

Personal information

First and Last name	Pietro Ferrara
Date and place of birth	Mirano –VE–, 09/04/1981
Citizenship	Italian
Website	http://www.pietro.ferrara.name
DBLP	http://dblp.uni-trier.de/pers/hd/f/Ferrara:Pietro
Google Scholar	https://scholar.google.com/citations?user=y1SCHOEAAAAJ&hl=en
E-mail	pietro.ferrara@gmail.com
Language skills	Italian (mother language) English (good spoken/written) French (good spoken/basic written)

Career

- 02/2016** **Head of Research and Development and Research Scientist** at JuliaSoft SRL,
→**Today** Verona Italy.
Duties:
- Research: investigate and extend the barriers of science in order to deliver innovative solutions to deliver higher quality tools than our competitors. This involves
 - Extending and improving Julia's analyses to new programming languages (e.g., .NET [FCS18]), novel properties (e.g., leakages through intents [SFS18] and privacy analyses [FOS18]), and making the overall framework more flexible and expressive (e.g., through framework specifications [NF18]). This goes from the design and mathematical formalization of the new features, their implementation and commercialization, and the academic dissemination of these results through scientific articles and talks.
 - Creating and maintaining a network of scientific collaborations, and design and develop scientific projects from the initial proposal to their development
 - Supervision of interns for their stage and bachelor or master theses.
 - Participate to the scientific community by being a program committee member of various international conferences and workshops, reviewing papers for several conferences and journals, participating and giving talks in international conferences, and giving lectures at different universities both for bachelor and master courses, and for scientific seminars.
- This lead to the publication of about a dozen of scientific publications, twenty scientific talks both at national and international conferences and fairs, several lectures at various universities, two scientific projects, the supervision of five bachelor or master theses.
- Commercial support: presentation of the Julia static analyzer to various potential customers, fairs and partners, technical and scientific support during Proof Of Concepts activities.
 - Documentation: preparation of technical documentation about the peculiarities of the product (three white papers, various data sheets about commercial, technical and scientific features, user manual of the analyzer, etc...), preparation of the technical e-learning course (through the automatic generation of documentation in HTML and pdf formats from textile and markup files), technical tutorials and commercial videos

07/2013 **Research Staff Member** at IBM Thomas J. Watson Research Center in Yorktown Heights, NY, U.S.A.
→12/2015
Duties:

- Research: Apply static and dynamic analysis to security properties of mobile software (mostly privacy properties in Android) by developing various tools to detect violations at compile or run time. This effort already lead to about 10 publications (one awarded as an ACM Distinguished Paper), and an IBM Research Accomplishment Award.
- Community: Program committee member of 2 conferences, demo co-chair at OOPSLA 2015, reviewer for 10 international conferences or journals, interviewer of various Software Engineer and Research Staff Member candidates at IBM Research.

04/2009 **Lecturer** (02/12-07/13) and **Postdoc** (04/09-01/12) at ETH Zürich, Switzerland
→07/2013
Supervisor: Peter Müller (Full professor, ETH Zürich)
Duties:

- Research: Design and implement a novel generic static analyzer (Sample) combining various value and heap analyses. 4 PhD and 6 master/bachelor students extended Sample with novel analyses. Overall, this effort lead to 10 publications in international journals and conferences. Sample currently supports various languages (namely, Scala, Chalice, and TouchDevelop), and many value (e.g., numerical) and heap (e.g., pointer and shape) analyses.
- Funding: Actively participate to the writing of two project proposals (600'000CHF in total, equivalent to about 580'000\$), and to their development as technical head and co-principal investigator.
- Teaching: Lecturer of a master course on static program analysis. Teaching assistant (teaching exercise sessions and evaluating final written exams or projects) various times for 3 different courses (both at bachelor and master level) on object-oriented programming languages, formal methods, and program verification. Supervise 3 master and 2 bachelor theses.
- Community: Program committee member of 3 conferences, external reviewer for 20 international journals and conferences, interviewer of about 30 candidates for PhD positions at ETH

Education

10/2005 → PhD degree in Computer Science
22/05/2009 Ecole Polytechnique (Paris) and Università Ca' Foscari (Venice)
Subject: "Static analysis via abstract interpretation of multithread programs"
Advisors: Radhia Cousot (research director, CNRS/Ecole Normale Superieure) and Agostino Cortesi (full professor and head of the Department of Computer Science, Università 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 Superieure of Paris on May 22nd, 2009.

2003 → **Master degree in Computer Science**
2004 *Laurea specialistica in Informatica, Università 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).
110/110 cum laude

- 2000 → **Bachelor degree in Computer Science**
 2003 *Laurea in Informatica, Università Ca' Foscari of Venice*
110/110 cum laude
- 1995 → **High school degree – Studies of Science**
 2000 *Diploma di maturità scientifica, Liceo Scientifico Statale “G. Bruno”, Mestre*
94/100

Research Interests and Vision

My research interests are focused on the application of rigorous mathematical theories to enhance the reliability, security, and performances of software by means of static analysis. Abstract interpretation is a framework applied to develop sound static analyses proving properties on all possible executions of a program. However, approximation is necessary to achieve computability, and the analysis might produce false alarms. Finding a good balance between precision, efficiency, and soundness depends on specific applications, and it usually requires deep research investigation. I am particularly interested in new scenarios where static analysis might have a relevant impact, and I have focused my recent research activity on mobile and .NET software.

Keywords: abstract interpretation, static analysis, mobile programs, software engineering, program verification, multithreading, security.

Awards, Honors and Fellowships

- 06/18** ACM SIGSOFT FME Distinguished Paper Award at Formalise 2018
- 10/15** IBM Research Accomplishment for “Fundamental Contributions to Science or Technology” to “Program Analysis and Programming Languages for Mobile”
- 07/14** ACM SIGSOFT Distinguished Paper Award at ISSTA 2014
- 07/12** Invited to the Microsoft Research Faculty Summit 2012
- 10/08 → 12/08** French Ministry of Foreign Affairs Fellowship for my PhD thesis
- 05/06** Vinci fellowship of Italian-French University “italo-francese” for my PhD thesis
- 02/06** 2nd prize at Clusit 2006 for my master thesis

Publications

Journals

- [CFH18]** A. Cortesi, P. Ferrara, R. Halder, and M. Zanioli: “Combining Symbolic and Numerical Domains for Information Leakage Analysis”, *Transactions on Computational Science*, Volume 31, pages 98-135, 2018
- [Ferr16]** P. Ferrara: “A generic framework for heap and value analyses of object-oriented programming languages”, *Theoretical Computer Science*, Volume 631, pages 43-72, June 2016
(ERA: A)
- [CFC15a]** A. Cortesi, G. Costantini, and P. Ferrara, “The Abstract Domain of Trapezoid Step Functions”, *Computer Languages, Systems & Structures*, Volume 43, pages 41-68, October 2015
- [CFC15]** G. Costantini, P. Ferrara and A. Cortesi, “A Suite of Abstract Domains for Static Analysis of String Values”, *Software: Practice and Experience*, Volume 45, Issue 1, pages 245–287, February 2015
(ERA: A, AM Journal: 56th/376)

[Ferr13] P. Ferrara, “A generic static analyzer for multithreaded Java programs”, *Software: Practice and Experience*, Volume 43, Issue 6, pages 663–684, June 2013 (ERA: A, AM Journal: 56th/376)

International conferences

[PCF18] F. Panarotto, A. Cortesi, P. Ferrara, A. Mandal and F. Spoto: “Static Analysis of Android Apps Interaction with Automotive CAN”, *Proceedings of the 3rd International Conference on Smart Computing and Communication (SmartCom 2018)*, Tokyo, Japan, December 10-12, 2018

[SFS18] R. Salvia, P. Ferrara, F. Spoto and A. Cortesi: “Static Detection of Leaks across Intents”, *Proceedings of the 17th IEEE International Conference On Trust, Security And Privacy In Computing And Communications (TrustCom 2018)*, New York, USA, July 31-August 3, 2018 (CORE: A, MS CS 11th/793)

[FOS18] P. Ferrara, L. Olivieri and F. Spoto: “Tailoring Taint Analysis to GDPR”, *Proceedings of the Annual Privacy Forum 2018*, Barcelona, Spain, June 13-14, 2018

[FCS18] P. Ferrara, A. Cortesi and F. Spoto: “CIL to Java-bytecode Translation for Static Analysis Leveraging”, *Proceedings of the 6th Conference on Formal Methods in Software Engineering (FormalISE 2018)*, Gothenburg, Sweden, June 2, 2018
ACM SIGSOFT FME Distinguished Paper Award

[MCF18] A. Mandal, A. Cortesi, P. Ferrara, F. Panarotto and F. Spoto: “Vulnerability Analysis of Android Auto Infotainment Apps”, *Proceedings of the ACM International Conference on Computing Frontiers 2018 (CF 2018)*, Ischia, Italy, May 8-10, 2018

[PPH17] D. Piorkowski, S. Penney, A. Z. Henley, M. Pistoia, M. M. Burnett, O. Tripp, P. Ferrara: “Foraging goes mobile: Foraging while debugging on mobile devices”, *Proceedings of IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC 2017)*, Raleigh, USA, October 11-14, 2017 (acceptance rate: 29%)
Honorable mention

[APT17] A. Aydin, D. Piorkowski, O. Tripp, P. Ferrara and M. Pistoia: “Visual Configuration of Mobile Privacy Policies”, in *Proceedings of the 20th International Conference on Fundamental Approaches to Software Engineering (FASE 2017)*, ARCoSS, LNCS, Springer, Uppsala, Sweden, April 22-29, 2017 (acceptance rate: 26%, MS SE: 29th/285, AM PLSE: 32th/342)

[FTLK17] P. Ferrara, O. Tripp, P. Liu, and E. Koskinen: “Using Abstract Interpretation to Correct Synchronization Faults”, in *Proceedings of the 18th International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI 2017)*, ARCoSS, LNCS, Springer, Paris, France, January 15-17, 2017 (MS SE: 34th/285, AM PLSE: 8th/342)

[TPT16] P. Tsankov, M. Pistoia, O. Tripp, M. Vechev, and P. Ferrara: “FASE: Functionality-Aware Security Enforcement”, in *Proceedings of the 31st ACM Annual Computer Security Applications Conference (ACSAC 2015)*, ACM Press, Los Angeles, USA, December 7-11, 2015 (CORE: A, acceptance rate: 24%, MS SP 12th/138, AM SP: 17th/97)

[FTP15] P. Ferrara, O. Tripp, and M. Pistoia, “MorphDroid: Fine-grained Privacy Verification”, in *Proceedings of the 31st ACM Annual Computer Security Applications Conference (ACSAC 2015)*, ACM Press, Los Angeles, USA, December 7-11, 2015 (CORE: A, acceptance rate: 24%, MS SP 12th/138, AM SP: 17th/97)

- [BFTP15]** L. Brutschy, P. Ferrara, O. Tripp, and M. Pistoia, “ShamDroid: Gracefully Degrading Functionality in the Presence of Limited Resource Access”, in Proceedings of the 30th ACM Conference on Object-oriented Programming (OOPSLA 2015), ACM Press, Pittsburgh, USA, October 27-30, 2015
(CORE: A*, acceptance rate: 25%, MS SE 4th/285, PL: 4th/168, AM PLSE: 5th/342)
- [BCF15]** G. Barbon, A. Cortesi, P. Ferrara, M. Pistoia and O. Tripp, “Privacy Analysis of Android Apps: Implicit Flows and Quantitative Analysis” (*invited paper*), in Proceedings of the 14th International Conference on Computer Information Systems and Industrial Management Applications (CISIM 2015), LNCS, Springer, Warsaw, Poland, September 24-26, 2015
- [FMN15]** P. Ferrara, P. Müller and M. Novacek, “Automatic Inference of Heap Properties Exploiting Value Domains”, in Proceedings of the 16th International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI 2015), ARCoSS, LNCS, Springer, Mumbai, India, January 12-14, 2015
(MS SE: 34th/285, AM PLSE: 8th/342)
- [CFPT15]** A. Cortesi, P. Ferrara, M. Pistoia and O. Tripp, “Datacentric Semantics for Verification of Privacy Policy Compliance by Mobile Applications”, in Proceedings of the 16th International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI 2015), ARCoSS, LNCS, Springer, Mumbai, India, January 12-14, 2015
(MS SE: 34th/285, AM PLSE: 8th/342)
- [BFM14]** L. Brutschy, P. Ferrara, and P. Müller, “Static Analysis for Independent App Developers”, in Proceedings of the 29th ACM Conference on Object-oriented Programming (OOPSLA 2014), ACM Press, Portland, USA, October 20-24, 2014
(CORE: A*, acceptance rate: 28%, MS SE 4th/285, PL: 4th/168, AM PLSE: 5th/342)
- [TFP14]** O. Tripp, P. Ferrara and M. Pistoia, “Hybrid Security Analysis of Web JavaScript Code via Dynamic Partial Evaluation”, in Proceedings of the International Symposium on Software Testing and Analysis (ISSTA 2014), ACM Press, San Jose, USA, July 23-25, 2014.
(CORE: A, acceptance rate: 28%, MS SE: 24th/285, AM PLSE: 4th/342)
ACM SIGSOFT Distinguished Paper Award
- [FSB14]** P. Ferrara, D. Schweizer and L. Brutschy, “TouchCost: Cost Analysis of TouchDevelop Scripts”, in Proceedings of the 17th International Conference on Fundamental Approaches to Software Engineering (FASE 2014), ARCoSS, LNCS, Springer, Grenoble, France, April 5-13, 2014
(acceptance rate: 26%, MS SE: 29th/285, AM PLSE: 32th/342)
- [Ferr14]** P. Ferrara, “Generic Combination of Heap and Value Analyses in Abstract Interpretation”, in Proceedings of the 15th International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI 2014), ARCoSS, LNCS, Springer, San Diego, USA, January 19-21, 2014
(MS SE: 34th/285, AM PLSE: 8th/342)
- [CFCM13]** G. Costantini, P. Ferrara, A. Cortesi and G. Maggiore, “The Domain of Parametric Hypercubes for Static Analysis of Computer Games Software”, in Proceedings of the 15th International Conference on Formal Engineering Methods (ICFEM 2013), LNCS, Springer, Queenstown, New Zealand, October 29-November 1, 2013
(acceptance rate: 32%)
- [CFC13]** A. Cortesi, P. Ferrara and N. Chaki, “Static Analysis Techniques for Robotics Software Verification” (*invited paper*), in Proceedings of the 44th International Symposium of Robotics (ISR 2013), Seoul, Korea, October 24-26, 2013
(CORE: A)

- [CFC12]** G. Costantini, P. Ferrara and A. Cortesi, "Linear approximation of continuous systems with Trapezoid Step Functions", in Proceedings of the 10th Asian Symposium on Programming Languages and Systems (APLAS 2012), LNCS, Springer, Kyoto, Japan, December 11-13, 2012
(MS PL: 42th/168, AM PLSE: 80th/342)
- [FFJ12]** P. Ferrara, R. Fuchs and U. Juhasz, "TVAL+: TVLA and Value Analyses Together", in Proceedings of the 10th International Conference on Software Engineering and Formal Methods (SEFM 2012), LNCS, Springer, Thessaloniki, Greece, October 3-5, 2012
(acceptance rate: 25%, MS SE: 76th/285, AM PLSE: 104th/342)
- [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
(acceptance rate: 26%, MS SE: 17th/285, AM PLSE: 43th/342)
- [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
(MS SE: 34th/285, AM PLSE: 8th/342)
- [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
(CORE: A, MS DPC: 45th/203, AM NET: 18th/177)
- [Ferr09a]** P. Ferrara, "Checkmate: a generic static analyzer of Java multithreaded programs", in Proceedings of the 7th IEEE International Conference on Software Engineering and Formal Methods (SEFM 2009), IEEE Computer Society, Hanoi, Vietnam, November 23-27, 2009
(acceptance rate: 35%, MS SE: 76th/285, AM PLSE: 104th/342)
- [Ferr08b]** P. Ferrara, "Static analysis of the determinism of multithreaded programs", in Proceedings of the 6th IEEE International Conference on Software Engineering and Formal Methods (SEFM 2008), IEEE Computer Society, Cape Town, South Africa, November 10-14, 2008
(CORE: A, acceptance rate: 28%, MS SE: 76th/285, AM PLSE: 104th/342)
- [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
(CORE: A*, acceptance rate: 28%, MS SE: 4th/285, MS PL: 4th/168, AM PLSE: 5th/342)
- [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

- [NF18]** L. Negrini, P. Ferrara: "SARL: Framework Specification for Static Analysis", in Proceedings of The Ninth Workshop on Tools for Automatic Program Analysis (TAPAS 2018), Freiburg im Breisgau, Germany, August 28, 2018
- [FS18]** P. Ferrara and F. Spoto: "Static Analysis for GDPR Compliance", in Proceedings of the 2nd Italian Conference on Cybersecurity (ITASEC 2018), Milan, Italy, February 6-8, 2018

- [BFS17]** E. Burato, P. Ferrara and F. Spoto: "Security Analysis of the OWASP Benchmark with Julia", in Proceedings of the 1st Italian Conference on Cybersecurity (ITASEC 2017), Venice, Italy, January 17-20, 2017
- [BSCF16]** Gianluca Barbon, Enrico Steffinlongo, Agostino Cortesi and Pietro Ferrara: "DAPA: Degradation-Aware Privacy Analysis of Android Apps", in Proceedings of the 12th International Workshop on Security and Trust Management (STM 2016), Heraklion, Greece, September 26-27, 2016
- [TPFR16]** Omer Tripp, Marco Pistoia, Pietro Ferrara, and Julia Rubin: "Pinpointing mobile malware using code analysis", in Proceedings of the IEEE/ACM International Conference on Mobile Software Engineering and Systems (MOBILESoft 2016), Austin, USA, May 16-17 2016
- [PTF15]** Marco Pistoia, Omer Tripp, Pietro Ferrara, and Paolina Centonze, "Automatic Detection, Correction and Visualization of Security Vulnerabilities in Mobile Apps" (invited paper), in Proceedings of the 3rd Workshop on Mobile Development Lifecycle (MobileDeLi 2015), Pittsburgh, USA, October 26, 2015
- [BFM14a]** L. Brutschy, P. Ferrara, and P. Müller, "TouchGuru: Integrating Static Analysis with a Mobile Development Environment" (invited paper), in Proceedings of the 2nd Workshop on Mobile Development Lifecycle (MobileDeLi 2014), Portland, USA, October 21, 2014
- [CCF13]** A. Cortesi, G. Costantini and P. Ferrara, "A survey on Product Operators in Abstract Interpretation", in Proceedings of the Festschrift for Dave Schmidt, Electronic Proceedings in Theoretical Computer Science, U.S.A., September 19-20, 2013
- [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 2008), 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 and Agostino Cortesi defended at Ecole Normale Supérieure of Paris on May 22nd, 2009.

Note:

For each conference and journal publication, the following metrics are reported:

- acceptance rate when less than 35%
- CORE: the CORE ranking (<http://103.1.187.206/core/>) when A* or A (all others are B)
- ERA: the ERA 2010 journal ranking (https://research.unsw.edu.au/sites/all/files/related_files/regular_page_content/era2010_journal_title_list.xls)
- MS: Microsoft Academics ranking (<http://academic.research.microsoft.com/?SearchDomain=2&entitytype=3>) when in the top 30% of conferences/journals in:
 - Software Engineering (SE)
 - Security & Privacy (SP)
 - Computer Security (CS)
 - Programming Languages (PL)
 - Distributed & Parallel Computing (DPC)
 - Journals in Computer Science (Journal)

- AM: Arnet Miner ranking (<http://arnetminer.org/page/conference-rank/html/All-in-one.html>) when in the top 30% of conferences in:
 - Programming Languages and Software Engineering (PLSE)
 - Network (NET)
 - Security and Privacy (SP)

Service

Member of the Program Committee of the following conferences:

- 7th ACM SIGPLAN International Workshop on the State Of the Art in Program Analysis (SOAP 2018)
- 18th Workshop on Formal Techniques for Java-like Programs (FTfJP 2016)
- International Conference on Computer Information Systems and Industrial Management Applications (CISIM 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011)
- 18th International Static Analysis Symposium (SAS 2012)

Member of the Artifact Evaluation Committee of CAV 2017

Member of the commission for postdoc positions at University of Venice (June 2017), University of Verona (June 2017).

Co-chair of the 2015 SPLASH Demonstrations track

Session chair at SAS 12

Organizer of the IBM Programming Languages Day 2015

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, Journal of Computer Science and Technology, Journal of Software and Systems Modeling, VMCAI 2013, ESOP 2013, ICFEM 2013, POPL 2014, Formal Aspects of Computing, CAV 2014, APLAS 2014, VMCAI 2015, NFM 2015, Science of Computer Programming, Computer Languages Systems & Structures – Special issue on VMCAI 2015, VMCAI 2016, ICALP 2016, ESOP 2017, PLDI 2017, Security and Communication Networks, SAS 2017, Computer Languages, Systems & Structures, Journal of Systems and Software.

Reviewer for ACM Computing Reviews since 2014

External reviewer for project proposals submitted to the Swiss National Science Foundation (2014)

External reader in the PhD committee of Junjie Chen at the New York University (April 2015)

Grants

01/18 → 12/19 Co-principal investigator of the Joint project “Security Static Analysis for Android Things” with University of Verona. The goal of this project is to formalize, implement and apply novel security analyses for Android Things software. The project is 2-years-long and involves one postdoc and two professors at University of Verona and two employees at Julia.

Funding: EUR 165'000 in total

06/17 → 05/18 Co-principal investigator of the ESF project “Static analysis for the safety and security of Android systems for automotive infotainment”. The goal of this project is to formalize, implement and apply novel reliability and security analyses for Android Auto apps. The project is 1-year-long and involves two postdocs (one at University Ca' Foscari of Venice, and one at University of Verona that will spend at least 7 months at Julia).

Funding: EUR 48'000 in total

04/12 → 07/13 Co-principal investigator of 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 (Lucas Brutschy).

Funding: CHF 298'000 in total

09/10 → 07/13 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).
Funding: CHF 302'896 in total

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, Università “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, Università “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

Tools and software

- 02/16 – Today** *Julia for .NET*, Julia SRL, Verona
Apply Julia (a 10 years old static analyzer for Java) to the analysis of CIL (.Net bytecode) obtained from the compilation of C# code. Julia has been widely applied to the analysis of Java bytecode. The main challenge is to translate CIL (and in particular, instructions accessing the memory through pointers) to Java Bytecode (that does not support pointers). In particular, CIL is translated into an intermediate XML representation similar to Java bytecode, and this is passed to Julia as BCEL classes.
- 10/09 – 07/13** *Sample: Static Analyzer of Multiple Programming Languages*, ETH, Zürich, Switzerland
A generic static analyzer that can be automatically plugged with a wide range of different heap and value analyses [Ferr14]. Several value analyses have been already developed [Ferr10, CFC11, ZFC12, FM12, CFC12, CFC14]. In addition, Sample supports several classical heap (e.g., TVLA [FFJ12] and program point-based abstraction) and numerical (e.g., Apron) analyses, as well as trace partitioning.
Sample works on an intermediate language (called Simple) simpler than common programming languages, but more refined than bytecode languages. Up to now, translations from TouchDevelop, 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,Ferr13]
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.
- 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*, Università 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.

Patents

2018

1. Brutschy, Lucas; Ferrara, Pietro; Pistoia, Marco; Tripp, Omer: Fine-grained user control over usages of sensitive system resources having private data with applications in privacy enforcement, US Patent 9,940,478
2. Ferrara, Pietro; Pistoia, Marco; Tripp, Omer: Semantic Privacy Enforcement, US Patent App. 15/223,804
3. Ferrara, Pietro; Pistoia, Marco; Tripp, Omer: System, method and apparatus for fine-grained privacy specification and verification, US Patent App. 15/223,848
4. Dolby, Julian T; Ferrara, Pietro; Pistoia, Marco; Tripp, Omer: Install-Time Security Analysis of Mobile Applications, US Patent App. 15/231,093
5. Ferrara, Pietro; Pistoia, Marco; Ponzio, John; Tripp, Omer: Application integrity verification in multi-tier architectures, US Patent App. 15/234,833
6. Ferrara, Pietro; Pistoia, Marco; Roos, Pascal; Tripp, Omer: Machine learning to facilitate incremental static program analysis, US Patent App. 15/244,229
7. Ferrara, Pietro; Pistoia, Marco; Tripp, Omer; Tsankov, Petar: Providing efficient information tracking with dynamically selected precision, US Patent App. 15/278,517
8. Ferrara, Pietro; Pistoia, Marco; Tripp, Omer: Performing entropy-based dataflow analysis, US Patent App. 15/287,071
9. Ferrara, Pietro; Pistoia, Marco; Tripp, Omer: Cooperative creation of dataflow models using sparse random instrumentation, US Patent 9,996,324

2017

10. Brutschy, Lucas; Ferrara, Pietro; Pistoia, Marco; Tripp, Omer: Synthesizing inputs to preserve functionality, US Patent 9,697,018
11. Ferrara, Pietro; Pistoia, Marco; Tripp, Omer; Tsankov, Petar: Self-repair and distributed-repair of applications, US Patent 9,684,788
12. Ferrara, Pietro; Pistoia, Marco; Tripp, Omer: System, method and apparatus for usable code-level statistical analysis with applications in malware detection, US Patent App. 14/954,338
13. Ferrara, Pietro; Pistoia, Marco; Tripp, Omer; Eunho, Yang: Trace recovery via statistical reasoning, US Patent 9,823,998
14. Dolby, Julian T; Ferrara, Pietro; Pistoia, Marco; Tripp, Omer: Detection of software or hardware incompatibilities in software packages, US Patent 9,733,927
15. Bello, Luciano; Ferrara, Pietro; Pistoia, Marco; Tripp, Omer: Security enforcement in the presence of dynamic code loading, US Patent App. 14/964,162
16. Bello, Luciano; Ferrara, Pietro; Pistoia, Marco; Tripp, Omer: System and method for bypassing evasion tests with applications in analysis and monitoring of mobile applications, US Patent App. 15/166,817
17. Ferrara, Pietro; Pistoia, Marco; Tripp, Omer: Privacy detection of a mobile application program, US Patent App. 15/193,293
18. Ferrara, Pietro; Pistoia, Marco; Tripp, Omer: System, method and apparatus for extracting usage-based fine grained permissions, US Patent App. 15/193,602

Talks

- 09/10/18** Hunting Software Security Vulnerabilities and Privacy Leaks with Semantic Static Analysis, the IT Security Expo and Congress (it-sa), Nuremberg, Germany
- 05/10/18** Analisi Statica per la Compliance GDPR, ISACA VI Venice AppSec, Venice, Italy

13/06/18 Tailoring taint analysis for GDPR, Annual Privacy Forum 2018, Barcelona, Spain
11/06/18 The Julia static analyzer and its application to security vulnerabilities, "Sicurezza e affidabilità" course", University Bicocca of Milan, Italy
02/06/18 CIL to Java-bytecode Translation for Static Analysis Leveraging, Formalise 2018, Gothenburg, Sweden
26/05/18 Java and its bytecode, Android, static analysis, CyberChallenge.IT course, University Ca' Foscari of Venice, Italy
26/03/18 La vulnerabilità del software nell'ecosistema IoT, seminar on cybersecurity in Industry 4.0, University of Verona, Italy
08/02/18 Static Analysis for GDPR Compliance, ITASEC 18, Milan, Italy
06/02/18 Code Analysis Reinvented: boosting software security and privacy (tutorial), ITASEC 18, Milan, Italy
17/01/18 Julia: reinventing static analysis, University of Padova, Italy
17/01/18 Julia: an abstract interpretation-based static analyzer of industrial OO software, "Software Verification" course at University of Padova, Italy
07/11/17 Code Analysis Reinvented: boosting Software Security and Privacy, W-JAX, Munich, Germany
06/11/17 Julia: an abstract interpretation-based static analyzer of industrial OO software, Max Planck Institute of Software Systems, Kaiserslauten, Germany
17/10/17 Software security, reliability and privacy: what role can static analysis play?, 31st AIEA National Conference (ISACA Milan Chapter), Milan, Italy
29/09/17 Scaling up Static Analyzers by Program Splitting, ETH, Zurich, Switzerland
10/11/16 Static Security Analysis for Mobile Software, ENISA Workshop "Mobile attacks and defense: from infrastructure to application", Berlin, Germany
07/04/15 MorphDroid: Fine-grained Privacy Verification, Università Ca' Foscari of Venice, Italy
31/03/15 A generic static analyzer and its application to TouchDevelop, Università della Svizzera Italiana, Lugano, Switzerland
22/04/14 Safety and cost analysis of TouchDevelop scripts, Università Ca' Foscari of Venice, Italy
17/04/14 Hybrid Security Analysis of Web JavaScript Code via Dynamic Partial Evaluation, ETH Zurich, Switzerland
16/04/14 Static Security Analysis in an Industrial Setting: from Taint to Data-Centric Analysis, IBM Research Zurich, Switzerland
09/04/14 TouchCost: Cost Analysis of TouchDevelop Scripts, FASE 14, Grenoble, France
26/03/14 Structural Data Leakage, IBM Thomas J. Watson Research Center, Yorktown Heights, NY, USA
12/02/14 Secure Language Design and Program Analysis for Security (with Omer Tripp), Harvard University, Boston, MA, USA
22/01/14 Generic Combination of Heap and Value Analyses in Abstract Interpretation, VMCAI 14, San Diego, CA, USA
11/12/12 Linear approximation of continuous systems with Trapezoid Step Functions, APLAS 12, Kyoto, Japan
15/10/12 Static analysis of multithreaded programs, IBM Thomas J. Watson research center, Yorktown, NY, USA
03/10/12 TVAL+: TVLA and Value Analyses Together, SEFM 12, Thessaloniki, Greece
20/07/12 TVAL+: Combining TVLA and Value Analyses, Microsoft Research, Redmond, WA, USA
13/06/12 Inference of Fractional, Counting and Chalice Access Permissions via Abstract Interpretation, Universidad Complutense de Madrid, Madrid, Spain
12/06/12 TVLA and Value Analyses Together, Instituto Madrileño de Estudios Avanzados, Madrid, Spain
16/03/12 Automatic inference of access permissions, Department of Computer Science, Università Ca' Foscari, Venice, Italy
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, Università 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, Zürich, Switzerland
18/12/08 Static analysis of the determinism of multithreaded programs, Lunch seminars, Università 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, Università 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, Università 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 Interpretation-based lifeguard), Workshop AIDA, Pisa, Italy

Teaching

Spring sem. 2018 *Software Correctness, Security, and Reliability* (prof. A. Cortesi, Università Ca' Foscari, Venice). Lectures (4 hours).
Spring sem. 2017 *Software Correctness, Security, and Reliability* (prof. A. Cortesi, Università Ca' Foscari, Venice). Lectures (4 hours) and evaluation of student exercises and final projects.
01/08/12 Admitted to and attended the course "Teaching at ETH: Committed and skilled"
Spring sem. 2012 *Static Program Analysis*. Lecturer. 13 lectures (2 hours each one with around 20 students) and oral exam preparation and evaluation.
Spring sem. 2012 *Analysis and Verification of Programs* (prof. A. Cortesi, Università Ca' Foscari, Venice). Lectures (4 hours) and evaluation of student projects.
Fall sem. 2011 *Concepts of Object-Oriented Programming* (Prof. P. Müller, ETH Zürich). Teaching assistant. 13 exercise sessions (2 hours each one with around 20 students) and written exam preparation.
Spring sem. 2011 *Functional Programming and Formal Methods* (Prof. P. Müller, ETH Zürich). Teaching assistant. Exercise sessions and written exam preparation.
Fall sem. 2010 *Concepts of Object-Oriented Programming* (Prof. P. Müller, ETH Zürich). Head teaching assistant. 12 exercise sessions (2 hours each one with around 10 students) and written exam preparation.

Fall sem. 2010 *Analysis and Verification of Programs* (prof. A. Cortesi, Università Ca' Foscari, Venice). Lectures (8 hours) and evaluation of student projects.

Spring sem. 2010 *Functional Programming and Formal Methods* (Prof. P. Müller, ETH Zürich). Teaching assistant. Exercise sessions and written exam preparation.

Fall sem. 2009 *Concepts of Object-Oriented Programming* (Prof. P. Müller, ETH Zürich). Teaching assistant for 4 exercise sessions (2 hours each one) with around 10 students. Exercise sessions and written exam preparation.

Fall sem. 2009 *Analysis and Verification of Programs* (prof. A. Cortesi, Università Ca' Foscari, Venice). Lectures (8 hours) and evaluation of student projects.

Spring sem. 2009 *Analysis and Verification of Programs* (prof. A. Cortesi, Università Ca' Foscari, Venice). Lectures (8 hours) and evaluation of student projects.

Spring sem. 2008 *Analysis and Verification of Programs* (prof. A. Cortesi, Università Ca' Foscari, Venice). Lectures (16 hours).

Student project supervision

11/2017 – 02/2018 – Co-supervisor of the master thesis at Università di Verona of Luca Olivieri on frontend for GDPR analyses.
Supervisor: prof. Fausto Spoto

10/2017 – 02/2018 – Co-supervisor of the master thesis at Università di Verona of Luca Negrini on advanced algorithms and application of machine learning to application splitting.
Supervisor: prof. Fausto Spoto

03/2017 – 06/2017 – Supervisor of the internship at Julia of Dinu Berinde (Università di Verona) on the application of Julia's analyses to Android programs.

06/2016 - 11/2016 - Co-supervisor of the master thesis at Università Ca' Foscari di Venezia of Rocco Salvia ("Intent Flow Analysis in Android Application", mark: 110/110 cum laude).
Supervisor: prof. Agostino Cortesi

10/2012 - 03/2013 - Supervisor of the master thesis at ETH of Zürich of Daniel Schweizer ("Overapproximating the cost of loops in TouchDevelop").

03/2011 - 08/2011 - Supervisor of the bachelor thesis at ETH of Zürich of Raphael Fuchs ("Interfacing TVLA and Sample").

03/2011 - 08/2011 - Supervisor of the master thesis at ETH of Zürich of Dominik Gabi ("Disjunction on demand").

01/2010 - 06/2010 - Supervisor of the bachelor thesis at ETH of Zürich of Roman Scheidegger ("Translating Java bytecode to Simple").

12/2009 - 05/2010 - Co-supervisor of the master thesis at Università Ca' Foscari of Venice of Giulia Costantini ("Abstract domains for static analysis of strings", mark: 110/110 cum laude). Supervisor: prof. Agostino Cortesi

References

- Patrick Cousot (pcousot@cs.nyu.edu), full professor, Courant Institute of Mathematical Sciences, New York University
- Peter Müller (peter.mueller@inf.ethz.ch), full professor and head of the Chair of Programming Methodology, ETH, Zürich
- Agostino Cortesi (cortesi@dsi.unive.it), full professor at the Computer Science department of Università Ca' Foscari of Venice

Other titles

21/06/05 Admitted in the Italian Register of engineers

21/01/05 Obtained the European Computer Driving License

20/02/03 Admitted in the Register of journalists as occasional contributor

Hobbies

- Chess: I am a decent chess player (<http://ratings.fide.com/card.phtml?event=673129>), part of the Battinelli chess club in Verona, member of its governing council, and captain of one of its teams. I have been playing chess since I was a child, and I have been playing for Capablanca club in Mestre (Venice), Paris Université Club in Paris, and Reti Club in Zurich (where I was the captain of one of the teams).
- Mountains: I love skiing and hiking, especially in Dolomiti. [Here](#) you can see my ski performances!