

# Burak Ekici, Ph.D.

Muğla Sıtkı Koçma University University, Department of Computer Engineering

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URL: <http://ekiciburak.github.io/>

Languages: Turkish(native), English (operational), French(intermediate), Italian(intermediate), German (Notions)

## Education & Employment

- 2022-now Assistant Professor @ *Department of Computer Engineering, Muğla Sıtkı Koçman University, Muğla, Turkey.*
- 2021-2022 Assistant Professor @ *Department of Computer Engineering, TED University, Ankara, Turkey.*
- 2019-2020 Assistant Professor @ *Department of Computer Engineering, İstanbul Kültür University, İstanbul, Turkey.*
- 2018-2019 Post-Doctoral Research Fellow @ *Department of Computer Science, University of Innsbruck, Innsbruck, Austria.*  
*Project: CoqHammer.*  
*Advisor: Cezary Kaliszyk.*  
*With: Łukasz Czajka.*
- 2016-2017 Post-Doctoral Research Fellow @ *Department of Computer Science, The University of Iowa, Iowa City-IA, USA.*  
*Project: Integrating CVC4 into SMTCoq.*  
*Advisor: Cesare Tinelli.*  
*With: Chantal Keller and Alain Mebsout.*
- 01.2013-12.2015 PhD Student @ *Department of Informatics, University Joseph Fourier, Grenoble-France.*  
*Thesis: Certification of programs with computational effects. [manuscript] [slides]*  
*Advisors: Jean-Guillaume Dumas, Dominique Duval, Damien Pous.*
- 2009-2012 MSc Student @ *Department of Computer Engineering, Yaşar University, Izmir-Turkey.*  
*Thesis: A parallelization approach to Haskell language through category theoretic implementations.*  
*Advisor: Ahmet H. Koltuksuz.*
- 2010-2011 Trainee Researcher @ *European Commission Joint Research Centre, Ispra(VA)-Italy.*  
*Project: Linearity detection of the growth effect on children fingertips.*  
*Advisor: Günter-Egon Schumacher.*
- 2004-2009 BSc Student @ *Department of Computer Engineering, Izmir Institute of Technology, Izmir-Turkey.*  
*Thesis: Parallelization of mathematical functions of a cryptographic and multiprecision library, Crympix.*  
*Advisor: Ahmet H. Koltuksuz.*  
*With: Görkem Kılınç and Çağatay Yücel.*

## Research Interests

Computational effects, categorical logic, type theory, Coq, functional programming, Haskell, OCaml, SMT, hammer systems.

## Publications & Abstracts

### JOURNALS

- 2023 *Burak Ekici.* [A Sound Definitional Interpreter for a Simply Typed Functional Language](#), *Axioms*.
- 2022 *Burak Ekici.* [Formal categorical reasoning](#), *Turkish Journal of Mathematics*.
- 2020 *Burak Ekici, Cezary Kaliszyk.* [Mac Lane's Comparison Theorem for the Kleisli Construction Formalized in Coq](#), *Mathematics in Computer Science*.
- 2018 *Burak Ekici.* [IMP with exceptions over decorated logic.](#), *Discrete Mathematics and Theoretical Computer Science*.

### CONFERENCES

- 2019 *Burak Ekici, Arjun Viswanathan, Yoni Zohar, Clark Barrett, and Cesare Tinelli.* ["Verifying Bit-vector Invertibility Conditions in Coq \(Extended Abstract\)."](#) Sixth Workshop on Proof eXchange for Theorem Proving (PxTP). Natal, Brazil, August 2019.
- 2018 *Łukasz Czajka, Burak Ekici, Cezary Kaliszyk.* ["Concrete Semantics with Coq and CoqHammer."](#) Proc. 11th Int. Conf. on Intelligent Computer Mathematics (CICM). Hagenberg, Austria, August 2018.
- 2018 *Burak Ekici.* ["Towards Mac Lane's Comparison Theorem for the \(co\)Kleisli Construction in Coq."](#) Proc. of the 3rd Formal Mathematics for Mathematicians (FMM), co-located with the 11th CICM. Hagenberg, Austria, August 2018.
- 2017 *Burak Ekici, Alain Mebsout, Cesare Tinelli, Chantal Keller, Guy Katz, Andrew Reynolds and Clark Barrett.* ["SMTCoq: A plug-in for integrating SMT solvers into Coq."](#) Proc. 29th Int. Conf. on Computer Aided Verification (CAV). Heidelberg, Germany, July 2017.
- 2016 *Burak Ekici, Guy Katz, Chantal Keller, Alain Mebsout, Andrew Reynolds and Cesare Tinelli.* ["Extending SMTCoq, a Certified Checker for SMT \(Extended Abstract\)."](#) *HaTT 2016: 1st International Workshop on Hammers for Type Theories, Coimbra, Portugal, July 2016*.
- 2015 *Jean-Guillaume Dumas, Dominique Duval, Burak Ekici, Damien Pous and Jean-Claude Reynaud.* ["Hilbert-Post completeness for the state and the exception effects."](#) *MACIS 2015: Sixth International Conference on Mathematical Aspects of Computer and Information Sciences, Berlin, Germany, 11–13 November 2015*.
- 2014 *Jean-Guillaume Dumas, Dominique Duval, Burak Ekici and Jean-Claude Reynaud.* ["Certified proofs in programs involving exceptions."](#) *CICM 2014 : Eighth Conference on Intelligent Computer Mathematics, Coimbra, Portugal, 7–11 July 2014, CEUR Workshop Proceedings, no 1186, paper 20*.
- 2014 *Jean-Guillaume Dumas, Dominique Duval, Burak Ekici and Damien Pous.* ["Formal verification in Coq of program properties involving the global state effect"](#) *JFLA 2014 : Journées Francophones des Langages Applicatifs, Fréjus, France, 8–11 January 2014*.
- 2010 *Burak Ekici, Çağatay Yücel, Görkem Kılınc, Ahmet H. Koltuksuz,* ["Implementations of Category Theory in Computer Science."](#), *9<sup>th</sup> National Mathematics Symposium, Karadeniz Technical University, October 2010*.
- 2010 *K. Kratchanov, E. Golemanova, T. Golemanov, T. Ercan, B. Ekici.* ["Implementation of Search Strategies in Control Network Programming."](#), *Procedural and Non-Procedural In: Proc. Intl. Symposium in Innovations in Intelligent Systems and Applications (INISTA 2010), June 2010, Kayseri, Turkey, 386–390*.

### ABSTRACTS

- 2022 *Burak Ekici.* ["Formal Categorical Reasoning."](#) *Studies on Scientific Developments in Geometry, Algebra, and Applied Mathematics (Online Event), 1–3 February 2022*.
- 2014 *Jean-Guillaume Dumas, Dominique Duval, Burak Ekici and Damien Pous.* ["Program certification with computational effects."](#) *Journées Nationales de Calcul Formel (JNCF) 2014, Marseille, France November 2014*.
- 2014 *Burak Ekici.* ["Certification of programs with computational effects."](#) *Doctoral session. CICM 2014 : Eighth*

*Conference on Intelligent Computer Mathematics, Coimbra, Portugal, 7–11 July 2014.*

## Teaching

2020–2023	Main Course: Formal Languages and Abstract Machines
2022–2023	Main Course: Functional Programming (Haskell)
2021–2022	Main Course: Category Theory in Computer Science
2021–2022	Main Course: Fundamentals of Programming I
2019–2020	Main Course: Digital Design
2019–2020	Main Course: Microprocessors
2019–2020	Main Course: Programming Languages
2018–2019	Proseminar: Discrete Mathematics

## Recent Talks

### INVITED

07.06.2019	<a href="#">Univalent Typoids in Coq</a> . Ludwig-Maximilians-Universität, Munich-Germany.
27.12.2018	Decorated semantics for an imperative language with exceptions. Özyeğin University, İstanbul-Turkey.
10.11.2015	<a href="#">Relative Hilbert-Post completeness for exceptions</a> . Foundations Seminar, Ljubljana-Slovenia.

### OTHERS

01.02.2022	Formal Categorical Reasoning. <a href="#">Studies on Scientific Developments in Geometry, Algebra, and Applied Mathematics</a> . (online event)
27.03.2019	Univalent Type Theory. Master Seminar, University of Innsbruck-Austria.
15.08.2018	<a href="#">Concrete Semantics with Coq and CoqHammer</a> . CICM'18 Hagenberg-Austria.
13.08.2018	<a href="#">Towards Mac Lane's Comparison Theorem for the (co)Kleisli construction in Coq</a> . FMM'18 Hagenberg-Austria.
31.05.2018	<a href="#">SMTCoq, a plug-in for the trustworthy integration of SAT/SMT solvers into Coq</a> . Master Seminar, University of Innsbruck-Austria.
03.06.2015	<a href="#">IMP with exceptions over decorated logic</a> . TFP'15, Sophia-Antipolis-France.
05.11.2014	<a href="#">Program certification with computational effects</a> . JNCF'14, Marseille-France.
11.07.2014	<a href="#">Certification of programs with computational effects</a> . CICM'14, Coimbra-Portugal.
09.01.2014	<a href="#">Formal verification in Coq of program properties involving the global state effect</a> . JFLA'2014, Fréjus - France.
05.12.2013	<a href="#">Formal verification in Coq of program properties involving the global state effect</a> . Séminaires LJK-Modèles et Algorithmes Déterministes: BIPOP-CASYS, Grenoble-France.

## Events Attended

### INVITED

07.06.2019	<a href="#">Types in Munich</a> (invited by Dr. Iosif Petrakis), Ludwig-Maximilians-Universität, Munich-Germany.
09-13.11.15	University of Ljubljana (invited by Dr. Andrej Bauer), Ljubljana, Slovenia.

## OTHERS

- 13-17.08.18 Conferences on Intelligent Computer Mathematics (CICM'18), Hagenberg-Austria.
- 25-30.03.18 3rd Conference on Artificial Intelligence and Theorem Proving (AITP'18), Aussois-France.
- 03-05.06.15 The Sixteenth Symposium on Trends in Functional Programming (TIFP'15), INRIA, Sophia-Antipolis-France.
- 26-29.05.15 Colloque Inter'Actions en Mathématiques 2015 (member of the organization committee), Institut Fourier, Grenoble-France.
- 03-07.11.14 Journées Nationales de Calcul Formel (JNCF'14), CIRM, Marseille-France.
- 07-11.07.14 Conferences on Intelligent Computer Mathematics (CICM'14), Coimbra-Portugal.
- 07-18.04.14 PhD school on semantics of proofs and certified mathematics by Institut Henri Poincaré, CIRM, Marseille-France.
- 07-11.01.14 JFLA: Journées Francophones des Langages Applicatifs, La-villa-clythia, Fréjus-France.
- 23-31.05.13 École Jeunes Chercheurs en Programmation, Inria, Rennes-France.

## Code

Please see my [github repository](#).

## Miscellaneous

Programming: C/C++, Java, Haskell, OCaml, Coq, Lean.  
Libraries: CRYMPIX, OpenMP, WHY3, SMTCoq, CoqHammer.

## Referees

[Jean-Guillaume Dumas](#)

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