ORESTIS MELKONIAN

PERSONAL DATA

PLACE	DATE OF BIRTH:	Athens, Greece	December 1992
EMAIL:	melkon.or@gmail.com
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EDUCATION

SEP 2019 - SEP 2023
PhD in COMPUTER SCIENCE @ **University of Edinburgh**, Scotland
Institute: Laboratory for Foundations of Computer Science (LFCS)
Supervisor: Philip Wadler
Co-supervisors: Brian Campbell, Aggelos Kiayias
Thesis: Verified Compilation from BitML to Bitcoin: An Agda Odyssey

SEP 2017 - JUL 2019
M.Sc. in COMPUTING SCIENCE @ **Utrecht University**, The Netherlands
GPA: 8.99/10 (*cum laude*)
Specialization: Programming Technology
Supervisors: Wouter Swierstra (UU), Manuel M.T. Chakravarty (IOHK)
Thesis: Formalizing Extended UTxO and BitML Calculus in Agda

OCT 2010 - APR 2016
B.Sc. in COMPUTER SCIENCE @ **National and Kapodistrian University of Athens**, Greece
GPA: 8.6/10 (*distinction*)
Specializations: Knowledge and Data Management, Software
Supervisors: Panos Rondogiannis, Angelos Charalambidis
Thesis: RHEA - A Reactive, Heterogeneous, Extensible and Abstract
   Framework for Dataflow Programming

FEB 2014 - JUL 2014
Erasmus exchange student in COMPUTER SCIENCE
Universita della Svizzera Italiana, Lugano, Switzerland
Coordinators: Ioannis Emiris, Marc Langheinrich

WORK EXPERIENCE

JAN 2024 - NOW
Formal Methods Engineer @ **Input Output (IOG)**
Formalizing BFT consensus protocols in Agda & developing Agda compilers
Supervisor: James Chapman

SEP 2023 - JAN 2024
Formal Methods Intern @ **Input Output (IOG)**
Working on the Agda formalization of the Cardano ledger
Supervisor: James Chapman

FEB 2021 - MAR 2023
Haskell Reviewer (part-time) @ **MigaMake**, Singapore
Reviewing code, technical reports, and scientific articles
Supervisor: Michal Gajda

JAN 2019 - JUL 2019
Haskell Developer (part-time) @ **QBayLogic**, The Netherlands
Implemented a GUI to inspect optimization steps in the Cλash compiler
Supervisor: Christiaan Baaij

DEC 2017 - DEC 2018
Haskell Developer (part-time) @ **Utrecht University**, The Netherlands
FORMALZ: A tower-defence game for learning Hoare-style specifications
Developed the SMT-based checker between teacher and student formulas
Supervisor: Wishnu Prasetya

JUN 2017 - AUG 2017
Research Intern @ **Max Planck Institute for Software Systems (MPI-SWS)**, Germany
Software Analysis & Verification Group
Proof mechanization of a novel C/C++11 memory model in Coq
Supervisor: Viktor Vafeiadis

MAY 2016 - MAY 2017
Technical Intern (*Backend Web Developer*) @ **CERN**, Switzerland
INVENIO project: *Video workflows for the Cern Document Server (CDS)*
Supervisor: Ludmila Marian

OCT 2015 - APR 2016
Research Intern @ **National Center for Scientific Research "Demokritos"**, Athens, Greece
Software & Knowledge Engineering Laboratory (SKEL)
Design and implementation of a dataflow framework for robotics
Supervisor: Angelos Charalambidis

Research Interests

- Programming Languages, Semantics
- Functional Programming, Compilers
- Formal Verification, Theorem Proving
- (Dependent) Type Theory, Category Theory
- Consensus, Blockchain, Smart Contracts
- Algorithmic Music

Selected Publications

FMBC '25 (ETAPS) — **A readable and computable formalization of the Streamlet consensus protocol**
Mauro Jaskelioff, Orestis Melkonian, James Chapman
6th *International Workshop on Formal Methods for Blockchains*

FMBC '25 (ETAPS) — **Program logics for ledgers**
Orestis Melkonian, Wouter Swierstra, James Chapman
6th *International Workshop on Formal Methods for Blockchains*

FMBC '25 (ETAPS) — **Validity, Liquidity, and Fidelity: Formal Verification for Smart Contracts in Cardano**
Tudor Ferariu, Philip Wadler, Orestis Melkonian
6th *International Workshop on Formal Methods for Blockchains*

NeurIPS '24 — **Learning Structure-Aware Representations of Dependent Types**
Konstantinos Kogkalidis, Orestis Melkonian, Jean-Philippe Bernardy
38th *Annual Conference on Neural Information Processing Systems*

FMBC '24 (ETAPS) — **Formal specification of the Cardano blockchain ledger, mechanized in Agda**
A.Knispel, O.Melkonian, J.Chapman, A.Hill, J.Jääger, W.DeMeo, U.Norell
5th *International Workshop on Formal Methods for Blockchains*

FMBC '24 (ETAPS) — **Structured Contracts in the EUTxO Ledger Model**
P.Vinogradova, O.Melkonian, P.Wadler, M.Chakravarty, J.Krijnen, M.Jones, J.Chapman, T.Ferariu
5th *International Workshop on Formal Methods for Blockchains*

WTSC '24 (FC) — **Message-passing in the Extended UTxO Model**
Polina Vinogradova, Orestis Melkonian
8th *Workshop on Trusted Smart Contracts*

TYPES '23 — **Nominal techniques as an Agda library (Extended Abstract)**
Murdoch J. Gabbay, Orestis Melkonian
29th *International Conference on Types for Proofs and Programs*

Haskell '22 (ICFP) — **Reasonable Agda is correct Haskell: writing verified Haskell using AGDA2HS**
Jesper Cockx, Orestis Melkonian, Lucas Escot, James Chapman, Ulf Norell
15th *International Haskell Symposium. ACM*

ISoLA '20 — **Native Custom Tokens in the Extended UTXO Model**
M.Chakravarty, J.Chapman, K.MacKenzie, O.Melkonian, J.Müller, M.Jones, P.Vinogradova, P.Wadler
9th *International Symposium On Leveraging Applications of Formal Methods, Verification and Validation*

ECOOP '20 — **Reconciling Event Structures with Modern Multiprocessors**
E.Moiseenko, A.Podkopaev, O.Lahav, O.Melkonian, V.Vafeiadis
34th *European Conference on Object-Oriented Programming*

WTSC '20 (FC) — **The Extended UTXO Model**
M.Chakravarty, J.Chapman, K.MacKenzie, O.Melkonian, M.Jones, P.Wadler
4th *Workshop on Trusted Smart Contracts*

FARM '19 (ICFP) — **Music as Language: Putting Probabilistic Temporal Graph Grammars to Good Use**
Orestis Melkonian
7th *ACM SIGPLAN International Workshop on Functional Art, Music, Modeling, and Design. ACM*

FARM '19 (ICFP) — **What Constitutes a Musical Pattern?**
Orestis Melkonian, Iris Yuping Ren, Wouter Swierstra, Anja Volk
7th *ACM SIGPLAN International Workshop on Functional Art, Music, Modeling, and Design. ACM*

ICSE' 19 — **Having Fun in Learning Formal Specifications**
Wishnu Prasetya, Craig Leek, Orestis Melkonian *et al.*
41th *International Conference on Software Engineering: Software Engineering Education and Training. ACM*

REBLS' 18 (SPLASH) — **RHEA: A Reactive, Heterogeneous, Extensible and Abstract Framework for Dataflow Programming**
Orestis Melkonian, Angelos Charalambidis
5th *ACM SIGPLAN International Workshop on Reactive and Event-Based Languages and Systems. ACM*

ESSLLI '18 — **D^3 as a 2-MCFL**
Konstantinos Kogkalidis, Orestis Melkonian
Student Session of the 30th European Summer School in Logic, Language and Information. Springer

Teaching Experience

Sep 2020 - Mar 2021	**Reasoning & Agents** @ University of Edinburgh *Demonstrator & Marker*
Sep 2019 - Mar 2020	**Types and Semantics for Programming Languages** @ University of Edinburgh *Teaching Assistant*
Sep 2019 - Mar 2021	**Introduction to Computation: Functional Programming** @ University of Edinburgh *Teaching Assistant & Tutor & Marker*

Academic Service

Apr 2026	Program Committee @ **FMBC**, International Workshop on Formal Methods for Blockchains, 2026
Apr 2025	Invited Reviewer @ **JFP**, Journal of Functional Programming, 2025
Oct 2025	External Reviewer @ **ITP**, International Conference on Interactive Theorem Proving, 2025
May 2025	Program Committee @ **FMBC**, International Workshop on Formal Methods for Blockchains, 2025
Nov 2024	Artifact Evaluation Committee @ **POPL**: Symposium on Principles of Programming Languages, 2025
Feb 2024	Artifact Evaluation Committee @ **OOPSLA**, 2024
Nov 2023	Artifact Evaluation Committee @ **POPL**: Symposium on Principles of Programming Languages, 2024
Jun 2023	Artifact Evaluation Committee @ **ICFP**: International Conference on Functional Programming, 2023
Feb 2023	Artifact Evaluation Committee @ **ESOP**: European Symposium on Programming, 2023
Nov 2022	Organizer @ **31st Agda Implementors' Meeting (AIM XXXI)**, Edinburgh, Scotland
Oct 2022	Artifact Evaluation Committee @ **POPL**: Symposium on Principles of Programming Languages, 2023
Jun 2022	Artifact Evaluation Committee @ **ICFP**: International Conference on Functional Programming, 2022
Mar 2022	Invited Reviewer @ **TYPES** post-proceedings, 2022
Feb 2022	Artifact Evaluation Committee @ **ESOP**: European Symposium on Programming, 2022
Jul 2021	Invited Reviewer @ **APLAS**: Asian Symposium on Programming Languages and Systems, 2021
Aug 2021	Invited Reviewer @ **MSCS**: Mathematical Structures in Computer Science *special edition in memory of Martin Hofmann*

Awards

Jun 2023	**EuroProofNet** Short-term Scientific Mission @ **Chalmers University of Technology**, Gothenburg, SE *Host: Jean-Philippe Bernardy*
May 2023	**SICSA** Research Scholar Grant @ **36th Agda Implementors' Meeting (AIM XXXVI)**, Delft, NL
Jun 2022	Travel Grant @ **Programming Language Mentoring Workshop (PLMW)**, PLDI, San Diego, US
Jun 2019	Travel Grant @ **ZuriHac: A 3-day Haskell Hackathon**, Zurich, CH
Apr 2019	Travel Grant @ **School and Workshop on Univalent Mathematics**, Birmingham, UK
Aug 2018	Registration Grant @ **European Summer School on Logic, Language & Information (ESSLLI)**, Sofia, BG
Jul 2018	Travel Grant @ **DeepSpec Summer School**, Princeton, US
Jul 2017	Travel Grant @ **CAV Conference**, Heidelberg, DE
Jan 2016	Travel Grant @ **Programming Language Mentoring Workshop (PLMW)**, POPL, Florida, US
Mar 2016	Travel Grant @ **Meddays '16**, Sophia-Antipolis, FR

Languages

Greek:	Native speaker
English:	**Fluent**, *Certificate of Proficiency, University of Michigan*
German:	**Intermediate**, *Zertifikat B1, Goethe Institute*
French:	**Beginner**, *A2.1, Supercomm Suisse SA*

Extra-Curricular Activities

Musical Instrument:	Electric jazz guitar (Intermediate) **RGT Grade 6 (***distinction***)**, *University of West London - Certificate in Music Performance* *Examiner:* Adam Moore BA(Hons), MMus, PGCE, FLCM

References

Philip Wadler
University of Edinburgh
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