

ANDREA BRACCIALI

Curriculum Vitae

General information

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Place and date of birth: Montepulciano, 21st June 1969
Nationality: Italian
Military service: accomplished in Italian FireBrigade, 1996
Spoken languages: Italian (native), English.

Current position

Research Fellow, Ph.D. at Department of Computer Science, University of Pisa.

Past positions

- 2005-2009 **Research Fellow** at Department of Computer Science, University of Pisa [from July 05 until June 09].
- 2002-2005 **Research Assistant** at Department of Computer Science, University of Pisa, under the FET-IST-2001-32530 *SOCS* project, funded by European Commission [from Jan 02 until June 05].
- 1997-2001 **Ph.D. Student** under a grant of the MURST (Italian Ministry of University and Technological and Scientific Research).

Education

- 05/2003 **Ph.D. in Computer Science (Dottorato in Informatica)**. Department of Computer Science, University of Pisa.
Thesis title: *Behavioural Patterns and Software Composition*
Supervisors: prof. F. Turini and prof. A. Brogi.
International referees: prof. F. Arbab (CWI - Amsterdam) and prof. E. Pimentel (Universidad de Málaga).
Final commission: prof. R. De Nicola (Univ. of Florence), prof. A. Bertossi (Univ. of Bologna), prof. P. Ciancarini (Univ. of Bologna).
- 12/2004 **Master Degree in Computer Science and Technology** (Laurea Specialistica in Scienze e Tecnologie Informatiche), Facoltà di Scienze matematiche fisiche e naturali, University of Pisa, final grade 110/110 con lode (summa cum laude).
- 11/1997 Awarded a **Ph.D. grant in computer science (Dottorato in Informatica)** at Department of Computer Science, University of Pisa by MURST (4 years).
- 06/1997 **Master Degree in Computer Science** (Laurea in Scienze dell'informazione) Facoltà di Scienze matematiche fisiche e naturali, University of Pisa, final grade 110/110 con lode (summa cum laude). Thesis title: *Un'architettura metalogica per un sistema multiagente (A metalogic architecture for multiagent systems)*. Supervisor: prof. F. Turini.
- 1995 **Erasmus student at CWI** - Amsterdam, NL, visiting prof. K. Apt.
- 1988 **High school certificate** (Maturità classica) Liceo-ginnasio "A. Poliziano" Montepulciano (SI), (final grade 60/60).

Research schools

- 1999 **First Compulog Americas Summer School on Constraint Logic Programming** Las Cruces, NM, USA, 1-6/8/1999. *Director:* prof. G. Gupta (New Messico State Univ.).
- 1999 **School of Logic and Computation.** Edinburgh, 10-13/4/1999. *Director:* prof. F. Kamareddine (Heriot-Watt Univ.).
- 1998 **Logic Summer School.** Cesena, 21-25/09/1998. Organised by AILA e SILFS.
- 1998 **International Summer School on Logic Programming,** Maratea, 7-12/9/1998. Organised by GULP (Gruppo Utenti Logic Programming).
- 1998 **Tenth International School For Computer Science Researchers “Distributed Systems and Security”,** Lipari, 5-18/7/1998. *Directors:* A.Ferro (Univ. Catania), S.Micali (MIT).
- 1997 **Logic summer school** (Scuola estiva di logica). Cesena, 15-19/09/1997. Organised by SILFS (Società italiana di logica e filosofia della scienza).

Teaching

Teaching activities I have been involved in comprise Undergraduate and Graduate university classes, thesis supervision and student assessment, and classes for professional qualification and professionals in continuing education.

University classes may involve groups form about 30 to up to about 60 students and regard both theoretical subjects, and practical exercises, for about 30 hours per term. They have also regarded tutoring, assessing and evaluating students and contributing to teaching material. Some classes have had over-average marks in the student assessment procedure (e.g. Introduction to Programming: 3,55/2,89 and 3,44/2,82 in the terms of the academic year 2005-2006 on a scale 1-4).

Classes oriented to professional qualification or professionals in continuing education may be intensive, e.g. one or few days, or a proper course of about 20/30 hours of frontal lessons, to groups of 10-20 students.

University courses Class: **Introduction to programming** (Corso di laurea in Informatica, University of Pisa, 2007-2008), Prof. Roberto Bruni. Teaching activity (2nd term).

Class: **Introduction to programming** (Corso di laurea in Informatica, University of Pisa, 2007-2008), Prof. Roberto Bruni. Teaching activity (1st term).

Class: **Introduction to programming** (Corso di laurea in Informatica, University of Pisa, 2006-2007), Prof. Roberto Bruni. Teaching activity (2nd term).

Class: **Introduction to programming** (Corso di laurea in Informatica, University of Pisa, 2006-2007), Prof. Roberto Bruni. Teaching activity (1st term).

Class: **Introduction to programming** (Corso di laurea in Informatica, University of Pisa, 2005-2006), Prof. Roberto Bruni. Teaching activity (2nd term).

Class: **Introduction to programming** (Corso di laurea in Informatica, University of Pisa, 2005-2006), Prof. Roberto Bruni. Teaching activity (1st term).

Class: **Artificial Intelligence** (Corso di laurea in Informatica, University of Pisa, 2000-2001), Prof. Maria Simi. Teaching activity.

Class: **Artificial Intelligence** (Corso di laurea in Informatica, University of Pisa, 1999-2000), Prof. Maria Simi. Preparation of teaching material (teaching activity).

Supervision
BA thesis
(Tirocini) R. Nunziato "Sviluppo dell'applicazione SEA per la Verifica Formale di Sistemi Aperti" (Development of SEA, an Application for the Formal Verification of Open Systems), Laurea in Informatica, University of Pisa, 2003.

Supervision
MA thesis
(Tesi laurea) G. Baldi "Cryptographic protocol verification with symbolic model checking." Laurea Specialistica in Informatica, University of Pisa, 2004.

G. Maggenti "'A coordination language for abductive, logic agents.'" Laurea in Scienze dell'Informazione, University of Pisa, 2005

Private companies, state agencies

Class: **Basic programming concepts in C** for Progetto di formazione (professional training project) SFIDA-PMI (MIUR n. 4446/ICT), Pisa 2008.

Class: **Domotic system programming** for IFTS (professional training) “*Tecnico superiore di progettazione e applicazione sistemi domotici*” Pisa 2007.

Class: **Introduction to programming (Java)** for IFTS (professional training) “*Tecnico superiore di progettazione e applicazione sistemi domotici*” Pisa 2007.

Class: **Object oriented programming (Java)** Approfondimenti sulla programmazione a oggetti) for IFTS (professional training) “*Analista programmatore database relazionali e linguaggi object oriented per il web*” Carrara 2003.

Class: **Web page development** (Realizzazione pagine web) for IFTS (professional training) “*Web designer*”, Massa 2002.

Class: Introduction to operating systems, **MacOs - Unix (Linux)**, for the master “*Multimedia developer per beni culturali*”, Lucca 2001.

Class: **Unix-Linux** at training center of Telecom Italia *Scuola R.Romoli*, L’Aquila 2001.

Class: **Microsoft Windows NT** at training center of Telecom Italia *Scuola R.Romoli*, L’Aquila 2001

Class: **Alfabetizzazione informatica** (Basic computer use) at Provincia di Livorno, Livorno 2001.

Other activities

Translation of *Semantics of Programming Languages* by G. Winskell for the Italian edition. (1999).

Research

Project and Grants

I have participated to the following research projects (for some of which I have contributed to the development of the proposals) and I have been awarded the following grants.

- 2009 **European Molecular Biology Organization (EMBO).**
Short term fellowship.
- 2009 **HPC-Europa2 Transnational Access Programme.** Fellowship.
- 2009 **British-Italian Partnership Programme 2008-2009:** “Refining spatial information in computational models for systems biology” [*PI*].
- 2009 **MIUR (PRIN07):** “SOFT: Security oriented formal techniques”
- 2007-2008 **MIUR:** “Bisca: Bio-Inspired Systems and Calculi with Applications.”
- 2007-2009 Awarded a **Research Fellowship** at Department of Computer Science, University of Pisa (two years).
- 2006 **MIUR:** “Sybilla: Description and analysis of the behaviour of bio-cells.”
- 2005-2007 Awarded a **Research Fellowship** at Department of Computer Science, University of Pisa (two years).
- 2002-2005 **The European Commission FET IST-2001-32530** “Societies of computees (SOCS).”
- 2002-2003 **MIUR (Italian Ministry of Research and Education):** “NAPOLI: Network Aware Programming – Objects, Languages, Implementations.”
- 1999-2000 **Azione integrata Italia-Spagna:** “Languages and Models for the Interaction of Software Components.”
- 1998-2000 **MURST:** “AI*IA: Intelligent Agents: Interaction and Knowledge Acquisition.”
- 1998-2001 Awarded a **Ph.D. grant** in Computer Science (Dottorato in Informatica) at Department of Computer Science, University of Pisa by **MURST (Italian Ministry of Research and Education)** (4 years).

Research activities, collaborations and visits

- 2006 **Invited talks at the University of Torino** on symbolic tools for the automated analysis of various aspects of security protocols and on symbolic semantics for the verification of open system equivalences.
- 2005 **Seminar at UCL-London,** on tools for Symbolic Analysis of Security Protocols.

- 2004 **Seminar at IRST-Trento**, on Symbolic Analysis of Security Protocols.
- 2004 **Invited seminar** at Institute for Advanced Computer Studies, **University of Maryland**, on declarative models for Multi-agent Systems.
- 2003 **Visit to** the Department of Computing, **Imperial College**, London, within the EU project *SOCS*, collaborating with prof. Antonis Kakas.
- 2001 **Invited seminar at SRI-International**, Menlo Park, California, on the formal verification of security protocols.
- 2000 **Visit to** the Dpto. de Lenguajes y Ciencias de la Computación, **University of Málaga**, within the project *Azione integrata Italia-Spagna* “Linguaggi e modelli per l’interazione di componenti software” (Languages and models for software component interaction).
- 1998 **Research collaboration with IEI-CNR** Pisa (professional collaboration), supervisor Tommaso Bolognesi, about extensions of the *conotation* language with dynamical constraints on events and state variables in concurrent systems.
- 1997 **Research collaboration with CNUCE-CNR** Pisa (professional collaboration), supervisor Tommaso Bolognesi, about “constraint-oriented” specification languages.

Reviewing and organisational activities

- International journals *Computer Languages, Theory and Practice of Logic Programming, Journal of Universal Computer Science, Theoretical Computer Science, Mathematical Structures in Computer Science, Handbook of Natural Computing*
- International conferences *FORTE/PSTV’98* (IFIP TC6/WG6.1 Joint International Conference on Description Techniques & Protocol Specification Testing and Verification),
COCL’99 (International Workshop on Component-based Software Development in Computational Logic),
ACM SAC 2001 (ACM Symposium on Applied Computing),
ACM SAS’03 (ACM Static Analysis Symposium),
Coordination’04 (6th Int. Conference on Coordination Models and Languages),
DALT’05 (Declarative Agent Languages and Technologies, AAMAS workshop)
CLIMA VI ’05 (Computational Logic in Multi-Agent Systems)
LPNMR’05 (Logic Programming Non Monotonic Reasoning)
ICLP’05 (Twenty First International Conference on Logic Programming)
ACM CCS’05 (Twelve ACM Conference on Computer and Communications Security)
IADIS AC’06 (IADIS Applied Computing 2006 International Conference)
GT-VMT’06 (5th Int.WS on Graph Transformation and Visual Modeling Techniques)

WITS'06 (6th Int.WS on Issues in the Theory of Security - IFIP WG 1.7, ACM SIGPLAN and GI FoMSESS)
EuroPar'06 (European Conference on Parallel Computing)
FCS-ARSPA'06 (Foundations of Computer Security and Automated Reasoning for Security Protocol Analysis)
FCS-ARSPA'07
CMSB'07 (Computational Methods in Systems Biology)
FBTC'07 (From Biology To Concurrency and back)
ACSD'07 (8th Int. Conf. on Application of Concurrency to System Design)
CMSB'09 (Computational Methods in Systems Biology)
CONCUR'09 (20th Int. Conf. on Concurrency Theory)
ICE'09 (2nd Interaction and Concurrency Experience)

National conferences *AI*IA'99, AI*IA'01, AI*IA'03*, (Congress of the Italian Association for Artificial Intelligence)
LP-01 (thematic workshop of EPIA2001 - Portuguese Conference on Artificial Intelligence).
ICTCS'07 (Italian Conference on Theoretical Computer Science)

Organisational activities *AI*IA'03* (Congress of the Italian Association for Artificial Intelligence). Organising committee.
Coordination'04 (Sixth International Conference on Coordination Models and Languages). Organising committee.

PC member *FBTC'08* From Biology to Concurrency (and Back). ICALP'08 Satellite Workshop.
ICE'09 Interaction and Concurrency Experience. CONCUR'09 Affiliated Workshop.

Research resume, research interests and future plans

Andrea Bracciali started his research activity during his Ph.D. studies, and has been carrying this out for several years. Driven by research curiosity, he has always had a somewhat large area of interest and has collaborated with a number of scientists, both young colleagues and affirmed senior researchers. After the period of research training, during which he participated in several schools, his research record currently consists of about forty published works, co-authored with about thirty researchers from various European institutions. He has actively sought research collaborations with different researchers in his area, participating in research visits, with the University of Malaga and with the Imperial College, London, and distributed working groups (SOCS project: Univ. Pisa, Univ. Bologna, ICSTM London, City Univ. London, Cyprus Univ.), keeping a good record of contacts for present and future collaborations. He has participated in international and national research projects, also carrying out the editing and co-authoring of deliverables, organisational and administrative reports and proposals. He has been and is active in reviewing (conference proceedings and journals) and organisational activities (conference and local events) and in participating in conference program committees. He has taught university classes of core courses for the degree in Computer Science, as well as classes for professionals and professional training for private and public institutions, and has supervised Master theses and followed Ph.D. students.

The main research topics spawned from his Ph.D. studies have regarded *specification languages and formal models of software interaction*, with particular reference to the description of the behaviour of distributed components interacting in open environments. This research line is founded on formal methods (mainly based on process algebras) for the description of the behaviour of software components, their interaction and properties of component-based systems, with a particular interest when systems are “open”, i.e., informally speaking, they may not be completely specified or controllable and can evolve dynamically. In this context, the following points have been investigated:

- models for open and dynamic systems, e.g. in the context of WAN-computing, mobile code, Global Computing [j2,j1,phd,c14,c8,c3,c2,c1],
- the development of techniques for the correct composition of software components independently developed (Component Adaptation), e.g. within the Component-based Software Engineering context [j1,c6,c5,c4,ej2,phd],
- the use of symbolic models for the design and verification of open software systems, and the development, starting from these models, of tools supporting (semi-)automated verification [j5,j4,c14,c8,ej3,o3].
- the issues of the security in the interaction of autonomous components in open environments. Specifically, the verification of security protocols has been addressed as interaction amongst independent components in partially accessible, not fully specified, possibly malicious environments [j4,ej1,phd,c7]. The use of abstract and symbolic techniques has also been

exploited to make verification computationally tractable and (under some hypotheses) complete, and to tune the most suitable methodological approaches [ej3]. This has led to the implementation of a symbolic model checker, combining theoretical aspects with the practical realisation of verification tools.

A parallel research interest, sharing several characteristics with the ones above, has been in the field of *(Multi) Agent Systems*. Declarative approaches based on computational logic for the specification and verification of the behaviour of “rational” agents operating within open environments have been investigated, together with the corresponding computational models (in particular, based on abductive logic) [c15,c16,c13,c12,c9]. Also in this case, the theoretical investigation has been contrasted with system development, like a software platform supporting agent reasoning and interacting within an open system [j3,c10]. A relevant issue in this context that has been addressed is *reasoning about time and changes*, i.e. reasoning about the time flux within an open environment. This puts the issue of the consistency between the dynamic and partially accessible environment and its logical representation [c11].

Currently, I am interested in further pursuing the investigation of models and analysis techniques for software applications operating within open environments. These research aims are motivated by the complexity of the computational paradigms currently emerging, like service oriented architectures, which seem to be particularly relevant for the Information Society. These paradigms require scientifically sound models for their description and verification, possibly complemented and validated by the development of effective and automated verification tools.

Recent results along these lines have been published in [j5], about a verification framework based on symbolic semantics, and in [ej4], where the framework is extended towards simple nominal calculi with types. I am interested in studying the problem of model checking system descriptions in the presence of incomplete information, as those outlined above. Furthermore, a suitable treatment of open nominal calculi, e.g. descriptions in which not only the behaviour but also the interconnection capabilities may be partially unknown, appears to be an interesting and natural direction for further investigations.

The models developed for describing the interactive behaviour of computational systems demonstrate a general validity that makes them potentially suitable for the study of interaction in other contexts, such as business, ecological and social interactive processes.

Over the last years very interesting connections between computation and life processes, e.g. biochemistry and cellular interaction, have been shown (“Cells as computation”), promoting a computational approach within recent research in Systems Biology (some recent proposals are surveyed in [bc2]). Beyond the potential connections, a revision and enhancement of traditional techniques and the definition of new formalisms are needed within the new multidisciplinary

contexts that presents quantitative and stochastic aspects, as well as interaction modalities unusual in Computer Science.

The application to Life Sciences of some of my research, as well as the investigation of newly emerging problems, seem to me of great interest and potentially very inspirational. Along this direction, I am investigating the applicability of techniques and models I have studied in the fields of concurrency and security to the analysis of life, interactive, systems. Some collaborations have been set up, and I am addressing the following main points:

- Use and enhancement of the computational models of open systems for the description of biological systems with a not fully understood/specified behaviour. This approach could enable a predictive use of the models by means of the inference of properties that have to be fulfilled by the unspecified, typically unknown, components/mechanisms. Proof of concept experiments have been proposed in [c17], more complete results might follow from further development of models, such as the mentioned model checking of incomplete specifications.
- The use of process algebras extended with stochastic semantics for the development of neural models and the definition of adequate linguistic abstractions (in collaboration with the Biology Department of the University of Pisa). We have developed a quite accurate stochastic model of a specific synaptic terminal, based on a fragment of the Pi-calculus process algebra. The model has been implemented in the SPiM (Cardelli et al.) stochastic simulator based on the Gillespie algorithm and validated against experimental data known in the literature. Experiments aim to understand, *in silico*, the quantitative emerging behaviour of a complex system, determined by the stochastic interplay of its numerous components. Specifically, short-term plasticity aspects, i.e. the activity dependent neural modification at the bases of memory and learning, has been investigated by means of this model [j8, j7, bc1, c19, c20]. More on the computer science side, the work done has allowed us to have a better understanding of the linguistic constructs needed to describe such kind of molecular interaction.
- The applicability of analysis techniques deriving from the verification of security properties of information systems. In particular, we are currently investigating ways to understand causality relations within metabolic pathways. A prototype tool, CMN (described above), has been developed and experiments carried out on some pathways of *E. coli k12*. ([j6, c18]). Initial work on the use of static analysis techniques, viz., control flow analysis, is in [ej5].
- The use of model checking for the study of infectious processes and associated therapies. This aims to complement the traditional, somehow “crafty”, interpretation of (quantitative and stochastic) model simulations with a formal methodology for precisely assessing (quantitative) properties about the dynamics of the processes of interests. Initial results on

the progression of Hiv quasi-species infection, the effects of Tuberculosis opportunistic infection and the effects of related therapies are in [j9].

Several future development scenarios for widening the discussed approaches can be envisaged. Some of the open problems can be ascribed to essential differences in how computer and life systems interact and to the different scale of complexity. Henceforth, a new set of formal investigation instruments needs to be developed (it is a shared belief that most likely radically new multidisciplinary theories will emerge).

Some of the open points that I consider worth being investigated in this context in a medium term research can be summarised as follows:

Linguistic issues. Suitable constructs for expressing specific biological interaction need to be developed, e.g. expressing localisation properties, which are often abstracted away in concurrency. This is currently a difficult problem, especially when quantitative models are considered. The possibility of mixing constructs at different levels of abstractions, as well as a suitable reinterpretation of the concept of interface, are other linguistic issues of interest.

Semantic issues. The mentioned linguistic issues obviously require a proper semantic treatment. Addressing spatial localisation and heterogeneity, for instance, is known as a difficult semantic problem. Furthermore, the applicability of symbolic semantics for dealing with incomplete information, often present in modelling biological systems, can be further investigated.

Analysis issues. Several of the analysis techniques from concurrency also need to be rethought when adapted to System Biology. Ongoing efforts propose to reconcile quali- and quantitative analysis by giving a qualitative meaning to numerical outcomes of in silico experiments, but consensus is lacking. Analogously, techniques as the mentioned model checking have to be tuned to properly accommodate the issues of the biological context.

Experimentation issues. By its nature, the described line of research requires validation by application to biological case studies through efficient computational tools.

It finally seems worth underlining that results in Computer Science and Systems Biology are strictly related, strengthening the interdisciplinary aspects of the approach. As mentioned, results in the former provide more effective investigation instruments for the latter. Results in the latter can produce advances in the definition of new interaction modalities for concurrent and distributed computer systems, with particular reference to the most recently emerging ones, such as self-configuring systems and communication networks.

More in general, a deeper understanding of a general “theory of interaction” seems to be potentially applicable to a wide scenario, as an unifying approach to the modelling and understanding of the emergent properties of several complex systems. Examples can be drawn from ecology, finance, social science and more.

Design and development of software

- SEA — Design and supervision of the development of the SEA tool, as ([j5], [c14], et.al.) part of the supervised BA thesis “Sviluppo dell’applicazione SEA per la Verifica Formale di Sistemi Aperti”. This software tool, developed in Prolog, supports the automated analysis of symbolic bisimulations for open-ended systems, modeled as suitable process algebras. It consists of a language independent verification tool resulting from original research results in the field of the analysis and verification of open systems. (Dipartimento di Informatica, Università di Pisa, a.y. 2003-2004).
- ASPASyA — Design and development supervision of an “Automated tool for Security Protocol Analysis based on a Symbolic Approach (ASPASyA)”, as part of the supervision of a MSc degree thesis. This tool is a complete symbolic model checker, written in O’Caml, for the semi-automated verification of properties for security protocols. It implements the principles of a symbolic verification theory developed within the research activity in the field of computer security, which was part of my Ph.D. thesis. (<http://www.cs.le.ac.uk/people/et52/aspasya/aspasya.html>).
- SOCS — Design, implementation and integration of components of Computees (Computational Entities), within the project *The European Commission* IST-2001-32530 “Societies of computees (SOCS)”. The software application, overall developed by the various participants in this project, consists of a multi-agent architecture for societies of intelligent agents operating in dynamic and open environments. The architecture integrates various components, e.g. a distributed execution support, the implementation of various agent reasoning capabilities and normative activity of their societies. This architecture has been used both as a prototypal architecture for the development of agents and societies, and for the validation of the theoretical model developed within the project. (<http://lia.deis.unibo.it/research/socs/>)
- ([c11]) — Design and development of a temporal reasoning module (TR), in Prolog. This is a particular research offspring of the project, which regards the study of reasoning methods, based on abduction, about time and changes in the presence of uncertainty. The TR module aims at reasoning with environment representations that can result in being inconsistent, because of the dynamicity and partial accessibility of the environment itself, and at finding possible explanations that make the representation consistent again.

CMN ([j6]) — Design and development of an interactive tool for testing causality hypotheses on metabolic networks. Given an abstract model of the possible reactions happening in a network and the relative environmental conditions the *possibility* for a metabolite to be produced can be tested. This is an (over-)approximation of reality yielding good accuracy results. Conditions of the experiment can be easily varied, e.g. by performing gene knock-out experiments. The tool exploits a logical reading of causal relations. (<http://www.di.unipi.it/~braccia/ToolCode>).

Papers

International journals

- [j9] A. Sorathiya, P. Liò and A. Bracciali “Formal reasoning on qualitative models of coinfection of HIV and Tuberculosis and HAART therapy”. *BMC Bioinformatics* 11(1): *Asia Pacific Bioinformatics Conference* 2010.
- [j8] A. Bracciali, M. Brunelli, E. Cataldo and P. Degano, “Synapses as Stochastic Concurrent Systems”. *Theoretical Computer Science*. Elsevier. 408(1), pages 66-82, 2008. (DOI: 10.1016/j.tcs.2008.07.008).
- [j7] A. Bracciali, M. Brunelli, E. Cataldo and P. Degano, ”Stochastic models for the in silico simulation of synaptic processes”. *BMC Bioinformatics*. 9(4):S7 2008.
- [j6] C. Bodei, A. Bracciali, D. Chiarugi, ”On Deducing Causality in Metabolic Networks”. *BMC Bioinformatics*. 9(4):S8 2008.
- [j5] P. Baldan, A. Bracciali and R. Bruni, “A Semantic Framework for Open Processes”. *Theoretical Computer Science*. Elsevier. 389(3), pages 446–483, 2007 (DOI: 10.1016/j.tcs.2007.09.004).
- [j4] A. Bracciali, G. Ferrari and E. Tuosto, ”A symbolic framework for multi-faceted security protocol analysis”. *International Journal of Information Security*. Springer. Vol. 7(1), pages 55–84, 2008. (ISSN: 1615-5262).
- [j3] A. Bracciali, U. Endriss, N. Demetriou, T. Kakas, W. Lu and K. Stathis, ”Crafting the Mind of PROSOCS Agents”. In P. Petta, J.P. Müller editors: *Best of "From Agent Theory to Agent Implementation 4"*, *Applied Artificial Intelligence*. Taylor and Francis. Vol. 20(4-5), pages 105–131, 2006.
- [j2] A. Bracciali, A. Brogi and F. Turini, ”A framework for specifying and verifying the behaviour of open systems”. *The Journal of Logic and Algebraic Programming*. Special Issue on Process Algebra and System Architecture. Elsevier. Vol 63(2), pages 215–240, 2005.
- [j1] A. Bracciali, A. Brogi, and C. Canal, ”A Formal Approach to Component Adaptation”. *Elsevier Journal of Systems and Software*. Special Issue on Automated Component-Based Software Engineering. Elsevier. Vol 74(1), pages 45–54, 2005.

Book chapters

- [bc2] P. Degano and A. Bracciali “Process Calculi, Systems Biology and Artificial Chemistry”. In G. Rozenberg, T.H.W. Bäck, and J.N. Kok editors *Handbook of Natural Computing*, Springer. 2010. To appear. (ISBN: 978-3-540-92911-6).

- [bc1] A. Bracciali, M. Brunelli, E. Cataldo and P. Degano, “Formal models of the *calyx of Held*.” In A. Condon, D. Harel, J.N. Kok, A. Salomaa, and E. Winfree editors *Algorithmic Bioprocesses*. Natural Computing Series. Springer. Pages 331-366, 2009. (ISBN: 978-3-540-88868-0 (Print) 978-3-540-88869-7 (Online), DOI: 10.1007/978-3-540-88869-7_18).

Workshops and Conferences (electronic journals)

- [ej5] C. Bodei, A. Bracciali, and D. Chiarugi, “Control Flow Analysis for Brane Calculi”. In *Proc. of 2nd International Meeting on Membrane Computing and Biologically Inspired Process Calculi (MeCBIC 2008)*, *Elect. Notes in Theoret. Comp. Science* vol. 227, Elsevier Science, 2009. (ISSN 1571-0661).
- [ej4] A. Bracciali, R. Bruni and A. Lafuente, “On symbolic semantics for name-decorated contexts”. In *Proc. ICE08, First Interaction and Concurrency Experience (ICALP2008 Workshop)*, *Elect. Notes in Theoret. Comp. Science* vol 229, issue 3, Elsevier Science, 2009. (ISSN 1571-0661).
- [ej3] A. Bracciali, G. Baldi, G. Ferrari, and E. Tuosto, ”A Coordination-based Methodology for Security Protocol Verification”. In *Proc. of 2nd International Workshop on Security Issues with Petri Nets and other Computational Models (WISP04)*, *Elect. Notes in Theoret. Comp. Science* vol. 121, Elsevier Science, 2005. (ISSN 1571-0661).
- [ej2] A. Bracciali, A. Brogi, and C. Canal, ”Systematic Component Adaptation”. In A. Brogi, E. Pimentel, editors, *Proc. FMCI, Formal Methods and Component Interaction (ICALP 2002 Satellite Workshop)*, *Elect. Notes in Theoret. Comp. Science* vol. 66(4), Elsevier Science, 2002. (ISBN 0444512799).
- [ej1] A. Bracciali, A. Brogi, G. Ferrari and E. Tuosto, ”Security Issues in Component-based Design”. In U. Montanari, V. Sassone, editors, *Proc. ConCoord, International Workshop on Concurrency and Coordination*, *Elect. Notes in Theoret. Comp. Science* vol. 54, Elsevier Science, 2001. (ISBN 0444510680).

Workshops and Conferences

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- [c20] A. Bracciali, M. Brunelli, E. Cataldo and P. Degano, “Expressive Models for Synaptic Plasticity”. In M. Calder and S. Gillmore editors. *Computational Methods in Systems Biology (CMSB’07)*, pages 152-167. Edinburgh,

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Ph.D. Thesis

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Technical knowledge

Operating systems	sys-	Use and (stand-alone) administration of: Linux, Mac-OS, MS-DOS, Win3.X., Windows95, Windows98, WindowsNT.
Specification and programming languages		Experienced in: Java, Pascal, Prolog, Lisp, HTML, JavaScript. Standard knowledge of: C, ML, ECSP, Perl.

Pisa, 30 November 2009