Curriculum Vitae
Luca Geretti

1. Academic career

Positions

October 2005
Master degree in Electronics Engineering from the University of Udine

Giugno 2009
PhD in Electronics Engineering and Computer Science from the University of Udine

Gennaio 2009 – Dicembre 2010
Research fellow, Computer Science department, University of Verona

January 2011 – October 2015
Research fellow, Engineering department, University of Udine

November 2015 – September 2017
Research fellow, Computer Science department, University of Verona

October 2017 – Today
Assistant Professor in the Computer Science department of the University of Verona

Research history
with selected references to publications and projects

After the degree at the University of Udine in 2005, focused on neural networks as an approach to parallel and distributed computing [a02,a04], the PhD activity moved to ad hoc mobile networks. The main objective is to identify computation paradigms able to distribute the load among heterogeneous nodes, with an approach as robust and autonomic as possible. To reach such a goal, in this phase there is a focus on basic services required to manage the network, such as localization [a01] and clustering [a03].
After the PhD experience, in 2009 a post-doc activity as the University of Verona is started. This event also marks a radical shift in the research focus, moving to formal verification of hybrid systems and the development of the related C++ library called Ariadne (http://www.ariadne-cps.org). This topic involves three main activities: theory, implementation and case study analysis. The theoretical study is focused on high-level strategies for verification [a06], but also on improvements on reachability algorithms both from the correctness and efficiency viewpoints [c05].
At the same time, the Ariadne library is enriched with verification routines, while the

reachability engine is extended to exploit multi-threading. The analysis of relevant case studies, after an exploration into diverse fields, settles to assisted surgery systems [a05], in collaboration with the robotics group of the department. In 2011, after the end of projects [p01,p02], there is a return to the University Udine while maintaining a scientific collaboration with Verona. A new activity starts, concerned with remote management of sensor networks [p03,p07], which requires the development of additional competences regarding web services and hardware prototyping [c06]. In parallel, research resumes on software paradigms for distributed computation, with a specific focus on system reliability and security [p04]. In this context, a new software project is started (https://bitbucket.org/atta-all/atta); the objective is to handle heterogeneous platform+language computation using the dataflow approach [b03,b04].

After completing projects [p03,p07], there is a return to the University of Verona su resume full involvement on Ariadne, in order to improve its verification capabilities [c08] and the ability to handle more complex robotic surgery models [a08]. During this last phase, there is a particular interest towards contract-based verification [a07] and the modeling of noisy systems in order to increase the library capabilities [c09].

2. Teaching activity

AA 2012/13, 2013/14, 2014/15

At: University of Udine, Engineering faculty

Degree: Electronics Engineering (Master)
Course: Electronic Systems Design

AA 2017/18

At: University of Verona, Computer Science department
Degree: Computer Science (Bachelor)
Course: Computer Architecture

3. Participations

European research projects

[p01] *COCONUT: "A COrrect-by-CONstrUcTion Workbench for Design and Verification of Embedded Systems"* FP7-2007-IST-1-217069

[p02] *C4C: "Control for coordination of distributed systems"* FP7-2007-ICT-2-223844

[p03] E2SG: "Energy to Smart Grid" ENIAC JU Grant Agreement n. 296131-1

[p04] nSHIELD: "new embedded Systems arcHItecturE for multi-Layer Dependable solutions" ARTEMIS JU Grant Agreement n. 269317

National research projects

[p05] *"Sensori wireless ed integrazione di sistema per applicazioni ubique in ambito ospedaliero"* PRIN protocollo 2005090428

Regional research grants

[p06] *TechUP: "Laboratorio di Ingegneria per le Tecnologie Ubique e Pervasive"* Progetto Regione FVG, LR 11/03, art. 11, bando 2005

[p07] EasyHome: *"Sistemi domotici user-friendly attraverso l'utilizzo di dispositivi di illuminazione efficienti ed intelligenti"* Progetto Regione FVG, POR FESR 2007 – 2013 Obiettivo competitività e occupazione

International conferences

2012 6th International Workshop on Reachability Problems (RP'12), "Ariadne: dominance checking of nonlinear hybrid automata using reachability analysis", September 17-19, Bordeaux (FR)

2016 International Workshop on Formal Methods for Industrial Critical Systems and Automated Verification of Critical Systems (FMICS-AVoCS 2016) "Formal Verification of Nonlinear Hybrid Systems Using Ariadne ", September 26-28, Pisa (IT)

PhD schools

2017 "Summer School on Formal Methods for Cyber-Physical Systems", September 12-18, Verona (IT), member of the organizing committee

4. Reviewer activity

International conferences

2007 American Control Conference (ACC)
2009 IFAC Conference Series on Analysis and Design of Hybrid Systems (ADHS)
2009 Design Automation Conference (DAC)
2010 American Control Conference (ACC)
2010 Design, Automation and Test in Europe (DATE)
2015 International Conference on Internet and Distributed Computing Systems (IDCS)
2016 Euromicro Conference on Digital System Design (DSD)
2017 Euromicro Conference on Digital System Design (DSD)

International journals

IEEE Transactions on Neural Networks
IEEE Transactions on Mobile Computing

6. Publications

International journals

[a01] Abramo, A.; Blanchini, F.; Geretti, L.; Savorgnan, C. "A mixed convex/nonconvex distributed localization approach for the deployment of indoor positioning services", IEEE Transactions on Mobile Computing, Volume 7, Issue 11, Nov. 2008, pg. 1325-1337, ISSN: 1536-1233, DOI: 10.1109/TMC.2008.59

[a02] Geretti, L.; Abramo, A. "The correspondence between deterministic and stochastic digital neurons: analysis and methodology", IEEE Transactions on Neural Networks, Volume 19, Issue 10, Oct. 2008, pg. 1739-1752, ISSN: 1045-9227, DOI: 10.1109/TNN.2008.2001775

[a03] Geretti, L.; Abramo, A. "Distributed multi-level hierarchic strategy for broadcast collaborative mobile networks", IEEE Transactions on Mobile Computing, Volume 9, Issue 9, Sep. 2010, pg. 1255-1266, ISSN: 1536-1233, DOI: 10.1109/TMC.2010.97

[a04] Geretti, L.; Abramo, A. "The synthesis of a stochastic artificial neural network application using a genetic algorithm approach", Advances in Imaging and Electron Physics, Volume 168, Aug. 2011, pg. 1-64, Waltham: Academic Press, Elsevier, Print ISBN: 978-0-12-385983-9, DOI: 10.1016/B978-0-12-385983-9.00001-6

[a05] Muradore, R.; Bresolin, D.; Geretti, L.; Fiorini, P.; Villa, T. "Robotic surgery – Formal verification of plans", IEEE Robotics and Automation Magazine, Volume 18, Sep. 2011, pg. 24-32, ISSN: 1070-9932, DOI: 10.1109/MRA.2011.942112

[a06] Benvenuti, L; Bresolin, D.; Collins, P.; Ferrari, A.; Geretti, L.; Villa, T. "Assume-guarantee verification of nonlinear hybrid systems with Ariadne", International Journal of Robust and Nonlinear Control, Volume 24, Issue 4, Mar. 2014, pg. 699-724, ISSN: 1049-8923, DOI: 10.1002/RNC.2914

[a07] Nuzzo, P.; Sangiovanni-Vincentelli, A.L.; Bresolin, D.; Geretti, L.; Villa, T. "A platform-based design methodology with contracts and related tools for the design of cyber-physical systems", Proceedings of the IEEE, Volume 103, Issue 11, 2015, pg. 2104-2132, DOI: 10.1109/JPROC.2015.2453253

[a08] Bresolin, D.; Geretti, L.; Muradore, R.; Fiorini, P.; Villa, T. "Formal verification of robotic surgery tasks by reachability analysis", Microprocessors and Microsystems, Volume 39, Issue 8, November 2015, pg. 836-842, DOI: 10.1016/j.micpro.2015.10.006

[a09] Geraldes, A.; Geretti, L.; Muradore, R.; Fiorini, P.; Mattos, L.S.; Villa, T.; "Formal Verification of Medical CPS: a Laser Incision Case Study", ACM Transactions on Cyber-Physical Systems, 2018 (accepted)

Book chapters

[b01] Bresolin, D.; Geretti, L.; Villa, T.; Collins, P. "An introduction to the verification of hybrid systems using Ariadne", Coordination Control of Distributed Systems, LNCS Volume 456, 2015, pg. 339-346, DOI: 978-3-319-10406-5

[b02] Bresolin, D.; Geretti, L.; Muradore, R.; Fiorini, P,; Villa, T. "Formal verification applied to robotic surgery", Coordination Control of Distributed Systems, LNCS Volume 456, 2015, pg. 347-355, DOI: 978-3-319-10406-5

[b03] Azzoni, P.; Rantos, K.; Geretti, L,; Abramo, A.; Gosetti, S.; "Biometric security domain", in Measurable and Composable Security, Privacy and Dependability, CRC Press, 2018 (accepted)

[b04] Azzoni, P.; Geretti, L; Abramo, A.; Stefanidis, K.; Gialelis, J.; Papalambrou, A.; Serpanos, D.; Rantos, K.; Toma, A.; Tassadaq, N.; Dabcevic, K.; Regazzoni, C.; Marcenaro, L.; Traversone, M.; Cesena, M.; Mignanti, S.; "Security, privacy and dependability technologies", in Measurable and Composable Security, Privacy and Dependability, CRC Press, 2018 (accepted)

International conferences

[c01] Abramo, A.; Blanchini, F.; Geretti, L.; Savorgnan, C. "Mixed convex/non-convex distributed localization algorithm for the deployment of indoor positioning services", American Control Conference 2007 (ACC'07), 9-13 July 2007, pg. 3967-3972, ISSN: 0743-1619, Print ISBN: 1-4244-0988-8, DOI: 10.1109/ACC.2007.4282529

[c02] Bresolin, D.; Di Guglielmo, L.; Geretti, L.; Villa, T. "Correct-by-construction code generation from hybrid automata specification", Proc. Of the 7th International Wireless Communication and Mobile Computing Conference (IWCMC'11), Jul. 2011, pg. 1660-1665, Print ISBN: 978-1-4244-9539-9, DOI: 10.1109/IWCMC.2011.5982784

[c03] Collins, P.; Bresolin, D.; Geretti, L.; Villa, T. "Computing the evolution of hybrid systems using rigorous function calculus", 4th IFAC Conference on Analysis and Design of Hybrid Systems (ADHS'12), June 2012, pg. 284-290, DOI: 10.3182/20120606-3-NL-3011.00046

[c04] Bresolin, D.; Di Guglielmo, L.; Geretti, L.; Muradore, R.; Fiorini, P.; Villa, T. "Open problems in verification and refinement of autonomous robotic systems", 15th Euromicro Conference on Digital System Design (DSD'12), September 2012, pg. 469-476, DOI: 10.1109/DSD.2012.96

[c05] Benvenuti, L.; Bresolin, D.; Collins, P.; Ferrari, A.; Geretti, L.; Villa, T. "Ariadne: dominance checking of nonlinear hybrid automata using reachability analysis", 6th International Workshop on Reachability Problems (RP'12), September 2012, pg. 79-91, Print ISSN: 0302-9743, Print ISBN: 978-3-642-33511-2, DOI: 10.1007/978-3-642-33512-9_8

[c06] Guerrieri, A.; Geretti, L.; Fortino, G.; Abramo, A. "A service-oriented gateway for remote monitoring of building sensor networks", IEEE 8th International Workshop on Computer Aided Modeling and Design of Communication Links and Networks (CAMAD'13), September 2013, pg.

139-143, DOI: 10.1109/CAMAD.2013.6708105

[c07] Bresolin, D.; Geretti, L.; Muradore, R.; Fiorini, P.; Villa, T. "Verification of robotic surgery tasks by reachability analysis: a comparison of tools", 17th Euromicro Conference on Digital System Design (DSD'14), September 2014, pg. 659-662, DOI: 10.1109/DSD.2014.55

[c08] Geretti, L.; Muradore, R.; Bresolin, D.; Fiorini, P.; Villa, T.; "Parametric formal verification: the robotic paint spraying case study", 20th World Congress of the International Federation of Automatic Control (IFAC 2017), 9-14 July 2017, pg. 9658-9663, DOI: (to be published)

[c09] Geretti, L.; Bresolin, D.; Collins, P.; Zivanovic, S.; Villa, T.; "Ongoing work on automated verification of noisy nonlinear systems with Ariadne", 29th IFIP International Conference on Testing Software and Systems (ICTSS 2017), 9-11 October 2017, pg. 313-319, DOI: 10.1007/978-3-319-67549-7_19

Verona, October 1st, 2017