

# CURRICULUM VITAE

## Kwon, Kyungmok

Integrated Photonics Laboratory, Department of Electrical Engineering, UC Berkeley  
550 Sutardja Dai Hall, UC Berkeley, Berkeley  
E-mail : kwon0512@berkeley.edu  
Tel : 1-732-325-8825

### Research Experiences

#### ● UC Berkeley

*Postdoctoral researcher*, Integrated Photonics Laboratory, Jan. 2017 – Present  
Department of Electrical Engineering and Computer Science (**Adviser** : Prof. Ming Wu)  
Research area : Silicon photonics, Nanophotonics

#### ● KAIST

*Postdoctoral researcher*, Integrated Nanophotonics Laboratory, Sep. 2015 – Jan. 2017  
School of Electrical Engineering (**Adviser** : Prof. Kyoungsik Yu)  
Research area : Micro/nano laser, Light source and detector, Metal-oxides synthesis

#### ● Lam Research

*Process Engineer*, Emerging technology group, June 2015 – Aug. 2015  
Lam Research, Fremont (**Supervisor** : Meihua Shen)  
Research area : Etching of Non-Volatile Materials with Novel Cycling Recipes

#### ● KAIST

*Ph.D.*, Integrated Nanophotonics Laboratory, Sept. 2010 – Aug. 2015  
Department of Electrical Engineering (**Adviser** : Prof. Kyoungsik Yu)  
Research area : Micron/nano laser, Light source and detector, Metal-oxides synthesis

#### ● KAIST

*Research Assistant*, NanoSensuating Systems Laboratory, Feb. 2010 – July. 2010  
Department of Bio and Brain Engineering (**Adviser** : Prof. Young-Ho Cho)  
Research area : MEMS

#### ● Korea University

*Undergraduate Research Assistant*, Display and Nanosystem Laboratory, Mar. 2008 – Jun. 2008  
Department of Electrical Engineering (**Adviser** : Prof. Byeong-Kwon Ju)  
Research area : OTFT

### Education

● KAIST (Korea Advanced Institute of Science and Technology) Daejeon, Korea

**Ph.D.** in the Department of Electrical Engineering (GPA: 4.1/ 4.3)  
**Adviser** : Kyoungsik Yu

Sept. 2010 – Aug. 2015

● **UC DAVIS**

Davis, CA, USA

**Visiting Student** at the Department of Electrical Engineering

Sept. 2008 – Jun. 2009

● **Korea University**

Seoul, Korea

**B. S.** in Department of Electrical Engineering (GPA: 3.98/ 4.5)

Mar. 2003 – Feb. 2010

## List of Skills

- Device Fabrication
  - Most of semiconductor process: Stepper(ASML), Aligner(KARL SUSS), Plasma etcher(Lam Research, OXFORD), Sputter, E-beam evaporator, Thermal evaporator, and etc.
  - Process run-sheet design, multi-layer mask layout design, Flip-chip bonder(KARL SUSS, FC-150), Wafer bonder(AML)
- Device Characterization
  - Specialized on the construction of optical measurement setup: Cryogenic Micro Photoluminescence/Electroluminescence system setup, Laser heating system, Chip to chip coupling setup
  - PL/EL measurement, Raman Spectrometer, Photo-detector, Spectrum analysis
  - SEM/EDS(FEI,Hitach), CD-SEM(Hitach), Dual beam FIB(FEI), AFM(Veeco), Confocal microscope(Olympus), Ellipsometry, Nanospec, Alpha step
- Simulation tools/ technical software
  - FDTD Solutions(Lumerical), Mode Solutions(Lumerical), COMSOL, Matlab, L-edit layout editor, Origin.

## AWARD and Scholarships

- Postdoctoral Fellowship Program by National Research Foundation of Korea (NRF) Sep. 2018
- MOC Student Award, 20th Microoptics Conference (MOC' 15) Oct. 2015
- Siegman International School on Lasers, OSA Aug.2015
- Best Poster Award, NANO KOREA 2014 Jul. 2014
- Annual research honor, KAIST 2013 ,2014
- Best Student Paper Award, 17<sup>th</sup> Opto-Electronics and Communications Conference

## Research Interests

- Silicon photonics
- Optical MEMS
- Nanoscale semiconductor light source and detector
- Nanoengineering
- Novel nano material – Nanowire, Nanoparticle, Metal-oxides

## Publications & Presentations

### International Journal

1. G. Son, S. Han, J. Park, **K. Kwon**, and K. Yu, "High-efficiency broadband light coupling between optical fibers and photonic integrated circuits" *Nanophotonics*, <https://doi.org/10.1515/nanoph-2018-0075>, 2018.
2. Y. Jung, J. Shim, **K. Kwon**, J-B. You, K. Choi, and K. Yu, "Hybrid integration of III-V semiconductor lasers on silicon waveguides using optofluidic microbubble manipulation," *Scientific Reports*, vol. 6, pp. 29841, 2016.
3. **K. Kwon**, J-B. You, J. Shim, Y. Jung, and K. Yu, "Optically pumped subwavelengthscale metallodielectric nanopatch resonators," *Scientific Reports*, vol. 6, pp. 31793, 2016.
4. **K. Kwon**, Y. Jung, M. Kim, J. Shim, and K. Yu, "Randomly distributed Fabry-Pérottype metal nanowire resonators and their lasing action," *Scientific Reports*, vol. 6, pp. 24898, 2016.
5. **K. Kwon**, J. Shim, J. O. Lee, K. Choi, and K. Yu, "Localized laser-based photohydrothermal synthesis of functionalized metal-oxides," *Advanced Functional Materials*, vol. 25, pp. 2205-2205, 2015.(Front cover)
6. **K. Kwon\***, M. Kim\*, J. Shim, Y. Jung, and K. Yu, "Partially directional microdisk laser with two Rayleigh scatterers," *Optics Letters*, vol. 39, pp. 2423-2426, 2014.
7. Y. Jung, J. You\*, K. Kwon\*, and K. Yu, "Wavelength-selective optical filters based on metal-patch cavities with slot waveguide interfaces," *Photonics Journal, IEEE*, vol. 6, pp. 1-10, 2014.
8. L. Gu, X. Liu, K. Kwon, C.-C. La, M. H. Lee, K. Yu, Y.-L. Chueh, and Z. Fan, "In situ doping control and electrical transport investigation of single and arrayed CdS nanopillars," *Nanoscale*, vol. 5, pp. 7213-7218, 2013.
9. **K. Kwon\***, J.-B. You\*, W.-J. Lee, J. Shim, D. Won, Y. Jung, B. Park, and K. Yu, "Lasing in hybrid metal-Bragg nanocavities," *Optics Letters*, vol. 38, pp. 1694-1696, 2013.
10. W.-J. Lee, J.-B. You, **K. Kwon**, B. Park, and K. Yu, "Direction-selective emission with small angular divergence from a subwavelength aperture using radiative waveguide

- modes," *Physical Review B*, vol. 87, p. 125108, 2013.
11. S. F. Leung, M. Yu, Q. Lin, **K. Kwon**, K. L. Ching, L. Gu, K. Yu, and Z. Fan, "Efficient photon capturing with ordered three-dimensional nanowell arrays," *Nano letters*, vol. 12, pp. 3682-3689, 2012.

### **Presentation of International Conference**

1. J. Henriksson, T. J. Seok, J. Luo, **K. Kwon**, N. Quack, and M. C. Wu, "Digital Silicon Photonic MEMS Phase-Shifter," in *Optical MEMS and Nanophotonics (OMN)*, 2018
2. **K. Kwon**, T. J. Seok, J. Henriksson, J. Luo, L. Ochikubo, J. Jacobs, R. S. Muller, and M. C. Wu, "128x128 Silicon Photonic MEMS Switch with Scalable Row/Column Addressing," in *Conference on Lasers and Electro-Optics (CLEO 2018)*, 2018
3. T. J. Seok, J. Luo, Z. Huang, **K. Kwon**, J. Henriksson, J. Jacobs, L. Ochikubo, R. S. Muller, and M. C. Wu, "MEMS-Actuated 8× 8 Silicon Photonic Wavelength-Selective Switches with 8 Wavelength Channels," in *Conference on Lasers and Electro-Optics (CLEO 2018)*, 2018
4. **K. Kwon**, K. Choi, J. O. Lee, J. Yoon, and K. Yu, "Optical actuation of a NEMS electric switch," in *21<sup>st</sup> Microoptics Conference (MOC'16)*, 2016
5. **K. Kwon**, K. Choi, J. You, J. Shin, and K. Yu, "Electrically driven surface plasmon polaritons circuits," in *20<sup>th</sup> Microoptics Conference (MOC'15)*, 2015 (**MOC Student Award**)
6. J. Shim, J. You, J. O. Lee, **K. Kwon**, J. Yoon, K. Yu, "Photothermal in-situ synthesis of localized tungsten oxide nanobeam structures," in *Frontiers in Optics 2014*, pp. FW1A.5.
7. **K. Kwon**, J. Shim, J. O. Lee, and K. Yu, "In-situ metal-oxides synthesis with pulsed laser heating," in *Nano Korea, 2014 (Best Poster Award)*
8. **K. Kwon**, J.-B. You, J. Shim, and K. Yu, "Nanopatch cavity with a subwavelength-scale cuboidal semiconductor core," in *Photonics Society Summer Topical Meeting Series, 2013 IEEE*, 2013, pp. 62-63.
9. Y. Jung, **K. Kwon**, and K. Yu, "Etchless Optical Cavity using Metal Nanowires on Dielectric-metal Slab Waveguide," in *Photonics Society Summer Topical Meeting Series, 2013 IEEE*, 2013, pp. 42-43.
10. J. B. You, W. J. Lee, **K. Kwon**, and K. Yu, "Open Nanopatch Cavity with Annular Bragg Reflector and Bottom Metal Plane," in *Quantum Electronics and Laser Science Conference*, 2012.
11. J. Shim, **K. Kwon**, and K. Yu, "Hydrothermal fabrication of patterned ZnO nanorod clusters using laser direct writing," in *Optical MEMS and Nanophotonics (OMN)*, 2012 International Conference on, 2012, pp. 190-191.
12. B. Park, **K. Kwon**, and K. Yu, "Non-imaging fluorescence detection system with hemispherical dome reflectors," in *Optical MEMS and Nanophotonics (OMN)*, 2012 International Conference on, 2012, pp. 196-197.
13. S. F. Leung, M. Yu, Q. Lin, **K. Kwon**, K. L. Ching, K. Yu, and Z. Fan, "Self-organized

- 3-D Nanostructures for Photon Management and Cost-effective Photovoltaics," in Pacific Rim Meeting on Electrochemical and Solid-State Science, 2012, pp. 2708-2708.
14. **K. Kwon**, J. B. You, J. Shim, W. J. Lee, and K. Yu, "Room-temperature lasing of a circular Bragg cavity laser with a bottom metal plane," in Opto-Electronics and Communications Conference (OECC), 2012 17th, 2012, pp. 297-298. (**Best Student Paper Award**)
  15. **K. Kwon**, J. B. You, Y. Jung, J. Shim, and K. Yu, "Nano pillar array laser with a bottom metal plane," in Optical MEMS and Nanophotonics (OMN), 2012 International Conference on, 2012, pp. 230-231.
  16. **K. Kwon**, B. Park, J. Shim, and K. Yu, "Fluorescence detection system with miniaturized integrating sphere," in Optical MEMS and Nanophotonics (OMN), 2011 International Conference on, 2011, pp. 235-236.

## Patents

### Patents Application

1. Korea Patent Application No. 10-2017-0109783 – **Kyungmook Kwon**, Jaeho Shim, Junghoon Park, Kyoungsik Yu, "Functionalized metal oxide manufacturing method and UV sensor manufactured thereof" (Application date : August 30, 2017)
2. Korea Patent Application No. 10-2017-0104223 – **Kyungmook Kwon**, Junghoon Park, Kyoungsik Yu, "Ultra-thin circular polarization analyzer integrated meta surface and plasmon photodetector" (Application date : August 17, 2017)
3. Korea Patent Application No. 10-2015-0052183 – **Kyungmook Kwon**, Kyunghan Choi, Kyoungsik Yu, "Portable Fluorescence Detection System" (Application date : April 14, 2015)
4. Korea Patent Application No. 10-2015-0032259 – **Kyungmook Kwon**, Juhyun Shin, Kyoungsik Yu, "Nanostructure fabrication method and method of making the stamp used for nanostructure fabrication" (Application date : March 09, 2015)

### Patent Registration

1. US Patent Registration No. US 9,855,618 B2– **Kyungmook Kwon**, Jaeho Shim, Kyunghan Choi, Kyoungsik Yu, "Functionalized Metal Oxide Soldering Methods and UV Sensor Manufactured Thereof" (Registration date : January 2, 2018)
- 2.
3. Korea Patent Registration No. 10-1773416– **Kyungmook Kwon**, Hyun Park, Seon Ju Yeo, Cuc Biu Thi, Chom Kyu Chong, Kyunghan Choi, Kyoungsik Yu, "A portable diagnosis system for detection of virus infection using a camera of device" (Registration date : August 25, 2017)
4. US Patent Registration No. US 9,583,650 B1– **Kyungmook Kwon**, Kyunghan Choi, Kyoungsik Yu, "Integrated plasmonic circuit and method of manufacturing the same" (Registration date : February 28, 2017)
5. Korea Patent Registration No. 10-1738877– **Kyungmook Kwon**, Kyunghan Choi,

- Kyoungsik Yu, “Plasmonic integrated circuit and method for making the integrated circuit” (Registration date : May 17, 2017)
6. Korea Patent Registration No. 10-1632622 – **Kyungmook Kwon**, Jaeho Shim, Kyoungsik Yu, “Functionalized metal oxide soldering methods and UV sensor manufactured thereof” (Registration date : June 16, 2016)
  7. US Patent Registration No. 9,207,175– **Kyungmook Kwon**, Byoungun Park, Kyoungsik Yu, “Condensing type portable fluorescence detection system” (Registration date : December 08, 2015)
  8. Korea Patent Registration No. 10-1437769 – **Kyungmook Kwon**, Youngho Jung, Jaeho Shim, Minkyung Kim, Kyoungsik Yu, “Plat resonator and method for manufacturing thereof” (Registration date : August 28, 2014)
  9. Korea Patent Registration No. 10-1411428 – **Kyungmook Kwon**, Byoungun Park, Kyoungsik Yu, “Condensing type portable fluorescence detection system” (Registration date : June 06, 2014)
  10. Korea Patent Registration No. 10-1376903 – **Kyungmook Kwon**, Seungwoo Kuk, Kyoungsik Yu, “Method for wafer level bonding with solder foil” (Registration date : March 14, 2014)
  11. Korea Patent Registration No. 10-1340953 – **Kyungmook Kwon**, Jaeho Shim, Kyoungsik Yu, “Hydrothermal synthesis of zinc oxide nanorods using laser direct writing method” (Registration date : December 06, 2013)
  12. Korea Patent Registration No. 10-1210899 – **Kyungmook Kwon**, Kyoungsik Yu, “Integrated (Portable) fluorescence detecting system” (Registration date : December 5, 2012)

## References

- Prof. Yu, Kyoungsik**      Department of Electrical Engineering,  
Korea Advanced Institute of Science and Technology (KAIST),  
Daejeon, 305-701, Korea.  
Email : [ksyu@kaist.edu](mailto:ksyu@kaist.edu)
- Prof. Wu, Ming**      Department of Electrical Engineering and computer sciences,  
UC Berkeley,  
Berkeley, CA, USA.  
Email : [mingwu@berkeley.edu](mailto:mingwu@berkeley.edu)

\*References are available on request.