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Department of Materials Science and Engineering
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EDUCATION

University of Michigan, Ann Arbor, MI, USA

- Ph.D. in Electrical Engineering and Computer Science, Sep. 2011 – Apr. 2015
- Thesis: Ultra-thin highly absorbing medium-based optical nanocavity for photonic and optoelectronic devices
- Advisor: Professor L. Jay Guo

University of Seoul, Seoul, Korea

- M.S. in Electrical and Computer Engineering, Mar. 2009 – Feb. 2011
- Thesis: Analysis of Optical Waveguides with Arbitrarily Refractive Index using Modified Airy Functions
- Advisor: Professor Chang-Min Kim

University of Seoul, Seoul, Korea

- B.E. in Electrical and Computer Engineering, Mar. 2003 – Feb. 2009

PROFESSIONAL EXPERIENCES

Northwestern University, Evanston, IL, USA

- Postdoctoral Fellow in Materials Science and Engineering, Mar. 2016 – present
- Advisor: Professor John A. Rogers

University of Illinois, Urbana-Champaign, IL, USA

- Postdoctoral Research Associate in Materials Science and Engineering, May 2015 – present
- Advisor: Professor John A. Rogers

HONORS AND AWARDS

- **Best Student Poster Award**, American Vacuum Society, 2014
- **Rackham Conference Travel Grant**, Univ. of Michigan, 2012 and 2013
- **Rollin M. Gerstacker Foundation Fellowship**, Univ. of Michigan, Sep. 2011 – Aug. 2012
- **Scholarship for Excellent Achievement**, Univ. of Seoul, 2010
- **Merit-based Scholarships**, Univ. of Seoul, 6 semesters in four years' undergraduate school
- **University Presidential Award for The Most Distinguished Student**, Univ. of Seoul, 2008

PUBLICATIONS

Journals

In Preparation[+]

34[+]. **K.-T. Lee** and L. J. Guo, "Omnidirectional transmissive structural color filters with high-efficiency and high-color-purity based on multi-cavity resonances,"

33[+]. Y.-C. Chen, H. W. Baac, **K.-T. Lee**, K. Teichert, A. J. Hart, L. J. Guo and E. Yoon, "Selective single cell detachment and retrieval for downstream analyses using nanosecond laser pulses in CNT-coated microwell arrays,"

32[+]. **K.-T. Lee***, C. Ji* and L. J. Guo **(*equal contribution)**, "Highly suppressed reflective wire grid polarizers exploiting perfect optical absorptions,"

31[+]. **K.-T. Lee** and L. J. Guo, "Polarization-Independent, Angle-Insensitive Broadband Perfect Absorbers,"

30[+]. **K.-T. Lee** and L. J. Guo, "Extraordinary Optical Absorption Effects in Phovotoltaics with An Ultrathin Photoactive Layer Thickness,"

29[+]. **K.-T. Lee***, J. He*, Y. Yao*, N. A. Batara, N. Hong, L. Xu, A. Gumus, R. R. Bahabry, M. M. Hussain, H. A. Atwater, N. S. Lewis, R. G. Nuzzo and J. A. Rogers **(*equal contribution)**, "Towards Zero Loss Concentration Photovoltaic Platforms Exploiting Wet Etching Based Full Solar Spectrum, Wide-Angle Antireflection Coatings,"

28[+]. **K.-T. Lee***, J.-Y. Jang*, S. J Park, U. K. Thakur and H. J. Park **(*equal contribution)**, "Subwavelength Nanocavity for Structural Transmissive Color Generation with Wide Viewing Angle,"

27[+]. R. R. Bahabry, A. Gumus, A. T. Kutbee, N. Wehbe, S. M. Ahmed, M. T. Ghoneim, **K.-T. Lee**, J. A. Rogers and M. M. Hussain, "Curreant Enhancement in Crystalline Silicon Photovoltaics by Low-Cost Nickel Silicide Back Contact,"

26[+]. **K.-T. Lee***, C. Ji*, S. J. Park, H. J. Park and L. J. Guo **(*equal contribution)**, "Angle Invariant Structural Color Filters with Improved Color Purity Based on Higher-Order Resonances,"

25[+]. Y. Yao*, **K.-T. Lee***, N. A. Batara, N. Hong, X. Sheng, J. He, L. Xu, M. M. Hussain, H. A. Atwater, N. S. Lewis, J. A. Rogers and R. G. Nuzzo **(*equal contribution)**, "A Nanomaterial Approach Towards Ultrabroadband Omnidirectional Antireflection Surfaces for Concentration Photovoltaics with Enhanced Efficiency,"

Under Review[#]

24[#]. **K.-T. Lee***, J.-Y. Jang*, S. J Park, C. Ji, S.-M. Yang, L. J. Guo and H. J. Park **(*equal contribution)**, "Angle-Insensitive and CMOS-Compatible Subwavelength Color Printing," in ***Advanced Optical Materials***

23[#]. **K.-T. Lee***, Y. Yao*, J. He*, B. Fisher, X. Sheng, L. Xu, M. Anderson, Y. Kang, A. Gumus, R. R. Bahabry, J. W. Lee, U. Paik, N. D. Bronstein, A. P. Alivisatos, S. Burroughs, M. M. Hussain, J. Lee, R. G. Nuzzo and J. A. Rogers **(*equal contribution)**, "A High Concentration Photovoltaic Module Architecture With Integrated Capabilities for Capture and Conversion of Diffuse Irradiation," under revision in ***Energy & Environmental Science***

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[2016]

22. **K.-T. Lee**, J. Y. Lee, T. Xu, H. J. Park and L. J. Guo, "Colored Dual-Functional Photovoltaic Cells," ***Journal of Optics*** **18** (6), 064003 (Apr. 2016) **[SCI, IF=2.059]**
21. **K.-T. Lee**, L. J Guo and H. J. Park, "Neutral- and Multi-Colored Semitransparent Perovskite Solar Cells," ***Molecules*** **21** (4), 475 (Apr. 2016) **[SCIE, IF=2.416]**
20. C. Yang, C. Ji, W. Shen, **K.-T. Lee**, Y. Zhang, X. Liu and L. J. Guo, "Compact Multilayer Film Structures for Ultrabroadband, Omnidirectional, and Efficient Absorption," ***ACS Photonics*** **3** (4), 590-596 (Mar. 2016) **[SCIE]**
19. **K.-T. Lee***, C. Ji* and L. J. Guo **(*equal contribution)**, "Wide-angle, polarization-independent ultrathin broadband visible absorbers," ***Applied Physics Letters*** **108** (3), 031107 (Jan. 2016) **[SCI, IF=3.302]**

[2015]

18. L. J. Guo, **K.-T. Lee** and J. Y. Lee, "Colored ultrathin hybrid photovoltaics with high quantum efficiency," ***SPIE Newsroom*** DOI: 10.1117/2.1201510.006141 (Nov. 2015)
17. **K.-T. Lee**, J. Y. Lee, S. Seo and L. J. Guo, "Microcavity-integrated colored semitransparent hybrid photovoltaics with improved efficiency and color purity," ***IEEE Journal of Photovoltaics*** **5** (6), 1654-1658 (Sep. 2015) **[SCIE, IF=3.165]**
16. **K.-T. Lee**, C. Ji, D. Banerjee and L. J. Guo, "Angular- and polarization-independent structural colors based on 1D photonic crystals," ***Laser & Photonics Reviews*** **9** (3), 354-362 (May 2015) **[SCI, IF=8.008]**
15. H. Kim, **K.-T. Lee**, C. Zhao, L. J. Guo and J. Kanicki, "Top Illuminated Organic Photodetectors with Dielectric/Metal/Dielectric Transparent Anode," ***Organic Electronics*** **20**, 103-111 (May 2015) **[SCI, IF=3.827]**
14. **K.-T. Lee***, M. Fukuda*, S. Joglekar and L. J. Guo **(*equal contribution)**, "Colored, see-through perovskite solar cells employing an optical cavity," ***Journal of Materials Chemistry C*** **3** (21), 5377-5382 (Apr. 2015) **[SCI, IF=4.696]**
13. **K.-T. Lee***, S. Seo* and L. J. Guo **(*equal contribution)**, "High-Color-Purity Subtractive Color Filters with a Wide Viewing Angle Based on Plasmonic Perfect Absorbers," ***Advanced Optical Materials*** **3** (3), 347-352 (Mar. 2015) **[SCIE, IF=4.062]**

[2014]

12. **K.-T. Lee***, J. Y. Lee*, S. Seo and L. J. Guo **(*equal contribution)**, "Colored ultrathin hybrid photovoltaics with high quantum efficiency," ***Light: Science & Applications*** **3**, e215; DOI:10.1038/lsa.2014.96 (Oct. 2014) **[SCIE, IF=14.603]**
11. **K.-T. Lee**, S. Seo, J. Y. Lee and L. J. Guo, "Strong resonance effect in a lossy medium-based optical cavity for angle robust spectrum filters," ***Advanced Materials*** **26** (36), 6324-6328 (Sep. 2014) **[SCI, IF=17.493]**
10. M. Fukuda, **K.-T. Lee**, J. Y. Lee and L. J. Guo, "Optical simulation of periodic surface texturing on ultra-thin amorphous silicon solar cells," ***IEEE Journal of Photovoltaics*** **4** (6), 1337-1342 (Sep. 2014) **[SCIE, IF=3.165]**

9. **K.-T. Lee**, S. Seo, J. Y. Lee and L. J. Guo, "Ultrathin metal-semiconductor-metal resonator for angle invariant visible band transmission filters," ***Applied Physics Letters*** **104** (23), 231112 (Jun. 2014) **[SCI, IF=3.302]**
8. J. Guo, C. Huand, Y. Yang, Y. J. Shin, **K.-T. Lee** and L. J. Guo, "ITO-Free, Compact, Color Liquid Crystal Devices using Integrated Structural Color Filters and Graphene Electrodes," ***Advanced Optical Materials*** **2** (5), 435-441 (May 2014) **[SCIE, IF=4.062]**
7. J. Y. Lee*, **K.-T. Lee***, S. Seo and L. J. Guo **(*equal contribution)**, "Decorative power generating panels creating angle insensitive transmissive colors," ***Scientific Reports*** **4**, 4192; DOI:10.1038/srep04192 (Feb. 2014) **[SCIE, IF=5.578]**

- **Highlighted/reported by Science Daily, Popular Science, National Science Foundation, PhysOrg, TechnologyOrg, Gizmag, Gizmodo, Computer Magazine, and etc**

[2013]

6. Y. J. Shin, Y.-K. Wu, **K.-T. Lee**, J. G. Ok and L. J. Guo, "Fabrication and Encapsulation of a Short-Period Wire Grid Polarizer with Improved Viewing Angle by the Angled-Evaporation Method," ***Advanced Optical Materials*** **1** (11), 863-868 (Nov. 2013) **[SCIE, IF=4.062]**
5. S. H. Ahn, J. G. Ok, M. K. Kwak, **K.-T. Lee**, J. Y. Lee and L. J. Guo, "Template-Free Vibrational Indentation Patterning (VIP) of Micro/Nanometer-Scale Grating Structures with Real-Time Pitch and Angle Tunability," ***Advanced Functional Materials*** **23** (37), 4739-4744 (Oct. 2013) **[SCI, IF=11.805]**

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4. H. W. Baac, J. G. Ok, A. Maxwell, **K.-T. Lee**, Y.-C. Chen, A. J. Hart, Z. Xu, E. Yoon and L. J. Guo, "Carbon-Nanotube Optoacoustic Lens for Focused Ultrasound Generation and High-Precision Targeted Therapy," ***Scientific Reports*** **2**, 989; DOI:10.1038/srep00989 (Dec. 2012) **[SCIE, IF=5.578]**

- **Highlighted/reported by Nature Photonics, Materials Views (Wiley-VCH), IEEE Spectrum, Discovery, Science Newsline, Laser Focus World, BioOptics Magazine, and etc**

3. J. G. Ok, H. S. Youn, M. K. Kwak, **K.-T. Lee**, Y. J. Shin, L. J. Guo, A. Greenwald and Y. Liu, "Continuous and scalable fabrication of flexible metamaterial films via roll-to-roll nanoimprint process for broadband plasmonic infrared filters," ***Applied Physics Letters*** **101** (22), 223102 (Nov. 2012) **[SCI, IF=3.302]**

[2011]

2. **K.-T. Lee**, E. J. Jung, C. H. Kim and C.-M. Kim, "Derivation of Tunneling Probabilities for Arbitrarily Graded Potential Barriers using Modified Airy Functions," ***Optical and Quantum Electronics*** **42** (2), 129-141 (Jan. 2011) **[SCI, IF=0.987]**

[2010]

1. J.-H. Pi, **K.-T. Lee**, D. Park and C.-M. Kim, "Analysis of Graded-Index Hollow Optical Fibers and Its Application to Atomic Waveguide Design," ***IEEE/OSA Journal of Lightwave Technology*** **28** (18), 2674-2680 (Jun. 2010**)** **[SCI, IF=2.965]**

Invited and seminar presentations

6. **K.-T. Lee**, "Advanced Light Management: From Nano to Macro," ***School of Electrical Engineering, Korea University***, Seoul, South Korea (May 2016)
5. **K.-T. Lee**, "Advanced Electromagnetic Wave Engineering: From Nano to Macro," ***Department of Electronics and Radio Engineering, Kyung Hee University***, Yongin, South Korea (May 2016)
4. **K.-T. Lee**, "Advanced Green Information Technology: From High-Efficiency Devices to Energy Harvesting," ***School of Electronics Engineering, Kyungpook National University***, Daegu, South Korea (Dec. 2015)
3. **K.-T. Lee**, "Ultra-thin highly absorbing medium-based optical nanocavity for photonic and optoelectronic devices," ***Department of Materials Science and Engineering, University of Illinois at Urbana-Champaign***, Urbana, IL, USA (Apr. 2015)
2. **K.-T. Lee**, "Ultra-thin highly absorbing medium-based optical nanocavity for photonic and optoelectronic devices," ***Center for Nanoscale Science and Technology, National Institute of Standards and Technology***, Gaithersburg, MD, USA (Mar. 2015)
1. **K.-T. Lee**, "Ultra-thin highly absorbing medium-based optical nanocavity for photonic and optoelectronic devices," ***Center for Integrated Nanotechnologies, Los Alamos National Laboratory***, Los Alamos, NM, USA (Nov. 2014)

Book chapter

1. L. J. Guo, Y.-K. Wu, C. Zhang, J. Zhou and **K.-T. Lee**, "Plasmonic nanoresonators for spectral imaging," (in preparation) (2016)

Conferences

27. S. J. Park, **K.-T. Lee**, S.-M. Yang, L. J. Guo and H. J. Park, "Angle Invariant Structural Color Filters With Improved Color Purity Based On Higher-Order Resonances," ***International Union of Materials Research Societies-International Conference on Electronic Materials (IUMRS-ICEM)***, Suntec, Singapore, Jul. 4-8, 2016
26. J.-Y. Jang, **K.-T. Lee**, S. J Park, C. Ji, S.-M. Yang, L. J. Guo and H. J. Park, "High Angular Tolerant Structural Colors Exploiting Strong Resonance Effects in Patterned Ultrathin Highly Absorbing Media," ***International Union of Materials Research Societies-International Conference on Electronic Materials (IUMRS-ICEM)***, Suntec, Singapore, Jul. 4-8, 2016
25. C. Yang, C. Ji, W. Shen, **K.-T. Lee**, Y. Zhang, X. Liu and L. J. Guo, "Ultrabroadband and Omnidirectional Absorbers Based on a Tandem Multilayer Structure," ***Optical Interference Coatings (OIC)***, Tucson, Arizona, USA, Jun. 19-24, 2016
24. R. R. Bahabry, A. Gumus, A. T. Kutbee, N. Wehbe, S. M. Ahmed, M. T. Ghoneim, **K.-T. Lee**, J. A. Rogers and M. M. Hussain, "Curreant Enhancement in Crystalline Silicon Photovoltaics by Low-Cost Nickel Silicide Back Contact," ***43rd IEEE Photovoltaic Specialists Conference (PVSC)***, Portland, OR, USA, Jun. 5-10, 2016

23. Y.-C. Chen, H. W. Baac, **K.-T. Lee**, K. Teichert, A. J. Hart, L. J. Guo and E. Yoon, "Selective single cell detachment and retrieval for downstream analyses using nanosecond laser pulses in CNT-coated microwell arrays," ***The 19th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS 2015)***, Gyeongju, South Korea, Oct. 25-29, 2015
22. **K.-T. Lee**, M. Fukuda, C. Ji and L. J. Guo, "Microcavity-integrated colored perovskite solar cells," ***Conference on Lasers and Electro-Optics (CLEO): 2015***, San Jose, CA, USA, May 10-15, 2015
21. J. Y. Lee, **K.-T. Lee** and L. J. Guo, "Colored Ultra-Thin Hybrid Photovoltaics with High Quantum Efficiency for Decorative PV Applications," ***2014 Materials Research Society (MRS) Fall Meeting & Exhibit***, Boston, MA, USA, Nov. 30 - Dec. 5, 2014 ***(Invited)***
20. **K.-T. Lee**, J. Y. Lee and L. J. Guo, "Ultra-light and -thin hybrid photovoltaics with high quantum efficiency and customized color and patterns," ***21st Annual Symposium on Vehicle Displays: Vehicle Displays & Interfaces 2014***, Dearborn, MI, USA, Oct. 23-24, 2014
19. **K.-T. Lee**, S. Seo, J. Y. Lee and L. J. Guo, "Structural color filters with high angular tolerance exploiting strong interference behaviors in ultrathin semiconductors," ***21st Annual Symposium on Vehicle Displays: Vehicle Displays & Interfaces 2014***, Dearborn, MI, USA, Oct. 23-24, 2014
18. **K.-T. Lee**, J. Y. Lee and L. J. Guo, "Colorful, see-through ultra-thin hybrid photovoltaics with high quantum efficiency," ***40th Annual Symposium of the American Vacuum Society Michigan Chapter "Thin films in energy storage and conversion applications"***, East Lansing, MI, USA, Aug. 25, 2014 **[Best Student Poster Award]**
17. J. Y. Lee, **K.-T. Lee**, S. Seo and L. J. Guo, "Ultra-thin Hybrid Photovoltaics with Angle-insensitive Color Appearance, Transparency and High Quantum Efficiency," ***Progress In Electromagnetics Research Symposium (PIERS) 2014***, Guangzhou, China, Aug. 25-28, 2014
16. J. Y. Lee, **K.-T. Lee***, S. Seo and L. J. Guo **(*presenter)**, "Semi-transparent and colored photovoltaic structures by using ultra-thin a-Si," ***Conference on Lasers and Electro-Optics (CLEO): 2014***, San Jose, CA, USA, Jun. 8-13, 2014
15. **K.-T. Lee**, S. Seo, J. Y. Lee and L. J. Guo, "Ultrathin transmission visible spectrum filters with wide viewing angle," ***Conference on Lasers and Electro-Optics (CLEO): 2014***, San Jose, CA, USA, Jun. 8-13, 2014
14. **K.-T. Lee**, J. Y. Lee, S. Seo and L. J. Guo, "Colored hybrid photovoltaics with angle invariance," ***Conference on Lasers and Electro-Optics (CLEO): 2014***, San Jose, CA, USA, Jun. 8-13, 2014
13. M. Fukuda, **K.-T. Lee**, J. Y. Lee and L. J. Guo, "Periodic surface texturing effect on ultra-thin a-Si/DMD solar cell studied by optical modeling," ***40th IEEE Photovoltaic Specialists Conference (PVSC)***, Denvor, CO, USA, Jun. 8-13, 2014
12. J. Y. Lee, **K.-T. Lee**, S. Seo and L. J. Guo, "Ultra-thin intrinsic amorphous silicon/organic hybrid structure for decorative photovoltaic applications," ***40th IEEE Photovoltaic Specialists Conference (PVSC)***, Denvor, CO, USA, Jun. 8-13, 2014
11. J. Y. Lee, **K.-T. Lee**, S. Seo, H. J. Park and L. J. Guo, "Dual-function ultra-thin a-Si solar cells for color generation and power harvesting," ***2013 Renewable Energy and the Environment meeting***, Tucson, AZ, USA, Nov. 04-07, 2013

10. J. Y. Lee, **K.-T. Lee**, S. Seo, H. J. Park and L. J. Guo, "Ultra-thin undoped a-Si:H/organic hybrid solar cells exploiting efficient photon management," ***2013 Materials Research Society (MRS) Fall Meeting & Exhibit***, Boston, MA, USA, Dec. 1-6, 2013
9. S. Seo, **K.-T. Lee***, J. Y. Lee and L. J. Guo **(*presenter)**, "Omnidirectional resonance in microcavity for high resolution filter," ***IEEE Photonics Conference 2013***, Bellevue, WA, USA, Sep. 8-12, 2013
8. **K.-T. Lee**, S. Seo, J. Y. Lee and L. J. Guo, "Angle-insensitive reflective color filters using lossy materials," ***IEEE Photonics Conference 2013***, Bellevue, WA, USA, Sep. 8-12, 2013
7. J. G. Ok, S. H. Ahn, M. K. Kwak, **K.-T. Lee**, C. M. Huard, J. Y. Lee and L. J. Guo, "Continuous and Scalable Fabrication of Functional films via Vibrational Indentation Patterning and Photo Roll Lithography," ***57th International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication (EIPBN 2013)***, Nashville, TN, USA, May 28-31, 2013
6. J. G. Ok, **K.-T. Lee**, C. Zhang, H. W. Baac, T. Ling, Y. J. Shin and L. J. Guo, "One-step fabrication of all-polymer waveguides with smooth sidewalls by NanoChannel-guided Lithography (NCL) for reduced propagation loss," ***2013 Materials Research Society (MRS) Spring Meeting & Exhibit***, San Francisco, CA, USA, Apr. 1-5, 2013
5. **K.-T. Lee**, T. Ling, H. W. Baac, Y. J. Shin and L. J. Guo, "Fabrication of transparent and flexible all-polymer microring resonators and its application to ultrasound imaging," ***SPIE Photonics West 2013***, San Francisco, CA, USA, Feb. 2-7, 2013
4. H. W. Baac, Y.-C. Chen, J. Frampton, J. G. Ok, T. Lee, **K.-T. Lee**, E. Yoon, S. Takamaya and L. J. Guo, "High-Precision Targeted Cell Therapy by Laser-Generated Focused Ultrasound," ***SPIE Photonics West 2013***, San Francisco, CA, USA, Feb. 2-7, 2013
3. J. G. Ok, S. H. Ahn, H. J. Park, M. K. Kwak, C. Pina-Hernandez, H. W. Baac, **K.-T. Lee**, C. Zhang, T. Ling, Y. Shin and L. J. Guo, "Continuous, scalable micro/nano patterning for optoelectronic and energy conversion applications," ***NSF Civil, Mechanical and Manufacturing Innovation Division (CMMI)***, Boston, MA, USA, 2012
2. J. G. Ok, **K.-T. Lee**, C. Zhang, H. W. Baac, T. Ling and L. J. Guo, "Continuous fabrication of polymer waveguides with smooth sidewalls by NanoChannel-guided Lithography (NCL) process," ***56th International Conference on Electron, Ion, and Photon Beam technology and Nanofabrication (EIPBN 2012)***, Waikoloa, HI, USA, May 29 - Jun. 1, 2012
1. **K.-T. Lee** and C.-M. Kim, "Enhancement of atom-guiding efficiency in hollow optical fibers," ***Asia Communications and Photonics Conference and Exhibition (ACP) 2009***, Shanghai, China, Nov. 2-6, 2009

Patent

2. D. Banerjee, L. J. Guo and **K.-T. Lee**, "Panel With Reduced Glare" US 2016/0085008 A1 (Mar. 2016)
1. L. J. Guo, J. Y. Lee and **K.-T. Lee**, "Decorative dual-function photovoltaic devices generating angle insensitive transmissive or reflective colors," PCT/US2014/063706 (May 2015)

REFERENCES

Swanlund Chair Professor John A. Rogers, Ph.D. (Postdoc advisor)

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