# Kamyar Givaki

Ph.D. in Computer Engineering - Computer Systems Architecture

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*Computer Arithmetic, Stochastic and approximate Computing, Low-Power Design, Machine Learning*

## Education

**Ph.D. in Computer Engineering - Computer Systems Architecture** — *Tehran, Iran*

University of Tehran — *2016 - 2023*

Thesis: Designing Efficient Architecture for Machine Learning Applications based on Stochastic Computing

Research Objectives:

- Designing Ultra-efficient Hardware Modules Based on Required Computations in Machine Learning Applications.
- Study the Computation Patterns and Requirements in Several Machine Learning Tasks.
- Introduce a generic Hardware design scheme with the combination of Residue Number Systems and Deterministic Approaches to Stochastic Computing.

Taken Modules: Performance Evaluation of Computer Systems, Advanced Computer Mathematics, Advanced Real-time Systems, Chip Multiprocessor Architectures, Embedded Systems Processing Elements, Multi-core Embedded Systems.

**M.Sc. in Computer Engineering - Computer Systems Architecture** — *Isfahan, Iran*

Isfahan University of Technology — *2014 - 2016*

Thesis: A high-payload Steganography Technique using Non-binary Spaces

Research Objectives:

- Designing a Steganography Method for Images with High Embedding Efficiency.
- The Method Offers Minimum Impact On Visual Quality of the Image.
- Is robust against CA-HCF-COM attack.

Modules: Digital Signal Processing, Network Security, Advanced Computer Architecture, VHDL, Expert Systems, Computer Arithmetic, Special Topics in Computer (Decision Support Systems)

**B.Sc. in Computer Engineering - Hardware** — *Tehran, Iran*

K.N.Toosi University of Technology — *2006 - 2012*

Final Project: Design and Implementation of a Digital Noise Generator

Final Project Objectives:

- Designing a noise generator with different distributions and implementing them using VHDL.
- Design a PCB for a XILINX Spartan-II FPGA with several I/O including several ADCs and DACs and Fabricating the Circuit.

Selected Modules: Advanced Programming, System Analysis, Operating Systems, Data Communications, Computer Networks, Linear Control, Electronic Circuits, Electronics II, Digital Electronics, VLSI Systems Design, Digital Integrated Circuits Design, Parallel Processing, Computer Architecture, Digital Design, Microprocessors, AI

## Research Interests

- Computer architecture
- Computer arithmetic
- Low-energy and resilient hardware designs
- Stochastic & Unary computing
- Ultra-low-power embedded systems
- Hardware accelerator design

## Honors & Awards

**Short Term Collaboration Grant** — *Barcelona, Spain*

Eurolab4HPC (a Horizon 2020 funded project) — *2020*

## Patents

***Method and Architecture for Accelerating Deterministic Stochastic Computing using Residue Number System***

Mohammadhassan Najafi, **Kamyar Givaki**, Seyed Reza Hojabrossadati, MH Gholamrezayi, Ahmad Khonsari, Saeid Gorgin, Dara Rahmati

*US Patent, Pub. number: US-20210241085-A1* — *2021*

***Embedded Stochastic-Computing Accelerator for Convolutional Neural Networks***

Mohammadhassan Najafi, Seved Reza Hojabrossadati, **Kamyar Givaki**, SM Reza Tayaranian, Parsa Esfahanian, Ahmad Khonsari, Dara Rahmati

*US Patent, Pub. number: US-20210256357-A1* — *2021*

# Publications

***A Generalized Residue Number System Design Approach for Ultra-Low Power Arithmetic Circuits Based on Deterministic Bit-streams***

**Kamyar Givaki**, Ahmad Khonsari, MH Gholamrezaei, Saeid Gorgin, M Hassan Najafi

*IEEE Transactions on Computer-Aided Design of Integrated Circuits and System* *2023*

***Hardware Efficient FIR Filter Architectures Using Accurate Unary Stochastic Computing***

**Kamyar Givaki**, Ahmad Khonsari, MH Gholamrezaei, Dara Rahmati, Saeid Gorgin

*IEEE* $40^{th}$ *International Conference on Computer Design (ICCD)* *2022*

***High Performance Deterministic Stochastic Computing Using Residue Number System***

**Kamyar Givaki**, Reza Hojabr, MohammadHosein Gholamrezaei, Ahmad Khonsari, Saeid Gorgin, Dara Rahmati, M. Hassan Najafi

*IEEE Design & Test, Volume 38, Issue 6* *2021*

***On the Resilience of Deep Learning for Reduced-voltage FPGAs***

**Kamyar Givaki**, Behzad Salami, Reza Hojabr, SM Reza Tayaranian, Ahmad Khonsari, Dara Rahmati, Saeid Gorgin, Adrian Cristal, Osman S Unsal

$28^{th}$ *Euromicro International Conference on Parallel, Distributed and Network-Based Processing (PDP)* *2020*

***TaxoNN: A Light-Weight Accelerator for Deep Neural Network Training***

Reza Hojabr, **Kamyar Givaki**, Kossar Pourahmadi, Parsa Nooralinejad, Ahmad Khonsari, Dara Rahmati, M. Hassan Najafi

*IEEE International Symposium on Circuits and Systems (ISCAS)* *2020*

***SkippyNN: An Embedded Stochastic-Computing Accelerator for Convolutional Neural Networks***

Reza Hojabr, **Kamyar Givaki**, SM Reza Tayaranian, Parsa Esfahanian, Ahmad Khonsari, Dara Rahmati, M Hassan Najafi

$56^{th}$ *Annual Design Automation Conference 2019* *2019*

***Using Residue Number Systems to Accelerate Deterministic Bit-stream Multiplication***

**Kamyar Givaki**, Reza Hojabr, M Hassan Najafi, Ahmad Khonsari, M Hossein Gholamrezayi, Saeid Gorgin, Dara Rahmati

*IEEE* $30^{th}$ *International Conference on Application-specific Systems, Architectures and Processors (ASAP)* *2019*

***Machine learning based impedance estimation in power system***

Kamyab Givaki, Saleh Seyedzadeh, **Kamyar Givaki**

$8^{th}$ *Renewable Power Generation Conference (RPG)* *2019*

# Skills

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| **Technologies** | Git, SVN, Kubernetes, Docker. |
| **Programming** | C, C++, C#, Python, VHDL, Verilog. |
| **Frameworks and Libraries** | Scikit-learn, TensorFlow, Keras, Pytorch, NLTK, SpaCy, Gym, CUDA, OpenMP. |
| **Tools** | Synopsys Design Compiler, Vivado Design Suite, ModelSim, HSpice, Matlab, Visual Studio, Gem5. |
| **OS** | Linux(RHEL/Centos/Ubuntu), Microsoft Windows |
| **Interpersonal Skills** | Problem-solving, Teamwork, Leadership, Focus, Public speaking, Active listening, Management |
| **Other Skills** | MS VISIO, Latex |
| **Languages** | English TOEFL Score: 89 (*Reading: 26, Listening: 28, Speaking: 14, Writing: 21*). |

# References


***Dr. Ahmad Khonsari*, Associate professor** *a_khonsari@ut.ac.ir, ak@ipm.ir*

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