

# ELİF USKUPLU

October 2, 2023

## RESEARCH INTERESTS

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- Homotopy type theory and its extensions
- Formalized mathematics and proof assistants
- Categorical semantics of type theories
- (Secondary) Combinatorial design theory and its application in coding theory

## EDUCATION

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- 2023 University of Southern California**  
Ph.D. in Mathematics, 3.70/4.00  
Advisor: Aaron Lauda, University of Southern California  
Advisor: Michael Shulman, University of San Diego
- 2019 Koç University**  
M.S. in Mathematics, 3.99/4.00
- 2017 Istanbul Bilgi University**  
B.Sc. in Mathematics, 3.65/4.00
- 2013 Istanbul Technical University**  
Mathematical Engineering, *Left due to undergraduate transfer*

## PUBLICATION LIST

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3. **Formalizing two-level type theory with cofibrant  $\text{exo-nat}$** , Elif Uskuplu, Available on arXiv, (2023).  
[arXiv:2309.09395](https://arxiv.org/abs/2309.09395).
2. **QC-LDPC codes from difference matrices and difference covering arrays**, Diane Donovan, Asha Rao, Elif Uskuplu, Emine Ş. Yazıcı, *IEEE Access*, vol. 11, pp. 52141–52157, (2023).  
[DOI:10.1109/ACCESS.2023.3279327](https://doi.org/10.1109/ACCESS.2023.3279327)
1. **High-rate LDPC codes from partially balanced incomplete block designs**, Diane Donovan, Aiden Price, Asha Rao, Elif Uskuplu, Emine Ş. Yazıcı, *Journal of Algebraic Combinatorics*, Volume 55, 259–275 (2022).  
[DOI:10.1007/s10801-021-01111-0](https://doi.org/10.1007/s10801-021-01111-0)

## CONFERENCE ABSTRACT PAPERS

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2. **Cofibrancy of The Exo-type of Natural Numbers**, Elif Uskuplu, *The Second International Conference on Homotopy Type Theory*, (2023).  
[Abstract paper](#)

1. **An Experiment with 2LTT Features in Agda**, Elif Uskuplu, *Workshop on Homotopy Type Theory/ Univalent Foundations*, (2022).  
[Abstract paper](#)

## HONORS & AWARDS & FUNDING

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7. Research Support by the grant of Michael Shulman, the Air Force Office of Scientific Research under award number FA9550-21-1-0009
6. Research support by the grant of Aaron Lauda, the NSF grant DMS-1902092, the Army Research Office W911NF-20-1-0075, and Simons Foundation
5. Outstanding Teaching Award, Koç University
4. The Scientific and Technological Research Council of Turkey (TUBITAK), ARDEB 1001 Research Project Scholarship, Grant Number: 116F166, Grant Provider: E. Şule Yazici
3. İstanbul Bilgi University the Board of Trustee Scholarship
2. Turkish Math Society, Cahit Arf Scholarship
1. Higher Education Student Student Loans and Dormitories Institution State Scholarship, Turkey

## EMPLOYMENT & EXPERIENCE

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<b>September 2019 – present</b>	University of Southern California, Los Angeles, CA. <b>Teaching Assistant</b>
<b>September 2017 – August 2019</b>	Koc University, Istanbul, Turkey. <b>Teaching Assistant</b>
<b>September 2018 – August 2019</b>	Istanbul Bilgi University, Istanbul, Turkey. <b>Teaching Assistant</b>

## TALKS & PRESENTATIONS

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<b>May 2023</b>	Cofibrancy of The Exo-type of Natural Numbers, <i>2nd International Conference on Homotopy Type Theory.</i>
<b>December 2022</b>	Homotopy Type Theory vs Set Theory, <i>GSU Research Seminars.</i>
<b>August 2022</b>	Proof Assistants: Agda for Beginners, <i>SageDays Istanbul.</i>
<b>July 2022</b>	An Experiment with 2LTT Features in Agda, <i>Workshop on Homotopy Type Theory/Univalent Foundation.</i>
<b>July 2022</b>	Formalization of 2LTT in Agda, <i>MURI Meeting at CMU.</i>
<b>February 2022</b>	A Brief Introduction to Homotopy Type Theory, <i>USC Math Grad Colloquium.</i>

## PROJECTS & ACTIVITIES

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5. **Formalization of 2LTT & Univalence Principle in Agda**, [github repository](#).
4. **Univalent mathematics in Agda (as a contributor)**, [github repository](#).
3. **Simply Typed Lambda Calculus with de Bruijn Indices in Lean4**, [github repository](#).
2. **Directed Reading Program Türkiye**, mentorship, [link](#).
1. **Mathematics Solidarity Platform**, volunteer, [link](#).

## PARTICIPATIONS

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11. **Formalization of Mathematics**, *The Simons Laufer Mathematical Sciences Institute (formerly MSRI)*, June, 2023.
10. **HoTT '23 and MURI '23 (joint event)**, *Carnegie Mellon University*, May, 2023.
9. **HoTTEST Summer School 2022**, *online participation*, July - August, 2022.
8. **MURI Meeting '22**, *Carnegie Mellon University*, June, 2022.
7. **Logic and Higher Structures**, *Centre International De Rencontres Mathematiques*, February, 2022.
6. **Istanbul Design Theory Workshop**, *Koc University*, September, 2018.
5. **Workshop on Graph Theory and its Applications**, *Gebze Technical University*, November, 2017.
4. **Undergraduate and Graduate Summer School**, *Nesin Mathematical Village,,* June, 2017.
3. **TMD Analysis Summer School**, *Feza Gursey Institute*, July, 2016.
2. **Logic Summer School**, *Feza Gursey Institute*, August, 2015.
1. **Philosophy and Mathematics Symposium**, *Yeditepe University*, February, 2014.