

CV

Heungman Park

Education

Ph.D. - Aug 2010, Physics, Vanderbilt University, Nashville, Tennessee, USA

M.S. - Sep 2005, Physics, Oregon State University, Corvallis, Oregon, USA

B.S. - Feb 2002, Physics, Hanyang University, Seoul, South Korea

Current position

Aug 2016 – Present

: Assistant Professor, Department of Physics & Astronomy, Texas A&M University - Commerce, USA

Previous positions

2013 – 2016: Postdoctoral researcher, Columbia University, USA

2011 – 2012: Postdoctoral researcher, University of Texas at Austin, USA

2010 – 2011: Postdoctoral researcher, Vanderbilt University, USA

Scholarship and Award

2010: The Akunuri Ramayya TA Award (Outstanding Teaching Assistant in Physics) at Vanderbilt Univ.

2007: SPIE conference outstanding student research award.

2005: Graduate Fellowship at Vanderbilt Univ.

1998: Korean Rotary Club scholarship

Grant Proposal Participation

1. ONR (2009): 'A new method for quantitatively analyzing depth-dependent defect concentrations and electronic structure modifications'
→ awarded
2. DARPA (2008): 'Development of Superior Incandescent Sources'
→ awarded

Research interest

Organic semiconductor physics, photo-excited charge carrier and exciton dynamics in organic materials, and linear and non-linear optical interactions in nanostructured materials, and photonic crystals.

Research experience

- Single molecule experiment for studying exciton dynamics in MEH-PPV conjugated polymers
- Super-resolution single molecule fluorescence imaging for studying exciton recombination in conjugated polymers such as MEH-PPV - postdoc research
- Photo-excited charge carrier dynamics in hybrid solar cell system (CuPc/GaAs, C60/GaAs, Oligo-thiophene) – postdoc research - postdoc research
- Non-linear optical imaging using second harmonic generation in bulk PCBM:P3HT heterojunction device - postdoc research
- Piezoelectric effects of multilayered PVDF polymer systems by SHG - postdoc research
- Annealing effect in boron-induced charge traps in Si/SiO₂ - postdoc research
- Second harmonic generation in oxide on silicon systems: Characterization boron charge traps in Si/SiO₂ interface and polarization-dependent SHG study in the systems - for Ph.D. degree

- Pump-probe acoustic phonon experiment: time-resolved optical experiment in InSb/GaAs heterostructure and in bulk GaAs - graduate research
- Diamond coated metal wires as advanced incandescent light and electron emission sources: Characterization of radiation and electron emission properties from diamond coated metal wires in a ultra-high vacuum system - graduate research
- Porous silicon photonic crystals: Fabrication of porous silicon photonic crystals, development of a novel photonic band-gap lithography technique using UV and an intense laser beam. Characterization of a chemical interaction between alcohols and porous silicon by FTIR - graduate research
- Synthesizing and characterization of Eu₂O₃ nanocrystals and thin nanocrystal film deposition by electrophoretic deposition - graduate research
- Surface Polarized Reflection for Langmuir layers of H₂, N₂, Benzene gases on highly polished glass surface - for M.S. degree
- Recording holographic digital data on azobenzene using laser beams- Undergraduate research
- Computational calculation of the electric potential of a quadrupole mass trap - Undergraduate research

Patent

H. Park, J. H. Dickerson, A. A. Stramel, D. A. Harju, and S. M. Weiss, "Direct laser and ultraviolet lithography of porous silicon photonic crystal devices" U.S. Patent Application Serial Number 228430 ([filed August 2008, US 20090111046 A1](#))

Workshop Attendance

2010: APS Energy Research Workshop, Portland, OR, USA.

Presentations

- 2013: APS March meeting, Baltimore, MD, USA. Poster presentation: "Photo-excited charge separation in CuPc/GaAs investigated by pump-probe second harmonic generation"
- 2011: Southeast Ultrafast Conference (SEUFC), Oak Ridge, TN, USA. Poster: "Threshold photon energy determination for filling boron-induced charge traps near Si/SiO₂ systems using second harmonic generation"
- 2010: APS March meeting, Portland, OR, USA. Oral presentation: "Determination of the energy level of boron induced charge traps in Si/SiO₂ systems by second harmonic generation"
- 2009: OS18 (Optics of Surface and Interfaces 8), Ischia, Italy. Oral presentation: "Boron induced charge traps at the interface of Si/SiO₂ probed by second harmonic generation"
- 2009: DIET XII (Desorption Induced by Electronic Transitions), Pine Mountain, GA, USA. Poster: "Boron induced interface charge traps at Si/SiO₂ systems probed by second harmonic generation"
- 2009: Southeast Ultrafast conference, Univ. of Central Florida, Orlando, FL, USA. Poster: "Second harmonic generation at Si/SiO₂ interfaces as a function of doping using femto-second laser pulses"
- 2007: OS17 (Optics of Surface and Interfaces 7), Jackson Hole, WY, USA. Poster: "Characterization of the interfaces of SOI wafers by Optical Second Harmonic Generation"
- 2007: SPIE conference, San Diego, CA, USA. Oral presentation: "Novel method of photonic band-gap lithography of porous silicon hetero-structures"

Publications

1. **Heungman Park**, Dat T. Hoang, Keewook Paeng, Jaesung Yang, L. Kaufman, "Conformation-dependent Photostability among and within Single Conjugated Polymers", [Nano Letters 15 \(11\), pp 7604–7609 \(2015\)](#).
2. **Heungman Park**, Dat T. Hoang, Keewook Paeng, Laura J. Kaufman, "Localizing Exciton Recombination Sites in Conformationally Distinct Single Conjugated Polymers by Super-Resolution Fluorescence Imaging", [ACS Nano, 9 \(3\), pp 3151–3158, \(2015\)](#).

3. Keewook Paeng, **Heungman Park**, Dat Tien Hoang, and Laura J. Kaufman, "Ideal probe single-molecule experiments reveal the intrinsic dynamic heterogeneity of a supercooled liquid", [PNAS 1424636112 \(2015\)](#)
4. Dat Tien Hoang, Keewook Paeng, **Heungman Park**, Lindsay M. Leone, and Laura J. Kaufman, "Extraction of Rotational Correlation Times from Noisy Single Molecule Fluorescence Trajectories", [Anal. Chem. 86 \(18\), pp 9322, \(2014\)](#)
5. X. Wu, **H. Park**, X.-Y. Zhu, "Probing Transient Electric Fields in Photoexcited Organic Semiconductor Thin Films and Interfaces by Time-Resolved Second Harmonic Generation", [J. Phys. Chem. C 118 \(20\), pp 10670 \(2014\)](#)
6. JeongWon Kim, **Heungman Park**, and Xiaoyang Zhu, "Charge Transport and Separation Dynamics at the C₆₀/GaAs(001) Interface", [Phys. Chem. C 118 \(6\), pp 2987 \(2014\)](#)
7. **H. Park**, M. Gutierrez, X. Wu, J. Kim, and X.-Y. Zhu, "Optical Probe of Charge Separation at Organic/Inorganic Semiconductor Interfaces", [J. Phys. Chem. C 117 \(21\), pp 10974 \(2013\)](#)
8. J.D. Morris, Timothy L. Atallah, **Heungman Park**, Zien Ooi, Ananth Dodabalapur, X.-Y. Zhu, "Quantifying space charge accumulation in organic bulk heterojunctions by nonlinear optical microscopy", [Organic Electronics 14 3014 \(2013\)](#)
9. J. D. Morris, Timothy L. Atallah, Christopher J. Lombardo, **Heungman Park**, Ananth Dodabalapur, and X.-Y. Zhu, "Mapping electric field distributions in biased organic bulk heterojunctions under illumination by nonlinear optical microscopy", [Appl. Phys. Lett., 102, 033301 \(2013\)](#)
10. **H. Park**, B. Choi, A. Steigerwald, K. Varga, and N. Tolk, "Annealing effect in boron-induced interface charge traps in Si/SiO₂ systems", [J. Appl. Phys. 113, 023711 \(2013\)](#)
11. **Heungman Park**, Jingbo Qi, Ying Xu, Gunter Lüpke, and Norman Tolk, "Polarization-dependent temporal behavior of second harmonic generation in Si/SiO₂ systems", [Journal of Optics 13 055202 \(2011\)](#)
12. **Heungman Park**, Ying Xu, Jingbo Qi, Leonard Feldman, Kalman Varga, Gunter Lüpke, and Norman Tolk, "Photon energy threshold for filling boron induced charge traps in SiO₂ near the Si/SiO₂ interface using second harmonic generation", [Appl. Phys. Lett., 97, 202105 \(2010\)](#)
13. **H. Park**, J. Qi, Y. Xu, K. Varga, S. M. Weiss, B. R. Rogers, G. Lüpke, and N. Tolk, "Boron induced charge traps near the interface of Si-SiO₂ probed by second harmonic generation", [Physica Status Solidi \(b\), 247, 1997 \(2010\)](#)
14. J. Qi, J. A. Yan, **H. Park**, A. Steigerwald, Y. Xu, S. Gilbert, X. Liu, J. K. Furdyna, S. T. Pantelides, N. Tolk, "Mechanical and electronic properties of ferromagnetic Ga_{1-x}Mn_xAs using ultrafast coherent acoustic phonons", [PRB, 81, 115208 \(2010\)](#)
15. **H. Park**, J. Qi, Y. Xu, K. Varga, S. M. Weiss, B. R. Rogers, G. Lüpke, and N. Tolk, "Characterization of boron charge traps at the interface of Si/SiO₂ using second harmonic generation", [Appl. Phys. Lett., 95, 062102, \(2009\)](#)
16. Xiong Lu, Robert Pasternak, **Heungman Park**, Jingbo Qi, Norman H. Tolk, Amitabh Chatterjee, Ronald D. Schrimpf, and Daniel M. Fleetwood, "Temperature-dependent second- and third-order optical nonlinear susceptibilities at the Si/SiO₂ interface", [PRB, 78, 155311 \(2008\)](#)
17. **H. Park**, J. H. Dickerson, and S. M. Weiss, "Spatially Localized One-Dimensional Porous Silicon Photonic Crystals", [Appl. Phys. Lett., 92, 011113 \(2008\)](#)
18. **Heungman Park**, Alex A. Stramel, David A. Harju, Sharon M. Weiss, James H. Dickerson, "Novel method of photonic band-gap lithography of porous silicon hetero-structures", [Proc. of SPIE Vol. 6640, 6640C, \(2007\)](#)
→ US patent in pending