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Affiliations

Assistant Professor Department of Physics Southern Illinois University, Carbondale, IL, USA	Aug. 2019 –
NRC Research Associate Solid State Quantum Information Science and Technology U.S. Naval Research Laboratory, Washington D.C., USA	2016 – 2019
Postdoctoral Researcher Department of Materials Science and Engineering University of Pennsylvania, PA, USA	2012 - 2016

Education

Ph.D., Physics Experimental Condensed Matter Physics: <i>Electronic charge transport and surface functionalization of organic semiconductors</i> Department of Physics and Astronomy Rutgers, The State University of New Jersey, New Brunswick, NJ, USA	2012
M.S., Physics <i>Theoretical Nuclear Physics</i> Yonsei University, Seoul, Korea	2004
B.S., Physics Yonsei University, Seoul, Korea	<i>Graduated with Honors</i> 2002
Military Service in South Korea	1998 - 2000

Academic Honors and Awards

NRC/ASEE Postdoctoral Research Publication Award The National Academy of Sciences, Engineering, and Medicine	Apr. 2020
Montana Instruments Lab Startup Grant Award (Platinum) Montana Instruments	Oct. 2019

NRC Research Associateship Award

The National Academy of Sciences, Engineering, and Medicine
The U.S. Naval Research Laboratory, Washington D.C., USA

Aug. 2016

Graduate Fellowship for Excellent Entering Student

Rutgers, The State University of New Jersey, New Brunswick, NJ, USA

2004 – 2006

Graduated with Honors

Yonsei University, Seoul, Korea

Feb. 2002

Research Interests

Quantum Optics, Quantum Information Science, Nanophotonics, Plasmonics, Electronic (charge carrier) Transport, Opto-electronics, 2D Transition Metal Dichalcogenides (TMDs) Semiconductors, Organic Field-Effect Transistors (OFETs), Organic Light-Emitting Diodes (OLEDs), Nanowire Optics, Organic Semiconductors, Inorganic & Organic Nanowires, Quantum dots, Graphene, Carbon Nanotubes

Publications ([†] *Authors contributed equally to the work*),

- [20] **B. Lee**, B. Pursley, S. Carter, S. Economou, M. Yakes, J. Grim, A. Bracker, D. Gammon, “Spin-dependent quantum optics in a quantum dot molecule” *Physical Review B* 100, 125438 (2019).
- [19] S. Carter, A. Bracker, M. Yakes, M. Zalalutdinov, M. Kim, C.-S. Kim, **B. Lee**, D. Gammon, “Tunable coupling of a double quantum dot spin system to a mechanical resonator” *Nano Letters* 9, 6166 (2019).
- [18] J. Grim, A. Bracker, M. Zalalutdinov, S. Carter, A. Kozen, M. Kim, C. S. Kim, J. T. Mlack, M. Yakes, **B. Lee**, and D. Gammon, “Scalable in operando strain tuning in nanophotonic waveguides enabling three-quantum-dot superradiance” *Nature Materials* 18, 963 (2019).
- [17] W. Liu, Yuhui Wang, C. H. Naylor, **B. Lee**, Biyuan Zheng, Gerui Liu, A. T. C. Johnson, Anlian Pan and R. Agarwal, “Understanding different exciton-plasmon coupling regimes in two-dimensional semiconductors coupled with plasmonic lattices: a combined experimental and unified equations of motion approach” *ACS Photonics* 5, 192-204 (2018).
- [16] **B. Lee**[†], W. Liu[†], C. H. Naylor, J. Park, S. Malek, J. Berger, A. T. C. Johnson and R. Agarwal, “Electrical tuning of exciton-plasmon polariton coupling in MoS₂ integrated with plasmonic nanoantenna lattice” *Nano Letters* 17, 4541-4547 (2017).
- [15] W. Liu[†], **B. Lee**[†], C. H. Naylor, H. Ee, J. Park, A. T. C. Johnson and R. Agarwal, “Strong exciton-plasmon coupling in MoS₂ coupled with plasmonic lattice” *Nano Letters* 16, 1262-1269 (2016).
- [14] **B. Lee**[†], J. Park[†], G. Han, H. Ee, C. H. Naylor, W. Liu, A. T. C. Johnson and R. Agarwal, “Fano resonance and spectrally modified photoluminescence enhancement in monolayer MoS₂ integrated with plasmonic nanoantenna array” *Nano Letters* 15, 3646-3653 (2015).
- [13] G. Han, N. Kaybert, C. H. Naylor, **B. Lee**, J. Ping, J. Park, J. Kang, S. Lee, Y. Lee, R. Agarwal and A. T. C. Johnson, “Seeded growth of highly crystalline molybdenum disulfide monolayers at controlled location” *Nature Communications* 6, Article number : 6128 (2015).

- [12] **B. Lee**, Y. Chen, A. Cook, A. Zakhidov and V. Podzorov, “Stable doping of Carbon Nanotubes via molecular self assembly” *Journal of Applied Physics* 116, 144503 (2014).
- [11] **B. Lee**[†], Y. Chen[†], D. Fu, H. Yi, K. Czelen, H. Najafov and V. Podzorov, “Trap healing and ultralow-noise Hall effect at the surface of organic semiconductor” *Nature Materials* 12, 1125 (2013).
- [10] Y. Chen, **B. Lee**, H. Yi, S. S. Lee, M. M. Payne, S. Pola, C. –H. Kuo, Y. –L. Loo, J. E. Anthony, Y. T. Tao and V. Podzorov, “Dynamic character of charge transport parameters in disordered organic semiconductor field-effect transistors” *Phys. Chem. Chem. Phys.* 14, 14142 (2012).
- [9] Y. Chen, **B. Lee**, D. Fu and V. Podzorov, “The origin of 650nm photoluminescence band in Rubrene” *Advanced Materials* 23, 5370 (2011).
- [8] D. J. Ellison, **B. Lee**, V. Podzorov and C. D. Frisbie, “Surface potential mapping of SAM-functionalized organic semiconductors by Kelvin Probe Force Microscopy” *Advanced Materials* 23, 502 (2011).
- [7] H. Najafov, **B. Lee**, Q. Zhou, L. C. Feldman and V. Podzorov, “Observation of long-range exciton diffusion in highly ordered organic semiconductors” *Nature Materials* 9, 938 (2010).
- [6] **B. Lee**, A. Wan, D. Mastrogiiovanni, J. E. Anthony, E. Garfunkel and V. Podzorov, “Origin of the bias stress instability in organic field-effect transistors” *Physical Review B* 82, 085302 (2010).
- [5] **B. Lee**, Y. Chen, F. Duerr, D. Mastrogiiovanni, E. Garfunkel, E. Y. Andrei and V. Podzorov, “Modification of electronic properties of graphene with self-assembled monolayers” *Nano Letters* 10, 2427-2432 (2010).
- [4] O. Khatib, **B. Lee**, J. Yuen, Z. Q. Li, M. Di Ventra, A. J. Heeger, V. Podzorov, and D. N. Basov, “Infrared signatures of high carrier densities induced in semiconducting poly(3-hexylthiophene) by fluorinated organosilane molecules” *Journal of Applied Physics* 107, 123702 (2010).
- [3] W. Leszek, S. Katalinic, **B. Lee**, M. Connors, E. Garfunkel, L.C. Feldman and V. Podzorov, “Ion-scattering analysis of self-assembled monolayers of silanes on organic semiconductors” *Nucl. Inst. & Meth. Phys. Res. Sec. B-Beam. Intraction Mater. Atoms* 268, 1889-1892 (2010).
- [2] **B. Lee**, T.-J. Choi, S.-W. Cheong and V. Podzorov, “Nanoscale conducting channels at the surface of organic semiconductors formed by decoration of molecular steps with self-assembled molecules” *Advanced Functional Materials* 19, 3726-3730 (2009).
- [1] C.-Y. Kao, **B. Lee**, L. S. Wielunski, M. Heeney, I. McCulloch, E. Garfunkel, L. C. Feldman and V. Podzorov, “Doping of conjugated polythiophenes with alkyl silanes” *Advanced Functional Materials* 19, 1906-1911 (2009).

Presentations

- [17] **B. Lee** “Exciton-plasmon polariton in 2D van der Waals semiconductor and spin-dependent quantum optics in a quantum dot molecule” Invited Seminar, Dept. of Physics, Southern Illinois University, Carbondale, IL, Mar. 23th 2019.

- [16] **B. Lee** “Exciton-plasmon polariton in 2D van der Waals semiconductor and spin-dependent quantum optics in a quantum dot molecule” Invited Seminar, Center for Integrated Nanotechnologies (CINT) – Sandia Laboratory, NM, Mar. 5th 2019.
- [15] **B. Lee** “Exciton-plasmon polariton in 2D van der Waals semiconductor and spin-dependent quantum optics in a quantum dot molecule” Invited Seminar, Center for Integrated Nanotechnologies (CINT) – Los Alamos National Laboratory, NM, Mar. 4th 2019.
- [14] **B. Lee** “Manipulating Light-Matter Interaction in 2D TMDs Semiconductors with Plasmonic Nanoresonators and Controlling Single Photon Emission in InAs Quantum Dots” Invited Seminar, Center for Quantum Information, KIST, South Korea, Jul. 18th 2018.
- [13] **B. Lee** “Manipulating Light-Matter Interaction and Functionalization of Semiconductors” Invited Seminar, Dept. of Physics and Astronomy, Howard University, DC, Apr. 17th 2018.
- [12] **B. Lee**, Sam Carter, Brennan C. Pursley, Joel Q. Grim, Michael Yakes, Allan S. Bracker and Dan Gammon “Resonant PL & Spin-flip Raman Emission From A Quantum Dot Molecule” Oral presentation, APS March Meeting, Mar. 2018.
- [11] **B. Lee** “Manipulating Light-Matter Interaction in Exciton-Plasmon System Composed of 2D TMDs Monolayer and Plasmonic Nanoantenna Array” Invited Seminar, The U.S. Naval Research Laboratory (NRL), Washington D.C., Jul. 07th 2016.
- [10] **B. Lee** “Manipulating Light-Matter Interaction in 2D layered Semiconductors Integrated with Plasmonic Nanostructures” Invited Seminar, Dept. of Physics and Engineering Physics, University of Tulsa, Oklahoma, Feb. 29th 2016.
- [9] **B. Lee** “Manipulating Light-Matter Interaction in 2D layered Semiconductors and Charge Transport of Organic Semiconductors” Invited Seminar, Dept. of Materials Science and Engineering, Pohang University of Science and Technology (POSTECH), South Korea, Jan. 25th 2016.
- [8] **B. Lee** “Charge Transport of Organic Semiconductors and Light-Matter Interaction in 2D semiconductors integrated with Plasmonics Nanostructures” Invited Seminar, Daegu-Gyeongbuk Institute of Science and Technology (DGIST), Dept. of Emerging Materials Science, South Korea, Jan. 19th 2016.
- [7] **B. Lee**, J. Park, W. Liu, G. Han, C. H. Naylor, H. Ee, A. T. C. Johnson and R. Agarwal “Fano resonance and spectrally modified photoluminescence enhancement in monolayer MoS₂ integrated with plasmonic nanoantenna array” Oral presentation in MRS Dec. 2015.
- [6] **B. Lee** “Tailoring light-matter interaction in exciton-plasmon system composed of monolayer MoS₂ and plasmonic nanostructures” Seminar, Yonsei University, Dept. of Physics, Nov. 26th 2015.
- [5] **B. Lee** “Tailoring light-matter interaction in exciton-plasmon system composed of monolayer MoS₂ and plasmonic nanostructures” Seminar, A-jou University, Dept. of Physics, Nov. 25th 2015.
- [4] **B. Lee**, Joohee Park, Wenjing Liu, Gang Hee Han, Ho-Seok Ee, Carl H. Naylor, A.T. Charlie Johnson and Ritesh Agarwal, “Fano resonance and spectrally modified photoluminescence enhancement in monolayer MoS₂ integrated with plasmonic nanoantenna array” Poster presentation in DGIST Global Innovation Festival November 2015.
- [3] **B. Lee**, A. Wan, D. Mastrogiiovanni, J. E. Anthony, E. Garfunkel and V. Podzorov, “Origin of the bias stress instability in organic field-effect transistors” Poster presentation in Organic Microelectronics and

Optoelectronics Workshop VII July 2011.

[2] **B. Lee**, A. Wan, D. Mastrogiovanni, J. E. Anthony, E. Garfunkel and V. Podzorov, “Origin of the bias stress instability in organic field-effect transistors” Poster presentation in APS March 2010.

[1] **B. Lee**, T.-J. Choi, S.-W. Cheong and V. Podzorov, “Nanoscale conducting channels at the surface of organic semiconductors formed by decoration of molecular steps with self-assembled molecules” Oral presentation in MRS June 2009.