

CONTACT INFORMATION	UNIVERSITY OF CALIFORNIA, SANTA CRUZ, USA E-MAIL: <a href="mailto:akembay@ucsc.edu">akembay@ucsc.edu</a> LINKS: <a href="#">HOMEPAGE</a> , <a href="#">GOOGLE SCHOLAR</a> , <a href="#">LINKEDIN</a>	
RESEARCH INTERESTS	<b>Brain-Inspired AI, Spiking Neural Networks, Computer Vision, Continual Learning, Knowledge Distillation, Interpretability of Deep Neural Networks and their visualization</b>	
EDUCATION	<b>University of California</b> , Santa Cruz, USA Ph.D., Electrical and Computer Engineering Sep 2023 - <b>expected grad. Jun 2029</b> Advisor: <a href="#">Prof. Jason Eshraghian</a> Current GPA: 3.95/4.00  <b>University of Science and Technology</b> , 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: <a href="#">Prof. Suhyun Kim</a> GPA: 4.43/4.50  <b>C-DAC's Advanced Computing Training School</b> , Pune, India Postgraduate Diploma in Advanced Computing Aug 2018 - Feb 2019  <b>L.N. Gumilyov Eurasian National University (ENU)</b> , Astana, Kazakhstan B.S. (summa cum laude), Mathematical and Computer Modeling Sep 2014 - Jul 2018 GPA: 3.86/4.00	
RESEARCH EXPERIENCE	<b>Research Assistant</b> Oct 2023 - Present University of California, Santa Cruz, USA Member of the <a href="#">Neuromorphic Computing Group</a> Research directions: Spiking Neural Networks, Knowledge Distillation, Continual Learning Advisor: <a href="#">Prof. Jason Eshraghian</a> <ul style="list-style-type: none"> <li>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%.</li> </ul> <b>Research Scientist Intern</b> Apr 2023 - Sep 2023 Korea University Medicine, Seoul, South Korea Research topic: Wireless Brain Chip for Brain Computer Interface Advisor: <a href="#">Prof. Il-Joo Cho</a> <ul style="list-style-type: none"> <li>Improved a wireless brain chip with a signal processing unit and communication module by implementing an algorithm to optimize data transfer.</li> </ul> <b>Research Assistant</b> Sep 2020 - Mar 2023 Artificial Intelligence Research Group, Korea Institute of Science and Technology (KIST) Research topic: Inversion of Spiking Neural Networks Advisor: <a href="#">Prof. Suhyun Kim</a> <ul style="list-style-type: none"> <li>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.</li> </ul> <b>Research Intern</b> Mar 2020 - Aug 2020 Computational Science Research Center, KIST Advisor: <a href="#">Prof. Seungchul Kim</a> <ul style="list-style-type: none"> <li>Designed algorithms for material dimension determination and LDOS-map calculation, enhancing quantum dot characterization capabilities.</li> </ul>	

**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., <b>Kembay A.</b> , Kim S. share 20%, applied, <a href="#">Link</a>	
AWARDS & HONORS	<b>Divisional MIP Fellowship</b>	Mar 2024
	Baskin Engineering School, UC Santa Cruz (\$18800)	
	<b>2023 POSCO Asia Fellowship</b>	Jan 2023
	POSCO TJ Park Foundation, S. Korea (3 years of tuition and a monthly stipend of 1 mln KRW)	
	<b>KIST-KT&amp;G Scholarship Foundation's Global Scholarship</b>	Dec 2021
	KT&G Scholarship Foundation, S. Korea (1 mln KRW)	
	<b>Sur – Place Konrad Adenauer Foundation Scholarship</b>	Apr 2019
	Konrad Adenauer Foundation, Germany (academic scholarship ~800 EUR)	
	<b>Scholarship ITEC programme</b>	Aug 2018
	Ministry of External Affairs, Government of India (including all costs and monthly stipend)	
	<b>Presidential Scholarship</b>	Mar 2017
	Foundation of the First President of the Republic of Kazakhstan	
	<b>Award of High-quality Performance</b>	Jun 2017
	Summer School on “Mathematical Methods in Science and Technology”, NU	
	<b>Merit-Based Scholarship</b>	2014 - 2018
	Dept. Mechanics and Mathematics, ENU (awarded to top students of the department, 7 times)	
PROFESSIONAL SERVICES	<b>Reviewer</b> 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)	