2021

AR

Annual Report

Department of BIO and BRAIN ENGINEERING

BioNano/MEMS

Biomedical Imaging

Bioinformatics/Systems Biology

Bioelectronics

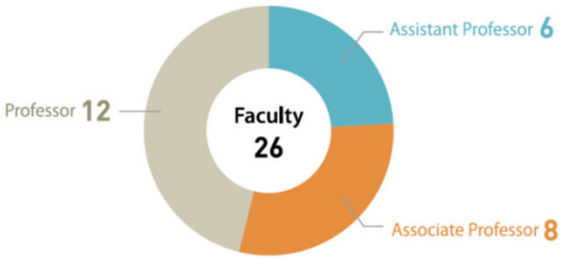
Neural Engineering

KAIST

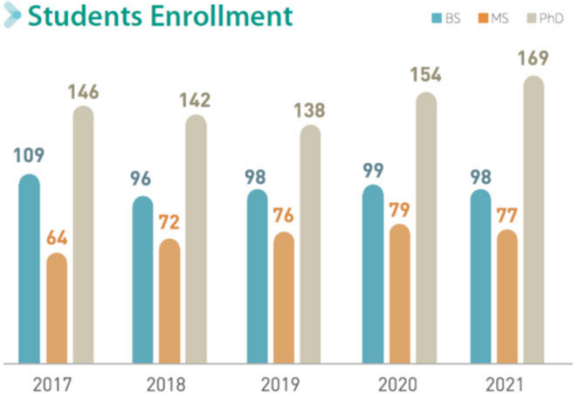
Dept. of Bio and Brain Engineering

Statistics

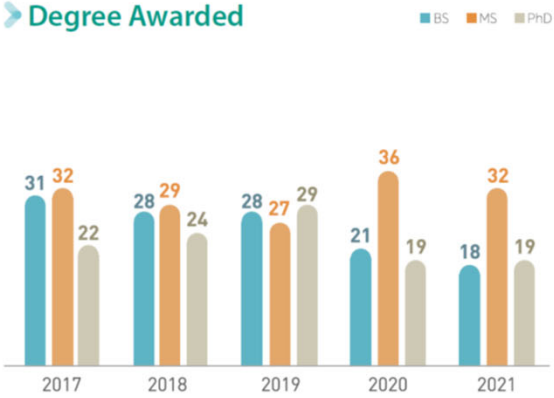
Faculty



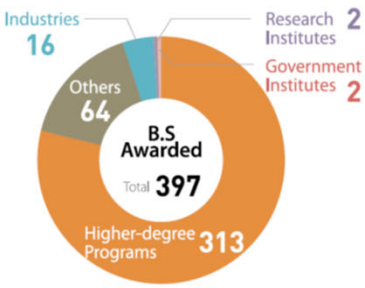
Students Enrollment

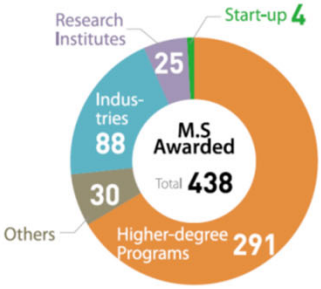


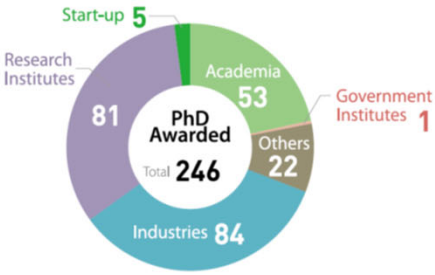
Degree Awarded



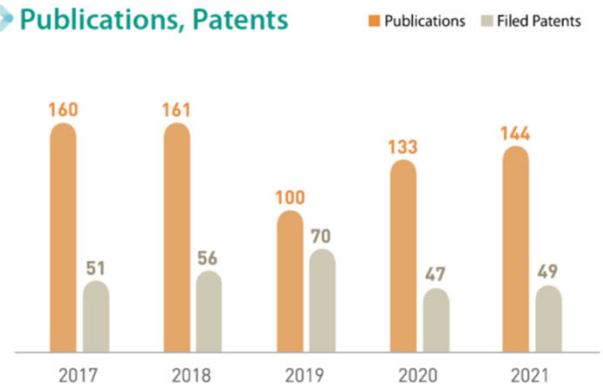
Career Status after Graduation



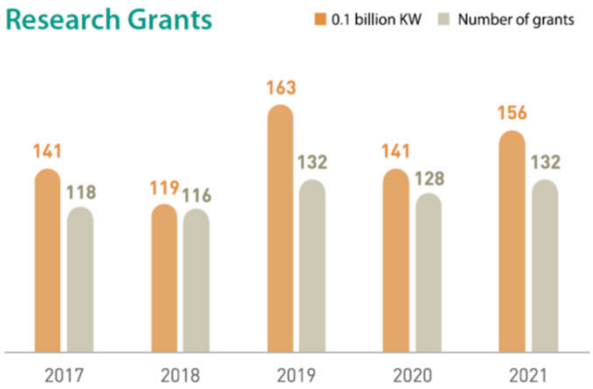




Publications, Patents



Research Grants



MS Degree Recipients

No.	Name	Thesis Title	Advisor	Term
1	Rah, Yujin	Effects of spatial boundary on episodic memory in children	Lee, Sang Ah	2021 Winter
2	Kang, Wonjun	A Study on the Differential Roles of Hippocampal Subregions in Memory Integration	Lee, Sue Hyun	2021 Winter
3	Kim, Na Yeon	Monocytes loaded with pro-inflammatory drug-encapsulating particles for prolonged modulation of the immunosuppressive tumor microenvironment	Park, Ji Ho	2021 Winter
4	Kim, Taehyun	A Study on the Neural Representation of Memory Confidence in the Hippocampus and Prefrontal Cortex	Lee, Sue Hyun	2021 Winter
5	Kim, Hyoyeon	Development of a drug delivery system for efficient STING agonist and anti-OX40 combination therapy	Park, Ji Ho	2021 Winter
6	Na, Hamin	Paper Capillary Electrophoresis for Quantitative Separation of Viral double-stranded RNA	Jeong, Ki-Hun	2021 Winter
7	Roh, Hyewon	Construction of a Fibroblast-Associated Tumor Spheroid Model Based on Collagen Drop Array Chip	Park, Je-Kyun	2021 Winter
8	Park, Geon Yeong	A study on domain knowledge acquisition and adaptation via information theoretic regularization	Lee, Sang Wan	2021 Winter
9	Byun, Ji Young	Graph neural network based heterogeneous propagation scheme for classifying Alzheimer's disease	Jeong, Yong	2021 Winter
10	Sung, Yoondo	A study on neural task dimensionality of prefrontal cortex for context-dependent reinforcement learning	Lee, Sang Wan	2021 Winter
11	Song, Haneul	Implicit emotional processing and its individual multimodal classification using event-related potential and skin response	Lee, Sang Ah	2021 Winter
12	Yang, Serin	Continuous Conversion of CT Kernel using Switchable CycleGAN with AdaIN	Ye, Jongchul	2021 Winter
13	Oh, Gyutaek	Unsupervised Deep Quantitative Susceptibility Mapping Reconstruction using Physics-based CycleGAN	Ye, Jongchul	2021 Winter
14	Yoon, Dongjo	Development of the micropatterned 3D hydrogel-neuron model based on soft lithography for the study of 3D neural network chip using microelectrode array	nam, Yoonkey	2021 Winter
15	Lee, Kyungwook	Prediction of Drug-Induced Liver Injury (DILI) Using Graph Convolutional Network on Heterogeneous Network	Lee, Doheon	2021 Winter
16	Lee, Jongbeom	The role of matrix stiffness on the regulation of TGF-β signaling in ovarian fibroblasts	Kim, Pilnam	2021 Winter

PhD Degree Recipients

No.	Name	Thesis Title	Advisor	Term
1	Joo, Jae Il	Reverse control of Boolean networks and its application to molecular regulatory networks of cancer	Cho, Kwang-Hyun	2021 Winter
2	Ha, Suhyun	Phenotype linkage-based rule mining for polypharmacological drug discovery	Lee, Doheon	2021 Winter
3	Kim, Daejeong	In vitro microelectrode array interface for enhanced recording yields and large-scale network study	nam, Yoonkey	2021 Winter
4	Yang, Sung-Pyo	Periodic Micro Optics-based 3D Endoscopic Cameras	Jeong, Ki-Hun	2021 Winter
5	Lee, Wonkyoung	Spread Spectrum Raman Spectroscopy for Ultrasensitive Label-Free Detection of Biomolecules	Jeong, Ki-Hun	2021 Winter
6	Lee, Yoonhyeok	Development of random subsample classifiers identifying mechanism-specific subgroups of type 2 diabetes	Yi, Gwan-Su	2021 Winter
7	Kim, Kisoo	Biologically Inspired Ultrathin Arrayed Camera	Jeong, Ki-Hun	2021 Winter
8	Kim, Byung-Hoon	Application of graph neural network for the analysis of resting-state functional magnetic resonance image	Ye, Jongchul	2021 Winter
9	Cha, Eunju	Deep learning based image reconstruction from subsampled k-space and missing phase information	Ye, Jongchul	2021 Winter
10	Choi, Hojun	Treatment of sepsis with exosome-based delivery of super-repressor IκBα	Shin, Eui-Cheol	2021 Winter
11	Lee, Hwang-yeol	Integrative network analysis of transcriptomic and epigenetic changes in aging	Cho, Kwang-Hyun	2021 Summer
12	Kim, Kwangmin	Context-Aware Multi-Token Concept Recognition for Biomedical Text Mining	Lee, Doheon	2021 Summer
13	Jung, Jik Han	Dual size-exclusion chromatography for efficient isolation of plasma-derived extracellular vesicles and their applications for companion diagnostics of non-small cell lung cancer	Park, Ji Ho	2021 Summer
14	Cho, Minkyung	Development of a perfusable 3D in vitro human artery-mimicking multichannel system for artery disease models	Park, Je-Kyun	2021 Summer
15	Hong, Nari	Thermoplasmonics and hydrogel-based neural chip platform for manipulation of structure and function of neuronal networks	nam, Yoonkey	2021 Summer
16	Amin Mirzaaghasi	in vivo biodistribution study of exosome in murine sepsis model	Park, Ji Ho	2021 Summer
17	Yoon, Jinhui	Effect of Cerebral Endothelial Glycocalyx on Capillary Stalling and Cerebral Blood Flow	Jeong, Yong	2021 Summer
18	Bae, Sangin	Ultrathin Light-field Camera for Facial Expression Reading	Jeong, Ki-Hun	2021 Summer

Other Awards & Honors

No.	Name	Title	Institute	Date Awarded	Advisor
19	Kang, Byoung-Hoon	Best Paper Award	The MicroTAS Conference	November, 2021	Jeong, Ki-Hun
20	Kim, Soo Jee	Best Poster Award	KBCS	November, 2021	Park, Je-Kyun
21	Han, Jieun	Best Poster Award	KBCS	November, 2021	Park, Je-Kyun
22	Han, Dong Hyun	Best Paper Award	The Society of Micro and Nano System	November, 2021	Park, Je-Kyun
23	Lee, Juncheol	Best Paper Award	KOSUA	November, 2021	Choi, Myung Chul
24	Kim, Yae Ji	Best Paper Award	KHBM	November, 2021	Jeong, Yong
25	Han, Hyeonjeong	Best Poster Award	KSEV	November, 2021	Park, Ji Ho
26	Kang, Byoung-Hoon	Best Poster Award	The Korean BioChip Society	November, 2021	Jeong, Ki-Hun
27	Yu, Eunsil	Best Poster Award	The Korean BioChip Society	November, 2021	Jeong, Ki-Hun
28	Yoon, Dongjo	Best Poster Award	The Korean Society of Medical & Biological Engineering	November, 2021	Nam, Yoonkey

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PUBLICATIONS

(Peer-reviewed journals)

Bioinformatics/Systems Biology 48
BioNano/MEMS 49
Biomedical Imaging 52
Bioelectronics 55
Neural Engineering 56

52. Oh, N; Park, S; Kim, JW; **Park, JH**; "Photothermal transfection for effective nonviral genome editing", ACS APPLIED BIO MATERIALS, vol.4, no.7, pp.5678~5685, 2021.07; DOI(http://dx.doi.org/10.1021/acsabm.1c00465)

53. Kim, H; Roh, H; Kim, H; **Park, JK**; "Droplet contact-based spheroid transfer technique as a multi-step assay tool for spheroid arrays", LAB ON A CHIP, vol.21, no.21, pp.4155~4165, 2021.11; DOI(http://dx.doi.org/10.1039/d1lc00581b)

54. Lee, G; Kim, SJ; Chun, H; **Park, JK**; "Multilayered and heterogeneous hydrogel construct printing system with crosslinking aerosol", BIOFABRICATION, vol.13, no.4, pp.045027, 2021.10; DOI(http://dx.doi.org/10.1088/1758-5090/ac25ca)

55. Cho, CH; Cho, M; **Park, JK**; "Biomarker barcodes: multiplexed microfluidic immunohistochemistry enables high-throughput analysis of tissue microarray", LAB ON A CHIP, vol.21, no.18, pp.3471~3482, 2021.09; DOI(http://dx.doi.org/10.1039/d1lc00375e)

56. Park, J; **Park, JK**; "Pushbutton-activated microfluidic cartridge as a user-friendly sample preparation tool for diagnostics", BIOMICROFLUIDICS, vol.15, no.4, pp.041302, 2021.07; DOI(http://dx.doi.org/10.1063/5.0056580)

57. Park, J; Lee, KG; Han, DH; Lee, JS; Lee, SJ; **Park, JK**; "Pushbutton-activated microfluidic dropenser for droplet digital PCR", BIOSENSORS & BIOELECTRONICS, vol.181, pp.113159, 2021.06; DOI(http://dx.doi.org/10.1016/j.bios.2021.113159)

58. Son, J; Kim, HH; Lee, JH; Jeong, WI; **Park, JK**; "Assembly and disassembly of the micropatterned collagen sheets containing cells for location-based cellular function analysis", BIOCHIP JOURNAL, vol.15, no.1, pp.77~89, 2021.03; DOI(http://dx.doi.org/10.1007/s13206-021-00007-2)

59. Park, YM; Park, J; Lim, SY; Kwon, Y; Bae, NH; **Park, JK**; Lee, SJ; "Integrated pumpless microfluidic chip for the detection of foodborne pathogens by polymerase chain reaction and electrochemical analysis", SENSORS AND ACTUATORS B-CHEMICAL, vol.329, pp.129130, 2021.02; DOI(http://dx.doi.org/10.1016/j.snb.2020.129130)

60. Kim, GY; Son, J; Han, JI; **Park, JK**; "Inertial microfluidics-based separation of microalgae using a contraction-expansion array microchannel", MICROMACHINES, vol.12, no.1, pp.97, 2021.01; DOI(http://dx.doi.org/10.3390/mi12010097)

61. Seo, H; Son, JJ; **Park, JK**; "Controlled 3D co-culture of beta cells and endothelial cells in a micropatterned collagen sheet for reproducible construction of an improved pancreatic pseudo-tissue", APL BIOENGINEERING, vol.4, no.4, pp.046103, 2020.12; DOI(http://dx.doi.org/10.1063/5.0023873)

2021 Annual Report

Department of
BIO and **BRAIN ENGINEERING**

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