

# Burak Ekici, Ph.D.

Muğla Sıtkı Koçman University, Department of Computer Engineering

e-mail : [burakekici@mu.edu.tr](mailto:burakekici@mu.edu.tr)  
URL : <http://ekiciburak.github.io/>  
Languages : Turkish (native), English (operational), French (inter.), Italian (inter.), German (notions)

## Education & Employment

- 2022-now Assistant Professor at *Department of Computer Engineering, Muğla Sıtkı Koçman University*, Muğla, Turkey.
- 2021-2022 Assistant Professor at *Department of Computer Engineering, TED University*, Ankara, Turkey.
- 2019-2020 Assistant Professor at *Department of Computer Engineering, İstanbul Kültür University*, İstanbul, Turkey.
- 2018-2019 Post-Doctoral Research Fellow at *Department of Computer Science, University of Innsbruck*, Innsbruck, Austria.  
*Project: CoqHammer.*  
*Advisor: Cezary Kaliszyk.*  
*With: Łukasz Czajka.*
- 2016-2017 Post-Doctoral Research Fellow at *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 at *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 at *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 at *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 at *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

- 2023 *Burak Ekici, Arjun Viswanathan, Yoni Zohar, Cesare Tinelli, and Clark Barrett.* [Formal Verification of Bit-vector Invertibility Conditions in Coq](#), *The 14th International Symposium on Frontiers of Combining System (FroCoS) 2023* (to appear).
- 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 Ham-mers 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-Cluaude 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 Appliqués, Fréjus, France, 8–11 January 2014*.
- 2010 *Burak Ekici, Çağatay Yücel, Görkem Kılınç, Ahmet H. Koltuksuz,* [Implementations of Category Theory in Computer Science](#), *9th 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

2022–2023 Main Course: Operating Systems (System programming in C)

2019–2020, 2022–2023 Main Course: Programming Language Concepts (OCaml, Coq)

2020–2023 Main Course: Formal Languages and Abstract Machines

2022–2023 Main Course: Functional Programming (Haskell, Coq)

2021–2022 Main Course: Category Theory in Computer Science (Coq)

2021–2022 Main Course: Fundamentals of Programming I (Java)

2019–2020 Main Course: Digital Design

2019–2020 Main Course: Microprocessors (x86)

2018–2019 Proseminar: Discrete Mathematics

## Recent Talks

### INVITED

07.06.2019 [Univalent Typoids in Coq](#). Ludwig-Maximilians-Universität, Munich-Germany.

27.12.2018 Decorated semantics for an imperative language with exceptions. Özyeğin University, İstanbul-Turkey.

10.11.2015 [Relative Hilbert-Post completeness for exceptions](#). Foundations Seminar, Ljubljana-Slovenia.

### OTHERS

01.02.2022 Formal Categorical Reasoning. [Studies on Scientific Developments in Geometry, Algebra, and Applied Mathematics](#). (online event)

27.03.2019 Univalent Type Theory. Master Seminar, University of Innsbruck-Austria.

15.08.2018 [Concrete Semantics with Coq and CoqHammer](#). CICM'18 Hagenberg-Austria.

13.08.2018 [Towards Mac Lane's Comparison Theorem for the \(co\)Kleisli construction in Coq](#). FMM'18 Hagenberg-Austria.

31.05.2018 [SMTCoq, a plug-in for the trustworthy integration of SAT/SMT solvers into Coq](#). Master Seminar, University of Innsbruck-Austria.

03.06.2015 [IMP with exceptions over decorated logic](#). TFP'15, Sophia-Antipolis-France.

05.11.2014 [Program certification with computational effects](#). JNCF'14, Marseille-France.

11.07.2014 [Certification of programs with computational effects](#). CICM'14, Coimbra-Portugal.

09.01.2014 [Formal verification in Coq of program properties involving the global state effect](#). JFLA'2014, Fréjus - France.

05.12.2013 [Formal verification in Coq of program properties involving the global state effect](#). Séminaires LJK-Modèles et Algorithmes Déterministes: BIPOP-CASYS, Grenoble-France.

## Events Attended

### INVITED

- 07.06.2019 [Types in Munich](#) (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](#)

LJK, University Grenoble Alpes  
email: [jean-guillaume.dumas@univ-grenoble-alpes.fr](mailto:jean-guillaume.dumas@univ-grenoble-alpes.fr)

[Dominique Duval](#)

LJK, University Grenoble Alpes  
email: [dominique.duval@univ-grenoble-alpes.fr](mailto:dominique.duval@univ-grenoble-alpes.fr)

[Cesare Tinelli](#)

Department of Computer Science,  
The University of Iowa  
email: [cesare-tinelli@uiowa.edu](mailto:cesare-tinelli@uiowa.edu)

[Cezary Kaliszyk](#)

Computational Logic Group,  
University of Innsbruck  
email: [cezary.kaliszyk@uibk.ac.at](mailto:cezary.kaliszyk@uibk.ac.at)

[Murat Taylı](#)

Department of Computer Engineering,  
İstanbul Kültür University  
email: [m.tayli@iku.edu.tr](mailto:m.tayli@iku.edu.tr)