Profile

Contacts

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I'm Ph.D. graduate in **computer science**, specialized in algorithms for processing and analyzing large datasets.

I was trained in **Computer Engineering** (BE/ME, University of Pisa) and **Computer Science** (MS/PhD, UCSB).

I'm passionate about the application of technology and data analysis to all aspects of life. In particular, I enjoy working to introduce the computing element in the loop of healthcare, food industry, and home automation.

Skills

ALGORITHMS

I enjoy developing efficient algorithms for solving fundamental problems on complex input domains, such as **high-dimensional geometric data**, **time series**, and **networks**.

Specifically, my specialty is **approximation algorithms**, algorithms that attain a solution whose deviation from optimality can be **formally bounded**.

My academic research is highly interdisciplinar and touched upon a variety of subjects, including **computer security**, **data compression**, **computer vision**, **traffic engineering**, **networking**, and **computational geometry**. I'm specifically keen to working with domain experts and specialize general algorithmic techniques to solve problems specific to their domain.

CODE

My go-to choices for programming languages are **Python** (more recently, **Julia**), **Ruby**, and **C++**.

I've written code in a variety of other languages including Java, Objective C, Javascript, Perl, Bash, PHP, Pascal, Basic, Prolog, Lisp, x86 Assembly.

I have extensive experience in system and **network programming** (Unix), app development (**Android/iOS**), and database query languages: **(No)SQL**. In a previous life, I have hacked kernel modules, written driver code, programmed microcontrollers and patched binaries.

DATA

My daily tools are **R**, **Python** and **Tableau**. I scale things up using **Pig** on **Hadoop**.

Data visualization plays a big part of my job, for which I use mostly **d3.js** (and derived libraries)

TOOLS

I put my code on **Github**, deploy webapps on **Heroku** (or locally on **Ruby on Rails**), and stay organized with **Trello** and **Wrike**. I general write all my code in Emacs but switch to **Xcode** or **Eclipse** for mobile apps or **RStudio** for R. I write publication-quality documents in **LaTeX** and **Inkscape**.

Education

- **Ph.D.**, Computer Science, UCSB (2012), *Dean's Fellowship*.
- **M.S.**, Computer Science, UCSB (2011), *GPA 4.0*
- **Diploma di Licenza Specialistica**, Sant'Anna School of Advanced Studies (2007), *Magna cum Laude*.
- **M.E.**, Computer Engineering, University of Pisa (2007), *Summa cum Laude*.
- **Diploma di Licenza**, Sant'Anna School of Advanced Studies (2005), *Summa cum Laude*.

- **B.E.**, Computer Engineering, University of Pisa (2004), *Summa cum Laude*.

Professional Experience

THE ACTIVITY EXCHANGE, INC. - OCT. 2012 / -

Founder (Data Science)

At the Activity Exchange, I had a major role in developing AchieveMint, a reward platform for healthy activities. My notable contributions are:

- **Mobile SDKs**. Initially, I led the **mobile effort** developing the SDKs (both Android and iOS) that enable health/wellness mobile apps to integrate with AchieveMint. Integrated apps enable their users to track their activities on the AchieveMint dashboard. AchieveMint's SDKs have been integrated in numerous apps, including apps with million users such as: **C25K**, **MonitorMyWeight**, **WeightSnap**. Assisting the app developers in the integration process has been a major part of my job.
- **Data API**. I developed the first version of **AchieveMint API** based on Ruby on Rails. The API aggregates data coming from the mobile SDKs installed on the user devices and from other web-services connected to AchieveMint, such as: **FitBit**, **Jawbone**, **Withings**, etc.
- **Data Reporting**. I've used R and Tableau to explore the users data to discover correlations in the behavior of AchieveMint. In particular, I focused on aggregating information across different apps, and external sources (weather, census, etc.) and producing reports and business intelligence.

GOOGLE RESEARCH - JUN. 2011 / SEP. 2011

Visiting Researcher

Notable contributions:

- I designed and adapted algorithms to detect set of highly connected nodes (communities) in large graphs.
- I implemented known algorithms and new variations on Google's **Mapreduce** and **Pregel** frameworks, allowing for processing graphs up to 150M nodes, 1B edges on thousand machines in few hours.

The position ended with a full time offer.

ASK.COM - AUG. 2005 / APR. 2009

Senior Sw. Eng - Oct. 2007 / Apr. 2009

R & D - Aug. 2005 / Sep. 2007

Projects:

- **BigNews** - I developed a news aggregator engine to cluster news articles with similar topics. The system was capable of processing in real time a number of articles exceeding 150,000 a day, continuously downloaded from 5,000 feeds.
- **HotScore** - Designed and implemented an algorithm to rank news clusters based on many indicators, including freshness of the news, impact, and social recognition.

CERN (EUROPEAN CENTER FOR NUCLEAR RESEARCH) JUN. 2004 / SEP. 2004

System Administrator

I worked on improving the responsiveness of the administrative authentication system. That required developing custom features over the **Apache HTTP Server** authentication module.

AICA (ITALIAN ASSOCIATION FOR COMPUTER SCIENCE) JUN. 2004 / SEP. 2004

I worked as coach of the Italian team designated to participate in the **International Olympiad in Informatics (IOI)**, an international computer

programming contest for high school students.

Publications

- **A.E. Feldmann, L. Foschini.** Balanced Partitions of Trees and Applications. *Algorithmica (2013)*.
- **L. Foschini, J. Hershberger, and S. Suri.** On the Complexity of Time-Dependent Shortest Paths. *Algorithmica (2012)*.
- **L. Foschini, R. Grossi, A. Gupta, and J.S. Vitter.** When indexing equals compression: Experiments with compressing suffix arrays and applications. *The ACM Transactions on Algorithms (2006)*.
- **L. Valcarenghi, L. Foschini, F. Paolucci, F. Cugini, and P. Castoldi**. Topology Discovery Services for Monitoring the Global Grid. *Communications Magazine (2006)*.
- **A. E. Feldmann** and **L. Foschini**. Balanced Partitions of Trees and Applications. *Symposium on Theoretical Aspects of Computer Science (STACS 2012)*.
- **H. Yıldız, L. Foschini, J. Hershberger, and S. Suri**. The Union of Probabilistic Boxes: Maintaining the Volume. *European Symposium on Algorithms (ESA 2011)*.
- **L. Cavedon, L. Foschini, and G. Vigna**. Getting the Face Behind the Squares: Reconstructing Pixelized Video Streams. *USENIX Workshop on Offensive Technologies (WOOT 2011)*.
- **S. Gauglitz, L. Foschini, M. Turk, and T. Höllerer**. Efficiently Selecting Spatially Distributed Keypoints for Visual Tracking. *IEEE International Conference on Image Processing (ICIP 2011)*.
- **F. Uyeda, L. Foschini, S. Suri, and G. Varghese**. Efficiently Measuring Bandwidth at All Time Scales. *Symposium on Networked Systems Design and*

Implementation (NSDI 2011).

- **L. Foschini, J. Hershberger, and S. Suri**. On the Complexity of Time-Dependent Shortest Paths. *The ACM-SIAM Symposium on Discrete Algorithms (SODA 2011)*.
- **S. Gandhi, L. Foschini, and S. Suri**. Space-efficient Online Approximation of Time Series Data: Streams, Amnesia, and Out-of-order. *International Conference on Data Engineering (ICDE 2010)*.
- **C. Buragohain, L. Foschini, and S. Suri**. Untangling the Braid: Finding Outliers in a Set of Streams. *Workshop on Algorithm Engineering and Experiments (ALENEX 2010)*.
- **A. Gulli, S. Cataudella, and L. Foschini**. TC-SocialRank: Ranking the Social Web. *Workshop on Algorithms and Models for the Web Graph (WAW 2009)*.
- **L. Foschini, A. V. Thapliyal, L. Cavallaro, C. Kruegel, and G. Vigna**. A Parallel Architecture for Stateful, High-Speed Intrusion Detection. *International Conference on Information Systems Security (ICISS 2008)*.
- **M. Cococcioni, L. Foschini, B. Lazzerini, and F. Marcelloni**. Complexity Reduction of Mamdani Fuzzy Systems through Multi-valued Logic Minimization. *IEEE International Conference on Systems, Man and Cybernetics (SMC 2008)*.
- **L. Valcarenghi, F. Paolucci, L. Foschini, F. Cugini, and P. Castoldi**. Centralized and Distributed Grid Topology Discovery Service Implementations. *Poster (Hot Interconnects 13, 2005)*.
- **L. Foschini, R. Grossi, A. Gupta, and J. S. Vitter**. Fast Compression with a static model in High-Order Entropy. *IEEE Data Compression Conference (DCC 04)*.

Patents

- **Antonio Savona, Antonino Gulli, L. Foschini**, Systems and methods for selecting and organizing information using temporal clustering. *United States Patent: 20070260586*
- **Antonio Savona, Antonino Gulli, L. Foschini, Giovanni Deretta**, Systems and methods for clustering information. *United States Patent: 20090070346*

Awards

- UCSB Dean's fellowship 2011-2012
- Microsoft Student **Travel Award** to attend the ACM-SIAM Symposium on Discrete Algorithms (SODA11)
- USENIX Student **Travel Award** to attend the 8th USENIX Symposium on Networked Systems Design and Implementation (NSDI11)
- Full scholarship (room and board) for the full duration of undergraduate and graduate studies at the **Sant'Anna School of Advanced Studies**, Pisa, Italy as a winner of a nation-wide competition.
- Participation in the XII and XIII **International Olympiad in Informatics** held in Beijing, China, 2000 and Tampere, Finland, 2001 respectively. Selected as a member of the Italian team in the Italian Olympiad in Informatics