Clément Pit-Claudel

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I'm an assistant professor at EPFL, heading the SYSTEMF lab. Previously, I was a PhD candidate at MIT with Adam Chlipala and then a senior applied scientist at Amazon AWS. My research focuses on programming languages, compilers, and formal verification; my broader interests include systems engineering, hardware design languages, security, performance engineering, and type theory. I built the first end-to-end verified compilation pipeline from high-level specifications to assembly language (POPL'15, SNAPL'17, IJCAR'20, PLDI'22, PLDI'24), the first verified compiler for a rule-based hardware design language with EHRs (PLDI'20, ASPLOS'21), and multiple widely-used IDEs and tools for automated and interactive theorem proving (CoqPL'16, SLE'20). My lab was the first to show that regex lookarounds can be matched in linear time (PLDI'24 — the resulting algorithms have been merged in Google Chrome) and to develop faithful specifications for a real-world regex language (ICFP'24, PLDI'24 SRC gold medal).

Education

2014 – 22 **Massachusetts Institute of Technology** (Cambridge, USA), **MS 2016, PhD 2022**
PhD thesis: *Relational compilation: functional-to-imperative code generation for performance-critical applications*.
MS thesis: *Compilation using Correct-by-Construction Program Synthesis*, awarded a 🎖 **William A. Martin Memorial Thesis Award for Outstanding Thesis in CS**. Advised by Adam Chlipala.

2011 – 14 **École Polytechnique** (Palaiseau, France), ***Diplôme d'ingénieur* 2014, MSE 2016**
MSE specializing in computer science; undergraduate in mathematics and physics.

Selected publications

2024 **SOSP** **Practical Verification of System-Software Components Written in Standard C**
Can Cebeci, Yonghao Zou, Diyu Zhou, George Candea, **Clément Pit-Claudel**.
Proceedings of the ACM SIGOPS 30th Symposium on Operating Systems Principles (SOSP 2024).

ICFP **A Coq Mechanization of JavaScript Regular Expression Semantics**
Noé De Santo, Aurèle Barrière, **Clément Pit-Claudel**.
Proceedings of the ACM on Programming Languages (ICFP 2024).

PLDI **Linear Matching of JavaScript Regular Expressions**
Aurèle Barrière, **Clément Pit-Claudel**.
Proceedings of the ACM on Programming Languages (PLDI 2024).

2022 **PLDI** **Relational Compilation for Performance-Critical Applications: Extensible Proof-Producing Translation of Functional Models into Low-Level Code**
Clément Pit-Claudel, Jade Philipoom, Dustin Jamner, Andres Erbsen, Adam Chlipala.
Proc. 43rd ACM SIGPLAN Intl. Conf. on Programming Language Design and Implementation (PLDI 2022).

2021 **ASPLOS** **Effective Simulation and Debugging for a High-Level Hardware Language Using Software Compilers**
Clément Pit-Claudel, Thomas Bourgeat, Stella Lau, Arvind, Adam Chlipala.
Proc. 26th ACM Intl. Conf. on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2021).

2020 **SLE** **Untangling Mechanized Proofs**
Clément Pit-Claudel.
Proc. 13th ACM SIGPLAN Intl. Conf. on Software Language Engineering (SLE 2020). 🎖 **Distinguished artifact**.

PLDI **The Essence of Bluespec: A Core Language for Rule-Based Hardware Design**
Thomas Bourgeat, **Clément Pit-Claudel**, Adam Chlipala, Arvind.
Proc. 41st ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2020).

2016 **CAV** **Trigger Selection Strategies to Stabilize Program Verifiers**
K. Rustan M. Leino and **Clément Pit-Claudel**.
Proc. 28th Intl. Conf. on Computer Aided Verification (CAV 2016).

2015 **POPL** **Fiat: Deductive Synthesis of Abstract Data Types in a Proof Assistant**
Benjamin Delaware, **Clément Pit-Claudel**, Jason Gross, Adam Chlipala.
Proc. 42nd ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL 2015).

See page 5 for a complete list of publications.

Research projects

Formal methods for real-world DSLs

Elk is a linear-time engine for a subset of JavaScript regular expressions (regexes). Some of the algorithms pioneered in Elk have been merged into V8 (and hence Chrome and Node.js). The project was led by my post-doc Aurèle Barrière.

Warblre is a near-complete Coq translation of the JS regex specification. Developing this spec helped us find mistakes in previous paper-based specifications and disprove longstanding assumptions about JS regexes. The project was led by Noé De Santo, an MS thesis student, an co-supervised by my post-doc Aurèle Barrière. 🎖 **SRC Gold medal (1st place, graduate division)**

Correct-by-construction refinement

Fiat is a library for the Coq proof assistant that lets users automatically refine declarative specifications into efficient functional programs. I wrote parts of the framework and examples and did the evaluation.

Narcissus is an extensible library of context-sensitive parser combinators, general enough to specify and automatically derive verified encoders and decoders for a wide range of binary formats like Ethernet, ARP, TCP, IP, etc. I wrote bit-manipulation libraries and data structures and did the integration and evaluation.

Extensible proof-producing compilers and binary code extraction

F2F is a program extraction framework for Coq that uses syntax-driven automation to derive correct-by-construction imperative programs from nondeterministic functional source code. I am the sole author.

Rupicola is a compiler-construction toolkit that lets users assemble verified domain-specific compilers from reusable translation lemmas, producing high-performance low-level code from unoptimized domain-specific functional models. I am the lead author.

Hardware design languages: semantics and verification

Kôika is a rule-based hardware design language with cycle-accurate semantics formalized in Coq. It features high-level abstractions inherited from Bluespec, executable semantics proven to refine one-rule-at-a-time execution, and a formally-verified compiler that generates circuits with good performance. I am one of two lead authors; I formalized the semantics in Coq and designed and verified the compiler to circuits.

Cuttlesim is a fast cycle-accurate simulator for Kôika that beats state-of-the-art RTL simulators by a factor 2 to 5 by leveraging high-level information to minimize redundant work. Cuttlesim generates C++ models that are readable enough to enable hardware debugging and testing using traditional software tools. I am the lead author.

Tooling for interactive theorem provers

Alectryon is a literate-programming system for Coq that produces interactive visualizations of Coq proofs. Alectryon offers a new way to write, communicate, and preserve proofs, combining the flexibility of procedural proof scripts and the intelligibility of declarative proofs. I am the sole author. 🎖 **Distinguished artifact**

Teaching experience

2024 – 25 ***Interactive Theorem Proving* (*CS-428*, *CS-628*) — EPFL**
Taught a hands-on introduction to formal verification and computer-checked mathematics, including compiler verification, proofs as programs, and proof automation. **4-month** instructorships

2023 – 25 ***Software Construction* (*CS-214*) — EPFL**
Designed and taught a new software engineering curriculum to 400+ students; managed a team of 30 people. Introduced a new lecture series on debugging; a software-correctness track; refactoring-focused lab callbacks; hands-on exercises; live-coding demos; and a career-advice lecture. The first iteration of the course received 98% positive ratings. **4-month** instructorships

2021 ***Kaufman Teaching Certificate Program* — Teaching+Learning Lab, MIT**
Successfully completed the KTCP, MIT's flagship teaching development program, with 15-hours of in-class instruction and 30 hours of pre- and post-workshop assignments aimed at developing my teaching skills. **3 month** teaching certification program

2021 ***Formal Reasoning about Programs* — MIT**
Created problem sets, developed automated grading technology, held debriefings, and taught students one-on-one and in small groups; received an average rating of 6.8/7 with 80% perfect scores.
3 month teaching assistantship

2016 ***Fundamentals of Programming* — MIT**
Designed labs, taught recitations, prepared debriefings; received 65 student reviews with an average teaching rating of 6.8/7 and 55 perfect teaching scores, and was awarded a 🎖 **Frederick C. Hennie III Teaching Award in Recognition of Outstanding Contributions to Departmental Teaching**.
4-month teaching assistantship

2011 – 12 **Association Tremplin**
Designed AP-level mathematics, physics, and computer science classes and taught over 60 motivated teenagers across three high schools from low-income neighborhoods. Classes were intended to encourage college applications, boost student confidence, and increase preparedness. Over 95% of the students completed the program successfully. **7-month** civil service in Seine-Saint-Denis, France

Industry experience

2021 – 22 **Amazon AWS (Senior Applied Scientist, Automated Reasoning Group, Dafny team)**
Launched Dafny-in-Dafny, a project to **bootstrap and verify** parts of Dafny's compilation pipeline; designed and implemented multiple **new languages features**, including changes in pattern matching, name resolution, and type-checking; audited parts of Dafny for soundness, discovering and fixing several **soundness bugs**; developed freely available **educational materials** and **verified libraries** for Dafny; provided **technical and scientific support** to existing customers; helped new customers adopt and get proficient in Dafny; participated in recruiting; mentored interns and colleagues; contributed to the day to day maintenance and evolution of Dafny. **1 year** pre-battical in Vancouver, WA

2017 **INRIA (Prosecco team, supervised by Cătălin Hriţcu)**
Implemented **reflective pattern-matching tactics** for F*; contributed to research on **effect erasure**; rewrote F*'s **IDE protocol and state machine** to implement a full-fledged IDE; built a **literate programming** system for F*; assembled **web-based builds of F* and Z3**. **3-month** internship in Paris, France

2015 **Microsoft Research (RISE group, supervised by K. Rustan M. Leino)**
Improved the predictability and robustness of the *Dafny* program verifier, generating custom triggers to prevent spurious quantifier instantiations and matching loops. **3-month** internship in Redmond, WA

2013 **华为 | Huawei**
Designed and implemented a fast upper body limb detection and tracking engine based on Bayesian inference in graphical models. **6 weeks** internship in Shenzhen, China

2009 **CSSI Communication & Systèmes**
Built a Fortran static analyzer to analyze control flow, build call graphs, and locate dead code.
1 month internship in *Le Plessis Robinson*, France

Entrepreneurship

2013 – 17 **Launched *YìXué Chinese Dictionary*, a paid English-Chinese dictionary for Windows Phone. YìXué sold over 1200 copies, achieved a 4.7★ rating with over 200 reviews, and was featured three times on Microsoft's app store.**

2009 – 13 **Launched and maintained *Create Synchronicity***, an open source backup & synchronization app (**550k downloads, 2k daily users**, translated to 30 languages). Featured in *PC Magazine*'s *Best free software of 2011* and *Computer Bild*'s *Open Source DVD*.

Service

EPFL: Working group on science & engineering of data (2023).

IC: Campus cybersecurity task force (Summer 2025), Dean search committee (Spring 2025), Faculty search committee (Fall 2024), MS reform committee (2024), Teaching committee (since Fall 2023), Academic committee (since Fall 2023), Teaching faculty candidate interviews (Spring 2023), Faculty candidate interviews (since Spring 2022), PhD recruiting committee (since Fall 2021, area chair for PLFM since Fall 2023).

Events: VSTTE'25 (Chair), SuRI'25 (Organizer), PLDI'24, '25 (Workshops and tutorials chair), Coq Workshop'24 (Chair), Proof Systems'24 (Organizer), POPL'24 (Session previews chair), Swiss Verification Day'24 (Organizer), CAV'21 (AEC chair).

Reviewing: JFLA'26, HATRA'25, PLDI'25 SRC, OOPSLA'25, OSDI'25, Dafny'25, CPP'25, POPL'25, HATRA'24, SEFI'24, ICFP'24, ESOP'24, PLDI'24, SPLASH'23 SRC, APLAS'23, CPP'23, CoqPL'23, LATTE'23, POPL'23, PriSC'23, PLDI'22, Coq Workshop'22, LATTE'21, PLOS'21, Formal Methods Symposium, Journal of Statistical Computation and Simulation, ACM Transactions on Programming Languages and Systems, Journal of Functional Programming.

Other roles: Session chair (ICFP'24 (Verification and Cost Analysis), PLDI'24 (Verification II), POPL'24 (Session preview), PLDI'22 (Hardware I, Memory), SPLASH'21 (SIGPLAN)); SRC judge (PLDI'24); AEC member (POPL'18, POPL'16); Mentor (PLATEAU'24, PLATEAU'23); Student PC member (IEEE S&P'19); Conference volunteer (PLDI'18, SPLASH'18); Grant reviewer (NRDI).

Funding and international collaborations

2025 **HADAL, ÔIKA: Mechanized foundations for trustworthy hardware design**
Swiss National Science Foundation (SNSF Project)
4 years, 805 kCHF with Prof. Thomas Bourgeat (EPFL).

REMPAR: "Représentations, modèles et parseurs"
Institut national de recherche en informatique et en automatique (Inria-EPFL Associate Team)
3 years with Prof. Hugo Herbelin (Inria).

2024 **RESET: Regex matching made Safe, Effective, and Trustworthy**
Swiss National Science Foundation (SNSF Project)
3 years, 467 kCHF.

VERSE: Verification Engineering for Real-world Software Engineers
DARPA (PROVERS)
7 months, 180 kUSD (self) with Galois, UPenn, UCam, UMass Amherst, UIUC, UMD.

FIRE: Open Mechanized Foundations for JavaScript Regular Expressions
FIT Domain Open Research Data Programme (ORD Contribute)
1 year, 30 kCHF.

Awards

Distinguished artifact, *Untangling Mechanized Proofs*, ACM SIGPLAN International Conference on Software Language Engineering (2020).

William A. Martin Memorial Thesis Award for Outstanding Thesis in CS, *Compilation using Correct-by-Construction Program Synthesis*, MIT (2016).

Frederick C. Hennie III Teaching Award in Recognition of Outstanding Contributions to Departmental Teaching, 6.009 *Fundamentals of Programming*, MIT (2016).

Robert B. Guenassia Award, MIT (2015).

2nd place, *École Polytechnique*'s ***Best Group Research Project***, for research on webcam-based gaze tracking (2013).

2nd place, Microsoft France's ***App Awards***, a mobile development contest, for *YìXué Chinese Dictionary* (2013).

3rd place, Computer Science **competitive entrance exam** of the *École Normale Supérieure* (*ENS Ulm*) (2011).

4th place, **French Olympiads in Mathematics, Paris division** (2008).

Other activities

Launched the proofs.swiss initiative to strengthen the Swiss formal-methods community, and jointly organized the first *Swiss Verification Day* (68 participants, 5 universities, 3 companies) at EPFL and the 2024 *Proof Systems for Mathematics & Verification* workshop (50 participants, 9 countries) at Unil.

Launched or contributed to many free software projects since 2012, including plugins and translations for Rockbox (a free audio player firmware), documentation tools for Coq, Lean and F*, and Emacs packages for bibliography management, on-the-fly syntax checking, and various research languages (I wrote biblio.el, ESH, company-coq, F*-mode, and boogie-friends; I co-maintain Flycheck and Proof-General).

Lab highlights (SYSTEMF)

We hosted 7 MS research theses, 7 MS industry theses, 32 projects, 11 internships, and 8 assistants since 2023.

One of our MS thesis students won first place at PLDI'24's ACM student research competition (gold medal, graduate division).

Our linear-time regex-matching algorithms were merged in Google's V8 JavaScript engine (Google Chrome & Node.js).

Skills

Software design & development: Wrote professional software in C#, Scala, Coq, OCaml, Dafny, Emacs Lisp, Python, TypeScript, JavaScript, VB.Net, and C++. Other languages include HTML+CSS, C, Java, F*, Racket, PHP.

Languages: **French** (mother tongue, French citizen), **English** (fluent), **Spanish**, **Chinese**, **Japanese** (basic).

All publications

2025 **ICSE** **Formally Verified Cloud-Scale Authorization**
Aleks Chakarov, Jaco Geldenhuys, Matthew Heck, Michael Hicks, Sam Huang, Georges-Axel Jaloyan, Anjali Joshi, K. Rustan M. Leino, Mikael Mayer, Sean McLaughlin, Akhilesh Mritunjai, Clement Pit-Claudel, Sorawee Porncharoenwase, Florian Rabe, Marianna Rapoport, Giles Reger, Cody Roux, Neha Rungta, Robin Salkeld, Matthias Schlaipfer, Daniel Schoepe, Johanna Schwartzentruber, Serdar Tasiran, Aaron Tomb, Emina Torlak, Jean-Baptiste Tristan, Lucas Wagner, Michael W. Whalen, Remy Willems, Tongtong Xiang, Tae Joon Byun, Joshua Cohen, Ruijie Fang, Junyoung Jang, Jakob Rath, Hira Taqdees Syeda, Dominik Wagner, Yongwei Yuan.
Proc. 47th IEEE/ACM Intl. Conf. on Software Engineering (ICSE 2025). **Distinguished paper**.

2024 **SOSP** **Practical Verification of System-Software Components Written in Standard C**
Can Cebeci, Yonghao Zou, Diyu Zhou, George Candea, **Clément Pit-Claudel**.
Proceedings of the ACM SIGOPS 30th Symposium on Operating Systems Principles (SOSP 2024).

CCS **Specification and Verification of Strong Timing Isolation of Hardware Enclaves**
Stella Lau, Thomas Bourgeat, **Clément Pit-Claudel**, Adam Chlipala.
Proc. 2024 ACM SIGSAC Conference on Computer and Communications Security (CCS 2024). **Distinguished artifact**.

OOPSLA **Gradient: Gradual Compartmentalization via Object Capabilities Tracked in Types**
Aleksander Boruch-Gruszecki, Adrien Ghosn, Mathias Payer, **Clément Pit-Claudel**.
Proceedings of the ACM on Programming Languages (OOPSLA 2024).

ICFP **A Coq Mechanization of JavaScript Regular Expression Semantics**
Noé De Santo, Aurèle Barrière, **Clément Pit-Claudel**.
Proceedings of the ACM on Programming Languages (ICFP 2024).

PLDI **Linear Matching of JavaScript Regular Expressions**
Aurèle Barrière, **Clément Pit-Claudel**.
Proceedings of the ACM on Programming Languages (PLDI 2024).

PLDI **Foundational Integration Verification of a Cryptographic Server**
Andres Erbsen, Jade Philipoom, Dustin Jamner, Ashley Lin, Samuel Gruetter, **Clément Pit-Claudel**, Adam Chlipala.
Proceedings of the ACM on Programming Languages (PLDI 2024).

Dafny **Incremental Proof Development in Dafny with Module-Based Induction**
Son Ho, **Clément Pit-Claudel**.
Dafny 2024 (Dafny 2024).

2023 **HATRA** **Diagrammatic notations for interactive theorem proving**
Shardul Chiplunkar, **Clément Pit-Claudel**.
4th International Workshop on Human Aspects of Types and Reasoning Assistants (HATRA 2023).

PLARCH **Hardware Verification of Timing Side Channel Freedom in the Spectre Era**
Stella Lau, Thomas Bourgeat, **Clément Pit-Claudel**, Adam Chlipala.
Workshop on Programming Languages for Architecture (PLARCH 2023).

2022 **PLDI** **Relational Compilation for Performance-Critical Applications: Extensible Proof-Producing Translation of Functional Models into Low-Level Code**
Ⓡ **Clément Pit-Claudel**, Jade Philipoom, Dustin Jamner, Andres Erbsen, Adam Chlipala.
Proc. 43rd ACM SIGPLAN Intl. Conf. on Programming Language Design and Implementation (PLDI 2022).

(PhD thesis) **Relational Compilation: Functional-to-Imperative Code Generation for Performance-Critical Applications**
Clément Pit-Claudel.
PhD thesis at MIT.

2021 **ASPLOS** **Effective Simulation and Debugging for a High-Level Hardware Language Using Software Compilers**
Ⓕ Ⓟ **Clément Pit-Claudel**, Thomas Bourgeat, Stella Lau, Arvind, Adam Chlipala.
Proc. 26th ACM Intl. Conf. on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2021).

CoqPL **Automated Synthesis of Verified Firewalls**
Shardul Chiplunkar, **Clément Pit-Claudel**, Adam Chlipala.
The 7th International Workshop on Coq for PL (CoqPL 2021). Workshop paper.

CoqPL **An experience report on writing usable DSLs in Coq**
Clément Pit-Claudel, Thomas Bourgeat.
The 7th International Workshop on Coq for PL (CoqPL 2021). Workshop paper.

2020 **SLE** **Untangling Mechanized Proofs**
Ⓕ Ⓡ 🎗 **Clément Pit-Claudel**.
Proc. 13th ACM SIGPLAN Intl. Conf. on Software Language Engineering (SLE 2020). 🎗 **Distinguished artifact**.

IJCAR **Extensible Extraction of Efficient Imperative Programs with Foreign Functions, Manually Managed Memory, and Proofs**
Clément Pit-Claudel, Peng Wang, Benjamin Delaware, Jason Gross, Adam Chlipala.
Proc. 10th International Joint Conference on Automated Reasoning (IJCAR 2020).

PLDI **The Essence of Bluespec: A Core Language for Rule-Based Hardware Design**
Ⓕ Ⓡ Thomas Bourgeat, **Clément Pit-Claudel**, Adam Chlipala, Arvind.
Proc. 41st ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2020).

2019 **ICFP** **Narcissus: Correct-by-Construction Derivation of Decoders and Encoders from Binary Formats**
Ⓕ Benjamin Delaware, Sorawit Suriyakarn, **Clément Pit-Claudel**, Qianchuan Ye, Adam Chlipala.
Proceedings of the ACM on Programming Languages (ICFP 2019).

ESOP **Meta-F* : Proof Automation with SMT, Tactics, and Metaprograms**
Guido Martínez, Danel Ahman, Victor Dumitrescu, Nick Giannarakis, Chris Hawblitzel, Cătălin Hriţcu, Monal Narasimhamurthy, Zoe Paraskevopoulou, **Clément Pit-Claudel**, Jonathan Protzenko, Tahina Ramananandro, Aseem Rastogi, Nikhil Swamy.
Proc. 28th European Symposium on Programming (ESOP 2019).

2018 **SETTA** **Correct-by-Construction Implementation of Runtime Monitors Using Stepwise Refinement**
Teng Zhang, John Wiegley, Theophilos Giannakopoulos, Gregory Eakman, **Clément Pit-Claudel**, Insup Lee, Oleg Sokolsky.
Proc. 4th International Symposium on Dependable Software Engineering: Theories, Tools, and Applications (SETTA 2018).

ML **ML as a Tactic Language, Again**
Guido Martínez, Danel Ahman, Victor Dumitrescu, Nick Giannarakis, Chris Hawblitzel, Cătălin Hriţcu, Monal Narasimhamurthy, Zoe Paraskevopoulou, **Clément Pit-Claudel**, Jonathan Protzenko, Tahina Ramananandro, Aseem Rastogi, Nikhil Swamy.
ML Family Workshop (ML 2018). Workshop paper.

2017 **SNAPL** **The End of History? Using a Proof Assistant to Replace Language Design with Library Design**
Adam Chlipala, Benjamin Delaware, Samuel Duchovni, Jason Gross, **Clément Pit-Claudel**, Sorawit Suriyakarn, Peng Wang, Katherine Ye.
The 2nd Summit on Advances in Programming Languages (SNAPL 2017).

2016 **CAV** **Trigger Selection Strategies to Stabilize Program Verifiers**
K. Rustan M. Leino and **Clément Pit-Claudel**.
Proc. 28th Intl. Conf. on Computer Aided Verification (CAV 2016).

CoqPL **Company-Coq: Taking Proof General one step closer to a real IDE**
Clément Pit-Claudel, Pierre Courtieu.
The 2nd International Workshop on Coq for PL (CoqPL 2016). Workshop paper.

(MS thesis) **Compilation Using Correct-by-Construction Program Synthesis**
Clément Pit-Claudel.
Master's thesis at MIT. **William A. Martin Memorial Thesis Award for Outstanding Thesis in CS**.

2015 **POPL** **Fiat: Deductive Synthesis of Abstract Data Types in a Proof Assistant**
Benjamin Delaware, **Clément Pit-Claudel**, Jason Gross, Adam Chlipala.
Proc. 42nd ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL 2015).

(Tech report) **Outlier Detection in Heterogeneous Datasets using Automatic Tuple Expansion**
Clément Pit-Claudel, Zelda Mariet, Rachael Harding, Sam Madden.
Technical report.

Key

This publication received an award.

This publication received the "Artifacts Evaluated" badge (used in some conferences that do not distinguish between "functional" and "reusable").

This publication received the "Artifacts Evaluated – Functional" badge: "*The artifacts associated with the research are found to be documented, consistent, complete, exercisable, and include appropriate evidence of verification and validation.*"

This publication received the "Artifacts Evaluated – Reusable" badge: "*The artifacts associated with the paper are of a quality that significantly exceeds minimal functionality. That is, they have all the qualities of the Artifacts Evaluated – Functional level, but, in addition, they are very carefully documented and well-structured to the extent that reuse and repurposing is facilitated. In particular, norms and standards of the research community for artifacts of this type are strictly adhered to.*" (not all conferences offer this badge; all my eligible papers received it).

This publication received the "Artifacts Evaluated – Results reproduced" badge: "*The main results of the paper have been obtained in a subsequent study by a person or team other than the authors, using, in part, artifacts provided by the author.*" (not all conferences offer this badge; all my eligible papers received it).