

## Vinod M. Menon

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### EMPLOYMENT AND APPOINTMENTS

- 2014 – Present *Professor*, Department of Physics  
City College of New York (CCNY)  
Graduate Center of the City University of New York (CUNY)
- 2014 – 2016 *Director*, CUNY Center for Advanced Technology in Photonics
- 2012 – 2013 *Visiting Scholar*, Research Laboratory for Electronics,  
Massachusetts Institute of Technology (MIT)
- 2011 *Visiting Researcher*, Max Planck Institute for the Science of Light, Erlangen, Germany
- 2010 – 2014 *Associate Professor*, Department of Physics,  
Queens College of the City University of New York (CUNY)  
Graduate Center of the City University of New York (CUNY)
- 2004 – 2010 *Assistant Professor*, Department of Physics,  
Queens College of the City University of New York (CUNY)  
Graduate Center of the City University of New York (CUNY)
- 2004 – 2006 *Visiting Researcher*, Department of Electrical Engineering, Princeton University
- 2003 – 2004 *Research Staff Member*, Department of Electrical Engineering, Princeton University

### PROFESSIONAL PREPARATION

- 2001 – 2003 Lucent-Bell Labs Postdoctoral Fellowship in Photonics, **Princeton University**
- 2001 PH.D. Physics, **University of Massachusetts**
- 1995 M. Sc. Physics (Quantum Optics specialization), **University of Hyderabad**, India

### RESEARCH INTERESTS

- CURRENT *Laboratory for Nano and Micro Photonics (LaNMP), CCNY*
- Excitons in two-dimensional Semiconductors
  - Exciton-polaritons in microcavities and metamaterials
  - Cavity quantum electrodynamics using organic and hybrid microcavities
  - Quantum emitters in wide bandgap materials (hBN, GaN)
  - Engineered nonlinear optical materials based on hybrid nanocomposites
  - Coherence and collective phenomena in organic molecular systems
  - Cavity assisted photochemistry
  - Defects in Van der Waals semiconductors for quantum emitters

*Significant accomplishments:*

- Realization of room temperature single photon emitter array (*Optica* 2018)
- Demonstration of long range energy transfer using metamaterials (*ACS Photonics* 2018)
- Demonstration of optical control of valley polaritons in microcavities with 2D materials (*Nature Photonics* 2017)
- Realization of new class of artificial photonic media: Photonic Hypercrystals (*PNAS* 2017)
- Demonstration of hyperbolic metamaterial based light emitter (*Optica* 2015)
- Realization of half-light half-matter quasiparticles in 2D semiconductors (*Nature Photonics* 2015)
- Demonstration of enhanced oscillator strength in organic-inorganic hybrid microcavities through exciton hybridization (*Phys. Rev. Lett.* 2014)
- Demonstration of optical topological transitions and radiative lifetime control in hyperbolic metamaterials (*Science* 2012)
- Established the structural stability of Y-DNA used for self-assembled nanostructures using FRET (*Nanoscale* 2012)
- Demonstration of extended light-matter quasiparticles in excitonic lattice (*Nature Photonics* 2009)
- Realization of an organic-inorganic hybrid flexible microcavity laser using spin coating (*Optics Express* 2008, US Patent# 8135052)

**CURRENT GRANTS**

- Excitonics and Polaritonics using 2D materials (NSF – EFRI 2DARE) – *PI*
- Polaritonics using two-dimensional atomic crystals (NSF – ECCS) – *PI*
- Interface states and excitons at heterojunctions between 2D and 3D materials system (NSF – DMR) – *PI*
- Ultrafast light emitters based on photonic hypercrystals and 2D Semiconductors (ARO) – *PI*
- Control of energy transfer and molecular excitations via strongly coupled light-matter quasiparticles (DOE – BES) - *PI*
- Development of a scanning-probe-assisted confocal microscope for the investigation of optical and magnetic phenomena (NSF – MRI) – *Co-PI*
- Multifunctional Near-field Scanning Optical Microscope (NSF –MRI) – *Co-PI*
- Center for Interface Design and Engineered Assembly of Low-Dimensional Systems (IDEALS) (NSF – CREST) – *Faculty participant*
- Center for precision assembly of superstratic and superatomic solids (NSF-MRSEC – Columbia University & CCNY)- *Faculty participant*

**MEDIA COVERAGE (RECENT)**

- “Breaking FRET distance barrier using metamaterials,” DOE Office of basic energy science, October 2018
- “Room temperature quantum emitter array” Phys.org, Laser Focus World, September 2018
- “Photonic Hypercrystals”, NSF Science 360, IEEE Spectrum, Photonic Spectrum, Phys.org, and more, May 2017
- “Photonic hypercrystals drastically enhance light emission from 2D materials” Phys.org, August 2016
- “Bull’s-Eye for Brighter Metamaterials” Optics & Photonics News, April 2015.
- “The Waves of the Future may Bend Around Metamaterials”, New York Times, March 2015

- “Scientists Take Step Towards Practical Metamaterial Light Emitters”, Compound Semiconductor, Jan 2015
- “Breakthrough lights up metamaterials”, NSF, Phys.org, Nanowerk, Science Newline, Science Daily, Phenomonica, Opli, and more, Jan 2015
- “Study unveils new half-light half-matter quantum particles”, NSF, Phys.org, Nanotechnology Now, Science Daily, Highbeam, and more, Dec 2014
- "Photon glue enabled new quantum mechanical particle," NSF, Phys.org, March 2014

## HONORS

- IEEE Photonics Society Distinguished Lectureship (2018-19)
- Recent work on Photonic Hypercrystals highlighted by NSF, 2017
- Senior membership – Optical Society of America
- Recent work on 2D exciton polaritons and metamaterials highlighted by NSF, 2015.
- Selected to showcase work at World Science Festival, NY 2012
- Indo-American Achievement Award given by Kerala Cultural and Civic Center, NY 2010
- Feliks Gross Endowment Award for Outstanding Scholarly Work by an Assistant Professor at CUNY 2008
- President’s Award for Innovative Teaching Project, Queens College – CUNY, 2006
- Inducted to Sigma Xi and Golden Key Honor Societies, 2006
- Lucent-Bell Labs Post-Doctoral Fellowship in Photonics at Princeton University, 2001
- Outstanding Graduate Student Award for the academic year 2000-2001 from the Department of Physics at University of Massachusetts, 2001

## PROFESSIONAL ACTIVITIES

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| EDITORIAL BOARD                                      | Associate Editor, OPTICA (OSA Journal)   |
| REVIEWER   | SCIENTIFIC PUBLICATIONS: Nature, Nature Photonics, Nature Physics, Nature Nanotech., Applied Physics Letters, Physical Review Letters, Physical Review B, Optics Letters, Optics Express, Optics Communications, IEEE Journal of Quantum Electronics, IEEE Photonics Technology Letters, Semiconductor science and technology, Princeton University Press, etc.<br><br>RESEARCH PROPOSALS: National Science Foundation (NSF), National Research Council (NRC), Natural Sciences and Engineering Research Council of Canada (NSERC), Army Research Office (ARO), European Research Council (ERC), US-Israel Binational Science Foundation (BSF), Defense Threat Reduction Agency (DTRA), Science and Tech. Center Ukraine, Dutch Tech. Foundation, etc. |
| ORGANIZING COMMITTEE/SESSION CHAIR/ADVISORY OUTREACH | IEEE Photonic conference 2016-18, Meta 2015, SPIE Photonics West, CLEO/QELS, OSA Frontiers in Optics, IEEE Summer Topical, SPIE Photonics North, SPIE Optics and Photonics, Photonics North, Advisory Board for MURI grant on exciton-polaritons in 2D materials. <ul style="list-style-type: none"> <li>• CUNY TV (also on PBS) - “Science goes to the movies” explaining holograms</li> <li>• Keynote address at graduation ceremony of Newcomers High School, NY</li> <li>• CUNY TV (also on PBS) – “Science goes to the movies” explaining light sabers, tractor beams, phasors and invisibility.</li> <li>• CUNY TV – “Science and U” episode explaining Li-Fi</li> </ul>   |

- User Executive Committee – Center for Functional Nanomaterials, Brookhaven National Labs
- CUNY TV – “Science and U” episode explaining invisibility to 4<sup>th</sup> graders
- Laboratory demonstration at World Science Festival, NY 2012
- Optics experiments for CUNY College Now program for high school students
- Judge for several high school science fairs
- Mentor for over 14 high school students (9 won awards at national science fairs)
- Mentor for Harlem Children Society high school summer research program for students from under-resourced and under-served communities in New York City
- Faculty Advisor for CCNY OSA Student Chapter

## UNIVERSITY SERVICE

- Director CUNY Center for Advanced Technology (2014 – 2016)
- Member of advisory committee – CUNY Advanced Science Research Center (2010 – present)
- Chair Photonics Director Search committee (2012 – 2016)
- Chaired/committee member on 6 junior faculty searches
- Member of executive committee – CUNY Center for Advanced Technologies (2008- 2013)
- Undergraduate pre-engineering and physics advising ( 2008 – 2013)

## PUBLICATIONS

1. “Control of strong light-matter interaction in monolayer WS<sub>2</sub> through electric field gating,” B. Chakraborty, J. Gu, M. Khatoniyar, Z. Sun, R. Bushati, A. Bohemke, R. Koots and V. M. Menon, *Nano. Lett.* **18**, 6455 (2018).
2. “Interacting polariton fluids in a monolayer of tungsten disulfide,” F. Brachati, A. Fieramosca, S. Hafezian, J. Gu. B. Chakraborty, D. Ballarini, L. Martinu, V. M. menon, D. Sanvitto, S. Kena-Cohen, *Nature Nanotech.* **13**, 906(2018)
3. “Near deterministic activation of room temperature quantum emitters in hexagonal boron nitride,” N. V. Proscia, Z. Shotan, H. Jayakumar, P. Reddy, A. Alkauskas, M. Doherty, C. A. Meriles, and V. M. Menon, *Optica* **5**,1128 (2018).
4. “Long range resonant energy transfer using optical topological transitions in metamaterials,” R. Deshmukh, S-A. Biehs, E. Khwaja, G.S. Agarwal, and V. M. Menon *ACS Photonics* **5**, 2737 (2018)
5. “Theory of polariton long range excitation energy transfer,” M. Du, L. A. Martinez, R. F. Ribeiro, Z. Hu, V. M. Menon, J.Yuen-Zhou *Chem. Science* **9**, 6659 (2018)
6. “Directional emission of Rh 6G on silver grating,” E. K. Tanyi, S. Mashhadi, S. D. Bhattacharyya, T. Galfsky, V. Menon, E. Simmons, V. A. Podolskiy, N. Noginova, and M. A. Noginov, *Opt. Lett.* **43**, 2668 (2018)
7. “Dipole aligned energy transfer between excitons in two-dimensional transition metal dichalcogenides and organic semiconductor,” J. Gu, X. Liu, E-C Lin, Y-H Lee, S. R. Forrest, and V. M. Menon, *ACS Photonics* **5**, 100 (2017).
8. “Optical control of room temperature valley polaritons,” Z. Sun, J. Gu, A. Ghazaryan, Z. Shotan, C. R. Consideine, M. Dollar, B. Chakraborty, X. Liu, P. Ghanemi, S. K-Cohen, and V. M. Menon, *Nature Photonics* **11**, 491 (2017).
9. “Photonic hypercrystals for control of light-mater interactions,” T. Galfsky, J. Gu, E. Narimanov and V. M. Menon, *Proc. Natl. Acad. Sci.* **14**, 5125 (2017).
10. “Nonreciprocity and one-way topological transitions in hyperbolic metamaterials,” A. Leviyev, B. Stein, A. Christofi, T. Galfsky, H. Krishnamoorthy, I. Kuskovsky, V. M. Menon and A. Khanikaev, *APL Photonics* **2**, 076103 (2017).

11. “Photoresponse of an organic semiconductor -2D transition metal dichalcogenides heterojunction,” X. Liu, J. Gu, K. Ding, D. Fan, X. Hu, Y-W Tseng, Y-H. Lee, V. M. Menon and S. R. Forrest, *Nano Lett.* **17**, 3176 (2017).
12. “Photoinduced modification of single photon emitters in hexagonal boron nitride,” Z. Shotan, H. Jayakumar, C. R. Conside, M. Macko, H. Fedder, J. Wrachtrup, A. Alkauskas, M. Doherty, V. M. Menon and C. A. Merilles, *ACS Photonics* **3**, 2490 (2016).
13. “Ultrahigh Raman enhancement on monolayer MoS<sub>2</sub>,” C. Muehlethaler, C. R. Conside, V. Menon, W. Lin, Y. Lee, and J. R. Lombardi, *ACS Photonics* **3**, 1164 (2016).
14. “Roadmap on optical metamaterials,” A. Urbas et al. *Journal of Optics* **18**, 090210 (2016)
15. “Broadband enhancement of spontaneous emission in 2D semiconductors using photonic hypercrystals,” T. Galfsky, Z. Sun, C. R. Conside, C-T Chou, W-C Ko, Y-H Lee, E. Narimanov and V. M. Menon, *Nano Lett.* **16**, 4940 (2016).
16. “Microcavity enhanced second harmonic generation in 2D MoS<sub>2</sub>,” J. K. Day, M. Chung, Y-H. Lee, and V. M. Menon, *Opt. Materials Express* **6**, 2360 (2016).
17. “Long range dipole-dipole interaction and anomalous Forster energy transfer across hyperbolic metamaterial,” S.-A. Biehs, V. M. Menon and G. S. Agarwal, *Phys. Rev. B* **93**, 245539 (2016).
18. “Surface plasmon polaritons in topological insulators nano-films and superlattices,” *Opt. Express* **24**, 7398 (2016)
19. “Control of photo-induced voltages in plasmonic crystals via spin-orbit interactions,” N. V. Proscia, M. Moocarme, R. Chang, I. Kretzschmar, V.M. Menon, and L. Vuong, *Opt. Express* **24**, 10402 (2016)
20. “Excitonic lasing in sub-wavelength nanosphere assemblies,” K. Appavoo, X. Liu, V. M. Menon, and M. Sfier, *Nano Lett.* **16**, 2004 (2016) DOI: 10.1021/acs.nanolett.5b05274
21. “Preferential emission into epsilon near zero metamaterial,” T. Galfsky, Z. Sun, Z. Jacob and V. M. Menon, *Opt. Materials Express* **5**, 2878 (2015)
22. “Control of light-matter interaction in 2D atomic crystals using microcavities,” (Invited) X. Liu and V. M. Menon, *IEEE Journal of Quantum Electronics* **51**, 0600308 (2015)
23. “Synthesis and applications of monolayer semiconductors,” (Invited) K-C Chiu, X-Q Zhang, X. Liu, V. M. Menon, Y-F Chen, J-M Wu, and Y-H Lee, *IEEE Journal of Quantum Electronics* **51**, 0600110 (2015)
24. “Lasing from 2D atomic crystals,” V. M. Menon, *Nature Materials* **14**, 370 (2015)
25. “Metal nanocluster light-emitting devices with suppressed parasitic emission and improved efficiency: exploring the impact of photophysical properties,” T-W. Koh, A. M. Hiszpanski, M. Sezen, A. Naim, T. Galfsky, A. Trivedi, Y-H. Loo, V. M. Menon and B. P. Rand, *Nanoscale* **7**, 9140 (2015)
26. “Active hyperbolic metamaterials: enhanced spontaneous emission and light extraction,” T. Galfsky, H. Krishnamoorthy, W. Newman, E. E. Narimanov, Z. Jacob, and V. M. Menon, *Optica* **2**, 62 (2015).
27. “Strong light-matter coupling in two-dimensional atomic crystals,” X. Liu, T. Galfsky, Z. Sun, F. Xia, E-C. Lin, Y-H. Lee, S. Kena-Cohen, and V. M. Menon, *Nature Photonics* **9**, 30 (2015).
28. “Nanocrystal fluorescence in photonic bandgap microcavities and plasmonic nanoantennas,” S. G. Lukishova et al. *J. of Phys.* **594** 012005 (2015).
29. “All-optical electromagnetically induced transparency using one-dimensional coupled microcavities,” A. Naweel, D. Goldberg and V. M. Menon, *Optics Express* **22**, 18818 (2014).
30. “Visualization of Exciton Transport in Ordered and Disordered Molecular Solids,” G. M. Akselrod, P. B. Deotare, N. J. Thompson, J. Lee, W. A. Tisdale, M. A. Baldo, V. M. Menon, and V. Bulovic, *Nature Comm.* **5**, 3646 (2014)
31. “Room temperature Frenkel-Wannier-Mott hybridization of degenerate excitons in a strongly coupled microcavity,” M. Sliotsky, X. Liu, V. M. Menon\* and S. R. Forrest\*, *Phys. Rev. Lett.* **112**, 076401 (2014).
32. “Tunable hyperbolic metamaterials utilizing phase change heterostructures,” H. Krishnamoorthy, Y. Zhou, S. Ramanathan, E. Narimanov, and V. M. Menon, *Appl. Phys. Lett.* **104**, 121101 (2014).
33. “Slow Light Enhanced Singlet Exciton Fission Solar Cells with a 126% Yield of Electrons per Photon,” N. J. Thompson, D. N. Congreve, D. Goldberg, V. M. Menon and M. A. Baldo, *Appl. Phys. Lett.* **103**, 263302(2013).

34. “Formation of microcavity polaritons in ZnO nanoparticles,” X. Liu, D. Goldberg, and V. M. Menon, *Optics Express* **21**, 20620 (2013).
35. “Enhanced amplified spontaneous emission from colloidal quantum dots in all-dielectric monolithic microcavities,” D. Goldberg and V. M. Menon, *Appl. Phys. Lett.* **102**, 08119 (2013).
36. “About the possibility of bistable dynamics in lasers with single-mode cavities,” V. Shuvayev, V. M. Menon, A. Lisyansky, and L. Deych, *J. Opt. Soc. Am. B*, **30**, 79 (2013).
37. “Topological transitions in metamaterials,” H. N. S. Krishnamoorthy, Z. Jacob, E. Narimanov, I. Kretzschmar, and V. M. Menon, *Science* **336**, 205 (2012).
38. “Enhanced nonlinear response of metal nanocomposite based photonic crystals,” S. Husaini, H. Teng, and V. M. Menon, *Appl. Phys. Lett.* **101**, 111103 (2012).
39. “Probing Y-shaped DNA structure with time resolved FRET,” S. Chatterjee, J. B. Lee, N. Valappil, D. Luo, and V. M. Menon, *Nanoscale* **4**, 1568 (2012).
40. “Flexible optics – Recent developments in molecular gels,” G. John, S. Jadhav, V. M. Menon, and V. T. John, *Angew. Chem.* **51**, 1760 (2012).
41. “Resonant enhancement of magneto-optical polarization conversion in microdisk resonators,” L. Deych, C. Meriles, and V. M. Menon, *Appl. Phys. Lett.* **99**, 241107 (2011).
42. “Investigating the distance limit of metal nanoparticle based spectroscopic ruler,” S. Chatterjee, J. B. Lee, N. Valappil, D. Luo, and V. M. Menon, *Biomedical Optics Express* **2**, 1727 (2011).
43. “Plasmon resonance induced enhancement of reflection band in a one-dimensional metal nanocomposite photonic crystal,” S. Husaini, L. Deych and V. M. Menon, *Optics Letters* **38**, 1368 (2011).
44. “Integrated Photonics using Colloidal Quantum Dots,” V. M. Menon, *SPIE Newsroom*, August 2010, DOI: 10.1117/2.1201007.003063
45. “Towards polaritonic logic circuits,” V. M. Menon, L. I. Deych, A. Lisyansky, *Nature Photonics* **4**, 345 (2010).
46. “Exciton Lattice polaritons in multiple quantum well based photonic crystals,” D. Goldberg, L. Deych, A. Lisyansky, Z. Shi, V. Tokranov, M. Yakimov, S. Oktyabrsky, and V. M. Menon, *Nature Photonics* **3**, 662 (2009).
47. “Integrated photonics using colloidal quantum dots,” V. M. Menon, S. Husaini, N. Okoye, and N. Valappil, *Journal of Nanophotonics* **3**, 031608 (2009).
48. “Luminescence from a Fibonacci photonic crystal,” V. Passias, Z. Shi, N. Valappil, L. Deych, A. Lisyansky, and V. M. Menon, *Optics Express* **17**, 6636 (2009).
49. “Time resolved and steady state luminescence properties of InGaP colloidal quantum dots,” S. Chatterjee, N. Valappil, and V. M. Menon, *Mater. Res. Soc. Symp. Proc.* **1133**, AA07-18 (2009).
50. “Organic photonic bandgap microcavities doped with semiconductor nanocrystals for room-temperature single photon sources on demand,” S. G. Lukishova, L. J. Bissell, V. M. Menon, N. Valappil, M. A. Hahn, C. M. Evans, B. Zimmerman, T. D. Krauss, R. W. Boyd, C. R. Stroud, Jr., *Journal of Modern Optics* **56**, 167 (2009).
51. “Lasing from quantum dots in a spin-coated flexible microcavity,” V. M. Menon, M. Luberto, N. Valappil, S. Chatterjee, *Optics Express* **16**, 19535 (2008).
52. “Solution processed microcavity structures with embedded quantum dots,” N. Valappil, M. Luberto, I. Zeylikovich, T. K. Gayen, J. Franco, B. B. Das, R. R. Alfano and V. M. Menon, *Photonics and Nanostructures: Fundamentals and Applications* **5**, 184 (2007)
53. “Control of spontaneous emission from colloidal quantum dots in a polymer microcavity,” V. M. Menon, N. Valappil, I. Zeylikovich, B. Das, T. Gayen and R. R. Alfano, *Mater. Res. Soc. Symp. Proc.* **959**, M10-01 (2007).
54. “Strong coupling and hybridization of Frenkel and Wannier-Mott excitons in an organic-inorganic optical microcavity,” R. J. Holmes, S. Kena-Cohen, V. M. Menon, and S. R. Forrest, *Phys. Rev. B* **74**, 235211 (2006).
55. “Light induced symmetry breaking and related giant enhancement of nonlinear properties in CdZnTe:V crystals,” S. Shwartz, R. Weil, M. Segev, E. Lakin, E. Zolotoyabko, V. M. Menon, S. R. Forrest, and U. El-Hanany, *Opt. Express* **14**, 9385 (2006).
56. “Photonic integration using asymmetric twin waveguide (ATG) technology – II. Devices,” V. M. Menon, F. Xia, and S. R. Forrest, *IEEE Journal of Selected Topics in Quantum Electronics* **11**, 30-42 (2005).

57. “Photonic integration using asymmetric twin waveguide (ATG) technology – I. Concepts and Theory,” F. Xia, V. M. Menon, and S. R. Forrest, *IEEE Journal of Selected Topics in Quantum Electronics* 11, 17-29 (2005).
58. “Reduction of absorption loss in asymmetric twin waveguide laser tapers using argon plasma-enhanced quantum-well intermixing,” Y. Huang, F. Xia, V. M. Menon, S. R. Forrest and M. Gokhale, *IEEE Photonics Technology Letters*, 16, 2221-2223 (2004).
59. “Control of Q-factor and critical coupling in microring resonators through integration of semiconductor optical amplifier,” V.M. Menon, W. Tong, and S. R. Forrest, *IEEE Photonics Technology Letters*, 16, 1343-1345 (2004).
60. “Non-reciprocity of counter propagating signals in a monolithically integrated Sagnac interferometer,” V. M. Menon, W. Tong, F. Xia, C. Li, and S. R. Forrest, *Optics Letters*, 29, 513-515 (2004).
61. “Monolithic integration of a semiconductor optical amplifier and a high bandwidth p-i-n photodiode using asymmetric twin-waveguide technology,” F. Xia, J. Wei, V. M. Menon, and S. R. Forrest, *IEEE Photonics Technology Letters*, 15, 452-454 (2003).
62. “All optical wavelength conversion using a regrowth free monolithically integrated Sagnac Interferometer,” V. M. Menon, W. Tong, C Li, F. Xia, I Glesk, P. R. Prucnal, and S. R. Forrest, *IEEE Photonics Technology Letters*, 15, 254-256 (2003).
63. “Dual frequency quantum cascade terahertz emitter,” V. M. Menon, W. D. Goodhue, A. S. Karakashian, A. Naweed, J. Plant, L. R. Ram-Mohan, A. Gatesman, V. Badami, and J. Waldman, *Applied Physics Letters*, 80, 2454-2456 (2002). (Also published in the Virtual Journal of Nanoscale Science and Technology, 5, #15, 2002.)
64. “Phonon mediated lifetimes in intersubband terahertz lasers,” V. M. Menon, W. D. Goodhue, A. S. Karakashian, and L. R. Ram-Mohan, *Journal of Applied Physics*, 88, 5262-5267 (2000).
65. “TE- and TM- polarized optoelectronic properties of HgCdTe quantum wells,” V. M. Menon, L. R. Ram-Mohan, I. Vurgaftman, and J. R. Meyer, *Journal of Electronic Materials*, 29, 865-868 (2000).

#### INVITED PRESENTATIONS (RECENT & UPCOMING)

1. CLEO Europe, Munich, June 2019
2. SPIE Photonics West, San Francisco, February 2019.
3. Physics of Quantum Electronics, Snowbird, Utah, January 2019
4. Optics and Quantum electronics Seminar, MIT, Boston, MA, Dec 12, 2018.
5. Dept. of Physics, Indian Institute of Science, Bangalore, India, August 9, 2018
6. International conference on spontaneous coherence in excitonic systems, Montreal, CA, July 16-20 (2018)
7. Workshop on 2D materials, University of Minnesota, June 4-5 (2018)
8. Workshop on Strong coupling and organic materials, Eindhoven, The Netherlands, April 16-18 (2018)
9. IBM Watson Research Center, Yorktown Heights, NY, March 23 (2018)
10. APS March Meeting, Los Angeles, CA, March (2018)
11. SPIE Photonics West, San Francisco, CA, January (2018)
12. Rice University, Houston, TX, November 2 (2017)
13. IEEE Photonics Conference, Orlando, FL, October 1-5 (2017)
14. Fundamental Optical Processes in Semiconductors, Skamania, WA August 27-31 (2017)
15. Open Quantum Systems, International Center for Theoretical Studies, Bangalore, India, July 27 (2017)
16. Carnegie Mellon University / Pittsburg Quantum Institute, Pittsburg, PA, April 6 (2017)
17. Physics of Quantum Electronics, Snowbird, UT, January 8-13 (2017)
18. Stevens Inst. Of Technology, Hoboken, NJ, November 16 (2016)
19. Penn State University, State College, PA, November 4 (2016)
20. Rensselaer Polytechnic Institute, Troy, NY, October 5 (2016)
21. Columbia University – MRSEC Seminar Series, September 27 (2016)
22. Center for Functional Nanomaterials – Brookhaven National Labs Users meeting, NY, May 23 (2016)
23. SPIE Defense and Commercial Sensing, Baltimore, MD, April 17-21 (2016)
24. SPIE Annual Meeting, San Diego, CA, August 28 - 31 (2016)
25. Oklahoma State University , March 3 (2016)

26. Photonics West, San Francisco, February 15-18 (2016)
27. New York University, October 27, 2015
28. Princeton University, September 23, 2015
29. SPIE Annual Meeting, San Diego, CA, August 9-12, 2015
30. Hybrid Photonic Materials, Santorini, Greece, May 27-31, 2015
31. Applied Materials, Santa Clara, May 13, 2015
32. University of Rochester - Inst. Of Optics, NY, April 6, 2015
33. Army Research Labs, MD, March 4, 2015
34. Brookhaven National Laboratories Users Meeting, January 5, 2015
35. Nanotechnology for Defense Conference, VA, November 19, 2014
36. Nanoanalytica, CCNY – Perkin Elmer joint event, November 7, 2014
37. Universal Display Corporation, NJ, August 26, 2014
38. Photonics North, Montreal, Canada, May 28-30, 2014
39. Boston University, MA, February 11, 2014
40. Fordham University, NY, December 4, 2013
41. University of Minnesota, MN, October 10, 2013
42. Columbia University, NY, October 9, 2013
43. Annual IEEE Photonics Conference, Bellevue, WA, September 9-12, 2013
44. CLEO – QELS Fundamental Science, San Jose, CA, June 9 – 14, 2013
45. City College of New York – Physics Department, NY, May 1, 2013
46. Harvard University – School of Engineering and Applied Science, MA, April 23, 2013
47. Boston University, MA, February 28, 2013
48. Physics of Quantum Electronics (PQE), Snowbird, UT, January 7 – 13, 2013
49. University of California Los Angeles – California NanoSystems Institute, CA, May 1, 2012
50. Rutgers University, NJ, April 12, 2012
51. Columbia University, NY, November 9, 2011
52. Southampton University, England, July 22, 2011
53. Delft University of Technology, The Netherlands, July 18, 2011
54. Max Planck Institute for the Science of Light, Erlangen, Germany, July 6, 2011
55. MIT Research Laboratory for Electronics, MA, March 8, 2011
56. IEEE Photonics Society Winter Topical, Keystone, CO, January 10-12, 2011
57. IBM T. J. Watson Research Center, NY, December 17, 2010

#### RECENT CONTRIBUTED CONFERENCE PRESENTATIONS (PAST 3 YEARS)

- Conference on Lasers and Electro-Optics and Quantum Electronics and Laser Science (CLEO/QELS), San Jose, CA, 15-19 May, 2018
  - “Formation of quantum emitter arrays in hexagonal boron nitride at room temperature,” N. Proscia, Z. Shotan, H. Jayakumar, P. Reddy, M. Doherty, A. Alkauskas, C. A. Meriles and V. M. Menon
  - “Modification of photoluminescence via strong coupling of vibronic transitions in organic molecules to surface plasmons,” R. Deshmukh, P. Marques, A. Panda, S. R. Forrest, and V. M. Menon
  - “Tuning exciton-polaritons in monolayer WS<sub>2</sub> using electric field gating,” B. Chakraborty, J. Gu. M. Khatoniyar, Z. Sun and V. M. Menon
  - “Observation of Rydberg exciton polaritons in 2D transition metal dichalcogenides,” J. Gu, A. Boehmke, R. Koots, V. M. Menon
  - “Strong coupling of 2D excitons to surface lattice modes of plasmonic crystals,” S. Guddala, R. Collison, M. Khatoniyar, M. Li, A. Khanikaev and V. M. Menon
  - “Interacting polariton fluids in a monolayer WS<sub>2</sub>,” F. Barachati, et al. (Post-Deadline)
- Frontiers in Optics, Washington DC, September 17-22, 2017



- “Control of light-matter interaction using photonic hypercrystals,” T. Galfsky, Z. Sun, J. Gu, N. Proscia, EE. Narimanov and V. M. Menon
- “Room temperature quantum emitter arrays in hBN,” N. Proscia, Z. Shotan, H. Jayakumar, P. Reddy, M. Doherty, A. Alkauskas, C. A. Meriles and V. M. Menon
- Conference on Lasers and Electro-Optics and Quantum Electronics and Laser Science (CLEO/QELS), San Jose, CA, 15-19 May, 2017
  - “Valley polarized exciton polaritons in two-dimensional semiconductor microcavity,” Z. Sun, et al.
  - “Long range energy transfer across an epsilon near zero metamaterial,” R. Deshmukh, S-A Bhies, E. Khwajaa, G. S. Agarwal, and V. M. Menon
  - Dipole aligned energy transfer between excitons in 2D semiconductors and organic materials” J. Gu, X. Liu, S. R. Forrest and V. M. Menon
  - “Photo induced modification of single photon emitters in hBN,” Z. Shotan et al.
- American Physical Society Annual Meeting, March Meeting, New Orleans, March 13-16, 2017
  - “Epsilon-near-zero metamaterial to break the FRET distance barrier,” R. Deshmukh et al.
  - “Valley polarized exciton polaritons in two-dimensional atomic crystal microcavity,” Z. Sun et al.
  - “Optical spectroscopy of photomodification of individual single photon emitters in hBN,” H. Jayakumar et al.
- Conference on Lasers and Electro-Optics and Quantum Electronics and Laser Science (CLEO/QELS), San Jose, CA, June 6-9, 2016
  - “Microcavity enhanced second harmonic generation in 2D semiconductors,” J. Day, Y. Chung, Y-H. Lee, and V. M. Menon
  - “Photonic hypercrystals for controlled enhancement of spontaneous emission from quantum emitters,” T. Galfsky, E. Narimanov and V. M. Menon
  - “Broadband control of light-matter interaction in 2D semiconductors using photonic hypercrystals,” T. Galfsky, Z. Sun, C. R. Consideine, Y-H- Lee, E. Narimanov and V. M. Menon
  - “Towards a large area plasmonic polarization detector,” N. Proscia, M. Moocarme, I. Kretzschmar, V. M. Menon and L. T. Vuong
- Frontiers in Optics, San Jose, CA, October 19-22, 2015
  - “Enhanced spontaneous emission in photonic hypercrystals,” T. Galfsky, E. Narimanov and V. M. Menon (**Post Deadline**)
- Conference on Lasers and Electro-Optics and Quantum Electronics and Laser Science (CLEO/QELS), San Jose, CA, June 10-14, 2015
  - “Room temperature exciton lasing in ultrathin film of coupled nanocrystals,” K. Appavoo, X. Liu, V. M. Menon and M. Sfier (**Post Deadline**)
  - “Simultaneous enhancement of decay rate and light extraction from active hyperbolic metamaterial,” T. Galfsky, , H. Krishnamoorthy, W. Newman, Z. Jacob, E. Narimanov and V. M. Menon
  - “Enhanced transverse photo induced voltage by slow light,” N. Proscia, I. Kretzschmar, R. Koder, V. M. Menon and L. Vuong
  - “Pseudospin selective microcavity polariton emission from two-dimensional atomic crystals,” Z. Sun, X. Liu, H-T Huang, Y-H. Lee, S. Kena-Cohen, and V. M. Menon
  - “Preferential emission into epsilon near zero metamaterial,” T. Galfsky, W. Newman, Z. Jacob and V. M. Menon
- SPIE Security and Defense, Oct 13, 2014
  - “Room temperature single photon sources based on nanocrystal fluorescence in photonic/plasmonic nanostructures,” S. G. Lukishova et al.
- IEEE Summer Topical Meeting, Montreal, July 14, 2015
  - “Light emission from atomic monolayers in a one-dimensional microcavity,” X. Liu, T. Galfsky, Y-H. Lee, F. Xia, A. Ramasubramaniam, S. Kena-Cohen, and V. M. Menon

- “Extracting light from high-k modes in a hyperbolic metamaterial,” T. Galfsky, , H. Krishnamoorthy, W. Newman, Z. Jacob, E. Narimanov and V. M. Menon

## PATENTS

1. “OLED device having enhancement layer,” N. Thompson, M. Baldo, M. Weaver, and V. M. Menon, US Patent # 9960386, May 1, 2018..
2. “Flexible microcavities through spin coating,” V. M. Menon and N. Valappil, US Patent # 8,610,103, December 17, 2013.
3. “Flexible microcavity structure made of organic materials using spin coating technique and method of making,” V. M. Menon, and N. Valappil, US Patent # 8,135,052, March 13, 2012.
4. “Photonic integrated devices having reduced absorption loss,” V. M. Menon, M. R. Gokhale, S. R. Forrest, Y. Huang, F. Xia, , US Patent #7,333,689, February 19, 2008.
5. “Organic injection laser,” S. R. Forrest, V. M. Menon, Z. Soos, US Patent # 7,242,703, Issued July 10, 2007.
6. “Monolithic wavelength stabilized asymmetric laser,” V. M. Menon, S. Datta, and S. R. Forrest, US Patent # 7,230,963, Issued June 12, 2007.
7. “Photonic integrated circuits,” S. R. Forrest, M. R. Gokhale, F. Xia, and V. M. Menon, US Patent #6,795,622, Issued September 21, 2004.
8. “Systems and methods using phonon mediated intersubband laser,” W. D. Goodhue, L. R. Ram-Mohan, A. S. Karakashian, and V. M. Menon, US Patent # 6,829,269, Issued December 7, 2004.

## TEACHING

- Developed and Taught
  - *Nano and Micro Photonics* (Graduate Level)
  - *Light in Performance* (Undergraduate Level) Awarded Presidents Award for Innovative Teaching Grant
  - *Photonics Lab* (Graduate Level – MS)
- Other Courses Taught
  - *Optoelectronics* (Undergraduate), *Modern Physics* (Undergraduate), *Freshman Physics I and II* (Undergraduate – calculus and algebra based), *Advanced Lab* (Undergraduate)

## MENTORING AND ADVISING

- 11 Doctoral Students (4 current and 7 graduated) - one of the students won the National Research Council post-doctoral fellowship, a second student was finalist in APS Div. of Laser Science thesis award competition.
- 3 Master degree students
- 17 Undergraduate students (11 went to graduate school)
- 22 High School students (5 won awards at Intel International Science and Engineering Fair, 9 won awards at NYC Science and Engineering Fair and 2 were selected to showcase their work to President Obama).
- 5 Post-doctoral researchers (3 current)

## PROFESSIONAL MEMBERSHIPS

- Senior Member, Optical Society of America
- Member, American Physical Society
- Member, IEEE