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**RESEARCH INTEREST**

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My research interests include algorithmic transparency, interpretability in affective intelligence, computational emotional dynamics, cerebral asymmetry and the effects of emotion on brain structure for affective computing, brain-computer interface, and assistive and rehabilitative technology.

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**EDUCATION**

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- **KAIST** Republic of Korea  
*Ph.D in Computer Science* Aug. 2018
  - Thesis: Wearable Affective Lifelog System for Understanding Emotion Dynamics in Daily Life
- **Boston University** Boston, MA  
*M.A in Computer Science* Oct. 2010
- **Inha University** Republic of Korea  
*B.S in Computer Science and Engineering* Feb. 2008

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**HONORS, AWARDS, MEDIA, PROFESSIONAL ACTIVITIES**

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- **Newspaper Coverage** Korean Media Electronic Times(ET News)  
*Affective Situation Learning System (www.etnews.com/20190327000232)* Mar. 2019
- **Newspaper Coverage** Korean Media Electronic Times(ET News)  
*Deep Physiological Affect Network (www.etnews.com/20170712000212)* Jul. 2017
- **Nominated Research Highlights** Annual Report 2015-2016, School of Computing, KAIST  
Jan. 2016
- **Honorable Mention Paper 2014 (Top 10%)** Computers in Biology and Medicine, Elsevier  
Jul. 2015

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**EXPERIENCE**

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- **Inha University** Republic of Korea  
*Assistant Professor, Department of Artificial Intelligence* Sep. 2021 – Present
  - Principle Investigator - Affective Artificial Intelligence Lab.(https://affectiv.ai)
  - Instructor - Affective Computing, Data Structures, Digital Signal Processing, Discrete Math., Machine Learning, Probability in AI, Reinforcement Learning
- **KAIST** Republic of Korea  
*Research Assistant Professor, School of Computing* Aug. 2018 – Aug. 2021
  - Instructor - Data Structures, Fall 2018 – Spring 2021

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**RESEARCH FUNDING**

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- National Research Foundation of Korea (NRF), Brain Korea 21 Four (BK21FOUR), co-PI, 6.5 billion Korean Won (approx. \$4,541,326), 2023/09/01 - 2027/08/31.
- Institute of Information & Communications Technology Planning & Evaluation (IITP), Development of an Interactive XR System for Recognizing the Arousal-Valence Model of Emotions using Multimodal Physiological Signals, PI, 1.83 billion Korean Won (approx. \$2,281,932), 2023/04/01 - 2025/12/31.
- General Electric (GE) Foundation, Development of an Affective Dynamic Model on Riemannian Manifolds for Extended Reality (XR)-based Aviation Training Systems, single PI, 200 million Korean Won (approx. \$153,562), 2023/03/01 - 2025/2/28.
- Institute of Information & Communications Technology Planning & Evaluation (IITP), Artificial Intelligence Convergence Innovation Human Resources Development, co-PI, 9.75 billion Korean Won (approx. \$6,916,920), 2022/07/01 - 2025/12/31.
- National Research Foundation of Korea (NRF), Sejong Science Fellowship, Development of a Closed-Loop Affective Feedback System for Trust-driven Robotic Arm Control, single PI, 575 million Korean Won (approx. \$513,400), 2021/03/01 - 2026/02/28.

## PATENT

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- Method for estimating human emotions using deep psychological affect network and system therefor, U.S(10,853,632), KOR(10-2221264).
- Method for estimating emotion based on psychological activity and biosignal of user and system therefor, KOR(10-2142183)
- Method for understanding emotion dynamics in daily life and system therefor, KOR(10-2341937)

## PUBLICATION

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- HyoSeon Choi, Dahoon Choi, Netiwit Kaongoen, Byung Hyung Kim, “Detecting Concept Shifts under Different Levels of Self-awareness on Emotion Labeling,” *27th International Conference on Pattern Recognition (ICPR)*, pp.276-291, Dec, 2024.
- Hyunwook Kang, Jin Woo Choi, Byung Hyung Kim, “Cascading Global and Sequential Temporal Representations with Local Context Modeling for EEG-based Emotion Recognition,” *27th International Conference on Pattern Recognition (ICPR)*, pp.305-320, Dec, 2024.
- Seunghun Koh, Byung Hyung Kim<sup>†</sup>, Sungho Jo<sup>†</sup>, “Understanding the User Perception and Experience of Interactive Algorithmic Recourse Customization,” *ACM Transactions on Computer-Human Interaction*, vol.31, no.3, 2024.  
<sup>†</sup>Co-Corresponding Author.
- Kobiljon Toshnazarov, Varun Mishra, Byung Hyung Kim, Uichin Lee, Lismer Andres Caceres Najarro, Youngtae Noh, “SOSW: Stress Sensing with Off-the-shelf Smartwatches in the Wild,” *IEEE Internet of Things Journal (IoT-J)*, vol.11, no.12, 2024.  
2023 JCR IF:**10.6**, Rank:4/158=**2.2%** in Computer Science, Information Systems
- HyoSeon Choi, ChaeEun Woo, JiYun Kong, Byung Hyung Kim, “Multi-Output Regression for Integrated Prediction of Valence and Arousal in EEG-Based Emotion Recognition,” *12th International Winter Conference on Brain-Computer Interface (BCI)*, Feb, 2024.
- Yunjo Han, Kobiljon E. Toshnazarov, Byung Hyung Kim, Youngtae Noh, Uichin Lee, “WatchPPG: An Open-Source Toolkit for PPG-based Stress Detection using Off-the-shelf Smartwatches,” *Adjunct of ACM International Joint Conference on Pervasive and Ubiquitous Computing & ACM International Symposium on Wearable Computing (UbiComp/ISWC '23 Adjunct)*, Oct, 2023.
- Netiwit Kaongoen, Jaehoon Choi, Jin Woo Choi, Haram Kwon, ChaeEun Hwang, Guebin Hwang, Byung Hyung Kim, Sungho Jo, “The Future of Wearable EEG: A Review of Ear-EEG Technology and its Applications,” *Journal of Neural Engineering*, vol.20, no.5, 2023.
- Jaehoon Choi, Netiwit Kaongoen, HyoSeon Choi, Minuk Kim, Byung Hyung Kim<sup>†</sup>, Sungho Jo<sup>†</sup>, “Decoding Auditory-Evoked Response in Affective States using Wearable Around-Ear EEG System,” *Biomedical Physics & Engineering Express*, vol.9, no.5, pp.055029, 2023. <sup>†</sup>Co-Corresponding Author.
- Byung Hyung Kim, Jin Woo Choi, Honggu Lee, Sungho Jo, “A Discriminative SPD Feature Learning Approach on Riemannian Manifolds for EEG Classification,” *Pattern Recognition*, vol.143, no.109751, 2023.  
2022 JCR IF:**8**, Rank:30/275=10.7% in Engineering, Electrical & Electronic.
- Jin Woo Choi, Haram Kwon, Jaehoon Choi, Netiwit Kaongoen, ChaeEun Hwang, Minuk Kim, Byung Hyung Kim, Sungho Jo, “Neural Applications Using Immersive Virtual Reality: A Review on EEG Studies,” *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, vol.31, pp.1645–1658, 2023.  
2022 JCR IF:4.9, Rank:4/68=**5.1%** in Rehabilitation.
- Byung Hyung Kim, Sungho Jo, Sunghye Choi, “ALIS: Learning Affective Causality behind Daily Activities from a Wearable Life-Log System,” *IEEE Transactions on Cybernetics*, vol.52, no.12, pp.13212–13224, 2022.  
2021 JCR IF:**19.118**, Rank:3/145=**1.72%** in Computer Science, Artificial Intelligence.
- Byung Hyung Kim, Ji Ho Kwak, Minuk Kim, Sungho Jo, “Affect-driven Robot Behavior Learning System using EEG Signals for Less Negative Feelings and More Positive Outcomes,” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 4162-4167, Sep, 2021.
- Yoon-Je Suh\*, Byung Hyung Kim\*<sup>†</sup>, “Riemannian Embedding Banks for Common Spatial Patterns with EEG-based SPD Neural Networks,” *35th AAAI Conference on Artificial Intelligence (AAAI)*, pp.854–862, Feb, 2021.  
Acceptance Rate=**21.4%**, **Top-tier** in Computer Science. \*Co-first Author. <sup>†</sup>Corresponding Author.
- Byung Hyung Kim, Yoon-Je Suh, Honggu Lee, Sungho Jo, “Nonlinear Ranking Loss on Riemannian Potato Embedding,” *25th International Conference on Pattern Recognition (ICPR)*, pp.4348-4355, Jan, 2021.
- Byung Hyung Kim, Seunghun Koh, Sejoon Huh, Sungho Jo, Sunghye Choi, “Improved Explanatory Efficacy on Human Affect and Workload through Interactive Process in Artificial Intelligence,” *IEEE Access*, vol.8, pp.189013-189024, 2020.

- Byung Hyung Kim, Sungho Jo, Sunghee Choi, “A-Situ: a computational framework for affective labeling from psychological behaviors in real-life situations,” *Scientific Reports*, vol.10, 15916, Sep, 2020.
- Jin Woo Choi\*, Byung Hyung Kim\*, Sejoon Huh, Sungho Jo, “Observing Actions through Immersive Virtual Reality Enhances Motor Imagery Training,” *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, vol.28, no.7, pp.1614-1622, 2020.  
2019 JCR IF:3.340, Rank:7/68=**9.56%** in Rehabilitation. \*Co-first Author.
- Byung Hyung Kim, Sungho Jo, “Deep Physiological Affect Network for the Recognition of Human Emotions,” *IEEE Transactions on Affective Computing*, vol.11, no.2, pp.230-243, 2020.  
2019 JCR IF:**7.512**, Rank:11/136=**7.72%** in Computer Science, Artificial Intelligence.
- Seunghun Koh, Hee Ju Wi, Byung Hyung Kim, Sungho Jo, “Personalizing the Prediction: Interactive and Interpretable Machine Learning,” *16th IEEE International Conference on Ubiquitous Robots (UR)*, pp.354-359, Jun, 2019.
- Byung Hyung Kim, Sungho Jo, “An Empirical Study on Effect of Physiological Asymmetry for Affective Stimuli in Daily Life,” *5th IEEE International Winter Workshop on Brain-Computer Interface*, Jan, 2017.
- Byung Hyung Kim, Jinsung Chun, Sungho Jo, “Dynamic Motion Artifact Removal using Inertial Sensors for Mobile BCI,” *7th IEEE International EMBS Conference on Neural Engineering*, pp.37-40, Apr, 2015.
- Byung Hyung Kim, Sungho Jo, “Real-time Motion Artifact Detection and Removal for Ambulatory BCI,” *3rd IEEE International Winter Workshop on Brain-Computer Interface*, Jan, 2015.
- Minho Kim, Byung Hyung Kim, Sungho Jo, “Quantitative Evaluation of a Low-cost Noninvasive Hybrid Interface based on EEG and Eye Movement,” *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, vol.23, no.2, pp.159-168, 2015.  
2014 JCR IF:3.972, Rank:3/65=**4.61%** in Rehabilitation.
- Byung Hyung Kim, Minho Kim, Sungho Jo, “Quadcopter flight control using a low-cost hybrid interface with EEG-based classification and eye tracking,” *Computers in Biology and Medicine*, vol.51, pp.82-92, 2014. **Honorable Mention Paper(Top 10%)**.
- Mingyang Li, Byung Hyung Kim, Anastasios Mourikis, “Real-time Motion Tracking on a Cellphone using Inertial Sensing and a Rolling-Shutter Camera,” *IEEE International Conference on Robotics and Automation (ICRA)*, pp.4712-4719, May, 2013.
- Byung Hyung Kim, Hak Chul Shin, Phill Kyu Rhee, “Hierarchical Spatiotemporal Modeling for Dynamic Video Trajectory Analysis,” *Optical Engineering*, vol.50, no.107206, Oct, 2011.
- Byung Hyung Kim, Danna Gurari, Hough O’Donnell, Margrit Betke, “Interactive Art System for Multiple Users Based on Tracking Hand Movements,” *IADIS International Conference Interfaces and Human Computer Interaction (IHCI)*, Jul, 2011.

## INVITED TALKS

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- Incheon International Airport Corporation, Dec. 2023
- Incheon National University, Jun. 2023
- Inha Univeristy, Aug. 2021
- Korea Industrial Education Institute, May 2019
- The Fourth Industrial Revolution and AI Korea, Feb. 2019