2022

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Annual Report

Department of BIO and BRAIN ENGINEERING

BioNano/MEMS

Biomedical Imaging

Bioinformatics/Systems Biology

Bioelectronics

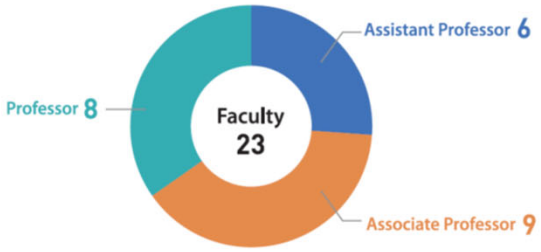
Neural Engineering

KAIST

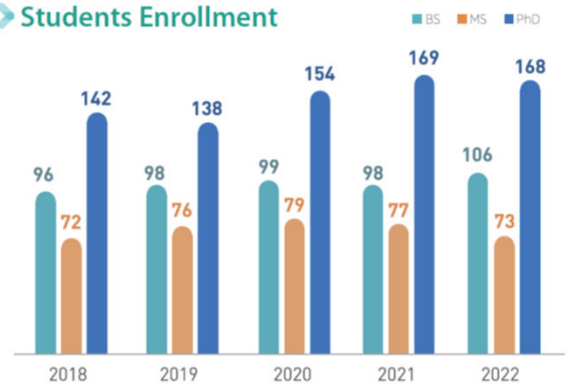
Dept. of Bio and Brain Engineering

Statistics

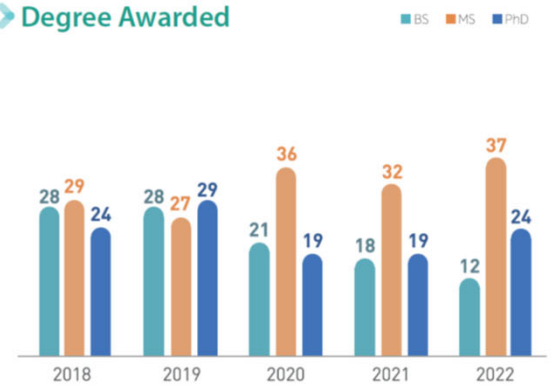
Faculty



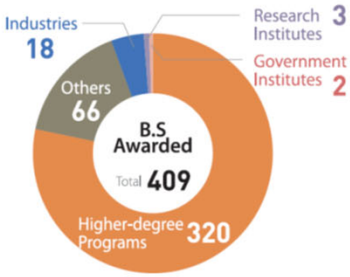
Students Enrollment

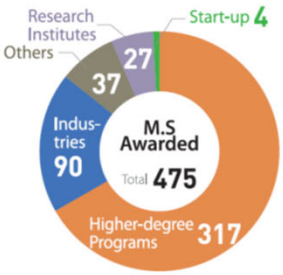


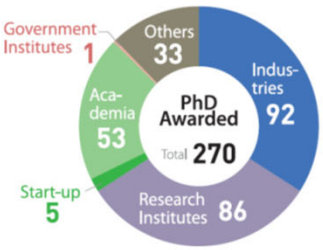
Degree Awarded



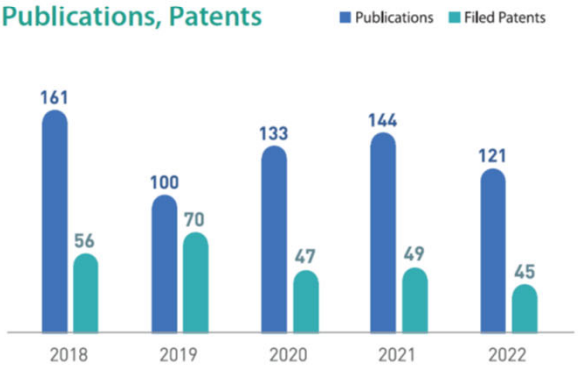
Career Status after Graduation



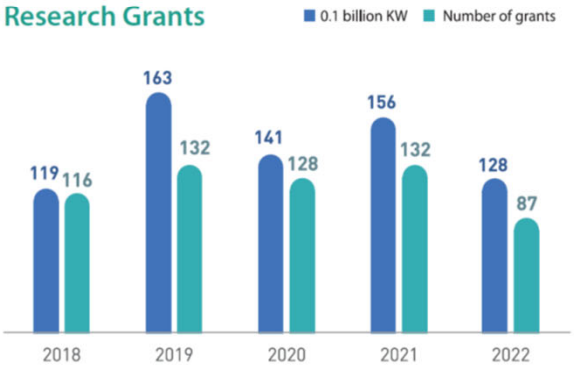




Publications, Patents



Research Grants



The 20th Anniversary of Bio & Brain Engineering

September 14, 2022

BS Degree Recipients

No.	Name	Advisor (Cooperation Advisor)	Term
1	Chang, Junho	Jeong, Ki-Hun	2022 Winter
2	Yang, Keunjae	Yi, Gwan-Su	2022 Winter
3	Kwon, Haram	Nam, Yoonkey	2022 Winter
4	Kim, Hyeonggeon	Jeong, Ki-Hun	2022 Winter
5	Kim, Sojeong	Cho, Young-Ho	2022 Winter
6	Kim, Taek-min	Ye, JongChul	2022 Winter
7	Oh, Jaeyeon	Park, Sung-Hong	2022 Winter
8	Yoo, Jiye	Park, Ji Ho	2022 Winter
9	Ryoo, Yeeun	Park, Ji Ho	2022 Winter
10	Ilia Churin	Park, Je-Kyun	2022 Summer
11	Jang, Jae Hyun	Lee, Sue-Hyun	2022 Summer
12	Jiramet Kinchagawat	Paik, Se-Bum	2022 Summer

MS Degree Recipients

No.	Name	Thesis Title	Advisor	Term
20	Younggil Cha	Horse-fly Eye Inspired Ultrathin Multi-Spectral Camera	Jeong, Ki-Hun	2022 Winter
21	Yeonsu Choi	Identification of mechanism-specific ANO1-related gene marker of Glioblastoma	Yi, Gwan-Su	2022 Winter
22	Jae Hyuk Choi	Identifying molecular targets for reverse-aging using Boolean network modeling and analysis of sin-gle-cell transcriptomic data of human dermal fibroblast cells	Cho, Kwang-Hyun	2022 Winter
23	Dong Hyun Han	Pushbutton-Activated DNA Extraction and Droplet Generation in a Microfluidic Device for Point-of-Care Molecular Diagnostics	Park, Je-Kyun	2022 Winter
24	Jieun Han	Microfluidic Multiplexed Device for Amino Acid Quantification Using Cell-Free Protein Synthesis	Park, Je-Kyun	2022 Winter
25	TaeHee Kim	Plasmonic Au nano-islands based SERS assay for spike protein detection using ACE2 protein	Jeong, Ki-Hun	2022 Winter
26	Pouya Ghasemlou	Nonlinear analysis of motor imagery and motor execution to improve accuracy and efficiency of brain-computer interfaces	Jeong, Jaeseung	2022 Summer
27	Jaemyeong Kwon	Light-field Intraoral Scanner using Solid Immersion Microlens Arrays	Jeong, Ki-Hun	2022 Summer
28	Qudan Park	Study on Flexural Rigidity and Lattice Structure of Microtubules Stabilized by Paclitaxel and Lau-limalide	Choi, Myung Chul	2022 Summer
29	Hyeonyeob Seo	Thermally drawn porous sutures for controlled drug release	Park, Seongjun	2022 Summer
30	Dongyeol Seok	A Design of a Motion Artifact Removal System in Non-contact ExG Devices based on Motion Artifact Amplitude Variations by the Distance and Voltage across the Elctrode-Tissue Interface	Kim, Chul	2022 Summer
31	Kyeonglim Lee	Proteomics-based characterization of matrix-bound nanovesicles from fibroblast-derived ECM	Kim, Pilnam	2022 Summer
32	Soo Min Lee	Detection of anomalous genes in p53 activator-resistant lung cancer cells using generative adversar-ial and graph neural networks	Cho, Kwang-Hyun	2022 Summer
33	Jung Eun Lee	Identification of Immunological reversion target for improving responsiveness to immune checkpoint inhibitors in high tumor mutational burden lung cancer	Cho, Kwang-Hyun	2022 Summer
34	JuntaeJang	Fully Wireless Multi-modal (Capacitive-Ultrasound) Power Transmission to Implantable Optogenetics Stimulator	Kim, Chul	2022 Summer
35	Jaehun Jeon	Micro-Spectrometer using Electrothermal Tunable MEMS Grating	Jeong, Ki-Hun	2022 Summer
36	Minh Duc Pham	The Effects of Physical Constraint on Fibroblast Phenotypes in the Matrix under the Stimulation of Cancer Secretome	Kim, Pilnam	2022 Summer

Other Awards & Honors

No.	Name	Title	Institute	Date Awarded	Advisor
1	Luu, Minh Huan	First prize	RSNA/MICCAI/ASNR	December, 2021	Park, Sung-Hong
2	Lim, Soorin Kim, Kwansso Kim, Yutae Han, Manyoung	Excellence award	Ministry of Science and ICT	December, 2021	Lee, Doheon
3	Cho, Kwang-Hyun	Research award	KAIST	February, 2022	Cho, Kwang-Hyun
4	Lee, Sang Wan	International cooperation award	KAIST	February, 2022	Lee, Sang Wan
5	Park, Seongjun	Top 10 re-search achievements	KAIST	February, 2022	Park, Seongjun
6	Cho, Kwang-Hyun	Basic re-search pro-motion meri-torious per-son	National Research Foun-dation of Korea	April, 2022	Cho, Kwang-Hyun
7	Lee, Sue-Hyun	Young scien-tist award	Scitech Korea	May, 2022	Lee, Sue-Hyun
8	Kwon, Minjae	Best presen-tation award	Korea Society for Brain and Neural Science	May, 2022	Lee, Sue-Hyun
9	Hwang, Soon Hong	Best presen-tation award	The Korean BioChip Soci-ety	May, 2022	Jeong, Ki-Hun
10	Yu, Eunsil	Best poster award	The Korean BioChip Soci-ety	May, 2022	Jeong, Ki-Hun
11	Kim, Hyun-Kyung	Best poster award	The Korean BioChip Soci-ety	May, 2022	Jeong, Ki-Hun
12	Kim, Soo Jee	Best poster award	The Korean BioChip Soci-ety	May, 2022	Park, Je-Kyun
13	Kang, Byoung-Hoon	Best poster award	Ministry of Science and ICT	July, 2022	Jeong, Ki-Hun

Other Awards & Honors

No.	Name	Title	Institute	Date Awarded	Advisor
14	Oh, Seung Won	Best poster award	TERMIS	October, 2022	Kim, Pilnam
15	Yong, Insung	Best poster award	TERMIS	October, 2022	Kim, Pilnam
16	Kang, Byoung-Hoon	CHEMINAS award	CHEMINAS	October, 2022	Jeong, Ki-Hun
17	Jo, Youngmin	Best poster award	The Korean BioChip Soci-ety	November, 2022	Kim, Pilnam
18	Park, Jongho	Best poster award	The Korean BioChip Soci-ety	November, 2022	Park, Je-Kyun
19	Kim, Gi Beom	Best poster award	Optical Society of Korea	November, 2022	Jeong, Ki-Hun
20	Park, Qudan	Best presen-tation award	The Korean Physical Society	November, 2022	Choi, Myung Chul
21	Lee, Jaehee	Best presen-tation award	IBS	August, 2022	Choi, Myung Chul
22	Park, Young-Gyun	Minister of education award	KERIS	November, 2022	Park, Young-Gyun

04

PUBLICATIONS

(Peer-reviewed journals)

Bioinformatics/Systems Biology 50
BioNano/MEMS 52
Biomedical Imaging 54
Bioelectronics 54
Neural Engineering 55

35. Kim, SJ; Lee, G; **Park, JK**; "Direct microextrusion printing of a low viscosity hydrogel on a supportive microstructured bioprinting substrate for the vasculogenesis of endothelial cells", ADVANCED MATERIALS TECHNOLOGIES, vol.7, no.8, pp. , 2022.08; DOI(http://dx.doi.org/10.1002/admt.202101326)

36. Lee, G; Kim, SJ; **Park, JK**; "Bioprinting of heterogeneous and multilayered cell-hydrogel constructs using continuous multi-material printing and aerosol-based crosslinking", STAR Protocols, vol.3, no.2, 2022.06; DOI(http://dx.doi.org/10.1016/j.xpro.2022.101303)

37. Cho, M; **Park, JK**; "Modular 3D in vitro artery-mimicking multichannel system for recapitulating vascular stenosis and inflammation", MICROMACHINES, vol.12, no.12, pp.1528, 2021.12; DOI(http://dx.doi.org/10.3390/mi12121528)

38. Roh, H; Kim, H; **Park, JK**; "Construction of a fibroblast-associated tumor spheroid model based on a collagen drop array chip", BIOSENSORS, vol.11, no.12, pp.506, 2021.12; DOI(http://dx.doi.org/10.3390/bios11120506)

39. Lee, D; Lee, M; Kwak, H; Kim, YS; Shim, J; Jung, JH; Park, W; **Park, JH**; Lee, S; Park, YK; "High-fidelity optical diffraction tomography of live organisms using iodixanol refractive index matching", BIOMEDICAL OPTICS EXPRESS, vol.13, no.12, pp.6404~6415, 2022.11; DOI(http://dx.doi.org/10.1364/boe.465066)

40. Jeong, M; Jung, YA; Yoon, J; Kang, JY; Lee, SH; Back, W; Kim, H; Sailor, MJ; Kim, D; **Park, JH**; "Porous silicon-based nanomedicine for simultaneous management of joint inflammation and bone erosion in rheumatoid arthritis", ACS NANO, vol.16, no.10, pp.16118~16132, 2022.10; DOI(http://dx.doi.org/10.1021/acsnano.2c04491)

41. Kumeria, T; Wang, J; Kim, B; **Park, JH**; Zuidema, JM; Klempner, M; Cavacini, L; Wang, Y; Sailor, MJ; "Enteric polymer-coated porous silicon nanoparticles for site-specific oral delivery of IgA antibody", ACS BIOMATERIALS SCIENCE & ENGINEERING, vol.8, no.10, pp.4140~4152, 2022.10; DOI(http://dx.doi.org/10.1021/acsbiomaterials.0c01313)

42. Jeong, M; Kim, H; Yoon, J; Kim, DH; **Park, JH**; "Coimmunomodulation of tumor and tumor-draining lymph nodes during in situ vaccination promotes antitumor immunity", JCI INSIGHT, vol.7, no.12, 2022.06; DOI(http://dx.doi.org/10.1172/jci.insight.146608)

43. Surwase, SS; Shahriar, SMS; An, JM; Ha, J; Mirzaaghasi, A; Bagheri, B; **Park, JH**; Lee, YK; Kim, YC; "Engineered nanoparticles inside a microparticle oral system for enhanced mucosal and systemic immunity", ACS APPLIED MATERIALS & INTERFACES, vol.14, no.9, pp.11124~11143, 2022.03; DOI(http://dx.doi.org/10.1021/acsami.1c24982)

44. Lee, D; Ha, J; Ahn, H; Jeong, SD; Jeong, M; **Park, JH**; Yun, CO; Kim, YC; "Based K+ ionophore as a strong immunogenic cell death inducer for cancer immunotherapy", ACS APPLIED BIO MATERIALS, vol.4, no.12, pp.8333~8342, 2021.12; DOI(http://dx.doi.org/10.1021/acsabm.1c00861)

45. Chandrasekaran, SS; Agrawal, S; Fanton, A; Jangid, AR; Charrez, B; Escajeda, AM; **Son, S**; Mcintosh, R; Tran, H; Bhuiya, A; Derby, MDL; Switz, NA; Armstrong, M; Harris, AR; Prywes, N; Lukarska, M; Biering, SB; Smock, DCJ; Mok, A; Knott, GJ; Dang, Q; Van, DE; Dugan, E; Kim, S; Liu, TY; Consortium, IT; Moehle, EA; Kogut, K; Eskenazi, B; Harris, E; Stanley, SA; Lareau, LF; Tan, MX; Fletcher, DA; Doudna, JA; Savage, DF; Hsu, PD; "Rapid detection of SARS-CoV-2 RNA in saliva via Cas13", NATURE BIOMEDICAL ENGINEERING, vol.6, no.8, pp.944~956, 2022.08; DOI(http://dx.doi.org/10.1038/s41551-022-00917-y)

2022 Annual Report

Department of
BIO and **BRAIN ENGINEERING**

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