# Mohammad Hadi

## *Curriculum Vitae*


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## BRIEF BIOGRAPHY

I received my B.Sc. degree as a top-ranking graduate from Isfahan University of Technology in 2011, and obtained my M.Sc. and Ph.D. degrees with honors from Sharif University of Technology in 2013 and 2018, respectively. I was with Chalmers University of Technology as a postdoctoral researcher during 2019. Currently, I'm a postdoctoral researcher at Sharif University of technology. As reflected in my published journal papers, I'm interested in the applications of new concepts such as software-defined networking, dynamic resource allocation, and network virtualization in various networking platforms such as elastic optical networks. Since 2010, I have engaged in several research and development projects, where I gained a lot of practical engineering experiences such as developing Linux-based software applications, real-time embedded system design, FPGA programming, and fast numerical optimization. I have been a member of the Optical/Data Networks Research Laboratory, Sharif University of Technology, and Fiber Optic Communications Research Center, Chalmers University of Technology.

## RESEARCH

2020 – NOW **Postdoc Researcher**
Optical Communication Networks
*Sharif University of Technology*

2020 **Postdoc Researcher**
Optical Communication Systems
*K. N. Toosi University of Technology*

2019-2020 **Postdoc Researcher**
Optical Communication Networks
*Chalmers University of Technology*

## EDUCATION

2013 – 2018 **Doctor of Philosophy**
GPA 18.70/20, FIRST CLASS HONORS
Optical Communication Systems
*Sharif University of Technology*

2011–2013 **Master of Science**
GPA 18.75/20, FIRST CLASS HONORS
Optical Communication Systems
*Sharif University of Technology*

2008 – 2011 **Bachelor of Science**
GPA 19.11/20, RANKED 1ST AMONG 144 STUDENTS
Communication Systems
*Isfahan University of Technology*

## AWARDS

2020 **Research Grant**
*Iranian National Elites Foundation*

2019 **Outstanding P.h.D. Thesis**
*IEEE Iran Section*

2018 **Outstanding P.h.D. Researcher**
*Sharif University of Technology*

2015-2017 **Ph.D. Research Assistant**
*Iranian National Elites Foundation*

2014 **Ph.D. Teaching Assistant**
*Iranian National Elites Foundation*

2011-2013 **M.Sc. Scholarship**
*Sharif University of Technology*

2009-2011 **B.Sc. Scholarship Award**
*Isfahan University of Technology*

2008-2011 **Top-Ranked Student Award**
*Isfahan University of Technology*

## HONORS

2008-2011 **B.Sc. Student Ranking**
Ranked 1st Among 144 Undergraduate Students
*Isfahan University of Technology*

2011-2013 **M.Sc. Student Ranking**
Ranked 6th Among 44 M.Sc. Graduate Students
*Sharif University of Technology*

2013 **Ph.D. Entrance Exam Ranking**
Ranked 4th Among All 1093 Participants
*Nationwide University Entrance Exam*

2013-2018 **Ph.D. Student Ranking**
Ranked 5th Among 38 Ph.D. Graduate Students
*Sharif University of Technology*

2013-2018 **Elites Foundation Membership**
*Iranian National Elites Foundation*

## JOURNAL PUBLICATIONS

[1] **M. Hadi**, C. Bhar, E. Agrell, A General QoS-Aware Scheduling Procedure for Passive Optical Networks, submitted to *OSA / IEEE Journal of Optical Communications and Networking*, vol. 12, no. 7, pp. 217 – 226, Jul. 2020.

[2] **M. Hadi**, E. Agrell, Joint Power-Efficient Traffic Shaping and Service Provisioning for Metro Elastic Optical Networks, *OSA / IEEE Journal of Optical Communications and Networking*, vol. 11, no. 12, pp. 578 – 587, Dec. 2019.

[3] **M. Hadi**, M. R. Pakravan, E. Agrell, Dynamic Resource Allocation in Metro Elastic Optical Networks Using Lyapunov Drift Optimization, *OSA / IEEE Journal of Optical Communications and Networking*, vol. 11, no. 6, pp. 250 – 259, Jun. 2019.

[4] **M. Hadi**, M. R. Pakravan, Energy-Efficient Service Provisioning in Inter-Data Center Elastic Optical Networks, *IEEE Transactions on Green Communications and Networking*, vol. 3, no. 1, pp. 180 – 191, Mar. 2019.

[5] **M. Hadi**, M. R. Pakravan, Energy-Efficient Transponder Configuration for Few-Mode Fiber-based Elastic Optical Networks, *IEEE Communications Letters*, vol. 22, no. 5, pp. 970 – 973, May 2018.

[6] **M. Hadi**, M. R. Pakravan, Rate-Maximized Scheduling in Adaptive OCDMA Systems using Stochastic Optimization, *IEEE Communications Letters*, vol. 22, no. 4, pp. 728 – 731, Apr. 2018.

[7] **M. Hadi**, M. R. Pakravan, Energy-Efficient Fast Configuration of Flexible Transponders and Grooming Switches in OFDM-Based Elastic Optical Networks, *OSA / IEEE Journal of Optical Communications and Networking*, vol. 10, no. 2, pp. 90-103, Feb. 2018.

[8] **M. Hadi**, M. R. Pakravan, Resource Allocation for Elastic Optical Networks using Geometric Optimization, *OSA / IEEE Journal of Optical Communications and Networking*, vol. 9, no. 10, pp. 889-899, Oct. 2017.

[9] **M. Hadi**, M. R. Pakravan, Analysis and Design of Adaptive OCDMA Passive Optical Networks, *IEEE / OSA Journal of Lightwave Technology*, vol. 35, no. 14, pp. 2853 – 2863, Jul. 2017.

[10] **M. Hadi**, F. Marvasti, M. R. Pakravan, Dispersion Compensation using High-Positive Dispersive Optical Fibers, *Chinese Optics Letters*, vol. 15, no. 3, Mar. 2017.

[11] **M. Hadi**, M. R. Pakravan, Spectrum-Convertible BVWXC Placement in OFDM-Based Elastic Optical Networks, *IEEE Photonics Journal*, vol. 9, no. 1, pp. 1-12, Feb. 2017.

## CONFERENCE PUBLICATIONS

[1] M. H. Keshavarz, **M. Hadi**, M. Lashgari, M. R. Pakravan, P. Monti, Optimal QoS-Aware Allocation of Virtual Network Resources to Mixed Mobile-Optical Network Slices, *Global Communications Conference (GLOBECOM)*, Dec. 2021, IEEE.

[2] **M. Hadi**, E. Agrell, Iterative Configuration in Elastic Optical Networks, *International Conference on Optical Network Design and Modeling (ONDM)*, May 2020.

[3] **M. Hadi**, M. M. Mojahedian, M. R. Aref, M. R. Pakravan, Time-Sharing Improves Dynamic Index Coding Delay, *Iran Workshop on Communication and Information Theory (IWCIT)*, Apr. 2019, IEEE.

[4] **M. Hadi**, M. R. Pakravan, M. M. Razavi, An Efficient Real-time Voice Activity Detection Algorithm using Teager Energy to Energy Ratio, *Iranian Conference on Electrical Engineering (ICEE)*, May 2019, IEEE.

[5] **M. Hadi**, M. R. Pakravan, Improved Routing and Spectrum Assignment Formulations for Optical OFDM Networks, *International Symposium on Telecommunications (IST)*, Sep. 2017, IEEE.

[6] **M. Hadi**, M. M. Mojahedian, M. R. Aref, Dynamic Index Coding Gain over a Complete Bi-directional Side Information Graph, *Iran Workshop on Communication and Information Theory (IWCIT)*, May 2016, IEEE.

[7] **M. Hadi**, M. M. Jahromi, H. R. Rezaiy, Rainbow Table TMTO Attack Optimization Considering Online Sequential Search Time, *International Congress on Technology, Communication, and Knowledge (ICTCK)*, Nov. 2014, IEEE.

[8] **M. Hadi**, M. R. Pakravan, Adaptive Level Control to Improve QoS in OCDMA Local Area Networks, *Iranian Conference on Electrical Engineering (ICEE)*, May 2013, IEEE.

## IN-PROGRESS PUBLICATIONS

[1] **M. Hadi**, E. Agrell, L. Wosinska, Power-Efficient Service-Differentiated Jitter Control in Metro Elastic Optical Networks.

[2] **M. Hadi**, E. Agrell, M. Farsi, Stochastic Analysis of Power-Efficient Elastic Point-to-point Optical Lightpath.

[3] **M. Hadi**, M. M. Mojahedian, M. R. Pakravan, M. R. Aref, Strategies for Optimal Transmission and Delay Reduction in Dynamic Index Coding Problem.

[4] F. S. Vajd, **M. Hadi**, C. Bhar, M. R. Pakravan, E. Agrell, Dynamic Joint Functional Split and Resource Allocation Optimization in Elastic Optical Fronthaul.

[5] C. Bhar, E. Agrell, **M. Hadi**, T. Svensson, QoS-Aware Video Delivery in Cell-Free Networks.

## THESES

***Ph.D. Thesis***

Resource Allocation Management in Elastic Optical Networks, Supervised by Dr. M. R. Pakravan

***M.Sc. Thesis***

Quality of Service Improvement in Optical CDMA Networks, Supervised by Dr. M. R. Pakravan

***B.Sc. Thesis***

Structural Improvements in Single Phase Double Speed Induction Motors, Supervised by Dr. M. R. Ahmadzadeh

## PATENT

**M. Hadi**, Electronic Speed Selector Switch for Induction Motors, *Iran Intellectual Property Office*, Registration No. 78188, 2013.

## LANGUAGE SKILLS

| | |
|---|---|
| NATIVE | Persian |
| FLUENT | English |
| FAMILIAR | Arabic |

## COMPUTER SKILLS

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|---|---|
| BEGINNER | ADS, HFSS, QT, NS2, NS3, Vivado |
| INTERMEDIATE | OPNET, Altium Designer, ModelSim, Code::Blocks, OrCAD PSpice, PyCharm |
| EXPERT | Linux, Windows, LaTeX, Microsoft Office, Eclipse, Microsoft Visual Studio, ISE Mathcad, MATLAB, YALMIP Gurobi, CPLEX, CVX |

## PROGRAMMING SKILLS

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|---|---|
| BEGINNER | Java, C# |
| INTERMEDIATE | Python, Batch Script |
| EXPERT | C, C++, Verilog, VHDL, Shell Script |

## SELECTED PRESENTATIONS

An Introduction to Optical Communication Networks, *Sharif University of Technology*, 2020.

Elastic Optical Networks, *Sharif University of Technology*, 2020.

Resource Allocation, A ubiquitous concept with different terminologies, *Chalmers University of Technology*, 2019.

Scopes for Energy-Efficiency in Optical Distribution Networks, *Chalmers University of Technology*, 2019.

Routing and Spectrum Assignment in Elastic Optical Networks, *Sharif University of Technology*, 2017.

Optical OFDM Networks, *Sharif University of Technology*, 2016.

Hopfield Neural Networks, *Sharif University of Technology*, 2015.

A Review of Automatically Switched Optical Networks, *Sharif University of Technology*, 2014.

Self-Organized Networks, *Sharif University of Technology*, 2013.

How Can We Make a Simple Physical Model?, *Information and Communication Technology Institute*, 2012.

## TEACHING EXPERIENCES

2013-2017 **Teacher Assistant**
Data Communication Networks
*Sharif University of Technology*

2020-2021 **Teacher**
Circuit Theory
Communication Systems
Statistical Optical Communications
*Sharif University of Technology*

2019-2020 **Teacher**
Engineering Circuit Analysis
Ordinary Differential Equations
Filter Synthesis and Design
Communication Systems Principles
*K. N. Toosi University of Technology*

2015 **Teacher**
Fourier Optics
Optical Signal Processing
Statistical Optical Communications
*Islamic Azad University*

2015-2017 **Teacher**
Digital Circuits
Electromagnetism
Digital Signal Processing
*Payame Noor University*

## REFERENCES

**Dr. Erik Agrell**
POSITION Professor
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*Chalmers University of Technology*
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**Dr. Farokh A. Marvasti**
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EMAIL marvasti@sharif.edu

## WORK EXPERIENCES

FEB 2019 –FEB 2020 (FT)

### Fiber Optic Communications Research Center
***Postdoc Researcher***

The research in FORCE is broad in scope and covers fundamental theory as well as experiments on devices, components, systems, and networks. As a post-doctoral researcher supervised by Dr. E. Agrell in FORCE, I focused on energy-efficient resource allocation in elastic optical networks. To facilitate the research, I developed a general simulation platform for numerical evaluation of the proposed algorithms using MATLAB, YALMIP, CPLEX, and Gurobi. We published several journal papers and reported the outstanding results of the proposed algorithms. We were invited to talk about our proposed general mathematical platform for resource allocation in elastic optical networks at the ONDM conference.

CURRENT, FROM SEP 2011 (PT)

### Data Networks Research Lab
***Student Researcher***

The research program of DNRL includes the development of new algorithms, models, architectures, communication techniques, and management schemes for next generation networks including wireless networks, sensor networks, cellular networks, and optical networks. My academic works in DNRL are supervised by Dr. M. R. Pakravan. Focusing on resource allocation management in optical CDMA and elastic optical networks, we have published more than 15

papers in reputable international journals and conferences. My experimental researches in DNRL deal with FPGA programming and Linux-based application development using various programming languages such as Python, C, C++, and Shell scripting. I have been involved in the design and development of optical CDMA systems, where I gained a lot of experience in FPGA-based high-speed interfaces and communication modules. I also developed a native real-time network protocol stack on an FPGA platform using VHDL and Verilog languages. Moreover, I became familiar with network simulators such as NS2, NS3, and OPNET during my researches in DNRL. Furthermore, I spent a year as a server administrator and learned a variety of settings for Linux-based services and applications such as logging tools, version control systems, project management techniques, web applications, file sharing methods, and so on.

MAY 2013 – MAR 2015 (PT)

## Electronic Research Institute
***Research Associate***

This position needed a broad computing and coding background across multiple programming languages and platforms and made me an expert in developing customized Linux kernels and real-time processing over digital signal processors. Especially, I customized a light-weight Linux kernel for BeagleBoard and developed an image processing application for automatic character recognition on the customized kernel. I was also the head of a research group that built an IP camera on CubieBoard. The manufactured camera handled ONVIF SOAP control requests and used RTP, RTCP, and RTSP protocols for its video streaming. Moreover, I proposed an efficient real-time voice activity detection algorithm and experimentally validated its performance in an open-source hardware board. I also developed a C# software package for fast decoding of convolutional codes using algorithms such as Fano and Stack. As another contribution, I spent six months on the design and programming of a general parallel computing system having a cluster of 128 Artix FPGAs.

MAR 2010 – SEP 2011 (PT)

## ICTI Research Institute
***Research Assistant***

ICTI research institute is conducting intense applied research in the areas of communications, computers, and electronics. My task in ICTI was to propose a systematic routine to model a black box using electronic elements. Especially, I designed a test bench to measure characteristic curves of an RF high power amplifier. I then used the results to provide a detailed model for the amplifier and added the model to ADS software to be used for circuit design and simulation. I also implemented the DMR protocol stack on a PIC microcontroller and linked it to an SDR-based transceiver to create a wireless communication link.