# Ehsān Shāh Hosseini


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## Research

**Expertise** Nanofabrication, theoretical and experimental photonics, microfluidics, and biosensing.

**Interests** Experimental and theoretical research in photonics, notably optical microcavities and their use in sensing, optomechanics, QED and communications. Optical device design, fabrication, and characterization.

## Education

**Dec. 2010 (Expected)** PhD in Electrical Engineering, **Georgia Institute of Technology**, Atlanta
Thesis: *"High Quality Integrated Silicon Nitride Nanophotonic Structures for Visible Light Applications"*
Advisor: Prof. Ali Adibi| Major: Photonics

**Aug. 2008** MSc in Electrical Engineering, **Georgia Institute of Technology**, Atlanta
Major: Photonics | Minor: Physics | Advisor: Prof. Ali Adibi
GPA: 3.72/4

**July 2003** BSc in Electrical Engineering, **Sharif University of Technology**, Tehran, Iran
Major: Fields & Waves in Communications | Advisor: Prof. Bijan Rashidian
GPA: 17.29/20

## Honors

**2005** Received the School of Electrical and Computer Engineering's best teaching assistant award at Georgia Institute of Technology.

**July 1999** Ranked 18$^{th}$ among 300,000 participants in the national undergraduate university entrance examination.

## Research Projects and Fundings

**Afosr**
- Photonic crystal-based integrated structures for optical communications and optical signal processing
- Ultra high quality factor SiN microdisks for visible range photonics
- Photonic lab-on-a-chip sensors for point-of-care detection of infectious diseases
- Nanofluidic structures integrated with SiN photonic and metallic plasmonic devices

**Darpa**
- Silicon photonic analog signal-processing engines with reconfigurability, Si-Phaser
- multimodal multiplexed integrated photonic devices for chemical and biological sensing CiphCer

**Sharp Labs**
- Short range NIR optical interconnects

**Other**
- Active devices based on GaN and InGaAlAs photonic crystals and microdisks

## Skills

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|---|---|---|
| Numerical | | Fdtd with Matlab, Meep, Lumerical, OptiFDTD, etc.<br>Fem with Comsol Multiphysics, Hfss<br>Cad with Autocad, Bricscad, Qcad, LayoutEditor, Cadence |
| Fabrication | Processes: | electron beam lithography, photolithography, Rie and Icp etching, Pecvd and Lpcvd, Sem, ellipsometry, Afm, thermal and electron beam evaporation, thermal annealing and Rtp |
| | Materials: | Si/$SiO_2$/SiN, InGaN/GaN, InP/InGaAlAs, and polymers |
| Charact. | | room temperature and low temperature photoluminescence measurements and passive characterization of optical resonators. Experience with tunable lasers, optical spectrum analyzers, liquid He microscopy cryostats, vacuum systems, and computer-controlled data acquisition using LabView and Matlab. Fluorescence sensing with microfluidic integration using Pdms, SU-8, and Unity polymers |

## Experience

Research assistant

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| 2003-2010 | Georgia Institute of Technology, Photonics Research Group |
| 2002-2003 | Sharif University of Technology, Integrated Photonics Lab |

Teaching assistant

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| 2003-2006 | Laser theory and applications, electromagnetics, microelectronic circuits, electromagnetic fields and waves, and microelectronic circuits lab |

## Journal Publications

1. P. Alipour, **E. Shah Hosseini**, A. Eftekhar, B. Momeni, and A. Adibi, "Athermal performance in high-Q polymer-clad silicon microdisk resonators," Opt. Lett. 35(20), 2010.
2. A. Atabaki, **E. Shah Hosseini**, B. Momeni, and A. Adibi, "Enhancing the guiding bandwidth of photonic crystal waveguides on silicon-on-insulator," Opt. Lett. 33(22), 2008.
3. B. Momeni, M. Chamanzar, **E. Shah Hosseini**, M. Askari, M. Soltani, and A. Adibi, "Strong angular dispersion using higher bands of planar silicon photonic crystals," Opt. Express 16(18), 2008.
4. B. Momeni, S. Yegnanarayanan, M. Soltani, A. Eftekhar, **E. Shah Hosseini**, and A. Adibi, "Silicon nanophotonic devices for integrated sensing," J. Nanophoton. 3, 2009.
5. B. Momeni, **E. Shah Hosseini**, M. Askari, M. Soltani, and A Adibi, "Integrated photonic crystal spectrometers for sensing applications," Opt. Commun. 282(15), 2009.
6. **E. Shah Hosseini**, S. Yegnanarayanan, A. Atabaki, M. Soltani, and A. Adibi, "High quality planar silicon nitride microdisk resonators for integrated photonics in the visible wavelength range," Opt. Express 17(17), 2009.
7. B. Momeni, **E. Shah Hosseini**, and A. Adibi, "Planar Photonic crystal microspectrometers in silicon-nitride for the visible range," Opt. Express 17(19), 2009.
8. **E. Shah Hosseini**, S. Yegnanarayanan, A. Atabaki , M. Soltani, and A. Adibi, "Systematic design and fabrication of high-Q single-mode pulley-coupled planar silicon nitride microdisk resonators at visible wavelengths," Opt. Express 18(3), 2010.

9. A. Atabaki, B. Momeni, A. Eftekhar, **E. Shah Hosseini**, S. Yegnanarayanan, and A. Adibi, "Tuning of Resonance-Spacing in a Traveling-Wave Resonator Device," Opt. Express 18(9) 2010.
10. B. Momeni, M. Askari , **E. Shah Hosseini**, A. Atabaki and A. Adibi, "An on-chip silicon grating spectrometer using a photonic crystal reflector," J. Opt. 12(3) 2010.
11. P. Alipour, **E. Shah Hosseini**, A. Eftekhar, B. Momeni, and A. Adibi, "Athermal Operation in Polymer-Clad Silicon Microdisk Resonators," accepted to be published in Opt. Lett.
12. A. Atabaki, **E. Shah Hosseini**, A. Eftekhar, S. Yegnanarayanan, and A. Adibi, "Optimization of Metallic Microheaters for High-Speed Reconfigurable Silicon Photonics," submitted to Opt. Express.
13. **E. Shah Hosseini**, P. Alipour, A. Atabaki and A. Adibi, "Athermal PDMS clad silicon nitride microdisk resonators," in preparation.

## Selected Conference Presentations and Proceedings

1. B. Momeni, **E. Shah Hosseini**, C. M. Reinke, M. Badiei, M. Askari, S. Mohammadi, M. Soltani, J. Huang, and A. Adibi, "Compact photonic crystal spectrometers for lab-on-a-chip biosensing applications," LEOS 2006 (19th IEEE LEOS Annual Meeting), Montreal, Quebec, Canada, November 2006.
2. B. Momeni, **E. Shah Hosseini**, C. M. Reinke, M. Askari, S. Mohammadi, M. Soltani, J. Huang, and A. Adibi, "Focusing dispersive photonic crystal elements for chip-scale wavelength demultiplexing," LEOS 2006 (19th IEEE LEOS Annual Meeting), Montreal, Quebec, Canada, November 2006.
3. B. Momeni, **E. Shah Hosseini**, M. Askari, S. Mohammadi, M. Soltani, and A. Adibi, "Compact photonic crystal demultiplexers and spectrometers," Photonics West 2007, San Jose, CA, January 2007 **(invited)**.
4. A. Atabaki, **E. Shah Hosseini**, B. Momeni, and A. Adibi, "Detailed analysis of photonic crystal waveguides near mode-gap and its applications for dispersion engineering," PECS-VII: Photonic and Electromagnetic Crystal Structures, Monterey, CA, April 2007.
5. B. Momeni, **E. Shah Hosseini**, M. Askari, S. Mohammadi, M. Soltani, and A. Adibi, "Chip-Scale photonic crystal spectrometers with high resolution for lab-on-a-chip sensing applications," Conference on Lasers and Electro-Optics (CLEO), Baltimore, MD, May 2007.
6. B. Momeni, M. Chamanzar, **E. Shah Hosseini**, M. Askari, M. Soltani, and A. Adibi, "Design and applications of strongly dispersive photonic crystal structures," Photonics West 2008, San Jose, CA, January 2008 **(invited)**.
7. A. H. Atabaki, **E. Shah Hosseini**, B. Momeni, and A. Adibi, "Engineering of planar photonic crystal waveguides on silicon-on-insulator for larger guiding bandwidth," Photonics West 2008, San Jose, CA, January 2008.
8. **E. Shah Hosseini**, S. Yegnanarayanan, M. Soltani, and A. Adibi,"Optimization of SiNx planar microdisk high Q resonators for chipscale visible integrated photonics," Conference on Lasers and Electro-Optics (CLEO), San Jose, CA, May 2008.
9. A. H. Atabaki, Q. Li, S. Yegnanarayanan, M. Chamanzar, **E. Shah Hosseini**, A. A. Eftekhar, M. Soltani, B. Momeni, and A. Adibi, "Interferometrically-coupled traveling-wave resonators for nonlinear optics applications," IEEE LEOS Winter Topicals: Nanophotonics, Innsbruck, Austria, January 2009.
10. P. Alipour, **E. Shah Hosseini**, A. A. Eftekhar, B. Momeni, and A. Adibi, "Temperature-insensitive silicon microdisk resonators using polymeric cladding layers," Conference on Lasers and Electro-Optics (CLEO), Baltimore, MD, June 2009.
11. B. Momeni, **E. Shah Hosseini**, and Ali Adibi, "Broadband Integrated Spectrometers in Silicon-Nitride for Spectral Analysis in Sensing Applications," Integrated Photonics and Nanophotonics Research and Applications (IPNRA), Honolulu, HI, July 2009.
12. M. Chamanzar, **E. Shah Hosseini**, S. Yegnanarayanan, and A Adibi, "Evanescent Excitation of Plasmonic Nanodisks Using Hybrid Guided Wave Silicon Nitride Structures," Conference on Lasers and Electro-Optics (CLEO), San Jose, CA, June 2010.

## References


Ali Adibi, PhD

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