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Citizenship or LPR—USA and Korea

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Education

- **Purdue University** — West Lafayette, IN, USA
  PhD—Biomedical Engineering — *Jan. 2024 – May 2027*
  - **Doctor of Philosophy**: Section of Imaging, Weldon School of Biomedical Engineering, College of Engineering
  - **Advisor(s)**: Kim YL, PhD
  - **Committee**: Young Kim L, PhD, Steinhubl SR, MD, Surowiec RK, PhD, Dydak U, PhD, and Tong Y, PhD
  - **Dissertation**: Spatiotextural machine learning of smartphone conjunctiva images for noninvasive screening of systemic diseases in resource-limited settings
  - **Academic honor society**: Phi Kappa Phi
- **Seoul National University** — Seoul, Korea
  MS—Neuroscience — *Mar. 2021 – Feb. 2023*
  - **Master of Science**: Program in Brain Science, College of Natural Sciences co-advised with Department of Neurology and Stroke Center, *Samsung Medical Center*, Seoul, Korea
  - **Advisor(s)**: Kim S-Y, MD, PhD and Seo W-K, MD, PhD
  - **Committee**: Kim S-Y, MD, PhD, Seo W-K, MD, PhD, and Han M-K, MD, PhD
  - **Dissertation**: Quantitative predictions of cerebral arterial labeling employing neural network ensemble orchestrate precise investigation in brain frailty of cerebrovascular disease
- **École polytechnique fédérale de Lausanne (EPFL)** — Lausanne, VD, Switzerland
  MS Exchange—Life Sciences Engineering — *Feb. 2022 – Jul. 2022*
  - ***Three* master's projects**: Lab Immersion I-III
    1. Quantitative parameterization and predictive modeling of neuronal activity in *Caenorhabditis elegans*, Rahi SJ, PhD, Institute of Physics, School of Basic Sciences
    2. Analysis of correlation between whisker angular position and membrane potential of barrel cortex neurons in the awake mouse, Petersen C CH, PhD, Brain Mind Institute, School of Life Sciences
    3. Development of a fully-automated tool for segmentation of skeletal muscles in large MRI dataset, Auwerx J, MD, PhD, Brain Mind Institute, School of Life Sciences
- **Hanyang University** — Seoul, Korea
  BS Triple Major—Biomedical, Electronic, and Chemical Engineering — *Mar. 2014 – Feb. 2021*
  - **Bachelor of Science *Triple Major***: (i) Department of *Biomedical Engineering, (ii) *Electronic Engineering, (iii) *Chemical Engineering, and (iv) †Mechanical Engineering, College of Engineering—triple *major and a †minor

Experiences

- **Purdue University** — West Lafayette, IN, USA
  Graduate Research and Teaching Assistant — *Jan. 2024 – May 2027*
  - **Graduate Research Assistant, Section of Imaging, Weldon School of Biomedical Engineering, College of Engineering**:
    1. Risk-stratification of malaria among school-age children with mobile health spectroscopy of blood analysis (NIH-R33TW012486, NIH-R21TW012486, and NIH-R01EB033788)
    2. Developing and validating an innovative mobile health algorithm for predicting blood hemoglobin levels in infants using digital photos of the inner eyelid captured by smartphone cameras (NIH-R33TW012486 and NIH-R01EB033788)
  - **Graduate Teaching Assistant, Fall 2025-2026, BME 50100 Multivariate Analyses in Biostatistics**: Fundamental principles of multivariate statistical analyses in biostatistics, including multiple linear regression, multiple logistic regression, analysis of variance, and basic epidemiology
  - **Principal investigator(s)**: Kim YL, PhD

- **National Cancer Center Korea** — Goyang, Korea
  Postmaster Research Assistant — *Feb. 2023 – Dec. 2023*
  - **Department of Neurology and Branch of Immuno-oncology in Division of Rare and Refractory Cancer, Research Institute and Hospital (under Ministry of Health and Welfare)**: Exploring subclinical lesion volume change in multiple sclerosis and AQP4 antibody-positive neuromyelitis optica spectrum disorder
  - **Principal investigator(s)**: Kim H-J, MD, PhD
- **Samsung Medical Center** — Seoul, Korea
  Graduate Research Assistant — *May 2021 – Jan. 2023*
  - **Department of Neurology and Stroke Center (under Samsung Life Public Welfare Foundation)**:
    1. Development of integrated brain-vascular imaging database for brain and cerebrovascular disease (NRF-2020M3E5D2A01084891)
    2. Cerebrovascular aging model and its association with genetic variability using digitalized cerebrovascular map in stroke patients (NRF-2019R1A2C2008788)
  - **Principal investigator(s)**: Seo W-K, MD, PhD
- **Korea Research Institute of Bioscience and Biotechnology** — Daejeon, Korea
  Graduate Trainee — *Mar. 2021 – Apr. 2021*
  - **Bionanotechnology Research Center (under Ministry of Science and ICT)**: Lab rotation
- **Korea Institute of Science and Technology** — Seoul, Korea
  Undergraduate Research Assistant — *May 2017 – Feb. 2021*
  - **Center for Neuroscience and Research Planning Unit for Brain Science, Brain Science Institute (under Ministry of Science and ICT)**:
    1. Discovery of diagnosis and treatment of autism spectrum disorder (KIST-2E30961)
    2. Development of new therapeutics based on autism neural circuitry—modulation of several repetitive behaviors in autism spectrum disorder model mice by ventral lateral thalamus specific output circuit (KIST-2E30190)
- **Seoul National University Hospital** — Seoul, Korea
  Visiting Research Scientist — *Apr. 2018 – Aug. 2019*
  - **Jan. 2019 – Aug. 2019, Biomedical Research Institute**: Human resource development for the biomedical unstructured big data analysis (IITP-041120190073)
  - **Apr. 2018 – Mar. 2019, Department of Oral and Maxillofacial Radiology**: 3D dental surgical image processing framework to quantitatively analyze oral and maxillofacial anatomical morphology
- **Fraunhofer Society** — Munich, Germany
  Visiting Research Intern — *Jun. 2018 – Aug. 2018*
  - **Institute for Digital Medicine**: Deep learning networks for skull stripping of fluid-attenuated inversion recovery magnetic resonance imaging data
  - **Principal investigator(s)**: Hahn HK, PhD
- **Ministry of National Defense Korea** — Seoul, Korea
  Conscription — *Jan. 2015 – Jan. 2017*
  - **Military Service Act**: Statutes of the Republic of Korea

Publications

- **Publications**: elucidation of *primary author(s) and †corresponding author(s)
  - Journal papers—international peer-reviewed SCIE

J12. *Kwon S-M, Park S-M, Dewan A, **Hong SG**, Sakthivel H, Leem J-W, †Kim YL One-shot transductive learning for versatile color sensing and mapping. *Communications Physics. Submitted.*

J11. *Kim M-H, Kim T-W, Lee J-S, **Hong SG**, Kwak S-J, Lee D-S, Kang D-H, †Choi S-H Interconnecting role of comorbid depressed mood and general anxiety in the symptom network of social anxiety disorder. *J Affect Disord. Submitted.*

J10. *Ji Y-H, *Marasigan VG M., Park S-M, Kwon S-M, **Hong SG**, Leem J-W, Travers JB, †Kim YL Training computer vision neural networks on photographs to learn board-certified dermatologists' photodamage ratings: addressing variability in clinical assessments. *In review.*

J9. *Park S-M, *Kwon S-M, ***Hong SG**, Ji Y-H, Nagappa SP, Leem J-W, Maestas R, Miell L, Byrnes M, Kirk A, Lin M, Eugenio BD, †Griffin SO, †Kim YL Machine learning detection of dental caries, sealants, and fluorosis severity using mobile photography: protocol for data collection, modeling, and validation. *JMIR Research Protocols. In preparation.*

J8. ***Hong SG**, *Lee D-S, Kim T-W, Kim M-H, Kang D-H, †Choi S-H. Radiomics-based classification and inference of subtypes and stages in social anxiety disorder using resting-state functional images. *Progress in Neuropsychopharmacology and Biological Psychiatry.* 2026;145:111614. doi:10.1016/j.pnpbp.2026.111614

J7. ***Hong SG**, *Kim K-H, Kang Y-R, Hyun J-W, Kim S-H, †Kim H-J Comparing lesion volume dynamics between multiple sclerosis and neuromyelitis optica spectrum disorder during remission using machine learning segmentation. *Journal of Clinical Neurology.* 2025;21(5):433-438. doi:10.3988/jcn.2025.0199

J6. *Sakthivel H, Park S-M, Kwon S-M, Kaguiri E, Nyaranga E, Leem J-W, **Hong SG**, Lane PJ, †Were EO, †Were MC, †Kim YL Machine learning of blood hemoglobin and hematocrit levels via smartphone conjunctiva photography in Kenyan pregnant women: a clinical study protocol. *BMJ Open.* 2025;15(5):e097342. doi:10.1136/bmj-open-2024-097342

J5. ***Hong SG**, Park S-M, Kwon S-M, Sakthivel H, Leem J-W, Steinhubl SR, Ngiruwonsanga P, Mangara J-L N., Célestin, T., †Kim YL Radiomic identification of anemia features in monochromatic conjunctiva photographs in school-age children. *Biophotonics Discovery.* 2025;2(2):022303. doi:10.1117/1.BIOS.2.2.022303

J4. ***Hong SG**, Park S-M, Kwon S-M, Sakthivel H, Nagappa SP, Leem J-W, Steinhubl SR, Ngiruwonsanga P, Mangara J-L N., Célestin, T., †Kim YL Smartphone conjunctiva photography for malaria risk stratification in school-age children. *npj Digital Medicine.* 2025;8(1):151. doi:10.1038/s41746-025-01548-8

J3. *Chung D-D, **Hong S-W**, Lee J-E, Chung J-W, Bang O-Y, Kim G-M, †Seo W-K, †Park S-J Topographical association between left ventricular strain and brain lesions in patients with acute ischemic stroke and normal cardiac function. *Journal of American Heart Association.* 2023;e029604. doi:10.1161/JAHA.123.029604

J2. ***Hong S-W**, Song H-N, Choi J-U, Cho H-H, Baek I-Y, Lee J-E, Kim Y-C, Chung D-D, Chung J-W, Bang O-Y, Kim G-M, Park H-J, Liebeskind DS †Seo W-K Automated in-depth cerebral arterial labeling using cerebrovascular vasculature reframing and deep neural networks. *Scientific Reports.* 2023;13(1):3255. doi:10.1038/s41598-023-30234-6

J1. *Lee W-J, *Kim Y-J, Kim J-H, Hwang S-J, Shin S-H, **Hong S-W**, †Lim H-W Changes in the optic nerve head induced by horizontal eye movements. *PLOS One.* 2018;13(9):e0204069. doi:10.1371/journal.pone.0204069

◦ Conference proceedings papers

C7. *Park S-M, Kwon S-M, Sakthivel H, **Hong SG**, Dewan A, Botana DJ, Leem J-W, †Kim YL. One-shot learning for color and spectral recovery. *SPIE Optics + Photonics: Emerging Topics in Artificial Intelligence.* 2026;OP110:x. doi:xx.xxxx/xx.xxxxxxx.

C6. *Park S-M, Kwon S-M, Sakthivel H, **Hong SG**, Dewan A, Botana DJ, Leem J-W, †Kim YL Spectral vision at the ddge for mobile health. *Optica Biophotonics Congress.* 2026;[Abstract#]:[page]. doi:xx.xxxx/xx.xxxxxxx.

C5. ***Hong SG**, Park S-M, Kwon S-M, Sakthivel H, Dewan A, Subramanian K, Leem J-W, Ngiruwonsanga P, Mangara J-L N., Twizere C, †Kim YL Noninvasive malaria risk stratification in school-age children using smartphone conjunctiva photography. *SPIE Photonics West: Optics and Biophotonics in Low-Resource Settings XII and Africa International Biotechnology and Biomedical Conference.* 2026;13839:x. doi:xx.xxxx/xx.xxxxxxx.

C4. *Kim M-H, *Kim T-W, Lee J-S, **Hong SG**, Kwak S-J, Lee D-S, Kang D-H, †Choi S-H Interconnecting role of comorbid depressed mood and general anxiety in the symptom network of social anxiety disorder. *Society for Neuroscience Annual Meeting 2025.* 2025;PSTR036.02:1.

C3. *Lee D-S, ***Hong SG**, Kim M-H, Kwak S-J, Ji H-J, Kang D-H, †Choi S-H Regional radiomics similarity network analysis of brain structural alterations in patients with social anxiety disorder. *Society for Neuroscience Annual Meeting 2025.* 2025;PSTR252.15:1.

C2. *Park S-M, Kwon S-M, Sakthivel H, **Hong SG**, Nagappa SP, Huang J, Leem J-W, †Kim YL Hyperspectral learning of colors for mHealth applications. *SPIE Photonics West: Optics and Biophotonics in Low-Resource Settings XI.* 2025;13307(1):62-64. doi:10.1117/12.3046219

C1. *Lim H-W, Song Y-M, Kim J-H, Shin Y-U, Hwang S-J, **Hong S-W**. Normal range of eye movement and its relationship to age. *Investigative Ophthalmology and Visual Science Annual Meeting 2017.* 2017;58(8):747. doi:10.1167/iovs.17-21727

- Conference oral presentations

  O1. ***Hong SG**, Park S-M, Kwon S-M, Sakthivel H, Dewan A, Subramanian K, Leem J-W, Ngiruwonsanga P, Mangara J-L N., Célestin, T., †Kim YL Noninvasive malaria risk stratification in school-age children using smartphone conjunctiva photography. *SPIE Photonics West: Optics and Biophotonics in Low-Resource Settings XI*, San Francisco, CA, USA, 2026.

- Dissertations

  D1. ***Hong S-W**, †Seo W-K, †Kim S-Y Quantitative predictions of cerebral arterial labeling employing neural network ensemble orchestrate precise investigation in brain frailty of cerebrovascular disease. MS Dissertation. *Seoul National University.* 2023.

- Books

  B1. TBD

- Media

  M1. Smartphone eye photos may help detect anemia in children. *SPIE News.* 2025.

- **Intellectual properties**: delineation of *primary author(s) or *legal applicant(s) and †corresponding author(s) or †inventor(s)
  - Research grants

    R1. *Oh D-Y, *Shin D-Y, *Choi Y-J, ***Hong S-W**, *Keum S-H, *Lee S-K, †Kang D-H A pilot study on analysis of treatment factors in writing exposure therapy for post-traumatic stress disorder. *Seoul Metropolitan Government (SMG)-Seoul National University (SNU) Boramae Medical Center.* 2023-2024.

  - Patents

    P11. *Purdue Research Foundation, †Kim YL, †Kweon S-M, †Park S-M, †Dewan A, †Sakthivel H, †Leem J-W, †**Hong S-W**. One-shot transductive learning for versatile color sensing and mapping. US Provisional Patent Application 63/886,046. x. 2025/x.

    P10. *Purdue Research Foundation, †Kim YL, †**Hong S-W**, †Park S-M, †Kweon S-M, †Sakthivel H, †Leem J-W System and method for predicting probability of presence of a disease of interest using smartphone conjunctiva photography. US Provisional Patent Application 19/357,244. x. 2025/x.

    P9. *Seoul National University, †**Hong S-W**. Apparatus and method for detection of large vessel stenosis or occlusion. KR20240123600. 102843463. 2023/2025.

    P8. *Samsung Life Public Welfare Foundation, †Seo W-K, †Kim Y-C, †**Hong S-W**, †Lee J-E, †Song H-N, †Baek I-Y, †Choi J-U Analysis method and device for cerebrovascular image based on cerebrovascular chunk features. US20230386029, KR20230164268. x, 102657687. 2023/x, 2022/2024.

    P7. *Samsung Life Public Welfare Foundation, *Sungkyunkwan University, †Seo W-K, †Kim Y-C, †**Hong S-W**, †Lee J-E, †Song H-N, †Baek I-Y, †Choi J-U, †Park H-J, †Cho H-H, †Kim J-H Classification method and analysis device for cerebrovascular branch in cerebrovascular image. US20230386030, KR20230164809. x, 102822382. 2023/x, 2022/2025.

    P6. *,†**Hong S-W**. Biosignal visualization service system using pan-cancer cell diagnosis kit based on glucose metabolism gene microarray chip. WO2023080288, KR20230064391. 102815972. 2021, 2021/2025.

    P5. *,†Cho Y-S, †**Hong S-W**. Method and system for generating deep learning network model for sacroiliac osteoarthritis diagnosis. KR20230037094. 102595106. 2021/2023.

    P4. *,†**Hong S-W**. Agricultural collective drone offering system. KR20200043938. 102471147. 2020/2022.

    P3. *,†**Hong S-W**. Eye movement and emotion based HMD. KR20200043318. 102435408. 2020/2022.

    P2. *,†**Hong S-W**. System and method for extracting morphological change in the optic nerve head for generating axial length of eyeball. KR20190089471. 102029768. 2018/2019.

    P1. *,†**Hong S-W**. Spatial perception ability and memory aging prevention system through hippocampal stimulation. KR20190089472. 102029010. 2018/2019.

  - Technology transfers—elucidation of *primary author(s) and †corresponding author(s)

    T1. *Song K-S, *Park T-J, *Park S-K, *Noh K-J, ***Hong S-W**, †Chang J-H Artificial intelligence based health index estimation algorithm development. *Samsung Electronics Co., Ltd.* 2019-2020.

Expertise

- **Dry lab, wet lab, and theoretical knowledge**: across low and high-level analysis

- Dry lab
  - High-level language—Python, MATLAB, and R
  - Operating system—UNIX
  - Document programming—LaTeX
- Wet lab
  - Protein work—western blot
- Theoretical knowledge: digital medicine, physics-assisted machine learning, computational neuroimaging, neurodevelopmental disorders

- **Linguistics**: CEFR-scaled

1. English—C1-C2
   - First and primary language
   - Cambridge English Qualifications
     - C2 Proficiency (B7364007)
     - C1 Advanced (B1767835)
   - IELTS (21KR002876HONS009A)
   - GRE (0009276)
2. Korean
   - Co-first language
3. German—C1
   - TestDaF (259001)
4. Japanese—C2
   - JLPT N1 (N1A257832A)
5. Chinese—C2
   - HSK L6 (H61709037572)

Honors

- **Honors**: including grant, scholarship, and stipend
  - Seoul National University Office of International Affairs Graduate Study Fellowship, *Seoul National University Office of International Affairs*, Korea, Feb. 2022
  - Seoul Regional Intellectual Property Center Grant 2021, *Seoul Metropolitan Government Seoul Business Agency*, Korea, Oct. 2021
  - Seoul National University Alumni Association Graduate Study Fellowship, *Seoul National University Alumni Association*, Korea, Feb. 2021
  - AmorePacific Group Project Excellence Award, *AmorePacific Group*, Korea, Dec. 2016

References

- **Selected letters of recommendation**: accompanying contact information
  - Kim YL, PhD, Professor and Showalter Faculty Scholar, Weldo School of Biomedical Engineering, College of Engineering, *Purdue University*—youngkim(at)purdue.edu
  - Steinhubl SR, MD, Vincent Reilly P Professor, Weldon School of Biomedical Engineering, College of Engineering, *Purdue University*—ssteinhu(at)purdue.edu
  - Dydak U, PhD, Professor and Purdue Faculty Scholar, School of Health Sciences, College of Health and Human Sciences, *Purdue University*—udydak(at)purdue.edu
  - Tong Y, PhD, Associate Professor, Weldon School of Biomedical Engineering, College of Engineering, *Purdue University*—tong61(at)purdue.edu
  - Boatin AA, Associate Professor and Co-director of Global Health, Department of Obstetrics and Gynecology, Massachusetts General Hospital, Harvard Medical School, *Harvard University*
  - Pienaar E, PhD, Associate Professor, Weldon School of Biomedical Engineering, College of Engineering, *Purdue University*—epienaar(at)purdue.edu

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