Amir Arbabi

113D Knowles Engineering Bldg
University of Massachusetts Amherst
151 Holdsworth Way, Amherst, MA 01003

phone: (413) 545-6193
e-mail: arbabi@umass.edu
web: http://people.umass.edu/arbabi

Education

2009–2013	**University of Illinois at Urbana-Champaign** Ph.D. in Electrical Engineering
2007–2009	**University of Waterloo** M.Sc. in Electrical Engineering
2002–2006	**University of Tehran** B.Sc. in Electrical Engineering

Professional History

1/2017–present	**University of Massachusetts Amherst** Assistant Professor of Electrical and Computer Engineering
2013–2016	**California Institute of Technology** T. J. Watson Laboratories of Applied Physics Postdoctoral Scholar (2013–2014), and Senior Research Scientist (2014–2016)

Research Interests

Experimental and theoretical aspects of nanophotonics, flat optics, and photonic integrated circuits with applications in optical data processing, sensors, consumer electronics, optical communications, and imaging.

Honors & Distinctions

- Best ECE Junior Faculty award. Awarded by IEEE-HKN student branch at UMass Amherst, 2021
- K. C. Yeh Endowed Fellowship of ECE Illinois, 2013
- Nick and Katherine Holonyak, Jr. Graduate Student Fellowship, 2012
- Nick and Katherine Holonyak, Jr. Outstanding Research Award, 2012
- E. A. Reid Fellowship Award of ECE Illinois, 2011
- Finalist of the Jean Bennett Memorial Award of the Frontiers in Optics conference, 2010
- "Ontario Graduate Scholarship" ($30,000) and "President's Graduate Scholarship" ($20,000). Awarded by the government of Ontario and the University of Waterloo for recognition of academic excellence in graduate studies, 2008 & 2009
- Ranked 1st among ∼750 graduates of the College of Engineering, University of Tehran, 2002–2006
- Ranked 1st in the first stage, and 2nd in the final stage of the 10th Iranian National Electrical Engineering Olympiad among more than 11,000 electrical engineering students, 2005
- Faculty of Engineering award for the highest annual GPA in the School of ECE, University of Tehran, for four consecutive years, 2002–2005
- Silver medal in the 14th Iranian National Physics Olympiad, 2001

Teaching

- ECE 333 Fields & Waves I: Spring 2019 (Discussion), Fall 2019, Fall 2020, Fall 2021
- ECE 572 Optoelectronics: Developed course materials and taught in Fall 2017, Fall 2018, Spring 2020, Spring 2021, Spring 2022
- ECE 597TN/697TN Photonics: Developed course materials and taught in Spring 2018
- ECE 571 Microelectronic Fabrication (Lab.): Spring 2017, Spring 2022
- ECE 415/416 Senior Design Project: Fall 2018, Spring 2019, Fall 2020, Spring 2021, Fall 2022, Spring 2022
- ECE 396 Independent Study: "Transmission Lines," Spring 2021, "Microfabrications Laboratory," Spring 2022
- ECE 496 Independent Study: "Microfabrications Laboratory," Spring 2022

Service Provided to UMass

- Faculty Senate research council: Fall 2020-Present
- Faculty search (hiring) committee: Spring 2021
- ECE department graduate program committee: Fall 2021, Spring 2022
- ECE department personnel committee: Fall 2019, Spring 2020
- ECE seminar committee: Fall 2017, Spring 2018
- New student orientation advisor: Summers of 2017, 2018, and 2019
- Undergraduate student advisor: Since Fall 2017
- Scribe in ECE faculty meetings: Spring 2017

Professional Service

- Associate editor, *Journal of Nanophotonics*, Nov. 2017–present
- Associate editor, *Sensors*, Sep. 2020–present
- Associate editor, *IEEE Photonics Journal*, Sep. 2021–present
- Associate editor, *Frontiers In Electronic Materials*, Sep. 2021–present
- Reviewer, various Nature, Science, PNAS, OSA, AIP, ACS, and IEEE journals
- Member of technical program committee of the Photonic and Phononic Properties of Engineered Nanostructures (2020 and 2021) conference
- Member of technical program committee of the High Contrast Metastructures (2021) conference
- Session chair at SPIE Photonics West conference: 2016–2020
- Agency Panel Review: National Science Foundation (2017)

Graduate Students and Postdoctoral Scholars Supervised

- Graduate students:
  Babak Mirzapourbeinekalaye, (2018–present)
  Mahsa Torfeh (2017–2021), defended Aug. 2021, currently PhD student at USC
  Mahdad Mansouree (2017–2021), defended May 2021, currently senior laser engineer at Lumentum
- Postdoctoral scholars:
  Dr. Andrew McClung (2018–present)
  Dr. Sarath Samudrala (2017–2018), currently postdoc at Lawrence Berkeley National Laboratory

---

Publications, Talks, and Patents

Book Chapters

1. A. Faraon, A. Arbabi, S. M. Kamali, E. Arbabi, and A. Majumdar, "Applications of wavefront control with dielectric metasurfaces," in Dielectric Metamaterials: Fundamentals, Designs and Applications, I. Brener, S. Liu, I. Staude, J. Valentine, C. Holloway, Ed., Woodhead Publishing, 2019.

Journals

[J60] **B. Mirzapourbeinekalaye**, S. Samudrala, **M. Mansouree**, A. McClung, and A. Arbabi, "Free-space-coupled wavelength-scale disk resonators," *Nanophotonics*, 2022.

[J59] **B. Mirzapourbeinekalaye**, A. McClung, and A. Arbabi, "General lossless polarization and phase transformation using bilayer metasurfaces," *Adv. Opt. Mater.*, 2102591, 2022.

[J58] V. J. Einck, **M. Torfeh**, A. McClung, D. E. Jung, **M. Mansouree**, A. Arbabi, and J. J. Watkins, "Scalable nanoimprint lithography process for manufacturing visible metasurfaces composed of high aspect ratio TiO_2 meta-atoms," *ACS Photonics*, vol. 8, pp. 2400–2409, 2021.

[J57] **M. Mansouree**, A. McClung, S. Samudrala, and A. Arbabi, "Large-scale parameterized metasurface design using adjoint optimization," *ACS Photonics*, vol. 8, pp. 455–463, 2021.

[J56] A. McClung, S. Samudrala, **M. Torfeh**, **M. Mansouree**, and A. Arbabi, "Snapshot spectral imaging with parallel metasystems," *Sci. Adv.*, vol. 6, eabc7646, 2020.

[J55] Y. Wu, S. Samudrala, A. McClung, T. Taniguchi, K. Watanabe, A. Arbabi, and J. Yan, "Up- and down-conversion between intra- and inter-valley excitons in waveguide coupled monolayer WSe_2," *ACS Nano*, vol. 14, 10503–10509, 2020.

[J54] J. Park, X. Hu, **M. Torfeh**, U. Okoroanyanwu, A. Arbabi, and J. J. Watkins, "Exceptional electromagnetic shielding efficiency of silver coated carbon fiber fabrics via roll-to-roll spray coating process," *J. Mater. Chem. C*, vol. 8, 11070–11078, 2020.

[J53] A. McClung, **M. Mansouree**, and A. Arbabi, "At-will chromatic dispersion by prescribing light trajectories with cascaded metasurfaces," *Light Sci. Appl.*, vol. 9, 93, 2020.

[J52] **M. Mansouree**, H. Kwon, E. Arbabi, A. McClung, A. Faraon, and A. Arbabi, "Multifunctional 2.5D metastructures enabled by adjoint optimization," *Optica*, vol. 7, pp. 77–81, 2020.

[J51] **M. Torfeh**, and A. Arbabi, "Modeling metasurfaces using discrete-space impulse response technique," *ACS Photonics*, vol. 7, pp. 941–950, 2020.

[J50] A. Arbabi, E. Arbabi, **M. Mansouree**, S. Han, S. M. Kamali, Y. Horie, and Andrei Faraon, "Increasing efficiency of high numerical aperture metasurfaces using grating averaging technique," *Sci. Rep.*, vol. 10, 7124, 2020.

[J49] M. Faraji-Dana, E. Arbabi, H. Kwon, S. M. Kamali, A. Arbabi, J. Bartholomew, and A. Faraon, "Hyperspectral imager with folded metasurface optics," *ACS Photonics*, vol. 6, pp. 2161–2167, 2019.

[J48] E. Arbabi, S. M. Kamali, A. Arbabi, and A. Faraon, "Vectorial holograms with a dielectric metasurface: ultimate polarization pattern generation," *ACS Photonics*, vol. 6, pp. 2712–2718, 2019.

[J47] M. Faraji-Dana, E. Arbabi, A. Arbabi, S. M. Kamali, H. Kwon, and A. Faraon, "Compact folded metasurface spectrometer," *Nature Commun.*, vol. 9, 4196, 2018.

[J46] E. Arbabi, J. Li, R. Hutchins, S. M. Kamali, A. Arbabi, Y. Horie, P. Van Dorpe, V. Gradinaru, D. Wagenaar, and A. Faraon, "Two-photon microscopy with a double-wavelength metasurface objective lens", *Nano Lett.*, vol. 18, pp. 4943–4948, 2018.

[J45] E. Arbabi, S. M. Kamali, A. Arbabi, and A. Faraon, "Full-Stokes imaging polarimetry using dielectric metasurfaces," *ACS Photonics*, vol. 5, pp. 3132–3140, 2018.

[J44] S. M. Kamali, E. Arbabi, A. Arbabi, and A. Faraon, "A review of dielectric optical metasurfaces for wavefront control," *Nanophotonics*, vol. 7, (6), pp. 1041–1068, 2018.

[J43] E. Arbabi, A. Arbabi, S. M. Kamali, Y. Horie, M. Faraji-Dana, and A. Faraon, "MEMS-tunable dielectric metasurface lens," *Nat. Commun.*, vol. 9, 812, 2018.

[J42] M. Jang, Y. Horie, A. Shibukawa, J. Brake, Y. Liu, S. M. Kamali, A. Arbabi, H. Ruan, A. Faraon, and C. Yang, "Wavefront shaping with disorder-engineered metasurfaces," *Nature Photon.*, vol. 12, pp. 84-90, 2018.

[J41] Y. Horie, A. Arbabi, E. Arbabi, S. M. Kamali, and A. Faraon, "High-speed, phase-dominant spatial light modulation with silicon-based active resonant antennas," *ACS Photonics*, vol. 5, pp. 1711–1717, 2017.

[J40] S. M. Kamali, E. Arbabi, A. Arbabi, Y. Horie, M. Faraji-Dana, and A. Faraon, "Angle-multiplexed metasurfaces: encoding independent wavefronts in a single metasurface under different illumination angles," *Phys. Rev. X*, vol. 7, 041056, 2017.

[J39] A. Arbabi, E. Arbabi, Y. Horie, S. M. Kamali, and A. Faraon "Planar metasurface retroreflector," *Nature Photon.*, vol. 11, pp. 415–420, 2017.

[J38] E. Arbabi, A. Arbabi, S. M. Kamali, Y. Horie, and A. Faraon, "Controlling the sign of chromatic dispersion in diffractive optics with dielectric metasurfaces," *Optica*, vol. 4, pp. 625–632, 2017.

[J37] Y. Horie, S. Han, J. Lee, J. Kim, Y. Kim, A. Arbabi, C. Shin, L. Shi, E. Arbabi, S. M. Kamali, H. Lee, S. Hwang, and A. Faraon, "Visible wavelength color filters using dielectric subwavelength gratings for backside-illuminated CMOS image sensor technologies," *Nano Lett.*, vol. 17, pp. 3159–3164, 2017.

[J36] H. Emmer, C. T. Chen, R. Saive, D. Friedrich, Y. Horie, A. Arbabi, A. Faraon, and H. A. Atwater "Fabrication of single crystal gallium phosphide thin films on glass," *Sci. Rep.*, vol. 7, 4643, 2017.

[J35] Z. Wang, Y. Yan, A. Arbabi, G. Xie, C. Liu, Z. Zhao, Y. Ren, L. Li, N. Ahmed, A. J. Willner, E. Arbabi, A. Faraon, R. Bock, S. Ashrafi, M. Tur, and A. E. Willner "Orbital angular momentum beams generated by passive dielectric phase masks and their performance in a communication link," *Opt. Lett.*, vol. 42, pp. 2746–2749, 2017.

[J34] E. Miyazono, I. Craiciu, A. Arbabi, T. Zhong, and A. Faraon, "Coupling erbium dopants in yttrium orthosilicate to silicon photonic resonators and waveguides," *Opt. Express*, vol. 25, pp. 2863–2871, 2017.

[J33] A. Arbabi, and A. Faraon, "Fundamental limits of ultrathin metasurfaces," *Sci. Rep.*, vol. 7, 43722, 2017.

[J32] A. Arbabi, E. Arbabi, S. M. Kamali, Y. Horie, S. Han, and A. Faraon "Miniature optical planar camera based on a wide-angle metasurface doublet corrected for monochromatic aberrations," *Nat. Commun.*, vol. 7, 13682, 2016.

[J31] S. M. Kamali, E. Arbabi, A. Arbabi, Y. Horie, and A. Faraon, "Highly tunable elastic dielectric metasurface lenses," *Laser Photon. Rev.*, vol. 10, pp. 1002–1008, 2016.

[J30] E. Arbabi, A. Arbabi, S. M. Kamali, Y. Horie, and A. Faraon, "Multiwavelength metasurfaces through spatial multiplexing," *Sci. Rep.*, vol. 6, 32803, 2016.

[J29] Y. Ren, L. Li, Z. Wang, S. M. Kamali, E. Arbabi, A. Arbabi, Z. Zhao, G. Xie, Y. Cao, N. Ahmed, Y. Yan, C. Liu, A. J. Willner, S. Ashrafi, M. Tur, A. Faraon, A. E. Willner "Orbital angular momentum-based space division multiplexing for high-capacity underwater optical communications," *Sci. Rep.* 6, 33306, 2016.

[J28] E. Arbabi, A. Arbabi, S. M. Kamali, Y. Horie, A. Faraon, "High efficiency double-wavelength dielectric metasurface lenses with dichroic birefringent meta-atoms," *Opt. Express*, vol. 24, pp. 18468–18477, 2016.

[J27] Y. Horie, A. Arbabi, E. Arbabi, S. M. Kamali, and A. Faraon, "Wide bandwidth and high resolution planar filter array based on DBR-metasurface-DBR structures," *Opt. Express*, vol. 24, pp. 11677–11682, 2016.

[J26] A. Faraon, A. Arbabi, Y. Horie, E. Arbabi, and S. M. Kamali, "Flat free-space optical elements based on dielectric metasurfaces," *SPIE Newsroom*, April 2016, doi: 10.1117/2.1201603.006375.

[J25] E. Arbabi, A. Arbabi, S. M. Kamali, Y. Horie, and A. Faraon, "Multiwavelength polarization insensitive lenses based on dielectric metasurfaces with meta-molecules," *Optica*, vol. 3, pp. 628-633, 2016.

[J24] M. P. Backlund, A. Arbabi, P. N. Petrov, E. Arbabi, S. Saurabh, A. Faraon, and W. E. Moerner, "Removing orientation-induced localization biases in single molecule microscopy using a wideband metasurface mask," *Nature Photon.*, vol. 10, pp. 459–462, 2016.

[J23] S. M. Kamali, A. Arbabi, E. Arbabi, Y. Horie, and A. Faraon, "Decoupling optical function and geometrical form using conformal flexible dielectric metasurfaces," *Nat. Commun.*, vol. 7, 2016.

[J22] A. Arbabi, R. Briggs, Y. Horie, M. Bagheri, and A. Faraon, "Efficient dielectric metasurface collimating lenses for mid-infrared quantum cascade lasers," *Opt. Express*, Vol. 23, No. 26, 2015.

[J21] Y. Horie, A. Arbabi, S. Han, and A. Faraon, "High resolution on-chip optical filter array based on double subwavelength grating reflectors," *Opt. Express*, Vol. 23, No. 23, pp. 29848–29854, 2015.

[J20] A. Arbabi, M. Bagheri, Y. Horie, and A. Faraon, "Dielectric metasurfaces for complete control of phase and polarization with subwavelength spatial resolution and high transmission," *Nature Nanotech.*, Vol. 10, pp. 937–943, 2015.

[J19] C. Edwards, A. Arbabi, B. Bhaduri, X. Wang, R. Ganti, P. J. Yunker, A. G. Yodh, G. Popescu, and L. L. Goddard, "Measuring the non-uniform evaporation dynamics of sprayed sessile microdroplets with quantitative phase imaging," *Langmuir*, Vol. 31, No. 40, pp. 11020–11032, 2015.

[J18] A. Arbabi, M. Bagheri, A. J. Ball, Y. Horie, and A. Faraon, "Subwavelength-thick lenses with high numerical apertures and large efficiency based on high-contrast transmitarrays," *Nat. Commun.*, Vol. 6, 7069, 2015.

[J17] A. Arbabi, S. M. Kamali, E. Arbabi, B. G. Griffin, and L. L. Goddard, "Grating integrated single mode microring laser," *Opt. Express*, Vol. 23, No. 4, pp. 5335–5347, 2015.

[J16] Y. M. Kang, M. Xue, A. Arbabi, J. Jin, L. L. Goddard, "Modal expansion approach for accurately computing resonant modes in a high-Q optical resonator," *Microw. Opt. Technol. Lett.*, Vol. 56, No. 2, pp. 278–284, 2014.

[J15] M. Xue, Y. M. Kang, A. Arbabi, S. J. McKeown, L. L. Goddard, and J. Jin, "Fast and accurate finite element analysis of large-scale three-dimensional photonic devices with a robust domain decomposition method," *Opt. Express*, Vol. 22, No. 4, pp. 4437–4452, 2014.

[J14] A. Arbabi, and L. L. Goddard, "Measurements of the refractive indices and thermo-optic coefficients of Si_3N_4 and SiO_x using microring resonances," *Opt. Lett.*, Vol. 38, No. 19, pp. 3878–3881, 2013.

[J13] R. Zhou, C. Edwards, A. Arbabi, G. Popescu, and L. L. Goddard, "Detecting 20 nm defects in large area nano-patterns using interferometric microscopy," *Nano Lett.*, Vol. 13, No. 8, pp. 3716–3721, 2013.

[J12] B. G. Griffin, A. Arbabi, L. L. Goddard, "Engineering the sensitivity and response time of edge-emitting laser hydrogen sensors," *IEEE Sens. J.*, Vol. 13, No. 8, pp. 3098-3105, 2013.

[J11] B. G. Griffin, A. Arbabi, M. P. Tan, A. M. Kasten, K. D. Choquette, and L. L. Goddard, "Demonstration of enhanced side mode suppression in metal filled photonic crystal vertical cavity lasers," *Opt. Lett.*, Vol. 38, No. 11, pp. 1936–1938, 2013.

[J10] A. Arbabi and L. L. Goddard, "Dynamics of self-heating in microring resonators," *IEEE Photon. J.*, Vol. 4, No. 5, pp. 1702–1711, 2012.

[J9] A. Arbabi and L. L. Goddard, "Integrated optical resonators: progress in 2011," (invited) *IEEE Photon. J.*, Vol. 4, No. 2, pp. 574–577, 2012.

[J8] C. Edwards, A. Arbabi, G. Popescu, and L. L. Goddard, "Optically monitoring and controlling nanoscale topography during semiconductor etching," *Light Sci. Appl.*, Vol. 1, No. 9, 2012.

[J7] B. G. Griffin, A. Arbabi, A. Kasten, K. Choquette, and L. L. Goddard, "Hydrogen detection using a functionalized photonic crystal vertical cavity laser," (invited) *IEEE J. Quantum Electron.*, Vol. 48, No. 2, pp. 160–168, 2012.

[J6] A. Arbabi and S. Safavi-Naeini, "Maximum gain of a lossy antenna," *IEEE Trans. Antennas and Propag.*, Vol. 60, No. 1, pp. 2–7, 2012.

[J5] A. Arbabi, Y. M. Kang, C. Lu, E. Chow, and L. L. Goddard, "Realization of a narrowband single wavelength microring mirror," *Appl. Phys. Lett.*, Vol. 99, No. 9, 2011.

[J4] A. Arbabi, Y. M. Kang, and L. L. Goddard, "Cylindrical coordinates coupled mode theory," *IEEE J. Quantum Electron.*, Vol. 46, No. 12, pp. 1769–1774, 2010.

[J3] A. Arbabi, E. Arbabi, and S. Safavi-Naeini, "A fundamental limit on subwavelength guided waves," *Progress In Electromagnetic Research M*, Vol. 17, pp. 253–265, 2011.

[J2] Y. M. Kang, A. Arbabi, and L. L. Goddard, "Engineering the spectral reflectance of microring resonators with integrated reflective elements," *Opt. Express*, Vol. 18, No. 16, pp. 16813–16825, 2010.

[J1] Y. M. Kang, A. Arbabi, and L. L. Goddard, "A microring resonator with an integrated Bragg grating: a compact replacement for a sampled grating distributed Bragg reflector," *Opt. Quantum Electron.*, Vol. 41, No. 9, pp. 689–697, 2009.

Conferences

[C81] A. McClung and A. Arbabi, "Large achromatic metalens doublet," *SPIE Photonics West*, 2022.

[C80] A. McClung, **M. Torfeh**, V. Einck, J. Watkins, and A. Arbabi, "Nanoimprint process for scalable manufacture of silicon nitride metalenses," *SPIE Photonics West*, 2022.

[C79] A. Arbabi, "Design, optimization, and fabrication of optical metasurfaces and metasystems," *SPIE Photonics West*, 2022.

[C78] V. Einck, A. McClung, D. Jung, **M. Torfeh**, **M. Mansouree**, A. Arbabi, and J. Watkins , "Rapid direct nanoimprint lithography manufacturing of visible wavelength metalenses composed of high aspect ratio TiO_2 nanoposts," *SPIE Photonics West*, 2022.

[C77] A. McClung, **M. Mansouree**, **B. Mirzapourbeinekalaye**, and A. Arbabi, "Design and fabrication of large-scale metasurfaces," *SPIE Photonics West*, 2022.

[C76] **B. Mirzapourbeinekalaye**, A. McClung, **M. Mansouree**, and A. Arbabi, "Optimization of metasurface design curves using the grating averaging technique," *SPIE Photonics West*, 2022.

[C75] K. Zou, K. Pang, H. Song, J. Fan, Z. Zhao, H. Song, R. Zhang, H. Zhou, A. Minoofar, C. Liu, X. Su, N. Hu, A. McClung, **M. Torfeh**, A. Arbabi, M. Tur, and A. E. Willner, "Demonstration of Free-Space 300-Gbit/s QPSK Communications Using Both Wavelength-and Mode-Division-Multiplexing in the Mid-IR," *Optical Fiber Communications Conference (OFC)*, 2021.

[C74] **M. Mansouree**, A. McClung, and A. Arbabi, "Designing arbitrarily large metasurfaces using inverse mapping technique," *Conference on Lasers and Electro-Optics (CLEO)*, 2021.

[C73] V. Einck, J. Watkins, A. Arbabi, A. McClung, **M. Torfeh**, **M. Mansouree**, "A scalable nanoimprint lithography process to manufacture diffractive optics and metalenses with high aspect ratio nanofeatures using high refractive index nanocrystals," *Optical Architectures for Displays and Sensing in Augmented, Virtual, and Mixed Reality (AR, VR, MR) II*, 2021.

[C72] A. McClung, **M. Mansouree**, S. Samudrala, **M. Torfeh**, **B. Mirzapourbeinekalaye**, and A. Arbabi, "Miniature optical systems based on cascaded metasurfaces," *MRS Fall Meeting*, 2020.

[C71] **M. Mansouree**, H. Kwon, E. Arbabi, A. McClung, A. Faraon, and A. Arbabi, "2.5D metastructures; design, optimization, and experimental demonstration," *14th International Congress on Artificial Materials for Novel Wave Phenomena (Metamaterials)*, 2020.

[C70] A. McClung, **M. Mansouree**, S. Samudrala, **M. Torfeh**, **B. Mirzapourbeinekalaye**, and A. Arbabi, "Optical systems based on cascaded metasurfaces (invited)," *IEEE Research and Applications of Photonics in Defense (Rapid)*, 2020.

[C69] **M. Mansouree**, A. McClung, S. Samudrala, and A. Arbabi, "Designing large-scale metasurfaces with parameterized adjoint optimization (invited)," *International Applied Computational Electromagnetics Society Symposium (ACES)*, 2020.

[C68] A. McClung, **M. Mansouree**, S. Samudrala, and A. Arbabi, "Properties of ideal metalenses," *Conference on Lasers and Electro-Optics (CLEO)*, 2020.

[C67] Y. C. Wu, S. Samudrala, A. McClung, K. Watanabe, T. Taniguchi, A. Arbabi, and J. Yan, "Excitonic spectral features of 1L-WSe2 with silicon nitride waveguide coupling," *APS March Meeting*, 2020.

[C66] A. McClung, S. Samudrala, and A. Arbabi, "Compact metasurface hyperspectral imaging system," *SPIE Photonics West*, 2020.

[C65] A. McClung, **M. Mansouree**, and A. Arbabi, "Trajectory-selective dispersion engineering using cascaded metasurfaces," *SPIE Photonics West*, 2020.

[C64] A. McClung, **M. Torfeh**, **B. Mirzapourbeinekalaye**, **M. Mansouree**, S. Samudrala, and A. Arbabi, "Cascaded metasurface optics (invited)," *SPIE Photonics West*, 2020.

[C63] **B. Mirzapourbeinekalaye**, S. Samudrala, **M. Mansouree**, and A. Arbabi, "Free-space-coupled microdisk resonators," *SPIE Photonics West*, 2020.

[C62] **M. Torfeh**, A. McClung, and A. Arbabi, "System-level models for metasurfaces (invited)," *SPIE Photonics West*, 2020.

[C61] M. Faraji-Dana, E. Arbabi, A. Arbabi, S. M. Kamali, H. Kwon, and A. Faraon, "Folded dielectric metasurface platform for compact optical systems" *IEEE Photonics Conference*, 2019.

[C60] M. Faraji-Dana, E. Arbabi, H. Kwon, S. M. Kamali, A. Arbabi, and A. Faraon, "Miniaturized folded metasurface hyperspectral imager" *Frontiers in Optics*, 2019.

[C59] **M. Mansouree** and A. Arbabi, "Metasurface design using level-set and gradient descent optimization techniques (invited)," *International Applied Computational Electromagnetics Society Symposium (ACES)*, 2019.

[C58] A. Arbabi and **B. Mirzapourbeinekalaye**, "Applications of the characteristic modes in the analysis and design of meta-structures (invited)," *SPIE Photonics West*, 2019.

[C57] **M. Mansouree** and A. Arbabi, "Multi-layer multifunctional metasurface design using the adjoint sensitivity technique," *SPIE Photonics West*, 2019.

[C56] **M. Torfeh** and A. Arbabi, "Analysis and design of metasurfaces using the discrete-space impulse response technique," *SPIE Photonics West*, 2019.

[C55] E. Arbabi, S. M. Kamali, A. Arbabi, A Faraon "Metasurface full-Stokes polarization camera," *SPIE Photonics West*, 2019.

[C54] **B. Mirzapourbeinekalaye** and A. Arbabi, "Implementation of loss-less Jones matrices using bi-layer birefringent metasurfaces," *SPIE Photonics West*, 2019.

[C53] E. Arbabi, J. Li, R. J. Hutchins, S. M. Kamali, A. Arbabi, Y. Horie, P. Van Dorpe, V. Gradinaru, D. A. Wagenaar, and A. Faraon "Double-wavelength metasurface objective lens for two-photon microscopy," *SPIE Photonics West*, 2019.

[C52] **M. Mansouree** and A. Arbabi, "Large-scale metasurface design using the adjoint sensitivity technique," *Conference on Lasers and Electro-Optics (CLEO)*, 2018.

[C51] E. Arbabi, A. Arbabi, S. M. Kamali, Y. Horie, M. Faraji-Dana, and A. Faraon, "MEMS-tunable dielectric metasurface lens," *Conference on Lasers and Electro-Optics (CLEO)*, 2018.

[C50] S. M. Kamali, E. Arbabi, A. Arbabi, Y. Horie, M. Faraji-Dana, and A. Faraon, "Angle-multiplexed metasurfaces," *Conference on Lasers and Electro-Optics (CLEO)*, 2018.

[C49] M. Faraji-Dana, E. Arbabi, A. Arbabi, S. M. Kamali, H. Kwon, and A. Faraon, "Folded planar metasurface spectrometer," *Conference on Lasers and Electro-Optics (CLEO)*, 2018.

[C48] A. Arbabi, **M. Mansouree**, E. Arbabi, S. M. Kamali, Y. Horie, and A. Faraon, "Flat optics with dielectric metasurfaces (invited)," *SPIE Photonics West*, 2018.

[C47] A. Faraon, S. M. Kamali, E. Arbabi, Y. Horie, Amir Arbabi, and M. Faraji-Dana "Flat optics with sub-wavelength high-contrast grating metasurfaces (invited)," *SPIE Photonics West*, 2018.

[C46] S. M. Kamali, E. Arbabi, A. Arbabi, Y. Horie, M. Faraji-Dana, and Andrei Faraon, "Angle-multiplexed metasurfaces," *SPIE Photonics West*, 2018.

[C45] E. Arbabi, A. Arbabi, S. M. Kamali, Y. Horie, M. Faraji-Dana, and A. Faraon,"Microelectromechanically tunable metasurface lens," *SPIE Photonics West*, 2018.

[C44] E. Arbabi, A. Arbabi, S. M. Kamali, Y. Horie, and A. Faraon, "Dispersion-controlled diffractive devices with dielectric metasurfaces," *IEEE Photonics Conference (IPC)*, 2017.

[C43] S. M. Kamali, E. Arbabi, A. Arbabi, Y. Horie, M. Faraji-Dana, and Andrei Faraon, "Dielectric metasurfaces with independent angular control," *IEEE Photonics Conference (IPC)*, 2017.

[C42] A. Faraon, A. Arbabi, E. Arbabi, S. M. Kamali, and Y. Horie, "Flat and conformal optics with dielectric metasurfaces," *International Conference on Optical MEMS and Nanophotonics*, 2017.

[C41] A. Arbabi, E. Arbabi, S. M. Kamali, Y. Horie, S. Han, and A. Faraon, "Increasing efficiency of high-NA metasurface lenses," *SPIE Photonics West*, 2017.

[C40] E. Arbabi, A. Arbabi, S. M. Kamali, Y. Horie, and A. Faraon, "Independent control of function and chromatic dispersion in diffractive optical devices with metasurfaces," *SPIE Photonics West*, 2017.

[C39] S. M. Kamali, E. Arbabi, A. Arbabi, Y. Horie, and A. Faraon, "Metasurfaces with controlled angular phase dispersion," *SPIE Photonics West*, 2017.

[C38] S. M. Kamali, E. Arbabi, A. Arbabi, Y. Horie, and A. Faraon, "Conformal and tunable optical dielectric metasurfaces based on flexible stretchable substrates," *IEEE Photonics Conference (IPC)*, 2016. Was awarded the **second Best Paper Award**.

[C37] N. Davoudzadeh, A. Arbabi, and L. L. Goddard, "Thermal nonlinearity based optical pulse generation in microrings," *Progress in Electromagnetic Research Symposium*, 2016.

[C36] A. Arbabi, E. Arbabi, Y. Horie, S. M. Kamali, S. Han, and A. Faraon, "Aberration corrected metasurface doublet lens," *Conference on Lasers and Electro-Optics (CLEO)*, 2016.

[C35] Y. Horie, A. Arbabi, E. Arbabi, S. M. Kamali, and A. Faraon, "Dielectric metasurface narrowband filter array," *Conference on Lasers and Electro-Optics (CLEO)*, 2016.

[C34] Y. Horie, A. Arbabi, E. Arbabi, S. M. Kamali, and A. Faraon, "Active dielectric antenna for phase only spatial light modulation," *Conference on Lasers and Electro-Optics (CLEO)*, 2016.

[C33] S. M. Kamali, E. Arbabi, A. Arbabi, Y. Horie, and A. Faraon, "Tunable dielectric metasurfaces using elastic substrates," *Conference on Lasers and Electro-Optics (CLEO)*, 2016.

[C32] E. Arbabi, A. Arbabi, S. M. Kamali, Y. Horie, and A. Faraon, "Dispersionless metasurfaces using dispersive meta-atoms," *Conference on Lasers and Electro-Optics (CLEO)*, 2016.

[C31] N. Davoudzadeh, A. Arbabi, J. Zhu, and L. L. Goddard "Optical clock pulse generation using thermal nonlinearity in microring resonators," *Conference on Lasers and Electro-Optics (CLEO)*, 2016.

[C30] Z. Wang, Y. Yan, A. Arbabi, C. Liu, G. Xie, Y. Ren, Z. Zhao, L. Li, N. Ahmed, A. J. Willner, E. Arbabi, A. Faraon, N. Ashrafi, S. Ashrafi, R. D. Linquist, M. Tur, and A. E. Willner, "Demonstration of using passive integrated phase masks to generate orbital-angular-momentum beams in a communications link," *Conference on Lasers and Electro-Optics (CLEO)*, 2016.

[C29] A. Arbabi, E. Arbabi, Y. Horie, S. M. Kamali, and A. Faraon, "Experimental demonstration of a metasurface planar retroreflector," *SPIE Photonics West*, 2016.

[C28] E. Arbabi, A. Arbabi, S. M. Kamali, Y. Horie, A. Faraon, "Polarization insensitive multi-wavelength metasurface lens," *SPIE Photonics West*, 2016.

[C27] S. M. Kamali, A. Arbabi, E. Arbabi, Y. Horie, and A. Faraon "Dielectric metasurfaces on thin flexible substrates," *SPIE Photonics West*, 2016.

[C26] S. Han, Y. Horie, C. Shin, A. Arbabi, E. Arbabi, S. Hwang, and A. Faraon "Dielectric metasurface filters for backside illuminated CMOS image sensors," *MRS Spring Meeting*, 2016.

[C25] A. Arbabi, Y. Horie, M. Bagheri, and A. Faraon, "Simultaneous and complete control of light polarization and phase using high contrast transmitarrays," *Conference on Lasers and Electro-Optics (CLEO)*, 2015.

[C24] A. Arbabi, Y. Horie, M. Bagheri, and A. Faraon, "Highly efficient polarization control using subwavelength high contrast transmitarrays," *SPIE Photonics West*, 2015.

[C23] A. Arbabi, Y. Horie, A. J. Ball, M. Bagheri, and A. Faraon, "Efficient high NA flat micro-lenses realized using high contrast transmitarrays," *SPIE Photonics West*, 2015.

[C22] Y. Horie, A. Arbabi, and A. Faraon, "On-chip broadband spectral fltering using planar double high-contrast grating reflectors," *SPIE Photonics West*, 2015.

[C21] Y. Horie, A. Arbabi, and A. Faraon, "Guided resonance reflective phase shifters," *SPIE Photonics West*, 2015.

[C20] C. Edwards, A. Arbabi, B. Bhaduri, R. Ganti, P. J. Yunker, G. Yodh, G. Popsecu, and L. L. Goddard, "Characterizing microdroplet evaporation using diffraction phase microscopy," *IEEE Photonics Conference (IPC)*, 2014.

[C19] A. Arbabi, M. Bagheri; A. J. Ball, Y. Horie, D. Fattal, and A. Faraon, "Controlling the phase front of optical fiber beams using high contrast metastructures," *Conference on Lasers and Electro-Optics (CLEO)*, 2014.

[C18] A. Arbabi, and A. Faraon, "Planar retroreflector," *Conference on Lasers and Electro-Optics (CLEO)*, 2014.

[C17] Yu Horie, A. Arbabi, and A. Faraon, "Reflective optical phase modulator based on high-contrast grating mirrors," *Conference on Lasers and Electro-Optics (CLEO)*, 2014.

[C16] A. Arbabi, and L. L. Goddard, "Single wavelength microring laser," *Conference on Lasers and Electro-Optics (CLEO)*, 2013.

[C15] A. Arbabi, and L. L. Goddard, "Grating assisted mode coupling in microring resonators," (invited) *IEEE Photonics Conference (IPC)*, 2013.

[C14] A. Arbabi, B. G. Griffin, and L. L. Goddard, "An active-passive monolithic integration platform with low loss passive section," *IEEE Photonics Conference (IPC)*, 2013.

[C13] B. G. Griffin, A. Arbabi, and L. L. Goddard, "Functionalized distributed feedback lasers for hydrogen sensing applications," *IEEE Photonics Conference (IPC)*, 2013.

[C12] A. Arbabi, and L. L. Goddard, "Determination of waveguide core and cladding refractive indices using single wavelength microring reflectors," *IEEE Photonics Conference (IPC)*, 2012.

[C11] Y. M. Kang, A. Arbabi, and L. L. Goddard, "Resolving split resonant modes in microrings," *IEEE Photonics Conference (IPC)*, 2012.

[C10] A. Arbabi, P. Lu, B. G. Griffin, and L. L. Goddard, "Thermally-induced nonlinearity and optical bistability in Si_3N_4 microring resonators," *Conference on Lasers and Electro-Optics (CLEO)*, 2012.

[C9] M. Raval, S. McKeown, A. Arbabi, and L. L. Goddard, "Palladium based Fabry-Pérot etalons for hydrogen sensing," *Optical Sensors*, 2012.

[C8] B. Griffin, A. Arbabi, and L. L. Goddard, "Coupled mode analysis of a distributed Bragg reflector laser for hydrogen detection," *Optical Sensors*, 2012.

[C7] B. G. Griffin, A. Arbabi, and L. L. Goddard, "Mode suppression in metal filled photonic crystal vertical cavity lasers," *SPIE Photonics West*, 2012.

[C6] A. Arbabi, Y. M. Kang, and L. L. Goddard, "Realization of small footprint microring reflectors," i*Conference on Lasers and Electro-Optics (CLEO)*, 2011.

[C5] A. Arbabi, Y. M. Kang, and L. L. Goddard, "Analysis and design of a microring inline single wavelength reflector," *Frontiers in Optics (FiO)*, 2010.

[C4] B. G. Griffin, C. Chang, A. Arbabi, and L. L. Goddard, "Pd coated Edge-emitting lasers for hydrogen sensing applications," *IEEE Sensors Conference*, 2010.

[C3] A. Arbabi, A. Rohani, D. Saeedkia, and S. Safavi-Naeini, "A terahertz plasmonic metamaterial structure for near-field sensing applications," *Int. Conf. Infrared and Millimeter Waves (IRMMW-THz)*, 2008.

[C2] A. Arbabi, "Slotted ground microsrip line," *UTECE Symposium 2005*, Tehran, March 2005. Was awarded the **Best Paper Award**.

[C1] A. Arbabi, A. Boutejdar, M. Mahmoudi and A. S. Omar, "Increase of characteristic impedance of microstrip line using a simple slot in metallic ground plane," *Int. Conf. Commun. Electron. (ICCE'06)*, 2006.

Invited Talks and Seminars

[T33] Design and fabrication of large-scale metasurfaces, SPIE Photonics West, Jan. 2022.

[T32] Design, optimization, and fabrication of optical metasurfaces and metasystems, SPIE Photonics West, Jan. 2022.

[T31] Miniature optical systems based on cascaded metasurfaces, MRS Fall Meeting, Dec. 2020.

[T30] Optical systems based on cascaded metasurfaces, IEEE Research and Applications of Photonics in Defense (Rapid), Aug. 2020.

[T29] Designing large-scale metasurfaces with parameterized adjoint optimization, International Applied Computational Electromagnetics Society Symposium (ACES), July 2020.

[T28] Cascaded metasurface optics, SPIE Photonics West, Feb. 2020.

[T27] System-level models for metasurfaces, SPIE Photonics West, Feb. 2020.

[T26] Metasurface design using level-set and gradient descent optimization techniques, International Applied Computational Electromagnetics Society Symposium, April 2019.

[T25] On-chip integration of optical systems using dielectric metasurfaces. Physics Department Seminar, City University of New York, April 2019.

[T24] Applications of the characteristic modes in the analysis and design of meta-structures. SPIE Photonics West, Jan. 2019.

[T23] On-chip integration of optical systems using dielectric metasurfaces. Mechanical and Industrial Engineering Department Seminar, UMass Amherst, Oct. 2018.

[T22] Planar optical components and systems based on dielectric metasurfaces. Boston Photonics Conference, Feb. 2018.

[T21] Flat optics with dielectric metasurfaces. SPIE Photonics West, Jan. 2018.

[T20] Planar free-space optical components and systems based on dielectric metasurfaces. Springfield IEEE Section, Oct. 2017.

[T19] Planar optical components and systems based on dielectric metasurfaces. SPIE Photonics West, Feb. 2017.

[T18] Flat and conformal optics with dielectric metasurfaces. 5th International Conference on Lasers, Optics & Photonics, Nov. 2016.

[T17] Planar free-space optical components and systems based on dielectric metasurfaces. EE Department, Sharif University of Technology, July 2016.

[T16] Planar free-space optical components and systems based on dielectric metasurfaces. ECE Department, University of Tehran, July 2016.

[T15] Planar optical components and systems based on dielectric metasurfaces. ECE Department Seminar, University of Massachusetts Amherst, April 2016.

[T14] Flat optics with dielectric metasurfaces. Invited talk at SPIE Micro- and Nanotechnology Sensors, Systems, and Applications VIII, April 2016.

[T13] Planar optical components and systems based on dielectric metasurfaces. ECE Department Seminar, University of Alberta, April 2016.

[T12] Planar free-space optical components and systems based on dielectric metasurfaces. Colloquium, Institute of Optics, University of Rochester, March 2016.

[T11] Planar free-space optical components and systems based on dielectric metasurfaces. Graduate Seminar, Department of Electrical and Electronic Engineering, Nanyang Technological University, March 2016.

[T10] Planar free-space optical components and systems based on dielectric metasurfaces. ECE Graduate Seminar, University of Pittsburgh, Feb. 2016.

[T9] Planar free-space optical components and systems based on dielectric metasurfaces. ESE Department Seminar, Washington University in St. Louis, Jan. 2016.

[T8] Optical components thinner than a wavelength and their application for microscopy. 11th Annual Advanced Imaging Methods (AIM) Workshop, UC Berkeley, Feb. 2015.

[T7] Micron-thick optical devices for microscopy. Medical Eng. Industry Day 2014, Caltech 2014.

[T6] Micron-thick efficient optical components. APhMS in the 21st Century, Caltech Nov. 2014.

[T5] Shaping beam profile of optical fibers using planar high contrast structures. 2014 Frontiers of Nano Science and Technology Conference, Caltech Jan. 2014.

[T4] Optimum phase mask design and implementation for coupling light between two waveguides. KNI-MDL Seminar, Caltech Dec. 2013.

[T3] Reflective microring resonators: compact narrow-band reflectors for photonic integrated circuits. Applied Physics Seminar, Caltech, March 2013.

[T2] Selective mode coupling in microring resonators. CNST Nanotechnology Workshop 2013, University of Illinois at Urbana-Champaign, May 2013.

[T1] Reflective microring resonators: compact narrow-band reflectors for photonic integrated circuits. Nanohour Seminar, University of Illinois at Urbana-Champaign, Nov. 2011.

Issued Patents

[P35] S. Han, A. Arbabi, A. Faraon, E. Arbabi, and H. Park, "Spectrometer including metasurface," Patent No. US 11,268,854.

[P34] A. Arbabi, S. Han, A. Faraon, and P. Hyeonsoo, "Imaging apparatus and image sensor including the same," Patent No. US 11,211,418.

[P33] S. Han, A. Arbabi, A. Faraon, and E. Arbabi, "Spectrometer including metasurface," Patent No. US 11,162,841.

[P32] M. Faraji-Dana, E. Arbabi, A. Arbabi, and A. Faraon, "Compact folded metasurface spectrometer," Patent No. US 11,092,486.

[P31] A. Arbabi, S. Han, and A. Faraon, "Image sensor," Patent No. US 11,089,286.

[P30] A. Arbabi, A. Faraon, and S. Han, "Imaging apparatus and image sensor including the same," Patent No. US 11,037,976.

[P29] S. Han, A. Arbabi, A. Faraon, S. Hwang, J. You, and B. Choi, "Optical systems," Patent No. US 10,942,333.

[P28] B. Na, **M. Mansouree**, S. Han, and A. Arbabi, "Addressable laser array device including vertical cavity surface emitting lasers adopting nanostructure reflector disposed at intersections of plural wiring patterns," Patent No. US 10,938,179.

[P27] A. Faraon, A. Arbabi, and Y. Horie, "Planar diffractive device with matching diffraction spectrum," Patent No. US 10,881,336.

[P26] A. Arbabi, Y. Horie, S. Han, A. Faraon, Y. Jin, K. Lee, C. Shin, Y. Kim, and J. Lee, "Image sensor including nanostructure color filter," Patent No. US 10,840,302.

[P25] A. Arbabi and A. Faraon, "Controllable planar optical focusing system," Patent No. US 10,816,704.

[P24] A. Arbabi, S. Han, A. Faraon, and H. Park, "Imaging apparatus and image sensor including the same," Patent No. US 10,790,325.

[P23] S. Han, B. Na, **B. Mirzapourbeinekalaye**, and A. Arbabi, "Metamaterial-based reflector, optical cavity structure including the same and vertical cavity surface emitting laser," Patent No. US 10,777,970.

[P22] A. Arbabi, A. Faraon, and S. Han, "Focusing device comprising a plurality of scatterers and beam scanner and scope device," Patent No. US 10,712,554.

[P21] S. M. Kamali, E. Arbabi, A. Arbabi, Y. Horie, M. Faraji-Dana, and A. Faraon, "Angle multiplexed metasurfaces," Patent No. US 10,690,809.

[P20] E. Arbabi, A. Arbabi, S. M. Kamali, Y. Horie, and A. Faraon, "Dispersionless and dispersion-controlled optical dielectric metasurfaces," Patent No. US 10,670,782.

[P19] S. Han, A. Arbabi, A. Faraon, and E. Arbabi, "Spectrometer including metasurface," Patent No. US 10,514,296.

[P18] S. M. Kamali, E. Arbabi, A. Arbabi, Y. Horie, and A. Faraon, "Tunable elastic dielectric metasurface lenses," Patent No. US 10,488,651.

[P17] S. Han, Y. Kim, S. M. Kamali, A. Arbabi, Y. Horie, A. Faraon, and S. Hwang, "Method of manufacturing image sensor including nanostructure color filter," Patent No. US 10,431,624.

[P16] A. Arbabi, S. Han, and A. Faraon, "Imaging apparatus and image sensor including the same," Patent No. US 10,403,668.

[P15] S. M. Kamali, E. Arbabi, A. Arbabi, and A. Faraon, "Conformal optical metasurfaces," Patent No. US 10,267,957.

[P14] S. M. Kamali, E. Arbabi, A. Arbabi, and A. Faraon, "Conformal optical metasurfaces," Patent No. US 9,995,859.

[P13] A. Arbabi, S. Han, and A. Faraon, "Focusing device comprising a plurality of scatterers and beam scanner and scope device," Patent No. US 9,995,930.

[P12] A. Arbabi, and A. Faraon, "Controllable planar optical focusing system," Patent No. US 9,989,680.

[P11] S. Han, Y. Horie, A. Faraon, and S. Hwang, "Image sensor including nanostructure color filter," Patent No. US 9,958,582.

[P10] S. Han, Y. Horie, A. Faraon, and A. Arbabi, "On-chip optical filter comprising Fabri-Perot resonator structure and spectrometer," Patent No. US 9,939,587.

[P9] S. M. Kamali, E. Arbabi, A. Arbabi, and A. Faraon, "Conformal optical metasurfaces," Patent No. US 9,995,859.

[P8] A. Arbabi, S. Han, and A. Faraon, "Focusing device comprising a plurality of scatterers and beam scanner and scope device," Patent No. US 9,995,930.

[P7] S. Han, A. Arbabi, A. Faraon, S. Hwang, J. You, and B. Choi, "Imaging apparatus and image sensor including the same," Patent No. US 9,946,051.

[P6] A. Arbabi, and A. Faraon, "Simultaneous polarization and wavefront control using a planar device," Patent No. US 9,739,918.

[P5] Y. Horie, A. Arbabi, and A. Faraon, "Optical phased array using guided resonance with backside reflectors," Patent No. US 9,915,832.

[P4] A. Arbabi, and A. Faraon, "Controllable planar optical focusing system," Patent No. US 9,482,796.

[P3] A. Arbabi, and A. Faraon, "Flat retroreflectors," Patent No. US 9,453,947.

[P2] G. Popescu, L. L. Goddard, C. Edwards, and A. Arbabi, "Optically monitoring and controlling nanoscale topography," Patent No. US 9,255,791.

[P1] L. L. Goddard, Y. M. Kang, and A. Arbabi, "Distributed Bragg reflector in a microring resonator," Patent No. US 8,670,476.