Akram El-Korashy

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Interests: language-based security, compiler verification, secure compilation, static analysis for crypto constant time

Research and Teaching

Nov 2016–Present	**Doctoral Researcher**, Max Planck Institute for Software Systems, Saarland, Germany. Working in the Foundations of Computer Security group with Deepak Garg. Interested in compiler verification, secure compilation, and language-based security. More specifically, I am working on formal verification of compiler security theorems, e.g., for compilers that target capability architectures.
Apr–Jul 2018	**Teaching Assistant**, CISPA, Saarland, Germany. Helped design, teach, and evaluate a graduate seminar on Secure Compilation.
Dec 2015–Oct 2016	**Research Intern**, Max Planck Institute for Software Systems, Saarland, Germany. Worked on differential privacy, and on capability machines. Wrote Masters thesis.
Oct 2015–Oct 2016	**Tutor**, Saarland University, Germany. Led tutorials for two courses: Cryptography and Artificial Intelligence, both taught to Masters and Bachelor students.
Aug–Sep 2012	**Research Intern**, Information Security & Cryptography Group, Saarland University. Analyzed security properties of digital signature schemes.
Mar–Aug 2012	**Research Intern**, *German Research Center for Artificial Intelligence (DFKI)*, Kaiserslautern, Germany. Worked on improving OCR of printed Urdu text. Wrote Bachelor thesis.
Feb 2010–Feb 2012	**Junior TA**, *Computer Science and Engineering*, German University in Cairo, Egypt. Gave lab sessions for three courses: Data Structures and Algorithms (twice), Object-Oriented Programming, and Intro to Computer Programming.
Oct–Nov 2010	**Intern**, *Robotics & Multi-Agent Systems research group*, German University in Cairo. Tested robot sensors and helped in troubleshooting motion problems.

Industry

Oct 2020–Dec 2020	**Applied Scientist Intern**, *Amazon Web Services*, Boston, MA (remotely). Worked with Adam Petcher of the AWS Cryptographic Algorithms team. Developed, in Coq and OCaml, a static analysis that checks whether a given x86 crypto implementation is constant time.
Aug 2019–Oct 2019	**Software Engineering Intern**, *Google*, Zurich, Switzerland. Worked with the YouTube Ads team on support for integration testing in prod environment.

Jan 2014–Sep 2014	**Junior Embedded Software Engineer**, *Valeo (Automotive Software)*, Cairo, Egypt.
	As a software requirements owner of a Jaguar-Land-Rover project at the Driving Radar Systems team, I was responsible for the unambiguity and common understanding of software requirements specification among systems, test, and software engineers. Also worked on integration tests, and test automation.
Jun 2013–Dec 2013	**Software Engineer**, *quTIP*, Cairo, Egypt.
	Started a web app (for the pharma industry in Egypt) from design till demo of an alpha version (full-stack web development).
Aug–Sep 2011	**Web Developer (back-end) Intern**, *German University in Cairo*.
	Helped in designing, developing and testing a web app using Python Django.
Jul 2011	**Software Quality Control Engineer - Intern**, *LINK Development*, Cairo, Egypt.
	Helped in tracking issues, and performing black-box acceptance and usability tests.
Jul–Aug 2010	**Network Field Maintenance Engineer - Trainee**, *Vodafone*, Cairo, Egypt.
	Helped in troubleshooting hardware problems in base transceiver stations.

Education

Nov 2016–now	**PhD, Computer Science [Expected]**, *Saarland University*, Germany.
Oct 2014–2016	**MSc, Computer Science**, *Saarland University*, Germany.
courses:	Applied Cryptography, Artificial Intelligence, Concrete Semantics, Cryptography, Deep Learning seminar, Distributed Systems, Logics in Security, Public-Key Encryption, Recursion Theory, Security
2008–Jun 2013	**BSc, Computer Science and Engineering**, *German University in Cairo*, Egypt.

Honors

2016	**Honors degree** in Masters study
2014-2016	International Max Planck Research School **scholarship** (1.5-year stipend) for Masters in Computer Science
2013	**Highest honors** in Bachelor study
2012	DAAD **scholarship** for Bachelor thesis project at DFKI Kaiserslautern
2008-2013	GUC undergraduate **full scholarship award** (5-year tuition fee waiver) for ranking in the top 10 students in nation-wide exams

Professional Activities

2022	PLDI 2022 Artifact Evaluation Committee Member
2020	IEEE S&P 2020 Poster Jury Member
2019	IEEE S&P 2020 Shadow PC Member
April 2017	Appointed student member in the expert panel hired by the Croatian Agency for Science and Higher Education for re-accreditation of PhD programs.

Invitations and Talks

Jan 2022	Gave a talk at PriSC 2022.
Dec 2021	Gave a talk at the Dagstuhl Seminar on Secure Compilation.
Dec 2019	Invited to attend the 7th Google Compiler and Programming Language Summit.
Sep 2019	Travel grant for the VeTSS Workshop on Verified Software (declined due to logistics)
Sep 2019	Attended the EUTypes 2019 Summer School and was awarded a travel grant.
June 2019	Gave a short talk at the ENTROPY 2019 workshop on *A Fully-Abstract Translation of Pointers to Capabilities*.
Dec 2018	Invited to attend the 6th Google Compiler and Programming Language Summit.
Nov 2018	Invited to attend the Facebook Testing & Verification Symposium.
May 2018	Gave a talk at the Dagstuhl Seminar on Secure Compilation.
July 2016	Gave a talk at the first Secure Compilation Meeting in Paris.

Additional Information

Nov 2019	Participated in a symposium on "Doing Good – Scientific Practice under Review".
summer 2010	Attended an algorithms and problem solving camp, and participated in the ACM national competition in Egypt.
programming and tools	Familiar with Java, Python, Coq, Prolog, Isabelle, OCaml, C, x86 assembly, and the CHERI ISA.
online courses	Completed Intro to Machine Learning, Artificial Intelligence, and Cryptography I.
languages	Arabic (native), English (IELTS: 8.0), German (B2), French (elementary)
personal	Egyptian citizen, permanent resident of Germany

Publications

draft	**El-Korashy, A., Blanco, R., Thibault, J., Durier, A., Garg, D., Hritcu, C. (2021)**, SecurePtrs: Proving Secure Compilation Using Data-Flow Back-Translation and Turn-Taking Simulation.
conference paper	**El-Korashy, A., Tsampas, S., Patrignani, M., Devriese, D., Garg, D., Piessens, F. (2021)**, *34th IEEE Computer Security Foundations Symposium (CSF), June 21-25, 2021 - Virtual Conference*, CapablePtrs: Securely Compiling Partial Programs using the Pointers-as-Capabilities Principle.
workshop paper	**Tsampas, S., El-Korashy, A., Patrignani, M., Devriese, D., Garg, D., Piessens, F. (2017)**, *Workshop on Foundations of Computer Security (FCS), August 21, 2017, Santa Barbara, CA*, Towards Automatic Compartmentalization of C Programs on Capability Machines.
masters thesis	**El-Korashy, A. (2016)**, *Saarland University*, A Formal Model for Capability Machines: An Illustrative Case Study towards Secure Compilation to CHERI.

conference paper   **El-Korashy, A., Shafait, F. (2013)**, *International Conference on Document Analysis and Recognition (ICDAR), August 25-28, 2013, Washington, DC*, Search space reduction for holistic ligature recognition in Urdu Nastaliq script.