

# Burak Ekici, Ph.D.

TED University, Department of Computer Engineering  
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Languages: Turkish(native), English (operational), French(intermediate), Italian(intermediate), German (Notions)

## Education & Employment

- 2021-now 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, SMT, hammer systems.

## Publications & Abstracts

### JOURNALS

- 2022 Burak Ekici. “[Formal categorical reasoning.](#)” Turkish Journal of Mathematics, 2022.

- 2020 *Burak Ekici*, Cezary Kaliszyk. “[Mac Lane’s Comparison Theorem for the Kleisli Construction Formalized in Coq](#).” *Mathematics in Computer Science*, 2020.
- 2018 *Burak Ekici*. “[IMP with exceptions over decorated logic](#).” *Discrete Mathematics and Theoretical Computer Science* 20(2), 2018.

#### 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-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 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

- 2021-2022 Main Course: Theory of Computation @ TED University.
- 2020-2021

2021-2022 Main Course: Category Theory in Computer Science @ TED University.

2021-2022 Main Course: Fundamentals of Programming I @ TED University.

2019-2020 Main Course: Digital Design @ İstanbul Kültür University.

2019-2020 Main Course: Microprocessors @ İstanbul Kültür University.

2019-2020 Main Course: Programming Languages @ İstanbul Kültür University.

2018-2019 Proseminar: Discrete Mathematics @ University of Innsbruck.

## 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

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 The University of Iowa

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[Cezary Kaliszyk](#)

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 University of Innsbruck

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