

DR AZALEA RAAD

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Lecturer and UKRI Future Leader Fellow
Imperial College London, Department of Computing
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Nationality: British
Languages (native fluency): English, Farsi, Turkish
Languages (intermediate): German
Languages (basic): French

EMPLOYMENT

Lecturer at Imperial College London Department of Computing	October 2019-- Present
Consultant at Facebook London Infer Verification Team and Incorrectness Logic Lab	September 2020 – Present
Postdoctoral Researcher at MPI-SWS Group: Programming Languages and Verification (PLV) Managers: Derek Dreyer and Viktor Vafeiadis	July 2017 – March 2020
Research Associate at Imperial College London Group: Verified Trustworthy Software Specification Manager: Philippa Gardner	January 2017 – June 2017

FUNDING

Sole Investigator UKRI Future Leader Fellowship Project Title: “PERSEVERE: A Rigorous Foundation for Persistent Verification” Amount: £1,500,000	Oct 2021 – September 2028
Principal Investigator UKRI VeTSS (UK Research Institute in Verified Trustworthy Software Systems) Project Title: “Validating the Foundations of Verified Persistent Programming” Amount: £100,000	April 2020 – March 2021

EDUCATION

PhD in Theoretical Computer Science Imperial College London Thesis: Abstraction, Refinement and Concurrent Reasoning Supervisors: Philippa Gardner and Sophia Drossopoulou Examiners: Derek Dreyer (MPI-SWS) and Matthew Parkinson (Microsoft Research)	October 2010 – December 2016
Master of Engineering in Computer Science Imperial College London, graduated third in class with a First Class Honours Degree Thesis title: Smelling of Roses (ROles - Specification , Exploration, Scrutiny) Supervisors: Sophia Drossopoulou and Susan Eisenbach The thesis was awarded the <i>Corporate Partnership Prize</i>	October 2006 – June 2010

PUBLICATIONS

Concurrent Incorrectness Separation Logic

Azalea Raad, Josh Berdine, Derek Dreyer, Peter O’Hearn
Principles of Programming Languages (POPL), 2022 (to appear)

Extending Intel-x86 Consistency and Persistency: Formalising the Semantics of Intel-x86 Memory Types and Non-Temporal Stores

Azalea Raad, Luc Maranget, Viktor Vafeiadis
Principles of Programming Languages (POPL), 2022 (to appear)

Revamping Hardware Persistency Models

Kyeongmin Cho, Sung-Hwan Lee, **Azalea Raad**, Jeehoon Kang
Programming Language Design and Implementation (PLDI), 2021

PerSeVerE: Persistency Semantics for Verification under Ext4

Michalis Kokologiannakis, Ilya Kaysin, **Azalea Raad**, Viktor Vafeiadis
Principles of Programming Languages (POPL), 2021

Persistent Owick-Gries Reasoning

Azalea Raad, Ori Lahav, Viktor Vafeiadis
Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA), 2020

Local Reasoning about the Presence of Bugs: Incorrectness Separation Logic

Azalea Raad, Josh Berdine, Hoang-Hai Dang, Derek Dreyer, Peter O’Hearn, Jules Villard
Computer-Aided Verification (CAV), 2020

Data Consistency in Transactional Storage Systems: A Centralised Approach

Shale Xiong, Andrea Cerone, **Azalea Raad**, Philippa Gardner
European Conference on Object-Oriented Programming (ECOOP), 2020

Persistency Semantics of the Intel-x86 Architecture

Azalea Raad, Gil Neiger, John Wickerson, Viktor Vafeiadis
Principles of Programming Languages (POPL), 2020

Weak Persistency Semantics from the Ground Up

Azalea Raad, John Wickerson, Viktor Vafeiadis
Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA), 2019

Effective Lock Handling in Stateless Model Checking

Michalis Kokologiannakis, **Azalea Raad**, Viktor Vafeiadis
Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA), 2019

Hyperstate Space Graphs for Automated Game Analysis

Michael Cook, **Azalea Raad**
Conference on Games (Cog), 2019
Winner of the best paper award

Model Checking for Weakly Consistent Libraries

Michalis Kokologiannakis, **Azalea Raad**, Viktor Vafeiadis
Programming Language Design and Implementation (PLDI), 2019

On Library Correctness under Weak Memory Consistency

Azalea Raad, Marko Doko, Lovro Rožić, Ori Lahav, Viktor Vafeiadis
Principles of Programming Languages (POPL), 2019

On the Semantics of Snapshot Isolation

Azalea Raad, Ori Lahav, Viktor Vafeiadis

Verification, Model Checking and Abstract Interpretation (VMCAI), 2019

Persistence Semantics for Weak Memory

Azalea Raad, Viktor Vafeiadis

Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA), 2018

On Parallel Snapshot Isolation and Release/Acquire Consistency

Azalea Raad, Ori Lahav, Viktor Vafeiadis

European Symposium on Programming (ESOP), 2018

Inferring Design Constraints from Game Ruleset Analysis

Michael Cook, Simon Colton, **Azalea Raad**

IEEE Conference on Computational Intelligence and Games (CIG), 2018

Abstraction, Refinement and Concurrent Reasoning

Doctoral Thesis, 2017

Verifying Concurrent Graph Algorithms

Azalea Raad, Aquinas Hobor, Jules Villard, Philippa Gardner

Asian Symposium on Programming Languages and Systems (APLAS), 2016

DOM: Specification and Client Reasoning

Azalea Raad, José Fragoso Santos, Philippa Gardner

Asian Symposium on Programming Languages and Systems (APLAS), 2016

CoLoSL: Concurrent Local Subjective Logic

Azalea Raad, Jules Villard, Philippa Gardner

European Symposium on Programming (ESOP), 2015

Abstract Local Reasoning for Concurrent Libraries: Mind the Gap

Philippa Gardner, **Azalea Raad***, Adam Wright, Mark Wheelhouse

Mathematical Foundations of Programming Semantics (MFPS), 2014

(* author list in alphabetical order – Raad and Wright have joint first authorship)

Mechanic Miner: Reflection-Driven Game Mechanic Discovery And Design

Michael Cook, Simon Colton, **Azalea Raad**, Jeremy Gow

EvoGames Workshop at European Conference on Applications of Evolutionary Computation, 2013

A Sip of the Chalice

Azalea Raad, Sophia Drossopoulou

Functional Techniques for Java-like Programs (FTfJP), 2011

Ludic Considerations of Tablet-Based Evo-Art

Simon Colton, Michael Cook, **Azalea Raad**

EvoMusArt Workshop at European Conference on Applications of Evolutionary Computation, 2011

SELECTED KEYNOTE AND INVITED TALKS

Keynote Tutorial

June 2021

Beyond Weak Memory Consistency: The Challenges of Memory Persistence

Programming Language Design and Implementation (PLDI), 2021

Invited Talk <i>Compositional Bug Catching: Incorrectness Separation Logic</i> World Logic Day	January 2021
Invited Talk <i>Specifying and Verifying Non-Volatile Memory</i> Verification of Distributed Systems (VDS)	June 2019
Keynote Talk <i>Correctness in a Weakly Consistent Setting</i> Asian Symposium on Programming Languages and Systems (APLAS)	December 2018
Invited Talk <i>Verifying Concurrent Graph Algorithms</i> Northern Concurrency Workshop	January 2017
Invited Tutorial Talk <i>CoLoSL: Why Not Frame All the Way?</i> Mathematical Foundations of Programming Semantics (MFPS)	June 2015
Invited Talk <i>CoLoSL: Concurrent Local Subjective Logic</i> Dagstuhl Seminar 15191: <i>Compositional Verification Methods for Next-Generation Concurrency</i>	May 2015
Invited Talk <i>CoLoSL: Concurrent Local Subjective Logic</i> Theory Seminar at the University of Birmingham	April 2015
Invited Talk <i>CoLoSL: Compositional Reasoning at Last!</i> Research Visit at the Max Planck Institute for Software Systems, Saarbrücken, Germany	December 2014

AWARDS AND PRIZES

Imperial College President's Award for Excellence in Research (Early Career Researcher)	2021
Best Paper Award , Conference on Games (CoG) <i>Hyperstate Space Graphs for Automated Game Analysis</i>	2019
Corporate Partnership Prize for Excellence and Outstanding Achievement	2010
Gloucester Research Prize for Academic Excellence	2009
David Howarth Project Prize for Automated Generation of Compiler Test Cases	2009
Olav Beckman Project Prize	2008
Imperial College Research Prize for Cognitive Robotics Project	2007
Research Prize (Sponsored by Deutsche Bank)	2007
Prize for Excellence in First Year Computing (Sponsored by Morgan Stanley)	2007

PROFESSIONAL SERVICES

Co-Chair Student Research Competition at POPL	2022
Organiser Dagstuhl Seminar 21462 (<i>Foundations of Persistent Programming</i>)	2021
Program Committee Member Programming Language Design and Implementation (PLDI)	2021
Co-Chair Student Research Competition at POPL	2021
Organiser Programming Languages Mentoring Workshop (PLMW), co-located with POPL	2021
Program Committee Member Verification, Model Checking, and Abstract Interpretation (VMCAI)	2021
Journal Reviewer Foundations and Trends in Programming Languages	2020
Program Committee Member Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)	2020
Accessibility Chair Programming Language Design and Implementation (PLDI)	2020
Program Committee Member International Conference on Networked Systems (NETYS)	2020
External Program Committee Member Programming Language Design and Implementation (PLDI)	2020
Student Research Competition, Program Committee Member Principles of Programming Languages (POPL)	2020
Program Committee Member Principles of Programming Languages (POPL)	2020
Panel Member Programming Languages Mentoring Workshop (PLMW), co-located with OOPSLA Panel Title: <i>What I wish I had known before attending graduate school</i>	2019
Student Research Competition, Program Committee Member International Conference on Functional Programming (ICFP)	2019
Student Research Competition, Program Committee Member Programming Language Design and Implementation (PLDI)	2019

Panel Member Programming Languages Mentoring Workshop (PLMW), co-located with POPL Panel Title: <i>Grad School and Beyond</i>	2019
Program Committee Member European Conference on Object-Oriented Programming (ECOOP)	2019
Member of Panel of Judges (Student Research Competition) Asian Symposium on Programming Languages and Systems (APLAS)	2019
Program Committee Member Mathematical Foundations of Programming Semantics (MFPS)	2018
External Reviewer Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)	2018
Program Committee Member Syntax and Semantics of Low-Level Languages (LOLA)	2018
External Reviewer European Symposium on Programming (ESOP)	2017
Program Committee Member International Workshop on Aliasing, Capabilities and Ownership (IWACO)	2017
Co-Organiser Imperial Concurrency Workshop	2015
Co-Organiser Workshop on Introduction to Verification and Testing (INVEST)	2014

TEACHING

The Theory and Practice of Concurrent Programming Third year course (Imperial College London); co-designed the course	2021
Models of Computation Second year course (Imperial College London)	2021
Models of Computation Second year course (Imperial College London)	2020
Logic and Reasoning First year course (Imperial College London)	2020

SUPERVISION

Masters Thesis Co-supervisor (Imperial College) Co-supervisor: Philippa Gardner Student: David Pollak Grade: Distinction, winner of the Microsoft prize for outstanding thesis project	October 2016-June 2017
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Masters Thesis Co-supervisor (Imperial College) **October 2016-June 2017**
Co-supervisor: Philippa Gardner
Student: Beatrix de Wilde
Grade: Distinction

Masters Thesis Co-supervisor (Imperial College) **October 2016-June 2017**
Co-supervisor: Philippa Gardner
Student: Cesar Roux Dit Buisson
Grade: Distinction

Course Support Leader (Imperial College) **October 2014-December 2016**
Separation Logic (Masters/Fourth-Year Course)

- Led weekly tutorial sessions in the first term of the academic year
- Gave two advanced (hour-long) lectures on *Concurrent Separation Logic*
- Other responsibilities included setting coursework questions, marking coursework scripts and holding online Q&A sessions on the Piazza platform

Masters Thesis Co-supervisor (Imperial College) **October 2012-June 2013**
Co-supervisor: Philippa Gardner
Student: Cosmin Badea
Grade: Distinction

Teaching Assistant (Imperial College) **October 2010-June 2013**
Introductory Courses: *Logic, Reasoning about Programs, Discrete Mathematics*
Intermediate Courses: *Models of Computation, Concurrency*
Advanced Courses: *Models of Concurrent Computation, Advanced Issues in Object Oriented Programming Languages, Separation Logic*
Responsibilities: holding tutorial sessions and coursework marking

Undergraduate Teaching Assistant (Imperial College) **October 2008-June 2011**
Courses: *Logic, Reasoning about Programs, Discrete Mathematics*

- Personal tutoring sessions held in the first and second terms of the academic year
- Responsibilities included leading the tutorial sessions and coursework marking

PROFESSIONAL EXPERIENCE

Research Intern at Microsoft Research (Cambridge) **September-December 2013**
Group: Programming Principles and Tools Group
Supervisor: Matthew Parkinson

Summer Research Intern at Imperial College London **July-September 2010**
Group: Computational Creativity
Supervisor: Simon Colton

Research Intern at Imperial College London **April-September 2009**
Joint work between the departments of Computing and Bio-engineering
Supervisor: Krysia Broda

Summer Technology Intern at Morgan Stanley, London **June-September 2008**
Application Development Team

Summer Research Intern at Imperial College London **July-September 2007**
Group: Computational Logic
Supervisor: Krysia Broda