

Naresh Emani

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SUMMARY¹

Prof. Naresh Emani's research interest spans Nanophotonics, Photovoltaics, Optoelectrical devices and Nanofabrication. He is interested in exploring novel phenomena in nano and micro-scale optics for next generation computing, renewable energy and environmental sensing

PROFESSIONAL CAREER

Assistant Professor of Electrical Engineering Indian Institute of Technology, Hyderabad	07.2017 - present
Scientist, Advanced Concepts and Nanotechnology Data Storage Institute, A*STAR, Singapore	12.2014 - 06.2017
Engineer, Advanced Reliability Development Program Taiwan Semiconductor Manufacturing Co., Hsinchu, Taiwan	08.2007 - 08.2009

EDUCATION

PhD, Electrical Engineering Purdue University, West Lafayette, USA	08.2009 - 12.2014
MTech, Electrical Engineering (Microelectronics) Indian Institute of Technology, Bombay, India	07.2005 - 07.2007
MSc Physics and BSc (Hons) Sri Sathya Sai Institute of Higher Learning, Prashanthi Nilayam, India	06.2000 - 03.2005

PROFESSIONAL RECOGNITION, AWARDS AND HONOURS

2020	Elevated to IEEE Senior Membership grade
2020	Review Editor on the Editorial Board of Plasmonics (speciality section of Frontiers in Photonics)
2017	Ramanujan Fellowship , Science and Engineering Research Board, DST, India
2014	SPIE travel grant, SPIE Optics and Photonics, San Diego, CA, August 16-21, 2014
2009	Most Valuable Person award for outstanding performance in Reliability division of TSMC
2005	All India Rank 1 in Physics Stream of Graduate Aptitude Test in Engineering (GATE) 2005
2005	Qualified for Junior Research Fellowship in UGC-CSIR JRF/NET Test 2005

RESEARCH PROJECTS

PI, Development of silicon photonics platform for sensing at mid-IR wavelengths MOE/STARS Scheme	05.2020- 05.2023
PI, Investigation of the carrier surface recombination in III-V semiconductors for on-chip nanophotonic applications, SERB	03.2019- 03.2022
PI, Ramanujan Fellowship, SERB	09.2017- 09.2022

¹Last Updated: April 24, 2021

TEACHING EXPERIENCE

Undergraduate courses: Semiconductor Fundamentals, Electronic Devices and Circuits, Physics of MOS Transistors, Engineering Electromagnetics

Postgraduate courses: Introduction to Nanophotonics, Introduction to VLSI Design, VLSI Technology and Microfabrication and Device Simulation Laboratory

PUBLICATION SUMMARY

15 refereed journal articles, 20+ Conference proceedings/talks and 1 patent

Source	Total Citations	h-index	i10-index
Google Scholar	4515	14	14
Scopus	3542	14	14

Source: [Google Scholar Profile](#), [Scopus Profile](#) (Updated on April 24, 2021)

SERIAL JOURNAL ARTICLES

- 15 Jinal Tapar, Saurabh Kishen, and **Naresh Kumar Emani**. Spectral singularities and asymmetric light scattering in pt-symmetric 2D nanoantenna arrays. *Optics Letters*, 45(18), 2020a. URL <https://doi.org/10.1364/OL.398551>. IF: 3.71
- 14 Saurabh Kishen, Jinal Tapar, and **Naresh Kumar Emani**. Enhanced light emission from gap plasmons in nano-strip MIM tunnel junctions. *Journal of Optics*, 22(9):095006, 2020. URL <https://doi.org/10.1088/2040-8986/ababe7>. IF: 2.38
- 13 Jinal Tapar, Saurabh Kishen, Kumar Prashant, Kaushik Nayak, and **Naresh Kumar Emani**. Enhancement of the optical gain in GaAs nanocylinders for nanophotonic applications. *Journal of Applied Physics*, 127(15):153102, 2020b. URL <https://doi.org/10.1063/1.5132613>. IF: 2.29
- 12 Song Tung Ha, Y H Fu, **Naresh Kumar Emani**, Pan Zhenying, Reuben M Bakker, Ramon Paniagua-Dominguez, and Arseniy I. Kuznetsov. Lasing action in active dielectric nanoantenna arrays. *Nature Nanotechnology*, 13:1042–1047, 2018. URL <https://doi.org/10.1038/s41565-018-0245-5>. First three authors contributed equally, IF: 37.49
- 11 **Naresh Emani**, Egor Khaidarov, Ramon Paniagua-Dominguez, Yuan Hsing Fu, Vytautas Valuckas, Shunpeng Lu, Xueliang Zhang, Swee-Tiam Tan, Hilmi Volkan Demir, and Arseniy I. Kuznetsov. High- efficiency and low- loss III-nitride dielectric metasurfaces for visible wavelength Nanophotonics. *Applied Physics Letters*, 111(22):221101, 2017. URL <http://doi.org/10.1063/1.5007007>. IF: 3.495
- 10 Rohith Chandrasekar, **Naresh Kumar Emani**, Alexei Lagutchev, Vladimir M Shalaev, Cristian Ciraci, David R Smith, and Alexander V Kildishev. Second harmonic generation with plasmonic metasurfaces: direct comparison of electric and magnetic resonances. *Optical Materials Express*, 5(11): 2682–2691, 2015a. URL <http://dx.doi.org/10.1364/OME.5.002682>. IF: 2.566
- 9 **Naresh Kumar Emani**, Di Wang, Ting-Fung Chung, Ludmila J Prokopeva, Alexander V Kildishev, Vladimir M Shalaev, Yong P Chen, and Alexandra Boltasseva. Plasmon resonance in multilayer graphene nanoribbons. *Laser & Photonics Reviews*, 9, 2015a. URL <https://doi.org/10.1002/lpor.201500058>. IF: 8.529
- 8 **Naresh Kumar Emani**, Alexander V Kildishev, Vladimir M Shalaev, and Alexandra Boltasseva. Graphene: A dynamic platform for electrical control of plasmonic resonance. *Nanophotonics*, 4 (1), 2015b. URL <http://dx.doi.org/10.1515/nanoph-2015-0014>. IF: 6.014
- 7 Carl Pfeiffer, **Naresh Kumar Emani**, Amr M Shaltout, Alexandra Boltasseva, Vladimir M Shalaev, and Anthony Grbic. Efficient light bending with isotropic metamaterial huygens surfaces. *Nano Letters*, 14(5):2491–2497, 2014. URL <http://pubs.acs.org/doi/abs/10.1021/nl5001746>. IF: 12.08

- 6 **Naresh Kumar Emani**, Ting-Fung Chung, Alexander V Kildishev, Vladimir M Shalaev, Yong P Chen, and Alexandra Boltasseva. Electrical modulation of fano resonance in plasmonic nanostructures using graphene. *Nano Letters*, 14(1):78–82, 2013. URL <http://pubs.acs.org/doi/abs/10.1021/nl403253c>. IF: 12.08
- 5 Jongbum Kim, Gururaj V Naik, **Naresh Kumar Emani**, Urcan Guler, and Alexandra Boltasseva. Plasmonic resonances in nanostructured transparent conducting oxide films. *Selected Topics in Quantum Electronics, IEEE Journal of*, 19(3):4601907–4601907, 2013. URL <http://dx.doi.org/10.1109/JSTQE.2013.2238611>. IF: 3.367
- 4 **Naresh Kumar Emani**, Ting-Fung Chung, Xingjie Ni, Alexander V Kildishev, Yong P Chen, and Alexandra Boltasseva. Electrically tunable damping of plasmonic resonances with graphene. *Nano letters*, 12(10):5202–5206, 2012. URL <http://pubs.acs.org/doi/abs/10.1021/nl302322t>. IF: 12.08
- 3 Xingjie Ni, **Naresh Kumar Emani**, Alexander V Kildishev, Alexandra Boltasseva, and Vladimir M Shalaev. Broadband light bending with plasmonic nanoantennas. *Science*, 335(6067):427–427, 2012a. URL <http://www.sciencemag.org/content/335/6067/427.short>. IF: 41.058
- 2 P.R. West, S. Ishii, G.V. Naik, **N. K. Emani**, V.M. Shalaev, and A. Boltasseva. Searching for better plasmonic materials. *Laser & Photonics Reviews*, 4(6):795–808, 2010a. URL <http://onlinelibrary.wiley.com/doi/10.1002/lpor.200900055/abstract>. IF: 8.529
- 1 Vrajesh D Maheta, **Emani Naresh Kumar**, Shweta Purawat, Christopher Olsen, Khaled Ahmed, and Souvik Mahapatra. Development of an ultrafast on-the-fly I_{DLIN} technique to study NBTI in plasma and thermal oxynitride pMOSFETs. *Electron Devices, IEEE Transactions on*, 55(10):2614–2622, 2008. URL <http://dx.doi.org/10.1109/TED.2008.2003224>. IF: 2.62

CONFERENCE PROCEEDINGS/TALKS

- 21 Jinal Tapar, Saurabh Kishen, and **Naresh Kumar Emani**. Tunable spectral singularities with asymmetric directional response in pt-symmetric 2D nanoantenna array. *Frontiers in Optics*, pp. FM2E-3. Optical Society of America, 2020c. URL <https://doi.org/10.1364/FIO.2020.FM2E.3>
- 20 Jinal Tapar and **Naresh Kumar Emani**. Exceptional scattering in PT-symmetric GaInP nanoantenna metasurfaces. *Photonics and Plasmonics symposia, IEEE ICEE, IIT Delhi (virtual)*, 26-28 November, 2020. URL <http://icee2020.iitd.ac.in/awards.html>. **Best Poster Award**
- 19 Saurabh Kishen, Jinal Tapar, and **Naresh Kumar Emani**. Study of gap plasmons in 2d finite metal-insulator-metal tunnel junctions. *WRAP 2019, Guwahati, India*, 2019. URL <https://10.1109/WRAP47485.2019.9013735>
- 18 Akshita Ramya K, Jinal Tapar, Saurabh Kishen, and **Naresh Kumar Emani**. Experimental verification of enhanced photoluminescence in p-doped GaAs using fluorescence lifetime measurements. *WRAP 2019, Guwahati, India*, 2019. URL <https://10.1109/WRAP47485.2019.9013731>
- 17 **Naresh Kumar Emani**. Directional lasing in resonant semiconductor nanoantennas arrays. *WRAP 2019, Guwahati, India*. **Invited Talk**
- 16 Jinal Tapar, Saurabh Kishen, and **Naresh Kumar Emani**. Optimizing the gain in semiconductor nanostructures for all-dielectric active metamaterial applications. *ICMAT, Marina Bay Sands, Singapore*, 23-28 June, 2019. **Poster**
- 15 **Naresh Kumar Emani**, Hanfang Hao, Egor Khaidarov, Ramon Paniagua-Dominguez, Yuan Hsing Fu, Reuben M Bakker, Vytautas Valuckas, and Arseniy I Kuznetsov. III-V material platforms for active dielectric metasurfaces. In *Plasmonics: Design, Materials, Fabrication, Characterization, and Applications XV*, page 103460S. International Society for Optics and Photonics, 2017. URL <https://doi.org/10.1117/12.2273861>

- 14 Ludmila J Prokopeva, You-Chia Chang, **N. K. Emani**, Ted Norris, and Alexander V Kildishev. In-the-cloud optimization tool for retrieving experimentally fitted conductivity of graphene (presentation recording). In *SPIE Nanoscience+ Engineering*, pages 95461W–95461W. International Society for Optics and Photonics, 2015. URL <http://dx.doi.org/10.1117/12.2190139>
- 13 Rohith Chandrasekar, **N. K. Emani**, Alexei Lagutchev, Vladimir M Shalaev, Cristian Ciraci, David R Smith, and Alexander V Kildishev. Studying the interplay of electric and magnetic resonance-enhanced second harmonic generation: Theory and experiments. In *CLEO: QELS_Fundamental Science*, pages FW3D–2. Optical Society of America, 2015b. URL http://dx.doi.org/10.1364/CLEO_QELS.2015.FW3D.2
- 12 Di Wang, **N. K. Emani**, Ting-Fung Chung, Ludmila Prokopeva, Alexander V Kildishev, Vladimir M Shalaev, Yong P Chen, and Alexandra Boltasseva. Plasmon resonance in single-and double-layer cvd graphene nanoribbons. In *CLEO: QELS_Fundamental Science*, pages FTu1E–3. Optical Society of America, 2015. URL http://dx.doi.org/10.1364/CLEO_QELS.2015.FTu1E.3
- 11 Rohith Chandrasekar, **Naresh Emani**, Alexei Lagutchev, Vladimir M Shalaev, Alexander Kildishev, Cristian Ciraci, and David R Smith. Second harmonic generation by metamagnetics: Interplay of electric and magnetic resonances. In *Frontiers in Optics*, page FM4B5. Optical Society of America, 2014. URL <http://dx.doi.org/10.1364/FIO.2014.FM4B.5>
- 10 **N. K. Emani**, Ting-Fung Chung, Alexander Kildishev, Yong P Chen, Vladimir M. Shalaev, and Alexandra Boltasseva. Graphene as a platform for dynamically controlled plasmonics. In *SPIE Optics and Photonics*, pages 9163–11. International Society for Optics and Photonics, 2014. **Invited Talk**
- 9 Ludmila J Prokopeva, **N. K. Emani**, Alexandra Boltasseva, and Alexander Kildishev. Tunable pulse-shaping with gated graphene nanoribbons. In *CLEO: QELS_Fundamental Science*, pages FM4C–2. Optical Society of America, 2014. URL http://dx.doi.org/10.1364/CLEO_QELS.2014.FM4C.2
- 8 **N. K. Emani**, Ting-Fung Chung, Ludmila Prokopeva, Alexander Kildishev, Yong Chen, and Alexandra Boltasseva. Tuning fano resonances with graphene. In *CLEO: Science and Innovations*, pages CW3O–4. Optical Society of America, 2013. URL http://dx.doi.org/10.1364/CLEO_SI.2013.CW3O.4
- 7 Ludmila J Prokopeva, **N. K. Emani**, Alexandra Boltasseva, and Alexander Kildishev. Time domain modeling of tunable response of graphene. In *CLEO: QELS_Fundamental Science*, pages QTh1A–8. Optical Society of America, 2013. URL http://dx.doi.org/10.1364/CLEO_QELS.2013.QTh1A.8
- 6 **N. K. Emani**, Ting-Fung Chung, Xingjie Ni, Alexander Kildishev, Yong P Chen, Vladimir Shalaev, and Alexandra Boltasseva. Electrically tunable plasmonic resonances with graphene. In *Quantum Electronics and Laser Science Conference*, pages JTU1M–2. Optical Society of America, 2012. URL http://dx.doi.org/10.1364/CLEO_AT.2012.JTU1M.2
- 5 Xingjie Ni, **N. K. Emani**, Alexander Kildishev, Alexandra Boltasseva, and Vladimir Shalaev. Symmetry-breaking plasmonic metasurfaces for broadband light bending. In *Quantum Electronics and Laser Science Conference*, pages QM3F–1. Optical Society of America, 2012b. URL <http://dx.doi.org/10.1364/QELS.2012.QM3F.1>
- 4 Paul West, Satoshi Ishii, Gururaj Naik, **Naresh Emani**, and Alexandra Boltasseva. Identifying low-loss plasmonic materials. In *SPIE Newsroom*. SPIE, 2010b. URL <http://dx.doi.org/10.1117/2.1201009.003167>
- 3 Souvik Mahapatra, Vrajesh Maheta, Shweta Deora, **Emani Naresh Kumar**, Shweta Purawat, Chris Olsen, Khaled Ahmed, Ahmed Islam, and MA Alam. Material dependence of negative bias temperature instability (NBTI) stress and recovery in sion p-mosfets. *ECS Transactions*, 19(2):243–263, 2009. URL <http://ecst.ecsdl.org/content/19/2/243.short>
- 2 AE Islam, **Emani Naresh Kumar**, H Das, S Purawat, V Maheta, H Aono, E Murakami, S Mahapatra, and MA Alam. Theory and practice of on-the-fly and ultra-fast vt measurements for NBTI degradation: Challenges and opportunities. In *IEDM Tech. Dig*, pages 805–808. IEEE, 2007. URL <http://dx.doi.org/10.1109/IEDM.2007.4419070>

- 1 **Emani Naresh Kumar**, VD Maheta, S Purawat, AE Islam, C Olsen, K Ahmed, MA Alam, and S Mahapatra. Material dependence of NBTI physical mechanism in silicon oxynitride sion pmosfets: A comprehensive study by ultra fast on the fly (UF OTF) idlin technique. In *IEDM Tech. Dig. IEEE*, 2007. URL <http://dx.doi.org/10.1109/IEDM.2007.4419071>

PATENTS

- 1 Jiaw-Ren Shih, Neeraj Kumar Jha, Rakesh Ranjan, and **Naresh Kumar Emani**. Methodology for bias temperature instability test, July 20 2010. US Patent 7,759,962

PROFESSIONAL ACTIVITIES AND OUTREACH

Technical reviewer for Optics Letters, Nano Letters, Applied Physics B, Optics. Express and Journal of Optics

Served as Purdue Research Park Ambassador to represent Birck Nanotechnology Center in engagement efforts with visiting professors, government officials, industry representatives and high school students

Nano Days Volunteer: Demonstrated fundamental and intriguing aspects of Nanotechnology for K-12 students to excite them towards a career in STEM disciplines