Workshop Scalable Approaches to High Performance and High Productivity Computing*, Bertinoro (FC), Italy. Talk title "Oblivious Algorithms for Multicores and Networks of Processors".
- 11/2007 *Algorithms and Computation Theory Seminar*, University of Texas at Austin, Austin, Texas, US. Talk title "On The Limits Of Cache And Network-Oblivious Matrix Transposition".

Other talks

- 12/2011 *31st Conference on Foundations of Software Technology and Theoretical Computer Science*, IIT Bombay, Mumbai, India. Talk title "Dynamic programming in faulty memory hierarchies (cache-obliviously)".
- 06/2011 *Workshop on Massive Data Algorithmics*, Paris, France. Talk title "Cache-oblivious dynamic programming in faulty memory hierarchies".
- 04/2010 *Kickoff Meeting progetto MIUR PRIN AlgoDEEP*, Bertinoro (FC), Italy. Talk title "Oblivious Algorithms for Multicores and Networks of Processors".
- 02/2010 *5th Symposium on Trustworthy Global Computing*, Munich, Germany. Talk title "A Novel Resource-Driven Job Allocation Scheme for Desktop Grid Environments".
- 09/2008 *Workshop on EU FET-IST FP6 project AEOLUS*, Sophia Antipolis, France. Talk title "Network-oblivious algorithms".
- 03/2007 *22nd IEEE International Parallel & Distributed Processing Symposium*, Miami, Florida, USA. Talk title "An Oblivious Approach to Parallel Algorithms".
- 03/2007 *21st IEEE International Parallel & Distributed Processing Symposium*, Long Beach, California, USA. Talk title "Network-Oblivious Algorithms".
- 11/2006 *2nd Symposium on Trustworthy Global Computing*, Lucca (LC), Italy. Talk title "On the Limits of Cache-Oblivious Matrix Transposition".
- 02/2006 *Workshop on Algorithms for the Next Generation Internet and Web: Methodologies, Design, and Applications*, Bertinoro (FC), Italy. Talk title "Cache-Oblivious Simulation of Parallel Programs".

Attended simposia, conferences and workshops

- 12/2011 *Workshop on Recent Advances in Data Structures*, The Institute of Mathematical Sciences, Chennai, India.
- 12/2011 *31st Conference on Foundations of Software Technology and Theoretical Computer Science*, IIT Bombay, Mumbai, India.
- 06/2011 *Workshop on Massive Data Algorithmics*, Paris, France.
- 09/2010 *Scalable Approaches to High Performance and High Productivity Computing*, Bertinoro (FC), Italy.
- 02/2010 *5th Symposium on Trustworthy Global Computing*, Munich, Germany.
- 09/2008 *Workshop on Workshop on EU FET-IST FP6 project AEOLUS*, Sophia Antipolis, France.
- 04/2008 *22nd IEEE International Parallel & Distributed Processing Symposium*, Miami, Florida, USA.
- 03/2007 *21st IEEE International Parallel & Distributed Processing Symposium*, Long Beach, California, USA.

- 09/2007 *Scalable Approaches to High Performance and High Productivity Computing*, Bertinoro (FC), Italy.
- 11/2006 *2nd Symposium on Trustworthy Global Computing*, Lucca (LC), Italy.
- 09/2006 *Scalable Approaches to High Performance and High Productivity Computing*, Bertinoro (FC), Italy.
- 02/2006 *Workshop on Algorithms for the Next Generation Internet and Web: Methodologies, Design, and Applications*, Bertinoro (FC), Italy.

Attended advanced courses

- 05/2007 *Summer School on Algorithmic Data Analysis*, Helsinki, Finland.
- 07/2006 *Summer School on Proteomes and Proteins*, Lipari (ME), Italy.
- 05/2006 *Combstru School on Computational Complexity*, Bertinoro (FC), Italy.
- 09/2006 *Scuola Nazionale dei Dottorati di Ricerca in Ingegneria Informatica*, Padova, Italy.
- 10/2005 *1^a Scuola Specialistica di Calcolo Parallelo*, CINECA, Casalecchio di Reno (BO), Italy.
- 09/2004 *13^a Scuola Estiva di Calcolo Parallelo*, CINECA, Casalecchio di Reno (BO), Italy.

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.**

Attended courses: Advanced Pronunciation & Conversation Skills – Texas Intensive English Program, Austin TX, USA, 2008; English Standard Course – EmbassyCES, Cambridge, UK, 2006.