

### Personal information

**First and Last name** Pietro Ferrara  
**Date and place of birth** Mirano –VE– , 09/04/1981  
**Citizenship** Italian  
**Address (Switzerland)**  
**Address (Italy)**  
**Website** <http://www.pietro.ferrara.name>  
**E-mail** [pietro.ferrara@gmail.com](mailto:pietro.ferrara@gmail.com)  
**Language skills** Italian (mother language)  
English (good spoken/written)  
French (good spoken/basic written)

### Career

**01/04/2009** *PostDoc position at ETH (Zurich)*  
→**Today** Supervisor: Peter Müller (ETH)

### Education

**10/2005** → **PhD degree in Computer Science**  
**22/05/2009** *Ecole Polytechnique (Paris) and University Ca' Foscari (Venice)*  
Subject: “Static analysis via abstract interpretation of multithread programs”  
Advisors: Radhia Cousot (research director, CNRS/Ecole Normale Supérieure) and Agostino Cortesi (full professor and head of the Department of Computer Science, University Ca' Foscari of Venice)  
Reviewers: Manuel Hermenegildo (full professor, Universidad Politécnica Madrid) and Helmut Seidl (full professor, Technische Universität München)  
Examiners: Eric Goubault (research director, CEA) and Francesco Logozzo (researcher, Microsoft Research)  
Defended at Ecole Normale Supérieure of Paris on May 22<sup>nd</sup>, 2009.

**2003** → **Master degree in Computer Science**  
**2004** *Laurea specialistica in Informatica*  
*University “Ca' Foscari” of Venice*  
Subject: “Development of a static analyzer for object oriented languages and application to the firewall analysis of JavaCard”  
Advisor: Prof. Agostino Cortesi.  
Co-advisor: Dr. Francesco Logozzo (Ecole Polytechnique, Paris).  
Final marks: **110/110 cum laude**

**2000** → **Bachelor degree in Computer Science**  
**2003** *Laurea in Informatica*  
*University “Ca' Foscari” of Venice*  
Final marks: **110/110 cum laude**

**1995** → **High school degree – Studies of Science**  
**2000** *Diploma di maturità scientifica*  
*Liceo Scientifico Statale “G. Bruno”, Mestre*  
Final marks: **94/100**

### Research Interests

Abstract interpretation, Java bytecode and CIL/MSIL, Scala programming language, multithreading, semantics, static analysis, verification, security, unsafe code.

## Publications

### International conferences

- [ZFC12]** M. Zanioli, P. Ferrara and A. Cortesi, "SAILS: static analysis of information leakage with Sample", in Proceedings of the 27th ACM Symposium on Applied Computing (SAC 2012), ACM Press, Riva del Garda, Italy, March 26-30, 2012
- [FM12]** P. Ferrara and P. Müller, "Automatic inference of access permissions", in Proceedings of the 13th International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI 2012), LNCS, Springer, Philadelphia, USA, January 22-24, 2012
- [CFC11]** G. Costantini, P. Ferrara and A. Cortesi, "Static analysis of string values", in Proceedings of the 13th International Conference on Formal Engineering Methods (ICFEM 2011), LNCS, Springer, Durham, United Kingdom, October 25-28, 2011
- [Ferr10]** P. Ferrara "Static type analysis of pattern matching by abstract interpretation", in Proceedings of the IFIP Conference on Formal Techniques for Distributed Systems (FORTE/FMOODS 2010), LNCS, Springer, Amsterdam, Netherlands, June 7-10, 2010
- [Ferr09a]** P. Ferrara, "Checkmate: a generic static analyzer of Java multithreaded programs", in Proceedings of the Seventh IEEE International Conference on Software Engineering and Formal Methods (SEFM 2009), IEEE Computer Society, Hanoi, Vietnam, November 23-27, 2009
- [Ferr08b]** P. Ferrara, "Static analysis of the determinism of multithreaded programs", in Proceedings of the Sixth IEEE International Conference on Software Engineering and Formal Methods (SEFM 2008), IEEE Computer Society, Cape Town, South Africa, November 10-14, 2008
- [FLF08]** P. Ferrara, F. Logozzo and M. Fähndrich, "Safer unsafe code for .NET", in Proceedings of the 23rd ACM Conference on Object-oriented Programming (OOPSLA 2008), ACM Press, Nashville, USA, October 19-23, 2008
- [Ferr08]** P. Ferrara, "Static analysis via abstract interpretation of the happens-before memory model", in Proceedings of the 2nd International Conference on Tests and Proofs (TAP 2008), LNCS, vol. 4966, Springer, Prato, Italy, April 9-11, 2008

### International workshops with program committee

- [Ferr08a]** P. Ferrara, "A fast and precise analysis for data race detection", in Proceedings of the Third Workshop on Bytecode Semantics, Verification, Analysis and Transformation (Bytecode'08), Budapest, Hungary, April 6, 2008
- [Ferr06]** P. Ferrara, "JAIL: Firewall Analysis of Java Card by Abstract Interpretation", in Proceedings of the 1st International Workshop on Emerging Applications of Abstract Interpretation (EAAI 2006), Vienna, Austria, March 26, 2006

### Thesis

- [Ferr09]** P. Ferrara, "Static analysis via abstract interpretation of multithread programs", PhD thesis under the supervision of Radhia Cousot (Directeur de recherche, CNRS/Ecole Normale Supérieure) and Agostino Cortesi (full professor and head of the Department of Computer Science, University Ca' Foscari of Venice) defended at Ecole Normale Supérieure of Paris on May 22<sup>nd</sup>, 2009.

## Program Committees

**Program committee member** of the 18th International Static Analysis Symposium (SAS 2012), the 11th International Conference on Computer Information Systems and Industrial Management Applications (CISIM 2012), and the 10th International Conference on Computer Information Systems and Industrial Management Applications (CISIM 2011).

**Reviewer** for the following conferences, workshops and journals: SAS 07, FTfJP 07, VMCAI 08, ESOP 08, LCTES 08, FM 09, CATS 2010, ESOP 2010, Journal of Symbolic Computation – Special issue on WING 2009, FMOODS 2010, APNOC 2010, FoVeOOS 2010, ESOP 2011, Journal of Symbolic Computation – Special issue on WING 2010, TOPI 2011, PSI 2011, SAS 2011, ESOP 2012, TACAS 2012, Bytecode 2012

## Awards and grants

- 04/12 → 04/14** Co-principal investigator on the Microsoft project “TouchBoost – Cloud-based Static Analyses to Improve Lay Programming on Mobile Devices”. The goal of this project is to apply static analysis to improve the efficiency and reliability of programs developed on a mobile device with Microsoft TouchDevelop. The project is 2-years-long and involves one postdoc and one PhD student.
- 09/10 → Today** Technical head on the SNF project “Verification-Driven Inference of Contracts” (project leader: prof. Peter Müller). The goal of this project is to explore the interaction between program verification and static analysis in order to effectively find bugs on software. The project is 3-years-long and involves two PhD students (Uri Juhasz and Milos Novacek).
- 04/09 → Today** PostDoc fellowship financed by ETH of Zurich.
- 01/09 → 03/09** Fellowship financed by École Normale Supérieure of Paris.
- 10/08 → 12/08** Fellowship of 3 months financed by French Ministry of Foreign Affairs.
- 10/05 → 09/08** PhD fellowship of 3 years financed by École Polytechnique of Paris.
- 05/06** Grant of 4.500 € financed by the University “italo-francese” in the “Programma Vinci 2006”.
- 02/06** The master's thesis has been awarded with the second position at the national master thesis' prize Clusit 2006 "Innovare la sicurezza delle Informazioni" (“Innovating the Security of Informations”)

## Talks

- 10/02/12** Access permission inference via abstract interpretation, Microsoft Research, Redmond, WA, USA
- 30/01/12** Automatic inference of fractional, counting and Chalice access permissions, IBM Watson research center, Hawthorne, NY, USA
- 22/01/12** Automatic inference of access permissions, VMCAI 12, Philadelphia, PA, USA
- 26/10/11** Static analysis of string values, ICFEM 11, Durham, Great Britain
- 25/02/11** Automatic inference of access permissions, Ecole Normale Supérieure of Paris, Paris, France
- 09/06/10** Static type analysis of pattern matching by abstract interpretation, FORTE/FMOODS 10, Amsterdam, Netherlands
- 08/04/10** Checkmate: a Generic Static Analyzer of Java Multithreaded Programs, Department of Computer Science, University Ca' Foscari, Venice, Italy
- 04/03/10** Abstract interpretation of memory models, IFIP WP 2.3, Lachen, Switzerland
- 26/11/09** Checkmate: a Generic Static Analyzer of Java Multithreaded Programs, SEFM 09, Hanoi, Vietnam
- 25/08/09** Static analysis via abstract interpretation of multithread programs, IRISA-INRIA, Rennes, France
- 22/05/09** Static analysis via abstract interpretation of multithread programs, PhD Defense, Ecole Normale Supérieure, Paris, France
- 29/01/09** Static analysis by abstract interpretation of Java multithreaded programs, Chair of Programming Methodology, ETH, Zurich, Switzerland
- 18/12/08** Static analysis of the determinism of multithreaded programs, Lunch seminars, University "Ca' Foscari" of Venice, Venice, Italy
- 11/11/08** Static analysis of the determinism of multithreaded programs, SEFM 08, Cape Town, South Africa
- 22/10/08** Safer unsafe code for .Net, OOPSLA 08, Nashville, Tennessee, USA
- 20/06/08** Static analysis via abstract interpretation of the happens-before memory model, Ecole Normale Supérieure of Paris, Paris, France
- 28/05/08** Static analysis via abstract interpretation of the happens-before memory model, Lunch seminars, University "Ca' Foscari" of Venice, Venice, Italy
- 10/04/08** Static analysis via abstract interpretation of the happens-before memory model, TAP 2008, Prato, Italy
- 05/04/08** A fast and precise alias analysis for data race detection, Bytecode 08 (ETAPS workshop), Budapest, Hungary
- 19/12/07** Static analysis of unsafe code, Lunch seminars, University "Ca' Foscari" of Venice, Venice, Italy
- 07/11/07** Static analysis of unsafe code, Microsoft Research, Redmond, WA, USA

- 26/03/06** JAIL: Firewall Analysis of Java Card by Abstract Interpretation, EAAI '06 (ETAPS workshop), Wien, Austria
- 16/02/06** JAIL (Javacard Abstract Intepretation-based lifeguard), Workshop AIDA, Pisa, Italy

### Internships

- 20/08/07** → Internship at Microsoft Corporation of Redmond (USA).
- 09/11/07** Theme: “*Static analysis of unsafe code in C# via abstract interpretation*”  
Mentor: Francesco Logozzo
- 01/04/05** → Collaborator at Department of Computer Science, University “Ca’ Foscari” of Venice. Theme: “*Development of a static analyzer for Java Card language*”
- 30/06/05**
- 01/09/04** → Internship at the Department of Computer Science, University “Ca’ Foscari” of Venice. Theme: I developed an application to evaluate automatically the practice exams of the “Base of programming” course and I help some students to develop simple C applications in Linux environment.
- 31/12/04**

### Student project supervision

- 03/2011 - 08/2011** - Supervisor of the bachelor thesis at ETH of Zurich of Raphael Fuchs (“Interfacing TVLA and Sample”).
- 03/2011 - 08/2011** - Supervisor of the master thesis at ETH of Zurich of Dominik Gabi (“Disjunction on demand”).
- 01/2010 - 06/2010** - Supervisor of the bachelor thesis at ETH of Zurich of Roman Scheidegger (“Translating Java bytecode to Simple”).
- 12/2009 - 05/2010** - Co-supervisor of the master thesis at Universita’ Ca’ Foscari of Venice of Giulia Costantini (“Abstract domains for static analysis of strings”, mark: 110/110 cum laude). Supervisor: prof. Agostino Cortesi

### Teaching

- 02/2012** → Static Program Analysis. Lecturer. 13 lectures (2 hours each one with around 20 students) and oral exam preparation and evaluation.
- 08/2012**
- 09/2011** → Concepts of Object-Oriented Programming (Prof. P. Müller). Teaching assistant. 13 exercise sessions (2 hours each one with around 20 students) and written exam preparation.
- 01/2012**
- 04/2011** → Functional Programming and Formal Methods (Prof. P. Müller). Teaching assistant.
- 06/2012** Exercise sessions and written exam preparation.
- 09/2010** → Concepts of Object-Oriented Programming (Prof. P. Müller). Head teaching assistant. 12 exercise sessions (2 hours each one with around 10 students) and written exam preparation.
- 01/2011**
- 11/2010** → Lectures (8 hours) and evaluation of student projects for the “Analysis and Verification of Programs” course (prof. A. Cortesi) of the master program in computer science at University “Ca’ Foscari” of Venice. Subject: numerical and heap analyses.
- 12/2010**
- 04/2010** → Functional Programming and Formal Methods (Prof. P. Müller). Teaching assistant.
- 06/2010** Exercise sessions and written exam preparation.
- 09/2009** → Concepts of Object-Oriented Programming (Prof. P. Müller). Teaching assistant
- 01/2010** for 4 exercise sessions (2 hours each one) with around 10 students. Exercise sessions and written exam preparation.
- 11/2009** → Lectures (8 hours) and evaluation of student projects for the “Analysis and Verification of Programs” course (prof. A. Cortesi) of the master program in computer science at University “Ca’ Foscari” of Venice. Subject: numerical and heap analyses.
- 12/2009**
- 06/2009** → Lectures (10 hours) for the group of the Chair of Programming Methodology at ETH Zurich. Subject: basis of abstract interpretation.
- 07/2009**
- 03/2009** → Lectures (8 hours) and evaluation of student projects for the “Analysis and Verification of Programs” course (prof. A. Cortesi) of the master program in computer science at University “Ca’ Foscari” of Venice. Subject: non-relational and relational numerical domains.
- 04/2009**
- 04/2008** → Lectures (16 hours) for the “Analysis and Verification of Programs” course (prof. A. Cortesi) of the master program in computer science at University “Ca’ Foscari” of Venice. Subject: a generic analyzer of Java programs.
- 11/2008**

## Tools and software

- 10/09 - Today**      *Sample: Static Analyzer of Multiple Programming Languages*, ETH, Zurich, Switzerland  
A generic static analyzer that can be plugged with a wide range of different analyses. Up to now, a type analysis [Ferr10], a string analysis [CFC11], an information flow analysis [ZFC12], and an inference of access permissions [FM12] has been implemented. In addition, several classical heap and numerical (e.g., sign and intervals) analyses have been already developed. Sample supports Apron and trace partitioning, and it can use TVLA as the engine for the heap abstraction. Sample works on an intermediate language (called Simple) simpler than common programming languages, but more refined than bytecode languages. Up to know, translations from Scala and Java bytecode to Simple has been developed.
- 04/08 - 01/10**      *Checkmate: Static Analysis of Java Multithreaded Programs*, Ecole Polytechnique and Ecole Normale Supérieure, Paris, France [Ferr09a]  
A generic static analyzer of Java multithreaded programs developed in Java. It is generic w.r.t. the numerical domain, the memory model and the property. It has been instantiated on the analysis of the happens-before memory model [Ferr08], and of the determinism [Ferr08b], together with other more approximated memory models, properties, and a set of well-known non-relational numerical domains.  
Website: <http://www.pietro.ferrara.name/checkmate>
- 08/07 - 11/07**      *Static Analysis of Unsafe Code*, Microsoft Research, Redmond – WA, USA [FLF08]  
An extension of Clousot (a generic static analyzer of MSIL programs) written in C# in order to analyze unsafe code (MSIL code dealing with pointers).
- 09/05 - 06/06**      *JAIL: Firewall Analysis of Java Card by Abstract Interpretation*, University “Ca’ Foscari”, Venice, Italy [Ferr06]  
Tool developed during my master’s thesis and the following internship in Java. It analyzes Java Card source code and checks if the applet isolation property is respected.

## References

- Peter Müller ([peter.mueller@inf.ethz.ch](mailto:peter.mueller@inf.ethz.ch)), full professor and head of the Chair of Programming Methodology, ETH, Zurich
- Radhia Cousot ([radhia.cousot@polytechnique.edu](mailto:radhia.cousot@polytechnique.edu)), CNRS research director
- Agostino Cortesi ([cortesi@dsi.unive.it](mailto:cortesi@dsi.unive.it)), full professor at the Computer Science department of University Ca’ Foscari of Venice
- Francesco Logozzo ([logozzo@microsoft.com](mailto:logozzo@microsoft.com)), researcher at Microsoft Research

## Comments on the PhD Thesis

*“(…) The problem addressed in the thesis is very interesting, very timely (…), and widely perceived as challenging both from the theoretical and practical sides. (…) This thesis however provides in my opinion major progress. I believe it makes an important contribution to this difficult area providing both sound theory and useful experimental evidence. (…) I believe some of these [results] will become a standard reference in the area.”*

Manuel Hermenegildo, full professor at Universidad Politécnica Madrid, Spain

*“(…) Pietro has presented a decent piece of scientific work. His notions of “determinacy” and “abstract determinacy” as program properties to be verified for concurrent programs are particularly interesting. (…) Pietro’s strength is in the design and realization of practical systems based on innovative ideas which he has demonstrated in the thesis both for the bytecode analyzer Checkmate and in his extensions to Clousot.”*

Helmut Seidl, full professor at Technische Universität München, Germany

*“(…) Multithreading is present in most modern processors but there has been comparatively limited work addressing the significant challenges that it brings. This thesis represents a major contribution to this very difficult area. In addition it offers a rare combination of sound theoretical work with significant practical implementation”*

Final report of the PhD commission

## Other titles

- 21/06/05** Admitted in the Italian Register of engineers  
**21/01/05** Obtained the European Computer Driving Licence  
**20/02/03** Admitted in the Register of journalists as occasional contributor

## Hobbies

- Play chess
- Journalism: I worked in many sporting magazines, two radios (Radio Carpini and Radio Italia 1), a television (Rete Azzurra), and two web sites (<http://www.vesport.it> and <http://www.sportincampo.it>).
- Between 2002 and 2005 I have worked in many athletics events (mainly marathon and half marathon) with a live description of races on web site <http://www.sportincampo.it>
- Development of web sites: e.g. <http://www.vesport.it> and <http://www.atleticamisterbianco.it/atletica2004>
- Sport: Athletic, swimming and soccer
- Astronomy: I like to watch with my telescope moon, planets and stars, and I take photos of them, through both a reflex camera photographic and capturing a video with a web cam connected to a computer
- Music: Italian and rock