Karim Ali

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Academic Employment

Oct 2014–present	**Postdoctoral Researcher**, Technische Universität Darmstadt, Germany.
Host	Eric Bodden

Education

2014	**Ph.D.**, *Computer Science*, University of Waterloo, Canada.
Advisor	Ondřej Lhoták
Thesis	The Separate Compilation Assumption
Committee	Jan Vitek, Frank Tip, Reid Holmes, and Werner Dietl
2010	**MMath**, *Computer Science*, University of Waterloo, Canada.
Advisor	Raouf Boutaba
Thesis	Algorizmi - A Configurable Virtual Testbed to Generate Datasets for Offline Evaluation of Intrusion Detection Systems
Reviewers	Ian MacKillop and Urs Hengartner
2007	**B.Sc.**, *Computer Science*, The American University in Cairo, Egypt.
Advisors	Sherif G. Aly and Sherif El-Kassas
Thesis	A Jabber Framework for Building Communication Capable Java Mobile Applications
Minor	Mathematics

Research Experience

2014–present	**Postdoctoral Researcher**, *Secure Software Engineering*, Technische Universität Darmstadt, Germany.
	○ Designing novel static analyses to detect misuses of cryptographic APIs in software systems.
	○ Exploring new static analysis techniques that incorporate user feedback in a just-in-time fashion.
	○ Developing various extensions to the IFDS analysis framework.
2010–2014	**Research Assistant**, *Programming Languages Group*, University of Waterloo, Canada.
	○ Conducted research for constructing partial static call graphs for Java programs.
	○ Developed various call graph construction algorithms for Scala.
	○ Studied static analysis techniques for various JVM-hosted languages.
2008–2009	**Research Assistant**, *Secutiry Research Group*, University of Waterloo, Canada.
	○ Worked on various models of Intrusion Detection Systems: e.g., peer-to-peer, kernel methods.
	○ Developed Algorizmi, an open-source evaluation system for Intrusion Detection Systems.
2007	**Researcher**, *Department of Computer Science*, The American University in Cairo, Egypt.
	○ Studied new techniques to support location management in Java-based pervasive systems.

Industrial Experience

2007	**Software Engineer**, *Execution Team*, ITWorx, Egypt.
	o Redesigned the graphical user interface of the stock brokerage system for Execution Ltd.
	o Improved user experience by redesigning major system components.
	o Enhanced code readability by reviewing the previously written code.
	o Used .Net framework, C#, CRM technologies during development.

Publications

Refereed Journal Articles (2 total)

TOSEM
To Appear — **Karim Ali**, Marianna Rapoport, Ondřej Lhoták, Julian Dolby, and Frank Tip. "Type-Based Call Graph Construction Algorithms for Scala". In: *ACM Transactions on Software Engineering and Methodology* (ID: TOSEM-2015-0035).

IJCSNS '08 — Sherif G Aly, Sarah Nadi, and **Karim Hamdan**. "A Java-Based Programming Language Support of Location Management in Pervasive Systems". In: *International Journal of Computer Science and Network Security* 8.6 (2008), pp. 329–336.

Refereed Conference Publications (4 total)

Onward! '15 — Steven Arzt, Sarah Nadi, **Karim Ali**, Eric Bodden, Sebastian Erdweg, and Mira Mezini. "Towards Secure Integration of Cryptographic Software". In: *Proceedings of the SIGPLAN Symposium on New Ideas in Programming and Reflections on Software at SPLASH*. Pittsburgh, Pennsylvania, United States, 2015, (Acceptance Rate: 35%).

ECOOP '14 — **Karim Ali**, Marianna Rapoport, Ondřej Lhoták, Julian Dolby, and Frank Tip. "Constructing Call Graphs of Scala Programs". In: *Proceedings of the 28th European Conference on Object-Oriented Programming*. Uppsala, Sweden, 2014, pp. 54–79. (Acceptance Rate: 26%).

ECOOP '13 — **Karim Ali** and Ondřej Lhoták. "Averroes: Whole-Program Analysis without the Whole Program". In: *Proceedings of the 27th European Conference on Object-Oriented Programming*. Montpellier, France, 2013, pp. 378–400. (Acceptance Rate: 25%).

ECOOP '12 — **Karim Ali** and Ondřej Lhoták. "Application-Only Call Graph Construction". In: *Proceedings of the 26th European Conference on Object-Oriented Programming*. Bejing, China, 2012, pp. 688–712. (Acceptance Rate: 19%).

Validated Artifacts (2 total, 1 distinguished artifact)

ECOOP '14
Distinguished Artifact — **Karim Ali**, Marianna Rapoport, Ondřej Lhoták, Julian Dolby, and Frank Tip. "Constructing Call Graphs of Scala Programs". In: *European Conference on Object-Oriented Programming*. 2014.

ECOOP '13 — **Karim Ali** and Ondřej Lhoták. "Averroes: Whole-Program Analysis without the Whole Program". In: *European Conference on Object-Oriented Programming*. 2013.

Other Refereed Publications (2 total)

GIIS '09 — **Karim Ali**, Issam Aib, and Raouf Boutaba. "P2P-AIS: A P2P Artificial Immune Systems architecture for detecting DDoS flooding attacks". In: *Global Information Infrastructure Symposium*. Hammamet, Tunisia, 2009.

GIIS '09 — **Karim Ali** and Raouf Boutaba. "Applying Kernel Methods to Anomaly-based Intrusion Detection Systems". In: *Global Information Infrastructure Symposium*. Hammamet, Tunisia, 2009.

Research Demonstrations (1 total)

ECOOP '13 — **Karim Ali**. "Averroes: Whole-Program Analysis without the Whole Program". In: *European Conference on Object-Oriented Programming*. 2013.

Posters (1 total)

Cheriton '13 — **Karim Ali**. "Averroes: Whole-Program Analysis without the Whole Program". In: *Chertion Symposium*. University of Waterloo, Canada, 2013.

Teaching

Lecturer
Winter 2015   **Technische Universität Darmstadt**, Static Analysis Seminar.

Substitute Lecturer
Winter 2014   **Technische Universität Darmstadt**, Designing Code Analyses for Large Software Systems.
Spring 2013   **University of Waterloo**, *CS241*, Foundations of Sequential Programs.

Graduate Teaching Assistant
2011–2013   **University of Waterloo**, *CS241*, Foundations of Sequential Programs.
2011–2013   **University of Waterloo**, *CS444/644*, Compiler Construction.
Spring 2011   **University of Waterloo**, *CS456/656*, Software Design and Architectures.
2008–2010   **University of Waterloo**, *CS456/656*, Computer Networks.
Winter 2008   **University of Waterloo**, *CS125*, Introduction to Programming Principles.
Fall 2007   **The American University in Cairo**, *CS448*, Security Engineering.

Undergraduate Teaching Assistant
Spring 2007   **The American University in Cairo**, *CS448*, Security Engineering.
2005–2006   **The American University in Cairo**, *CS330*, Computer Architecture.
2004–2005   **The American University in Cairo**, *CS106*, Fundamentals of Computer Science.

Advising

Ph.D. Students (Technische Universität Darmstadt)
2015-present   **Johannes Späth**, Scalable Rich Pointer Analysis, expected 2018.
2015-present   **Stefan Krüger**, Detecting Misuses of Cryptographic APIs, expected 2019.
2015-present   **Lisa Nguyen**, Human-Oriented Program Analysis, expected 2019.
2015-present   **Stefan Triller**, Malware Detection, expected 2019.

Research Assistants (Technische Universität Darmstadt)
2015-present   **Manuel Benz**, Mining GitHub Repositories for Misuses of Cryptographic APIs.
Winter 2015   **Sachin Pattan**, Finding Common Patterns of Using Cryptographic APIs in Android Apps.

Professional Service

Conference Committees
ISSTA '16   Artifact Evaluation Committee Member, International Symposium on Software Testing and Analysis
PLDI '15   Artifact Evaluation Committee Member, ACM SIGPLAN conference on Programming Language Design and Implementation
ECOOP '15   Artifact Evaluation Committee Member, European Conference on Object-Oriented Programming
ECOOP '14   Artifact Evaluation Committee Member, European Conference on Object-Oriented Programming

Conference Organization
ECOOP '18   Publicity Chair and Webmaster, European Conference on Object-Oriented Programming
ISSTA '18   Publicity Chair and Webmaster, International Symposium on Software Testing and Analysis
PLDI '15   Co-organizer, Workshop on WALA

SCP   Science of Computer Programming
TSE   Transactions on Software Engineering

Volunteer Work

Fall 2013	**Graduate Student Ambassador**, *David R. Cheriton School of Computer Science*, University of Waterloo, Canada.
Winter 2012	**Tour Guide**, *Computer Science Open House*, University of Waterloo, Canada.
2010–2011	**President**, *Egyptian Students Association*, University of Waterloo, Canada.
Spring 2007	**Ushers Committee Leader**, *Honors Assembly*, The American University in Cairo, Egypt.
Spring 2007	**Academic Committee Head**, *Association for Computer Machinery (ACM)*, The American University in Cairo, Egypt.

Awards and Honors

2014	**Distinguished Artifact Award**, *European Conference on Object-Oriented Programming*.
2012-2014	**David R. Cheriton Scholarship**, *University of Waterloo, Canada*, $20,000.
2012	**University of Waterloo Special Graduate Scholarship**, *Canada*, $2,500.
2012	**Queen Elizabeth II Graduate Scholarship in Science and Technology**, *Canada*, $5,000.
2011	**University of Waterloo Special Graduate Scholarship**, *Canada*, $1,000.
2008	**University of Waterloo Graduate Entrance Scholarship**, *Canada*, $3,000.
2007	**B.Sc. Summa Cum Laude Honors**, *The American University in Cairo*, Egypt.
2007	**Best CS Group Graduation Project Award**, *The American University in Cairo*, Egypt.
2003-2007	**Shell Endowed Scholarship**, *The American University in Cairo*, Egypt, 30% off tuition.

Artifacts

averroes	A tool that enables any Java analysis framework to analyze partial programs. http://github.com/karimhamdanali/averroes/
scalacg	A Scala compiler plugin for call graph construction. http://github.com/olhotak/scalacg
cgc	Datalog implementation of the *separate compilation assumption*. http://plg.uwaterloo.ca/~karim/projects/cgc/
algorizmi	An open-source cloud-based testbed for evaluating Intrusion Detection Systems. http://sourceforge.net/projects/algorizmi/
beep	Java mobile platform. http://sourceforge.net/projects/beep/

Languages

English	**Fluent**
Arabic	**Mother Tongue**
French	**Novice**
German	**Novice**

Residency Status

Canada   **Citizen**