

CONTACT INFORMATION	UNIVERSITY OF CALIFORNIA, SANTA CRUZ, USA E-MAIL: akembay@ucsc.edu LINKS: HOMEPAGE , GOOGLE SCHOLAR , LINKEDIN	
RESEARCH INTERESTS	Brain-Inspired AI, Spiking Neural Networks, Computer Vision, Continual Learning, Knowledge Distillation, Interpretability of Deep Neural Networks and their visualization	
EDUCATION	University of California , Santa Cruz, USA Ph.D., Electrical and Computer Engineering Sep 2023 - expected grad. Jun 2029 Advisor: Prof. Jason Eshraghian Current GPA: 3.95/4.00 University of Science and Technology , Seoul, South Korea M.S., AI - Robotics Mar 2021 - Feb 2023 Thesis: <i>"Inversion of Spiking Neural Networks, with application to Knowledge Distillation"</i> Advisor: Prof. Suhyun Kim GPA: 4.43/4.50 C-DAC's Advanced Computing Training School , Pune, India Postgraduate Diploma in Advanced Computing Aug 2018 - Feb 2019 L.N. Gumilyov Eurasian National University (ENU) , Astana, Kazakhstan B.S. (summa cum laude), Mathematical and Computer Modeling Sep 2014 - Jul 2018 GPA: 3.86/4.00	
RESEARCH EXPERIENCE	Research Assistant Oct 2023 - Present University of California, Santa Cruz, USA Member of the Neuromorphic Computing Group Research directions: Spiking Neural Networks, Knowledge Distillation, Continual Learning Advisor: Prof. Jason Eshraghian <ul style="list-style-type: none"> Implementing Knowledge Distillation techniques to enable selective knowledge transfer in neural networks, using top-K guided specification on logits, feature and attention maps, resulting in improved previous state-of-the-art KD results by 1.47%. Research Scientist Intern Apr 2023 - Sep 2023 Korea University Medicine, Seoul, South Korea Research topic: Wireless Brain Chip for Brain Computer Interface Advisor: Prof. Il-Joo Cho <ul style="list-style-type: none"> Improved a wireless brain chip with a signal processing unit and communication module by implementing an algorithm to optimize data transfer. Research Assistant Sep 2020 - Mar 2023 Artificial Intelligence Research Group, Korea Institute of Science and Technology (KIST) Research topic: Inversion of Spiking Neural Networks Advisor: Prof. Suhyun Kim <ul style="list-style-type: none"> Developed inversion techniques for Spiking Neural Network models to enable data-free knowledge transfer using batch normalization statistics, facilitating efficient training of neuromorphic systems without original datasets. Research Intern Mar 2020 - Aug 2020 Computational Science Research Center, KIST Advisor: Prof. Seungchul Kim <ul style="list-style-type: none"> Designed algorithms for material dimension determination and LDOS-map calculation, enhancing quantum dot characterization capabilities. 	

Research Assistant

Dec 2019 - Jan 2020

Department of Mathematics, Nazarbayev University (NU), Astana, Kazakhstan
 Project: Imaging in Seismic Exploration
 Advisor: [Durvudkhan Suragan](#), PhD

Research Assistant

Mar 2018 - Oct 2019

Department of Computer and Software Engineering, ENU
 Project: Development of algorithms and embedded software for determining the geoelectric section for geoinformation technology GPR

- Developed a non-iterative algorithm for precise electromagnetic wave source localization in GPR data interpretation using Finite Element Method (FEM), enabling accurate sub-surface imaging and enhancing GPR data interpretation in noisy conditions.

PUBLICATIONS

*: equal contribution

- [P11] *A Quantitative Analysis of Catastrophic Forgetting in Quantized Spiking Neural Networks*
[Kembay A.*](#), Aguilar K.*, and Eshraghian J., 2024, Under Review
- [P10] *Efficient Knowledge Distillation via Salient Feature Masking*
[Kembay A.](#), Zhu R.-J., and Eshraghian J., 2024, Under Review
- [P9] *Future-Guided Learning: A Predictive Approach To Enhance Time-Series Forecasting*
 Gunasekaran S., [Kembay, A.](#), Ladret H., Zhu R.-J., Kavehei O., and Eshraghian J., 2024, Under Review.
- [P8] *Leveraging Spiking Neural Networks for Solar Energy Prediction in Agriculture*
[Kembay A.](#), Zhu R.-J., Kuipers N., Eshraghian J., and Josephson C.
 Bay Area Machine Learning Symposium ([BayLearn 2024](#))
- [P7] *Frameworks that integrate Spiking Neural Networks: A Review*
[Kembay A.](#), Kim S.
 The Journal of KINGComputing, 2022, vol. 18, no. 6, pp. 93 - 105
- [P6] *Simulation web platform for the electro-chemical oxygen reduction reaction*
 Kim Sch., Lee Ch., Lee B., Seol D., Kim D., [Kembay A.](#), Yun K., Jang S., Lee J.
 The International Workshop on Computational Nanotechnology ([IWCN 2021](#))
- [P5] *Web platforms for conventional simulations of matters*
 Kim Sch., Kim D., [Kembay A.](#), Kim S., Yun K., et al.
 2021 KPS Spring Meeting Conference, Oral presentation.
- [P4] *A Simulation Web Platform for Analyzing Electronic Structures of Semiconductors*
 Kim S., [Kembay A.](#), Lee J., et al.
 2021 KPS Spring Meeting Conference, Poster
- [P3] *Inverse source identification problem for the wave equation: an application for interpreting GPR data*
 Mukanova B., Iskakov K., [Kembay A.](#), Boranbaev S.
 Scopus indexed: Eurasian Journal of Mathematical and Computer Applications, 2020, pp. 78-91.
- [P2] *Mathematical modeling of the source and response of environment for the equation of geoelectric*
 Iskakov K., Mukanova B., Berdyshev A., [Kembay A.](#), Tokseit D.
 Web of Science indexed: Bulletin of the Karaganda University, 2019, pp. 129-141.
- [P1] *The study of the properties of the reflected signals according to the GPR ZOND-12e*
[Kembay A.](#), Mukanova B.
 Materials of the International scientific conference "Theoretical and applied questions of Mathematics, Mechanics and Computer Science," 2019, pp. 135-136.

PATENTS (US ONLY)	<i>The electronic structure calculation web-program</i> Kim Sch., Kembay A. , Kim S. share 20%, applied, Link	
AWARDS & HONORS	Divisional MIP Fellowship	Mar 2024
	Baskin Engineering School, UC Santa Cruz (\$18800)	
	2023 POSCO Asia Fellowship	Jan 2023
	POSCO TJ Park Foundation, S. Korea (3 years of tuition and a monthly stipend of 1 mln KRW)	
	KIST-KT&G Scholarship Foundation's Global Scholarship	Dec 2021
	KT&G Scholarship Foundation, S. Korea (1 mln KRW)	
	Sur – Place Konrad Adenauer Foundation Scholarship	Apr 2019
	Konrad Adenauer Foundation, Germany (academic scholarship ~800 EUR)	
	Scholarship ITEC programme	Aug 2018
	Ministry of External Affairs, Government of India (including all costs and monthly stipend)	
	Presidential Scholarship	Mar 2017
	Foundation of the First President of the Republic of Kazakhstan	
	Award of High-quality Performance	Jun 2017
	Summer School on “Mathematical Methods in Science and Technology”, NU	
	Merit-Based Scholarship	2014 - 2018
	Dept. Mechanics and Mathematics, ENU (awarded to top students of the department, 7 times)	
PROFESSIONAL SERVICES	Reviewer 2024 <i>NeuroAI @ Neural Information Processing System (NeurIPS)</i> 2024 <i>APL Machine Learning</i> 2024 <i>IEEE International Symposium on Circuits and Systems (ISCAS)</i>	
TECHNICAL SKILLS	Computer proficiency: Linux user, competent at Python, SQL (MongoDB), Maple, Advanced Web Programming and Database Technologies, JavaScript, HTML, PyTorch. SNN-related frameworks: snnTorch, SpikingJelly, Norse, Brian2.	
LANGUAGES	Kazakh (native), English (fluent), Russian (advanced), Korean (TOPIK-II)	