

Mohaddaseh Nikseresht

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Current Position

KU Leuven, Leuven, Belgium

Feb 2021- Present

PhD Researcher, Computer Science

- My research is supported by the **Marie Skłodowska-Curie Fellowship**, one of Europe's most competitive and prestigious awards, as an ESR4 researcher on the SAS (Safer Autonomous Systems) project.
- **Research Focus:** Software protection, reliability, autonomous mobile robots
- **Thesis:** Improving the reliability and safety of autonomous mobile robots through software hardening and mitigating the impact of bit flips.

Education

Shiraz University, Shiraz, Iran

Sep 2017- Sep 2019

M.Sc., Computer Engineering

- **GPA:** 18.80 out of 20, **Rank 1st** among all students
- **Research Focus:** Optimization, uncertainty, embedded systems
- **Thesis:** An Uncertainty-aware Multi-Objective Genetic Algorithm-based Task Scheduling for Embedded Systems

Sep 2012 – July 2017

Shiraz University, Shiraz, Iran

B.Sc., Computer Engineering

Final Project: Estimating travel time and traffic delays using vehicle positioning data

- **Achievement:** Elected as one of five members of the **Shiraz University Scientific** Olympiad team (2016) based on exams for 3rd- and 4th-year Bachelor's Computer Science students.

Publications

[1] A Multi-objective Task Scheduling Method for Embedded System Design

Mohaddaseh Nikseresht, Mohsen Raji.

CSICC 2020, IEEE Conference, Tehran, Iran (Paper). January 2020.

[2] MOGATS: A Multi-Objective Genetic Algorithm Based Task Scheduling for Heterogeneous Embedded Systems

Mohaddaseh Nikseresht, Mohsen Raji.

International Journal of Embedded Systems (Paper). March 2021.

[3] UMOTS: An Uncertainty-aware Multi-objective Genetic Algorithm-based Static Task Scheduling for Heterogeneous Embedded Systems

Mohsen Raji, **Mohaddaseh Nikseresht**. *The Journal of Supercomputing* (Paper). May 2021.

- [4] A Selective Soft Error Protection Method for COTS Processor-based Systems
Mohaddaseh Nikseresht, Jens Vankeirsbilck, Davy Pissoort, Jeroen Boydens.
ET, IEEE Conference, Sozopol, Bulgaria, (Paper, Project's Public Repository). September 2021
- [5] Impact of Selective Implementation on Soft Error Detection Through Low-level Re-execution
Mohaddaseh Nikseresht, Brent De Blaere, Jens Vankeirsbilck, Davy Pissoort, Jeroen Boydens
DASC, IEEE Conference, AB, Canada, (Paper, Project's Public Repository). October 2021
- [6] A Study on Selective Implementation Approaches for Soft Error Detection Using S-SWIFT-R
Mohaddaseh Nikseresht, Jens Vankeirsbilck, Jeroen Boydens.
The Journal of Electronics (MDPI), (Paper, Project's Public Repository). October 2022

Under Progress:

- [7] A Novel Study on Enhancing the Reliability of Autonomous mobile Robots Against Bitflips Impact.
Mohaddaseh Nikseresht, Jens Vankeirsbilck, Davy Pissoort, Jeroen Boydens.
IEEE Transactions on Reliability

Research Projects

An Uncertainty-aware Multi-Objective Genetic Algorithm based Task Scheduling for Embedded Systems *Sep 2017- Sep 2019*

- This project was the focus of my master's thesis, where I developed a **multi-objective** task scheduling algorithm to handle uncertainties in embedded systems. Based on the **NSGA-II genetic algorithm**, uncertainties in execution time, energy consumption, and task reliability were modeled, and task reliability using **Monte Carlo simulations**. The algorithm helps system designers balance the desired parameters effectively using Monte Carlo simulations. The results demonstrated its optimal performance, and my findings were published in the respected *Journal of Supercomputing*.

- **Primary Set Skills:** C/C++, Python, Linux

Project Duration: 2 years

Enhance the reliability and safety of autonomous mobile robots by developing selective software hardening strategies to ensure the correct execution of autonomous systems and mitigate the impact of bit flips *Feb 2021 – Present*

- My PhD thesis focuses on improving the reliability and safety of autonomous mobile robots against bit flip impacts. Traditional protection methods are resource-intensive, so we proposed a novel **selective protection technique** that identifies vulnerable components through **dynamic fault injection analysis**. By protecting only the identified components, we evaluated the technique's effectiveness in terms of reliability, code size, and performance overhead, aiming for optimized performance. The results demonstrate a significant reduction in silent data corruption, from 39.1% in the unprotected state to less than 3.1%, while maintaining an overhead of just 1.71%.

- **Primary Set Skills:** Python, C/C++, Linux

Project Duration: 3.5 years

Awards, Honors, and Accomplishments

- Received full funding for my Bachelor's project by the Top Ideas Center at Shiraz University (2016).

- Graduated from Shiraz University, Class of 2019, ranked first, and awarded a 4,000,000 Iranian rial prize.
- Attended ACACES 2021 Summer School, Fiuggi, Italy – September 2021 (funded with €2500 from KU Leuven).
- Fully funded for my PhD research by KU Leuven and later awarded the prestigious Marie Skłodowska-Curie Fellowship (February 2021).
- Authored a comprehensive proposal for the Research Foundation – Flanders (FWO), Brussels, Belgium (2022).
- Elected as one of five members of the Student Scientific Association through a direct student vote at Shiraz University, Shiraz, Iran (2017–2019).
- Led the organization of the Open Day for the Computer Science Department at Shiraz University, Iran (2019)

Teaching Experience

KU Leuven, Leuven, Belgium

2021–present

- **Teaching Assistant:** Mathematical Foundations for Engineering (Fall 2023)
- **Projects Supervised:**
 - Defined and Supervised a Master’s Project in Computer Science (Fall 2023)
 - Co-supervised three projects in (Fall 2021, Fall 2022, Fall 2023)

Shiraz University, Shiraz, Iran

2017–2019

- **Teaching Assistant:** Parallel Algorithms (Fall 2018, Supervisor: Gh. Dastghaibfard, Ph.D.), Computer Architecture (Fall 2017, Spring 2017, Fall 2018, Supervisor: Farshad Khunjush, Ph.D.), Designing and Analyzing Algorithms (Fall 2019, Zohre Azimifarh , Ph.D.), Operating Systems(Spring 2018, Mohammad R. Moosavi, Ph.D.), Principles of Programing (Fall 2017, Ali Zibaeenejad, Ph.D.)

References

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| <ul style="list-style-type: none"> ○ Prof. Gholamhossein Dastghaibfard Faculty of computer science and Engineering Shiraz University, Shiraz, Iran. Email: dstghaib@shirazu.ac.ir Website: https://ece.shirazu.ac.ir/en/~dstghaib | <ul style="list-style-type: none"> ○ Prof. Mohammad Taheri Faculty of computer science and Engineering Shiraz University, Shiraz, Iran Email: mtaheri@cse.shirazu.ac.ir Website: https://ece.shirazu.ac.ir/en/~motaheri |
| <ul style="list-style-type: none"> ○ Prof. Mohammad R. Moosavi Faculty of computer science and Engineering Shiraz University, Shiraz, Iran. Email: mrmosavi@gmail.com Website: https://ece.shirazu.ac.ir/en/~smmosavi | <ul style="list-style-type: none"> ○ Prof. Mohsen Raji Faculty of computer science and Engineering Shiraz University, Shiraz, Iran. Email: mraji@shirazu.ac.ir Website: https://ece.shirazu.ac.ir/en/~m-raji |