Bonggun **Sh**in

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I am deeply passionate about creating new innovations by bridging the gap between AI and various domains, including but not limited to biotechnology and novel drug development. Throughout my career, I have authored several top-tier papers and filed over ten patents. Currently, I am seeking opportunities to further advance my career and contribute to groundbreaking innovations in various fields.

▬▬▬▬ Professional Experiences

Nov/'23– Present
Organizer, *NeuralSquid Systems LLC*, Atlanta, GA.
- Performing consulting services related to deep learning research.
- Exploring online opportunities for offline restaurants; developing a group order shopping mall MVP and testing market fit.

Aug/'21– Oct/'23
Chief Executive Officer, *Deargen USA*, Atlanta, GA.
- Led a 10-member cross-functional team in AI-driven projects on glue platforms, molecule optimization, and QSAR, achieving a paper under review, three patent filings, **one patent grant** (▤ KR Patent), and **an ongoing collaboration with a major pharmaceutical company**.
- Forged five AI-biology research collaborations, resulting in a paper under review.
- Directed AI research as Principal Investigator, advancing adversarial training, active learning, federated learning in heterogeneous settings, and uncertainty estimation. Guided strategic innovation, culminating in **three top-tier papers**. (▤ UAI'23, ▤ KDD'22, and ▤ AAAI'22) and **five patents** (▤ ▤ ▤ ▤ 4 WO Patents and ▤ KR Patent).

Dec/'16– Oct/'23
Chief AI Officer/Co-founder, *Deargen*, Seoul, South Korea.
- Played a key role in **securing Series A ($2.3M) and Series B ($17M) funding**.
- Created a drug discovery platform that identified candidates against the novel coronavirus, resulting in **four papers** (▤ CSBJ'19, ▤ Viruses'20, ▤ MLHC'21, and ▤ ACM'21), **two patents** (▤ US Patent ▤ WO Patent) and **a partnership with a German biotechnology company** ↗.
- Invented a new biomarker selection platform with **two papers** (▤ Frontiers in Genetics'19 and ▤ Scientific Reports'19) and **two patents**. (▤ WO Patent ▤ KR Patent)

Aug/'15– May/'20
Research Assistant, *Atlanta, GA*, Emory University.
- Proposed a new way of automation of schema mapping - ▤ **ADBIS**'21
- Proposed a new SOTA drug target interaction method - ▤ **MLHC**'19
- Proposed a new multimodal ensemble method - ▤ **IEEE BHI**'19
- Proposed a SOTA tweet sentiment analysis method - ▤ **EMNLP-WS**'17
- Proposed a new clinical reports classification method - ▤ **IJCNN**'17

2017 Summer
Research Intern, *VISA Research*, Palo Alto, CA.
- Developed a novel embedding compression technique achieving an **80-fold reduction in size while enhancing performance**.
  - ▤ US Patent and ▤ IJCAI'19

Feb/'15– Aug/'15	**Software Engineer**, *December&Company*, Seoul, South Korea.
	○ Modified the existing broker-dependent Front-End Protocol (FEP) communication module to be abstract, enabling connection to various brokers.
	○ Added an additional security broker FEP module to the trading platform.
	○ Conducted research on NLP-based trading opportunities and provided valuable guidance.
	○ Launched a smart execution strategy project aimed at generating extra profits for the company.
Jan/'14– Feb/'14	**Software Engineer**, *Viva Republica (Toss)*, Seoul, South Korea.
	○ Implemented bank account registration, withdrawal, and validity functions using a firm-banking API (MVP of the toss service).
Jan/'09– Oct/'09	**Software Engineer**, *Quramsoft*, Suwon, South Korea.
	○ Proposed a new neighbor pixel prediction method based on Gaussian mixture model using C/C++.
	○ Developed the fireworks part of the commercially released app (The Party Master) that was bundled with the Samsung Omnia phone using DirectX for Windows Mobile.
Feb/'04– Aug/'04	**Software Membership**, *Samsung Electronics*, Suwon, South Korea.
	○ Worked as a member of Student Software Engineering Program called Samsung Software Membership.
	○ Developed the machine simulator using OpenGL and MFC.
Jun/'00– Jan/'03	**Software Engineer**, *Eolith*, Suwon, South Korea.
	○ Developed and released two commercial arcade games using C and Hyperstone.

Teaching Experiences

Apr 2021	**Guest Lecture** , *Seoul, KR*, The Korean Intellectual Property Office.
	○ Guest lecture on "Deep Learning-based Healthcare Applications".
Dec 2019	**Guest Lecture**, *Seoul, KR*, Emory University.
	○ Guest lecture on "Deep Learning-based Drug Discovery" in a machine learning class.
2016–2018	**Teaching Assistant**, *Atlanta, GA*, Emory University.
	○ Fall 2017, CS534, **Machine Learning**, Instructor: Dr. Joyce Ho
	○ Spring 2017, CS571 **Natural Language Processing**, Instructor: Dr. Jinho Choi
	○ Fall 2016, CS557 **Artificial Intelligence**, Instructor: Dr. Eugene Agichtein
	○ Spring 2016, CS329 **Computational Linguistics**, Instructor: Dr. Jinho Choi
	○ Fall 2015, CS323 **Data Structures and Algorithms**, Instructor: Dr. Jinho Choi

Education

May 2020	**Emory University**, *Atlanta, GA*, *Ph.D in Computer Science*.
	Thesis: Deep learning approaches toward computerized drug discovery **Chris Schoettle Graduate Research Award** **Advisor**: Dr. Joyce C. Ho

2019 **Emory University**, *Atlanta, GA, MS in Computer Science.*
2009 **KAIST**, *Daejeon, South Korea, MS in Electrical Engineering.*
2006 **Illinois Institute of Technology**, *Chicago, IL , BS in Computer Engineering.*

Publications

G [Google Scholar]: http://scholar.google.com/citations?user=j9nUzZAAAAAJ

* indicates equal contribution

[1] Y Kim, S Kim, I Seo, and **B Shin**. "Phase-shifted Adversarial Training" THE CONFERENCE ON UNCERTAINTY IN ARTIFICIAL INTELLIGENCE, 2023

[2] Y Kim and **B Shin**. "In Defense of Core-set: A Density-aware Core-set Selection for Active Learning" ACM SIGKDD CONFERENCE ON KNOWLEDGE DISCOVERY AND DATA MINING, 2022

[3] D Oh, **B Shin**. "Improving evidential deep learning via multi-task learning" PROCEEDINGS OF THE AAAI CONFERENCE ON ARTIFICIAL INTELLIGENCE, 2022

[4] J Zhang, **B Shin**, JD Choi and J Ho. "SMAT: An Attention-based Deep Learning Solution to the Automation of Schema Matching" PROCEEDINGS OF THE 25TH EUROPEAN CONFERENCE ON ADVANCES IN DATABASES AND INFORMATION SYSTEMS, 2021

[5] Y Kim and **B Shin**. "An Interpretable Framework for Drug-Target Interaction with Gated Cross Attention" MACHINE LEARNING FOR HEALTHCARE, 2021

[6] **B Shin**, S Park, JY Bak, and JC Ho. "Controlled Molecule Generator for Optimizing Multiple Chemical Properties" ACM CONFERENCE ON HEALTH, INFERENCE, AND LEARNING, 2021

[7] Y Choi, **B Shin**, K Kang, S Park, and BR Beck. "Target-Centered Drug Repurposing Predictions of Human Angiotensin-Converting Enzyme 2 (ACE2) and Transmembrane Protease Serine Subtype 2 (TMPRSS2) Interacting Approved Drugs for Coronavirus Disease 2019 (COVID-19) Treatment through a Drug-Target Interaction Deep Learning Model", VIRUSES, 2020.

[8] S Park, YH Ko, B Lee, **B Shin**, BR Beck. "Molecular optimization of phase III trial failed anti-cancer drugs using target affinity and toxicity-centered multiple properties reinforcement learning", CLINICAL CANCER RESEARCH, 2020.

[9] BR Beck, **B Shin**, Y Choi, S Park, and K Kang. "Predicting commercially available antiviral drugs that may act on the novel coronavirus (SARS-CoV-2) through a drug-target interaction deep learning model", COMPUTATIONAL AND STRUCTURAL BIOTECHNOLOGY JOURNAL, 2020, **[Most cited papers in the journal for the past 3 years]**

[10] **B Shin***, S Park*, WS Shim, Y Choi, K Kang, K Kang. "Cascaded Wx: a novel prognosis-related feature selection framework in human lung adenocarcinoma transcriptomes" FRONTIERS IN GENETICS, 2019

[11] **B Shin***, S Park*, S Park, JH Hong, HJ An, SH Chun, K Kang, YH Ahn, YH Ko, and K Kang. "Wx: a nn-based feature selection algo. for transcriptomic data", NATURE SCIENTIFIC REPORT, 2019

[12] **B Shin**, S Park, K Kang, and JC Ho "Self-Attention Based Molecule Representation for Predicting Drug-Target Interaction" MACHINE LEARNING FOR HEALTHCARE, 2019

[13] **B Shin**, H Yang, and JD Choi "The Pupil Has Become the Master: Teacher-Student Model-Based Word Embedding Distillation with Ensemble Learning" IJCAI, 2019

[14] **B Shin**, J Hogan, AB Adams, RJ Lynch, RE Patzer, JD Choi, "Multimodal Ensemble Approach to Incorporate Various Types of Clinical Notes for Predicting Readmission", IEEE-EMBS BIOMEDICAL AND HEALTH INFORMATICS, 2019

[15] **B Shin**, FH Chokshi, T Lee and JD Choi "Classification of radiology reports using neural attention models" IJCNN, 2017

[16] **B Shin**, T Lee and JD Choi "Lexicon Integrated CNN Models with Attention for Sentiment Analysis" EMNLP WORKSHOP (WASSA), 2017

[17] **B Shin** and AH Oh "Bayesian group nonnegative matrix factorization" TECHNICAL REPORT 1212.4347, ARXIV, 2012

[18] **B Shin** and S Jo, "Pattern-Preserving-based Motion Imitation for Robots" UBIQUITOUS ROBOTS AND AMBIENT INTELLIGENCE, 2011, **[Best Paper Finalist]**

[19] BG Shin, T Kim, S Jo, "Non-invasive brain signal interface for a wheelchair navigation", ICCAS, 2010

Talks

Sep 2023	**Invited Talk**, *Deep Learning Transformation in Drug Discovery*, ISDD'23.
Jul 2023	**Invited Talk**, *Key considerations in AI for Science*, 2023 STEM Career Talk Concert – Artificial Intelligent.
Jun 2023	**Invited Talk**, *Harnessing the Synergy: Unveiling Critical Factors for Successful AI Adoption in Scientific Applications*, SNU.
Jun 2023	**Invited Talk**, *Harnessing the Synergy: Unveiling Critical Factors for Successful AI Adoption in Scientific Applications*, KIAS.
Aug 2022	**Invited Talk**, *Deep learning transformation in drug discovery*, KSEA UKC'22.
Apr 2022	**Invited Talk**, *Deep learning transformation in drug discovery*, Emory University.
Oct 2021	**Seminar**, *Recent Topics in Deep Learning based Drug Discovery*, SKKU.
Oct 2021	**Seminar**, *Recent Topics in Deep Learning based Drug Discovery*, Postech.
Sep 2021	**KAIST AI Colloquium**, *Recent Topics in Deep Learning based Drug Discovery*, KAIST.
Sep 2021	**Seminar**, *Recent Topics in Deep Learning based Drug Discovery*, Dankook University.
June 2021	**Invited Talk**, *Interdisciplinary Research for Innovation and Entrepreneurship*, The Korean American Scientists and Engineers Association.
May 2021	**Tech Talk**, *Toward Structure Free Drug Discovery*, The Korean Society Nonclinical Study.
Apr 2021	**Tech Talk**, *Toward Structure Free Drug Discovery*, The Korean Society for Clinical Pharmacology and Therapeutics.
Apr 2021	**Guest Lecture**, *Deep Learning based Healthcare Applications*, The Korean Intellectual Property Office.
Oct 2020	**Tech Talk**, *Deep Learning based Drug Discovery*, GTC Korea 2020, NVIDIA.

Dec 2019	**Guest Lecture**, *Deep Learning based Drug Discovery*, CS 534: Machine Learning, Emory University.
Sep 2019	**Invited Talk**, *Deep Learning based Drug-protein Interaction*, Clova AI TechTalk, Naver.

Academic Services

Reviewer	**NeurIPS2020-2023, ICML2021-2023, ICLR2022-2024, AAAI2022-2024, MLHC2020**.

Honors and Awards

Dec 2021	**The 1st Prize Winner of the Startup Pitch Competition'21**, *KSEA*.
Apr 2020	**Chris Schoettle Graduate Research Award**, *Emory University*.
Nov 2011	**Best Student Paper Finalist**, *International Conference on URAI*.
Sep 2011	**Best TA Award**, *KAIST*.
2010–2011, 2007–2008	**National Fellowship**, *KAIST*.
Sep 2011	**Student Travel Grant**, *RL Competition, ICML workshop*.
2004–2006	**Dean's List, International Scholarship**, *IIT*.
Fall 2004	**Research Grant**, *Korea Science and Engineering Foundation*.

Languages

Korean	Native
English	Professional working proficiency

Skills

Programming	PYTHON, C/C++, Matlab, R, Next.js, JavaScript, ASSEMBLERS, LaTeX
DeepLearning	KERAS, TENSORFLOW, PYTORCH
Data Science	SCIKIT-LEARN, PANDAS