Emanuele D'Osualdo

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Current position

Sep 2020–present **Postdoctoral Researcher**, Foundations of Programming group, *Max Planck Institute for Software Systems*, Saarbrücken, Germany

Topic Concurrent separation logics, liveness, refinement (with Prof. Derek Dreyer)

Experience

Sep 2018–Aug 2020 **Marie Curie Research Fellow**, Computing Department, *Imperial College London*, UK

Topic Compositional verification and specification for progress and security properties of concurrent software, integrating separation logics, automata theory and process algebra.

Funding Two years EU funded fellowship (H2020-MSCA-IF-2017 795218)

Apr 2017–Sep 2018 **Research Associate**, Program Specification and Verification Group, *Imperial College London*, UK

Topic Abstraction and compositionality for proving liveness of concurrent software (with Prof. Philippa Gardner)

May 2015–Apr 2017 **Postdoctoral Researcher**, *Concurrency Theory Group*, TU Kaiserslautern, Germany

Topic Logics and Automata for Infinite State Model Checking (with Prof. Roland Meyer)

Education

2010–2015 **PhD in Computer Science**, *University of Oxford*, Merton College, UK

Thesis Verification of Message Passing Concurrent Systems (supervisor: Prof. Luke Ong)

Awards Winner of the 2016 BCS/CPHC Distinguished Dissertation award

2007–2010 **M.Sc. in Computer Science**, *University of Udine*, Italy, 110/110 *cum laude*

Dissertation on static analysis of Bigraphs by Abstract Interpretation

2004–2007 **B.Sc. in Computer Science**, *University of Udine*, Italy, 110/110 *cum laude*

Dissertation on Monads and Arrows in Haskell

Oct 2007–Mar 2008 **Exchange Student (Erasmus)**, *Istanbul Bilgi Universitesi*, Istanbul, Turkey

Awards

2016 **Winner of the Distinguished Dissertation award**, *BCS/CPHC*, UK

Best British PhD dissertation in Computer Science selected by the Council of Professors and Heads of Computing, and the BCS Academy of Computing.

2010–2013 **Scatcherd European Scholarship**, *University of Oxford*, UK

University-wide fully-funded PhD scholarship.

2004–2010 **Scuola Superiore Student Fellowship**, *University of Udine*, Italy

University-wide fully-funded 5 years scholarship for excellent students. Members are annually reviewed and required to attend extra courses. See scuolasuperiore.uniud.it.

Publications

My research output is characterised by high-quality papers in top-tier conferences.
Total citations 91 (Google Scholar, Dec 2019).

CONCUR'20 **Decidable Inductive Invariants for Verification of Cryptographic Protocols with Unbounded Sessions**, with *Felix Stutz*. In Proc. of Concurrency Theory. LIPIcs. 2020.
CORE rank A · Length 18 pages + 5 appendix

CSF'17 **Deciding Secrecy of Security Protocols for an Unbounded Number of Sessions: The Case of Depth-bounded Processes**, with *Luke Ong and Alwen Tiu*.
In Proc. of Computer Security Foundations. IEEE Computer Society. 2017.
Citations 6 · CORE rank A · Length 17 pages

LICS'16 **First-order Logic with Reachability for Infinite-State Systems**, with *Roland Meyer and Georg Zetzsche*. In Proc. of Symposium on Logic in Computer Science. ACM. 2016.
Citations 4 · CORE rank A* · Length 18 pages + 3 appendix

ESOP'16 **On Hierarchical Communication Topologies in the π-calculus**, with *Luke Ong*.
In Proc. of European Symposium on Programming. Vol. 9632 of LNCS. Springer. 2016.
Citations 3 · CORE rank A · Length 27 pages + 14 appendix

SAS'13 **Automatic Verification of Erlang-Style Concurrency**, with *Jonathan Kochems and Luke Ong*. In Proc. of Static Analysis. Vol. 7935 of LNCS. Springer. 2013.
Citations 53 · CORE rank A · Length 18 pages + 5 appendix

AGERE'12 **Soter: an Automatic Safety Verifier for Erlang**, with *Jonathan Kochems and Luke Ong*.
In Proceedings of the 2nd edition on Programming systems, languages and applications based on actors, agents, and decentralized control abstractions. ACM. 2012.
Citations 20

Monograph **Verification of Message Passing Concurrent Systems**. BCS/CPHC Distinguished Dissertation Award Series, ISBN 978-1-78017-363-4, BCS. 2016. Citations 4

Teaching

2016/2017 **Lecturer** of Concurrency Theory, *TU Kaiserslautern*, Germany

Full 40 hours MSc course, designed syllabus, prepared material and exercises, managed 2 assistants, handled examinations. Student evaluations were outstanding (ranked 2nd).

2016 **Lecturer** of Advanced Automata Theory, *TU Kaiserslautern*, Germany

Full 40 hours MSc course, prepared material and exercises, managed 2 assistants, co-handled examinations. Student evaluations were outstanding.

May–Jul 2015 **Teaching Assistant**, Concurrency Theory, *TU Kaiserslautern*, Germany

Jun 2013–Mar 2014 **Tutor** at Merton College, *University of Oxford*, UK

Subjects Concurrent Programming, Imperative Programming 2

Weekly highly interactive tutorials for groups of 4 undergraduates.

2011–2014 **Teaching Assistant**, Dept. of Computer Science, *University of Oxford*, UK

Subjects Imperative Programming (Scala), Concurrent Programming (Scala), Functional Programming (Haskell), Concurrency (CSP).

PhD and Project supervision

2017–ongoing Assistant Supervisor of **Julian Sutherland**, PhD in Computer Science, *Imperial College*
Topic Compositional Termination Proofs of Fine-grained Concurrent Programs

2019 **Felix Stutz**, MSc Computer Science, *Saarland University*, Germany
Topic Automatic verification of cryptographic protocols through inductive invariants

2018 **Blaine Rogers**, MEng Joint Mathematics and Computing, *Imperial College London*
Thesis A π-calculus Abstraction for Erlang

Invited Talks

May 2019 Talk at **Effective Verification: Static Analysis Meets Program Logics**, Lorentz Center, The Netherlands. Invitation-only research workshop.
Topic *Inductive Invariants for Automatic Verification of Cryptographic Protocols*

Jan 2019 Talk at **Open Problems in Concurrency Theory**, Lisbon, Portugal
Invitation-only research seminar organised by IFIP-WG 1.8 co-located with POPL'19.
Topic *Progress for Concurrent Programs*

Aug 2016 Participated to the invitation-only **Automata, Logic and Games research meeting**, Institute of Mathematical Sciences, National University of Singapore.

Aug 2016 Invited talk at **Workshop on Communicating, Distributed and Parameterized Systems**, NUS, Singapore
Topic *The Hierarchical π-calculus*

Research Talks

Decidable Inductive Invariants for Verification of Cryptographic Protocols
Sep 2020 CONCUR 2020, Virtual event
Sep 2020 iFM^2 Meeting, University of Udine, Italy
Sep 2020 Nobuko Yoshida's group, Imperial College London, UK
May 2019 Effective Verification Workshop, Leiden, The Netherlands

TaDA Live: Compositional Reasoning for Termination of Fine-grained Concurrent Programs
Oct 2019 Iris Workshop, Aarhus University, Denmark
Jul 2019 Surrey Concurrency Workshop and S-REPLS 12, University of Surrey, Guilford, UK
Jan 2019 Open Problems in Concurrency Theory, POPL'19, Lisbon, Portugal

Deciding Secrecy of Security Protocols for an Unbounded Number of Sessions
Sep 2017 Highlights of Logics, Games and Automata, Queen Mary University of London
Aug 2017 CSF'17, UCSB, Santa Barbara, USA

First-order Logic with Reachability for Infinite-State Systems
Jul 2016 LICS'16, Columbia University, New York City, USA

On Hierarchical Communication Topologies in the π-calculus

May 2018 PLAS Group Seminar, University of Kent, UK
Oct 2017 Theory Group Seminar, Queen Mary University of London, UK
Dec 2016 IMDEA Software, hosted by Boris Köpf, Madrid
Aug 2016 Nanyang Technological University, hosted by Alwen Tiu, Singapore
Apr 2016 ESOP'16, ETAPS, Eindhoven, Nederlands
Mar 2016 D-CON'16, Universität des Saarlandes, Saarbrücken, Germany
Feb 2016 Oxford Advanced Seminar on Informatic Structures, University of Oxford
Feb 2016 Nobuko Yoshida's group, Imperial College, London

Precise Abstractions of Concurrent Systems

Aug 2014 Hosted by Pawel Sobocinski, University of Southampton

Automatic Verification of Erlang-Style Concurrency

Jun 2013 SAS'13, Seattle, USA
Jan 2013 Student Short Talk Session at POPL'13, Rome

Academic Activities

Program Committee Erlang Workshop 2018, EXPRESS/SOS 2019

Organisation Local organiser for MFPC/CALCO 2019 in London

Reviewer *Conferences:* SAS 2018, PLDI 2018, CONCUR 2018/2017/2015, ERLANG 2018, FoSSaCS 2017, TACAS 2016, NETYS 2016, MFCS 2012, LICS 2015, FSTTCS 2015, VMCAI 2014, DMC 2014, TAMC 2012, POPL 2012, TLCA 2011.
Journals: Information and Computation, Information and Software Technology, Mathematical Structures in Computer Science.

Research Software

Lemma9 A tool for automatically checking/inferring invariants of security protocols (with F. Stutz).
Website `http://github.com/bordaigorl/lemma9`

Soter A proof-of-concept static analyser for Erlang programs (with J. Kochems).
Demo `http://mjolnir.cs.ox.ac.uk/soter/`

JamesBound A proof-of-concept implementation of my ESOP'16 type system for the π-calculus
Website `http://github.com/bordaigorl/jamesbound`
– Includes an Haskell framework for analysing the π-calculus.

Stargazer An innovative, instructional, interactive execution environment for the π-calculus
Website `http://stargazer.emanueledosualdo.com`
– Used as a teaching/presentation aid in my talks and lectures, with excellent student engagement and feedback.
– University of Southern Denmark is using it in lectures.

Other skills

Languages Italian (native speaker) • English (fluent)

Programming Haskell, Python, JavaScript, Scala, Java, Erlang

Music Studied violin for more than ten years playing Classical and Jazz Music.
Studied Musical Composition from 2000 to 2005 at the conservatory of Udine.