ORESTIS MELKONIAN

PERSONAL DATA

PLACE | DATE OF BIRTH:	Athens, Greece | December 1992
EMAIL:	melkon.or@gmail.com
WEBSITE:	omelkonian.github.io

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 an Agda-to-Rust compiler* *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
- Type Theory, Category Theory
- Blockchain Technology, Smart Contracts
- Algorithmic Music

Selected Publications

NeurIPS '24	**Learning Structure-Aware Representations of Dependent Types** K.Kogkalidis, O.Melkonian, J.Bernardy *38th Annual Conference on Neural Information Processing Systems*
TYPES '24	**Mechanizing BFT consensus protocols in Agda (Extended Abstract)** Orestis Melkonian, Mauro Jaskelioff, James Chapman, Jon Rossie *30th International Conference on Types for Proofs and Programs*
FMBC '24	**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	**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	**Program logics for ledgers (Extended Abstract)** Orestis Melkonian, Wouter Swierstra, James Chapman *29th International Conference on Types for Proofs and Programs*
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*
TyDe '19 (ICFP)	**Formal Investigation of the Extended UTxO Model (Extended Abstract)** Orestis Melkonian, Wouter Swierstra, Manuel M.T. Chakravarty *4rd ACM SIGPLAN International Workshop on Type-Driven Development. ACM*
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

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) Paper Reviewer @ **TYPES** post-proceedings, 2022
Feb 2022	Artifact Evaluation Committee @ **ESOP**: European Symposium on Programming, 2022
Jul 2021	(Invited) Paper Reviewer @ **APLAS**: Asian Symposium on Programming Languages and Systems, 2021
Aug 2021	(Invited) Paper 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***)** *UWLQ Level 3 Certificate in Music Performance* University of West London *Examiner:* Adam Moore BA(Hons), MMus, PGCE, FLCM

(Algorithmic) Music Composition, Films, Philosophy, Literature, Travelling

References

Philip Wadler	**Wouter Swierstra**	**Manuel M.T. Chakravarty**	**Viktor Vafeiadis**
University of Edinburgh	Utrecht University	IOHK	MPI-SWS
✉ wadler@inf.ed.ac.uk	✉ w.s.swierstra@uu.nl	✉ manuel.chakravarty@iohk.io	✉ viktor@mpi-sws.org

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