

Curriculum Vitae

Amir Borji

Department of Electrical Engineering
Sharif University of Technology
Tehran, Iran
Email: aborji@sharif.edu
Homepage: <http://sharif.edu/~aborji>



Education

- Jan. 1999 – Apr. 2004** University of Waterloo, Waterloo, ON, Canada
- **Ph.D** in Electrical and Computer Engineering (GPA=96/100)
 - **Thesis:** Fast Electromagnetic Analysis and Design of Multiple Coupled Cavity Structures
Research was partly funded by **Ericsson Inc.**
 - **Supervisor:** prof. S. Safavi-Naeini
- Sept. 1994 – Feb. 1998** Isfahan University of Technology, Isfahan, Iran
- **M.Sc.** in Electrical and Computer Engineering (Communication Systems)
 - **Ranking 1st** in the department of E&CE (GPA=**19.53/20.0**)
 - **Thesis :** Radiation Pattern Computation of Microstrip Antennas on Finite Ground Planes
Thesis supervisor: prof. S. Safavi-Naeini
 - **Program Advisor:** prof. M. R. Aref
 - **Ranking 4th** among almost 3500 applicants in the nation-wide entrance examination (“konkooor”) for M.Sc. degree, Iran
- Sept. 1989 – Sept. 1994** Isfahan University of Technology, Isfahan, Iran
- **B.Sc.** in Electrical and Computer Engineering (Electronics)
 - **Ranking 2nd** among all students graduated in 1994 from the department of E&CE and **ranking 1st** in the class of 1989 (GPA=**18.90/20.0**)
 - **Ranking 9th** among almost 125000 applicants in the nation-wide entrance examination (“konkooor”) for B.Sc. degree, Iran
 - **Project:** Design and Implementation of an Analog Emulator for MTI Radar Signals

Work and Research Experience

Sept 2016 – present

- Research Assistant Professor, Department of Electrical and Computer Engineering, University of Waterloo, Waterloo, Ontario, Canada

Sept 2012 – present

- Assistant Professor, Department of Electrical Engineering, Sharif University of Technology, Tehran, Iran

July 2011 – July 2012

- Associate Chair in Graduate Studies, department of E&CE, Isfahan University of Technology, Isfahan, Iran

May 2009 – July 2011

- Director of Communications Group, department of E&CE, Isfahan University of Technology, Isfahan, Iran

Sept 2006 – Sept 2012

- Assistant Professor, department of E&CE, Isfahan University of Technology, Isfahan, Iran

July 2007–Sept 2007, July 2008–Sept 2008, July 2009–Sept 2009, July 2010–Sept 2010, July 2011–Sept 2011, July 2012–Sept 2012, July 2015–Sept 2015

- Visiting Scholar, department of E&CE, University of Waterloo, Waterloo, ON, Canada

Sept 2005 – Sept 2006

- **Post Doctoral Fellow**, department of E&CE, University of Waterloo, Waterloo, ON, Canada
- Design and implementation of a medium power dual-mode cross-coupled dielectric resonator filter for wireless base-station applications. This research was carried out under a contract with **ActsPower Technologies Inc., CA**
- Development of a comprehensive CAD program for coupling matrix synthesis of multiple coupled resonator filters using optimization methods
- Developing a new technique for fast summation of lattice sums and its application in modeling wave propagation in substrate integrated waveguides and photonic crystals

Apr. 2004 – Aug. 2005

- **Post Doctoral Fellow**, Department of E&CE, University of Waterloo, Waterloo, ON, Canada
- Co-supervision of Dan Busuioc, Ph.D candidate in E&CE department. He successfully defended his PhD thesis in August 2005. Research area: Very efficient and low-profile antenna arrays for Ku-band satellite communications based on integrated waveguide technology.
- Design, fabrication, and measurement of a number of microstrip array antennas with substrate integrated waveguide feed network at 12.5GHz
- Teaching part of a graduate course in Spring 2005 (ECE770-9). Topic: Spectral domain technique for analysis of multilayer planar antennas and periodic structures.
- System Administrator and CAD software consultant in RF/Microwave and Photonics group, Dept. of E&CE, University of Waterloo.

Jan. 1999 – Apr. 2004

- **Research Assistant**, Department of E&CE, University of Waterloo, Waterloo, ON, Canada
- **Teaching Assistant** for 6 terms, Department of E&CE, University of Waterloo, Waterloo, ON, Canada
Electromagnetic Fields and Waves - Antennas, Propagation, and Wireless Systems – Analog Integrated Circuits
- System Administrator and CAD software consultant in RF/Microwave and Photonics group, Dept. of E&CE, University of Waterloo
- Involved in design, numerical simulation, fabrication, and measurement of microwave filters under a research contract with **Ericsson Radio Access, Sweden**
- Development of fast approximate models for first order design and optimization of generalized iris-coupled combline bandpass filters
- Development of a full-wave CAD tool for very fast numerical analysis and simulation of conductor-loaded multiple-coupled-cavity bandpass filters based on the surface integral equation and method of moments.
- Development of a novel technique for very fast calculation of the potential Green's functions inside a rectangular enclosure suitable for numerical analysis of EMC and packaging problems.
- Supervising undergraduate project (a group of four students): Design, fabrication, and measurement of a microstrip coupled dielectric resonator filter.

Sept. 2002 – Feb. 2003

- Design of circularly polarized high gain planar antenna arrays for mobile satellite applications under a research contract with **Winegard Inc., Burlington, Iowa, USA**

Nov. 2001 – Feb. 2002

- Simulation and parasitic extraction of an RFIC power amplifier package under a research contract with **Tavanza Inc., Sunnyvale, California, USA**

Feb. 1998 – Dec. 1998

- Full-time design and development engineer, MOJ-GOSTAR SEPAHAN ENG CO, Isfahan, Iran

Sept. 1994 – Feb. 1998

- Part-time design and development engineer, MOJ-GOSTAR SEPAHAN ENG CO, Isfahan, Iran

Sept. 1993 – June 1998

- Teaching Assistant for 7 terms, Department of E&CE, Isfahan University of Technology, Isfahan, Iran
Engineering Electromagnetics - Fields and Waves - High Frequency Circuit Design

June 1993 – Sept. 1994

- Research Assistant and Circuit Designer, Electrical and Computer Engineering Research Center, Isfahan University of Technology, Isfahan, Iran

Awards

Sept. 2002 - Sept. 2003

Jan. 1999 - Dec 2001

Sept. 1996 - Sept. 1998

Ontario Graduate Scholarship (OGS)

International Graduate Students Scholarship

Faculty of Engineering Entrance Scholarship

University of Waterloo Graduate Scholarship

Graduate Research Fellowship, Isfahan University of Technology, Isfahan, IRAN

International Organizations and Conferences

- Member of IEEE since 1999
- Reviewer of IEEE Trans. on Microwave Theory and Techniques
- Reviewer of IEEE Antennas and Wireless Propagation Letters
- Reviewer of IEE Electronics Letters
- Reviewer of Plasmonics (Springer)
- Reviewer of Journal of Electromagnetic Waves and Applications

Courses Taught

Please check the courses' websites for more information.

➤ Undergraduate courses since Fall 2006

- 1- Engineering Electromagnetics (<http://sharif.edu/~aborji/25733>)
- 2- Electromagnetic Fields and Waves (<http://sharif.edu/~aborji/25762>)
- 3- Microwave Engineering
- 4- Antenna Theory and Design
- 5- Microwaves and Antennas (<http://sharif.edu/~aborji/25766>)

➤ Graduate courses since Fall 2006

- 1- RF and Microwave Circuit Design
- 2- Advanced Electromagnetic Theory I
- 3- Numerical Techniques in Electromagnetics
- 4- Advanced Electromagnetic Theory II
- 5- Advanced Engineering Mathematics
- 6- Advanced Antenna Theory (<http://sharif.edu/~aborji/25149>)
- 7- Electromagnetics of Planar Layered Media and Periodic Structures (<http://sharif.edu/~aborji/25120>)

Publications

1. **A. Borji**, S. Safavi-Naeini and S.K. Chaudhuri, "Mutual Coupling Factor of Rectangular Loops in Rectangular Coaxial Cavities", *Proc. of the 8th Symposium on Antenna Technology and Applied Electromagnetics (ANTEM2000)*, Winnipeg, Manitoba, July 31-Aug. 2, 2000, pp.133-136
2. **A. Borji**, S. Safavi-Naeini and S.K. Chaudhuri, "TEM Properties of Shielded Homogeneous Multiconductor Transmission Lines with PEC and PMC Walls", *Proc. of the 2001 IEEE MTT-S Int. Microwave Symp.*, Phoenix, AZ, 20-25 May 2001, vol.2, pp.731-734
3. **A. Borji**, D. Busuioc, S. Safavi-Naeini and S.K. Chaudhuri, "ANN and EM Based Models for Fast and Accurate Modeling of Excitation Loops in Compline-type Filters", *Proc. of the 2002 IEEE MTT-S Int. Microwave Symp.*, Seattle, WA, June 2-7, 2002, vol.3, pp.2105-2108
4. **A. Borji** and S. Safavi-Naeini, "Fast Convergent Green's Function in a Rectangular Enclosure", *Proc. of the 2003 IEEE AP-S/URSI Int. Symp.*, Columbus, OH, USA, June 22-27, 2003, vol.4, pp.950-953
5. **A. Borji** and S. Safavi-Naeini, "Rapid Calculation of the Green's Function in a Rectangular Enclosure with Application to Conductor Loaded Cavity Resonators", *IEEE Trans. Microwave Theory and Techniques*, Vol. 52, No. 7, pp.1724-1731, July 2004
6. **A. Borji** and S. Safavi-Naeini, "Fast Full-Wave Analysis of Conductor-Loaded Rectangular Cavity Resonators Using Surface Integral Equation and Moment Method", *Proc. of the 2004 IEEE AP-S/URSI Int. Symp.*, Monterey, CA, USA June 20-26, Vol. 2, 2004, pp.1187-1190

7. D. Busuioc, M. Shahabadi, **A. Borji** and S. Safavi-Naeini, "G/T of a Multi-Segment Active Array - Dependence on Array Configuration", *Proc. of the 2004 IEEE AP-S/URSI Int. Symp.*, Monterey, CA, USA June 20-26, Vol. 1, 2004, pp.133-136
8. M. Shahabadi, D. Busuioc, **A. Borji** and S. Safavi-Naeini, "Low-Cost, High-Efficiency Quasi-Planar Array of Waveguide-Fed Circularly Polarized Microstrip Antennas", *IEEE Trans. Antennas and Propagation*, Vol. 53, No. 6, pp.2036-2043, June 2005
9. D. Busuioc, **A. Borji**, M. Shahabadi and S. Safavi-Naeini, "Low Loss Integrated Waveguide Feed Network for Planar Antenna Arrays", *Proc. of the 2005 IEEE AP-S/URSI Int. Symp.*, WA, DC, USA, July 3-8, 2005, Vol. 2B, p.646-649
10. D. Busuioc, **A. Borji**, M. Shahabadi and S. Safavi-Naeini, "High efficiency antenna array with optimized hybrid corporate feed", *Proc. of the 2006 IEEE AP-S/URSI Int. Symp.*, Albuquerque, NM, USA, pp.1503-1506
11. D. Busuioc, M. Shahabadi, **A. Borji**, G. Shaker and S. Safavi-Naeini, "Substrate integrated waveguide antenna feed-design methodology and validation", *Proc. of the 2007 IEEE AP-S/URSI Int. Symp.*, Honolulu, HI, USA, pp.2666-2669
12. **A. Borji**, D. Busuioc and S. Safavi-Naeini, "Efficient, Low-Cost Integrated Waveguide-Fed Planar Antenna Array for Ku Band Applications", *IEEE Antennas and Wireless Propagation Letters*, Vol. 8, pp.336-339, 2009
13. A. Bakhtafrooz, **A. Borji**, "Compact Two-Layer Slot Array Antenna for K-Band Applications Based on Substrate Integrated Waveguide", *Proc. of the 17th Iranian Conference on Electrical Engineering*, 12-14 May 2009, Tehran, Iran, pp. 116-119
14. **A. Borji**, M. H. Hosseini and M. H. Sadrearhami, "28GHz High Efficiency Planar Array Antenna with Hybrid Feed Network", *Proc. of the 2009 IEEE AP-S/URSI Int. Symp.*, June 2009, Charleston, NC, USA
15. A. Bakhtafrooz and **A. Borji**, "Sensitivity of Planar Slot Array Antennas to Manufacturing Tolerances", *Proc. of the 2009 IEEE AP-S/URSI Int. Symp.*, June 2009, Charleston, NC, USA
16. **A. Borji** and F. Fani-Sani, "Wire Antennas in Proximity of Conducting Wedges and Cylinders", *Proc. of the 2009 IEEE AP-S/URSI Int. Symp.*, June 2009, Charleston, NC, USA
17. A. Bakhtafrooz, **A. Borji**, D. Busuioc and S. Safavi-Naeini, "Compact Two-Layer Slot Array Antenna with SIW for 60GHz Wireless Applications", *Proc. of the 2009 IEEE AP-S/URSI Int. Symp.*, June 2009, Charleston, NC, USA
18. M. Esmaili and **A. Borji**, "Diagnosis and Tuning of Multiple Coupled Resonator Filters", *Proc. of the 18th Iranian Conference on Electrical Engineering*, 11-13 May 2010, Isfahan, Iran, pp. 124-129
19. A. Bakhtafrooz, **A. Borji**, D. Busuioc and S. Safavi-Naeini, "Novel Two-Layer Millimeter-wave Slot Array Antennas Based on Substrate Integrated Waveguides", *Progress In Electromagnetic Research*, Vol. 109, pp. 475-491, 2010
20. M. Fereidani, **A. Borji** and R. Safian, "Relation Between Reflection Phase and Surface-wave Band-Gap in Artificial Magnetic Conductors", *IEEE Trans. Microwave Theory and Techniques*, Vol. 59, No. 8, pp.1901-1908, Aug. 2011
21. H. Fadakar, A. Zeidaabadi-Nezhad, and **A. Borji**, "Effect of Surface Roughness on Propagation of Surface Plasmon Polaritons Along Thin Lossy Metal Films", *Proc. of the 19th Iranian Conference on Electrical Engineering*, 17-19 May 2011, Tehran, Iran, pp. 468-473
22. B. Semnani and **A. Borji**, "Lower Bound on Scattered Power from Antennas", *IEEE Antennas and Wireless Propagation Letters*, Vol. 11, pp.373-376, 2012
23. A. Bostani and **A. Borji**, "An Efficient Volume Integral Equation Technique for the Analysis of Tapered Dielectric Rod Antennas", *Proc. of the 6th International Symposium on Telecommunications (IST2012)*, 6-8 Nov. 2012, Tehran, Iran, pp.88-93
24. A. Bakhtafrooz and **A. Borji**, "Application of the Array Scanning Method in Periodic Structures with Large Periods", *Electromagnetics*, Vol.35, No.5, pp.293-309, 2015

25. A. Shahverdi and **A. Borji**, "The Effect of Higher Order Harmonics on Second Order Nonlinear Phenomena", *Optics Communications*, Vol. 343, pp. 124-130, 15 May 2015
26. A. Bakhtafrouz and **A. Borji**, "Input Impedance and Radiation Pattern of a Resonant Dipole Embedded in a 2D Periodic Leaky-Wave Structure", *IET Microwaves, Antennas & Propag.*, 2015, Vol. 9, Issue 14, pp.1567-1573
27. H. Fadakar, A. Zeidaabadi-Nezhad, **A. Borji**, and M. Shahabadi, "Spurious-Free Analysis of Two-Dimensional Low-Loss Metallic Gratings", *Journal of Optics*, Vol. 18, Issue 3, pp. 1-9, March 2016
28. H. Fadakar, **A. Borji**, A. Zeidaabadi-Nezhad, and M. Shahabadi, "Improved Fourier Analysis of Periodically Patterned Graphene Sheets Embedded in Multilayered Structures and Its Application to the Design of a Broadband Tunable Wide-Angle Polarizer", *IEEE Journal of Quantum Electronics*, Vol. 53, No. 3, pp.1-8, June 2017

Graduate Students

Master Students:

1-Ahmad Bakhtafrooz (graduated)

- Research: Design, fabrication and sensitivity analysis of substrate integrated waveguide slot arrays at 60 GHz.
This research was carried out in collaboration with prof. Safavi-Naeini from University of Waterloo

2-Ahmad Farsaei (graduated) (co-supervised with prof. Sadri)

- Research: Modeling nonlinearities in microwave amplifiers using Volterra series

3-Majid Mohammadi-Demneh (graduated)

- Research: Improving the efficiency of class F RF power amplifiers using a defected ground structure

4-Fatemeh Fani-Sani (graduated)

- Research: Analysis of 2D photonic crystals including the effects of material dispersion and loss

5-Mahbobeh Esmaeili (graduated)

- Research: Fast extraction of coupling matrix for diagnosis and tuning of multiple coupled resonator filters

6-Farid Shokouhi (graduated) (co-supervised with prof. Zeidaabadi-Nezhad)

- Research: Using electromagnetic band-gap structures to eliminate the scan blindness in planar phased array antennas

7-Amin Shahverdi (graduated)

- Research: Combining Harmonic Balance and Finite Difference Techniques for Simulation of Wave Propagation in Nonlinear Media

8-Naimeh Ghaffarian (graduated)

- Research: Amplification of Surface Plasmon Polaritons in Semiconductor and Ferroelectric Multilayer Structures
This research was carried out in collaboration with prof. A. H. Majedi from University of Waterloo

9-Behrooz Semnani (graduated)

- Research: Physical limitations in radiating structures and the design of optimum antennas

10-Alireza Bostani (graduated)

- Research: Analysis and design of tapered dielectric rod antennas for mm-wave applications

11-Soghra Sarkooyeh (graduated)

- Research: Design of ultra-wideband microwave phase shifters

12-Elahe Marzban (graduated)

- Research: Microwave filter synthesis using inverse scattering techniques

13-Hamidreza Kazemi (graduated)

- Research: Analysis and design of a millimeter wave multi-beam antenna using a circular grating

14-Ali Jafargholi (graduated)

- Research: Analysis and design of graphene based terahertz nano-circuits

15-Amir Masoud Bagheri (graduated) (co-supervised with prof. Mehrany) (graduated)

- Research: Slow Light and completely stopped light in multilayer structures

16-Zohreh Seyed Rezaie (graduated) (co-supervised by prof. Rejaei) (graduated)

- Research: Graphene based terahertz plasmonic channel waveguide

PhD Students

1-Ahmad Bakhtafrouz (graduated)

- Research: Radiation of finite sources in the vicinity of infinite periodic structures

2-Amin Rashidi-Zadeh

3-Razieh Safarzadeh (co-supervised with prof. Farzaneh)

Research Interests

- Antenna theory, phased array antennas, new developments in phased array antennas
- Theory and applications of leaky waves, leaky wave antennas
- Analysis and applications of periodic structures in electromagnetics and optics (PBG, EBG, AMC, Metasurfaces)
- Analytical and numerical techniques in electromagnetics and optics
- Synthesis and design of microwave filters and multiplexers
- Guided-wave optics
- Surface Plasmon polaritons, plasmonic devices, graphene based nano-devices