

# College of Computing Yonsei University

Department of Computer Science and Engineering  
Department of Artificial Intelligence  
School of Integrated Technology



YONSEI UNIVERSITY  
COLLEGE OF COMPUTING



## Letter from the Dean

“ College of Computing at Yonsei University commits to cultivating new, modern experts who will become renowned leaders in academia and industry with the fundamental knowledge and advanced skillsets in Computer Science and Artificial Intelligence. ”

Today's society has been witnessing how computing technologies and artificial intelligence have brought a flurry of transformative breakthroughs which revolutionized all areas of life. This worldwide phenomenon spans multiple disciplines from social science to public health, promising to improve our lives in new ways beyond traditional science and engineering. Today, more than ever, there is a clear need for new kinds of talents who must be equipped with diverse skills, influential minds, and a strong sense of responsibility.

College of Computing at Yonsei University has been newly established in 2022 to meet the need and take the lead. With more than 20 faculty members, the Department of Computer Science & Engineering and the Department of Artificial Intelligence commit to delivering world-class research and learning experience to about 500 undergraduate and 300 graduate students. Our core Computer Science research areas include computer networks, computer graphics, computer architecture and systems, databases, and data engineering. The core Artificial Intelligence research topics include computer vision, machine learning, data mining, natural language processing, etc. Together, our College achieves a unique interdisciplinary research thrust via LEAP program: LEarning, Architecture, and Perception.

College of Computing at Yonsei University

commits to cultivating new, modern experts who will become renowned leaders in academia and industry with the fundamental knowledge and advanced skillsets in Computer Science and Artificial Intelligence. Students may design their own unique academic curricula to meet their interests under the guidance of faculty members in related areas. They will be prepared to tackle real-world challenges in the industry, advance science through research, and, most importantly, help people. Our College sincerely dedicated to ensuring our students can achieve and thrive as global leaders in this new era of advanced information technology, and we sincerely invite you to join us.

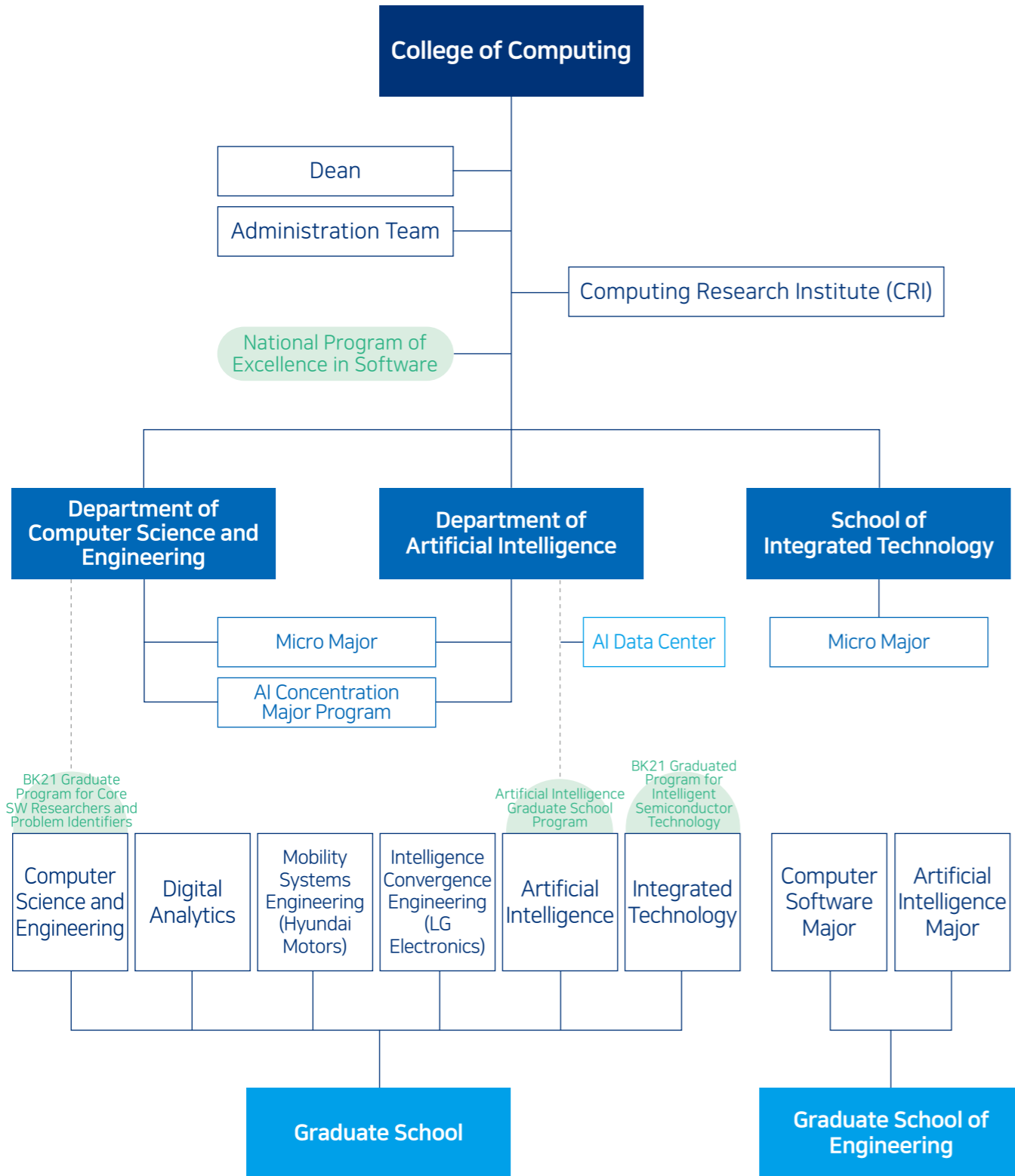
### Hojung Cha

Dean  
College of Computing,  
Yonsei University



Innovative Leaders  
with a Community Spirit

# Organization



# Mission

## Development of Global SW/AI Convergence Talent for All Students

- Educate 100+ SW/AI Global-Standard Professionals per year
- Focus on Developing Interdisciplinary Talents with AI knowledge (Interdisciplinary studies with diverse fields including Medical, Humanities and Social Studies, etc.)

### Education

- Basics on SW/AI for All Students
- 'AI Bi-linguality'

## Maximizing the Capability of SW/AI within the University

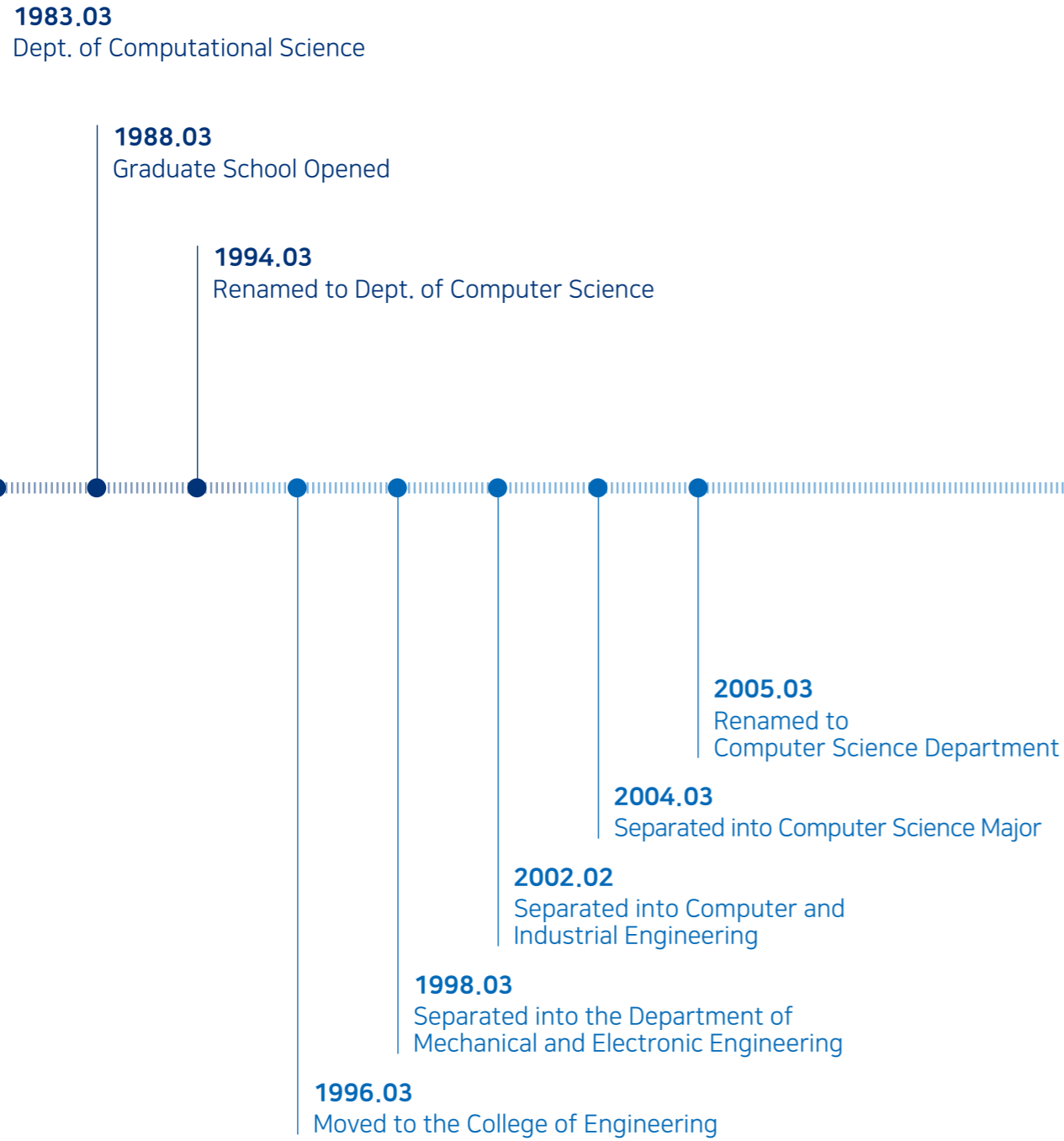
- **College of Computing:** in Charge of Core Technology (Software and AI)
- Other Colleges: applying domain-specific knowledge on AI

### Research

- Leading AI core research
- Establishing SW/AI Convergence
- Support Unicorn Start-ups

# History

## College of Science



## College of Engineering

## College of Computing





# Department of Computer Science and Engineering

An, Hyungchan



✉ hyung-chan.an@yonsei.ac.kr    🌐 <http://opt.yonsei.ac.kr>    📞 +82-2-2123-7278

## Education

- Ph.D. in Computer Science, Cornell University, 2012
- BS in Computer Science and Engineering, Seoul National University, 2006

## Experience

- 2016 – Present: Associate Professor, Dept. of Computer Science and Engineering, Yonsei University
- 2012 – 2016: Postdoctoral Researcher, École Polytechnique Fédérale de Lausanne
- 2002 – 2005: Programmer, Icube Corp.

## Research Areas

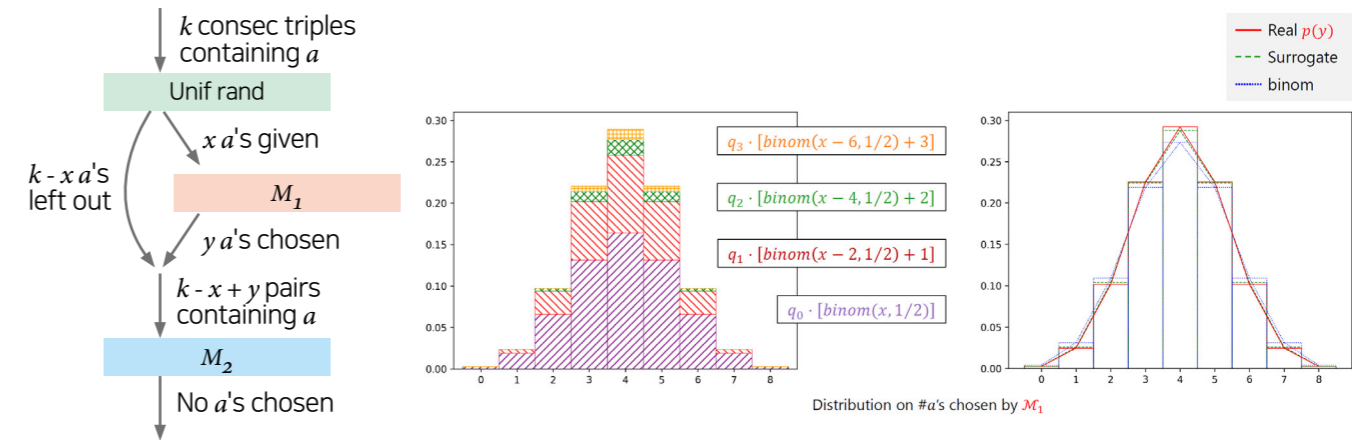
- Approximation Algorithms and Online Algorithms: Design and analysis of algorithms for combinatorial optimization problems
- Algorithms with provable performance guarantees
- Computational Application of Optimization Algorithms: Practically efficient implementation of optimization algorithms
- Theoretical tools to evaluate practical implementations

## Publications

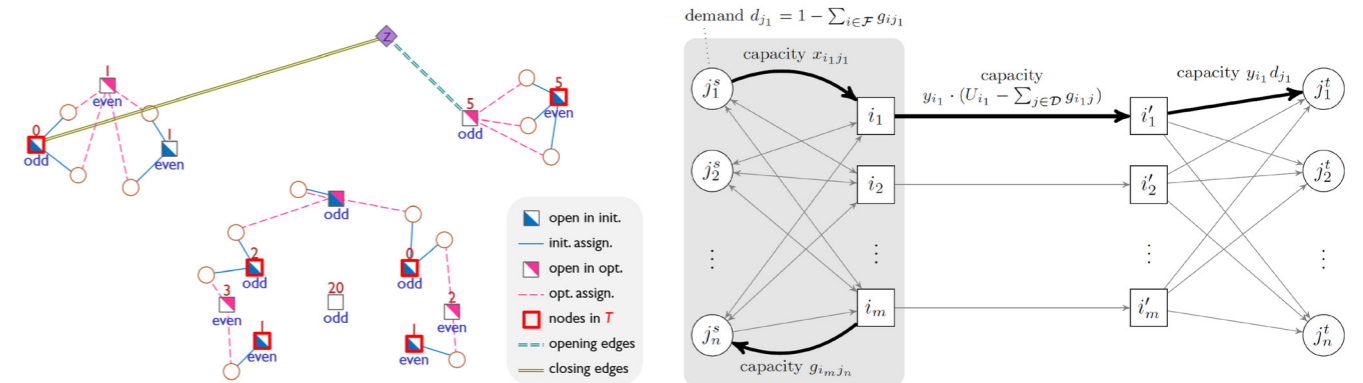
- Making Three out of Two: Three-Way Online Correlated Selection, ISAAC, 2021
- Constant-Factor Approximation Algorithms for the Parity-Constrained Facility Location Problem, ISAAC, 2020
- LP-based algorithms for capacitated facility location, SIAM J. Comput., 2017

# Approximation / Online Algorithms

- Design and analysis of approximation/online algorithms for combinatorial optimization problems
- Approximation algorithms: efficient algorithms that find near-optimal solutions with provable performance guarantees
- Online algorithms: algorithms that produce their outputs "in real time" without waiting to read the entire input



Two-way online correlated selection algorithm and its analysis via surrogate distributions

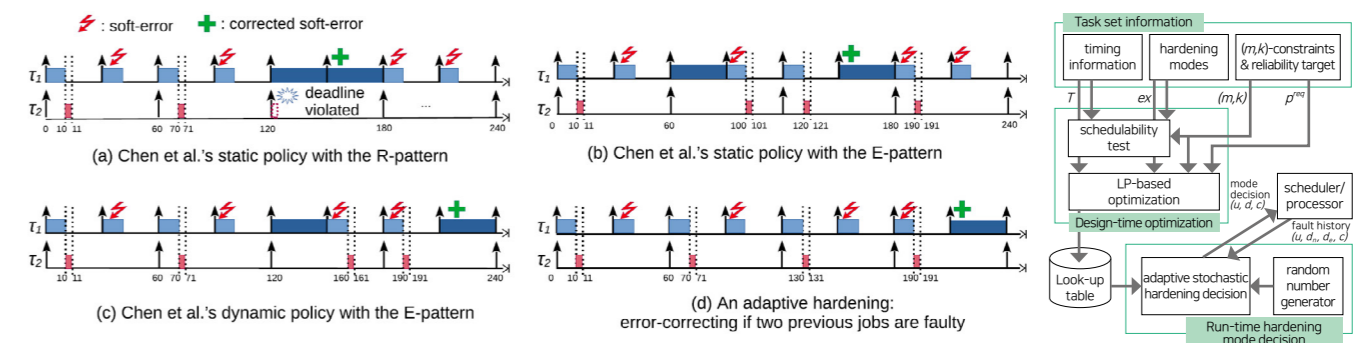


Bounding the cost of repairing parity violations in a solution to (unconstrained) facility location

Strengthening of the standard LP relaxation for capacitated facility location using multicommodity flow networks

# Computational Applications of Optimization Algorithms

- Formulation of the search of optimal decisions as concrete mathematical problems
- Practically efficient implementation of optimization algorithms
- Theoretical tools to evaluate practical implementations



A design-time LP that optimizes adaptive stochastic soft-error hardening policies for real-time systems

## Burgstaller, Bernd



✉ [bburg@yonsei.ac.kr](mailto:bburg@yonsei.ac.kr) 🌐 <http://elc.yonsei.ac.kr> ☎ +82-2-2123-5728

### Education

- Ph.D. in Computer Science, Vienna University of Technology, 2005
- MS in Computer Science, Vienna University of Technology, 1997

### Experience

- 2007 – Present: Professor, Dept. of Computer Science and Engineering, Yonsei University
  - 2005 – 2007: Postdoctoral Researcher, The University of Sydney
  - 2000 – 2004: Predoctoral Researcher, Vienna University of Technology
- 1997 – 2000: Software Engineer and Range Architect, Philips Consumer Electronics

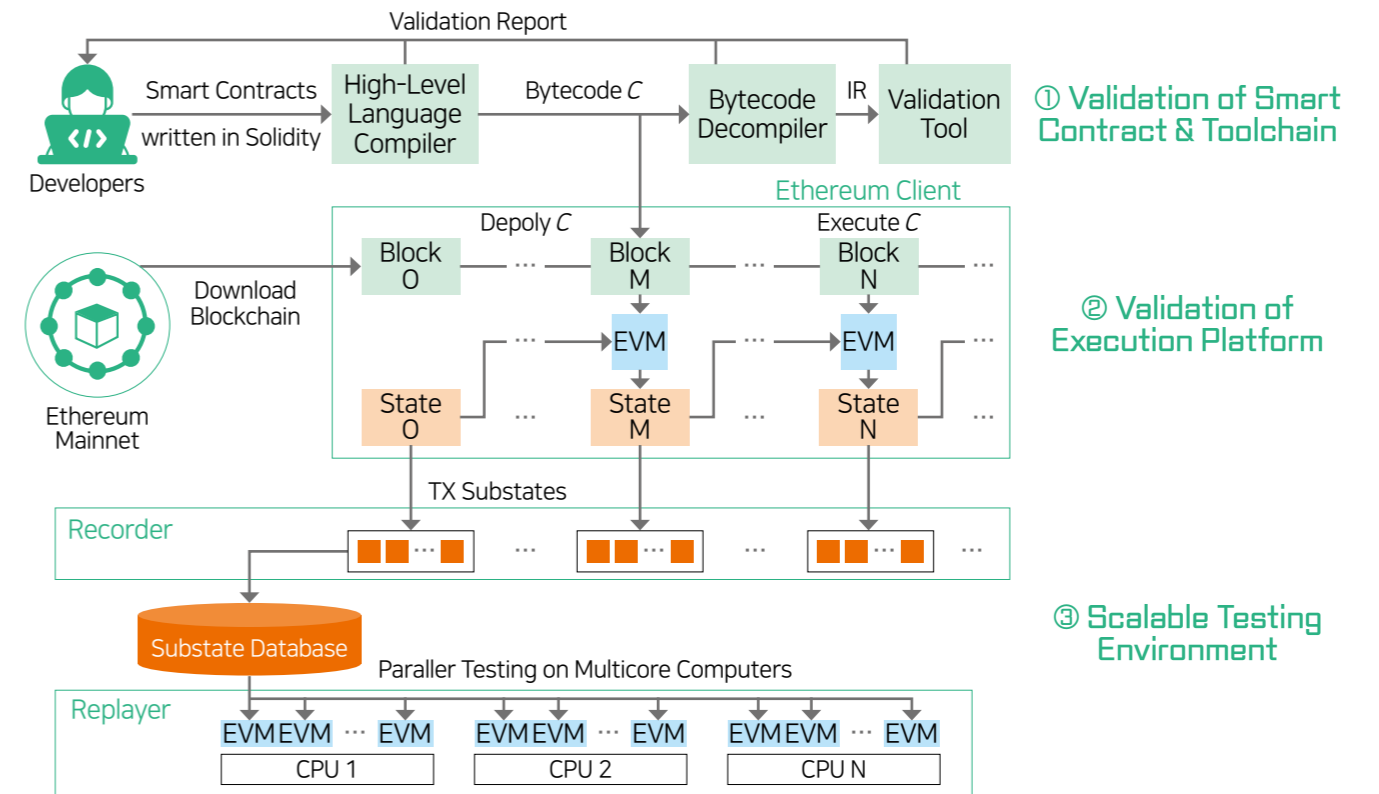
### Research Areas

- Programming Languages & Software Engineering: Validation and test of smart contracts; Blockchain virtual machines; performance profiling, modeling, and simulation of heterogeneous systems
- Compilation for Novel Hardware Architectures: Orchestration for multicores and the cloud, persistent memory, near-data processing, heterogeneous memory architectures, and AI accelerators

### Publications

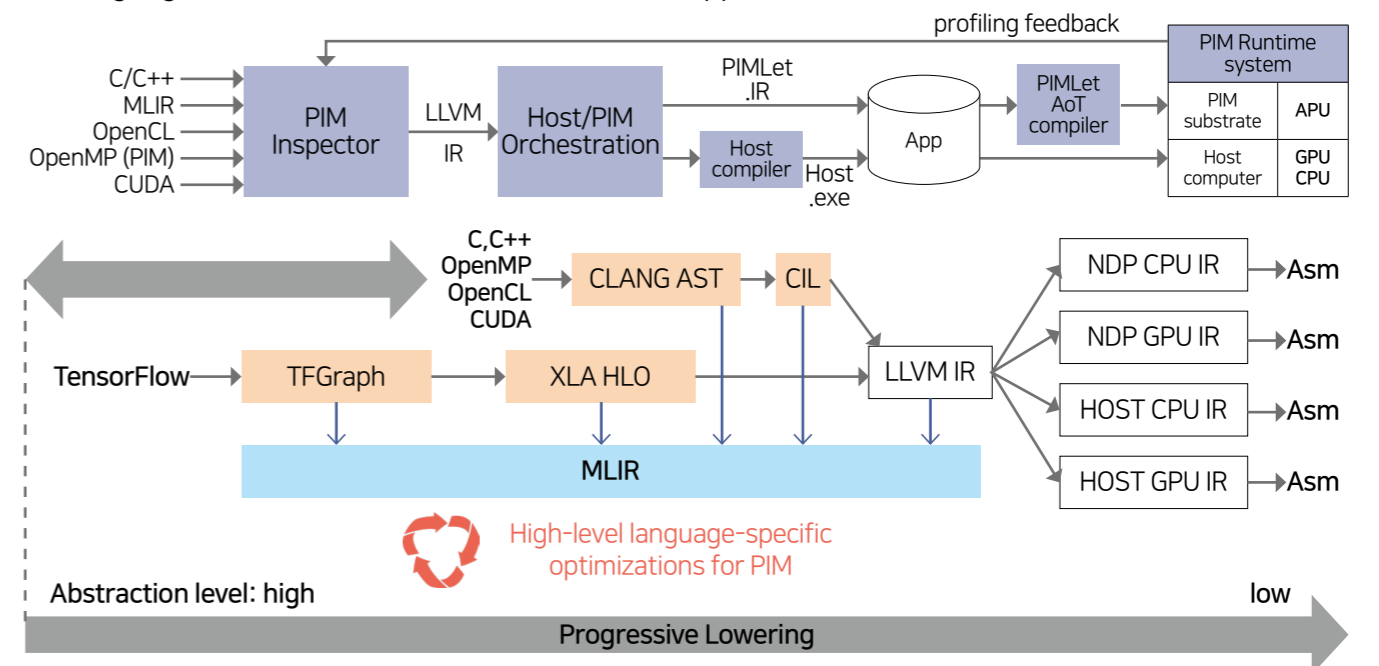
- Bespoke software countermeasures against soft errors, LCTES 2022
- Scalable off-the-chain transaction testing and profiling for the Ethereum blockchain, USENIX ATC 2021
  - Non-blocking synchronization primitives and a high-level language memory consistency model for Ada, JSA 2020

- Validation of smart contracts and compiler toolchain
- Validation of smart contract execution on clients and VM
- Scalable testing environment on distributed multicore systems



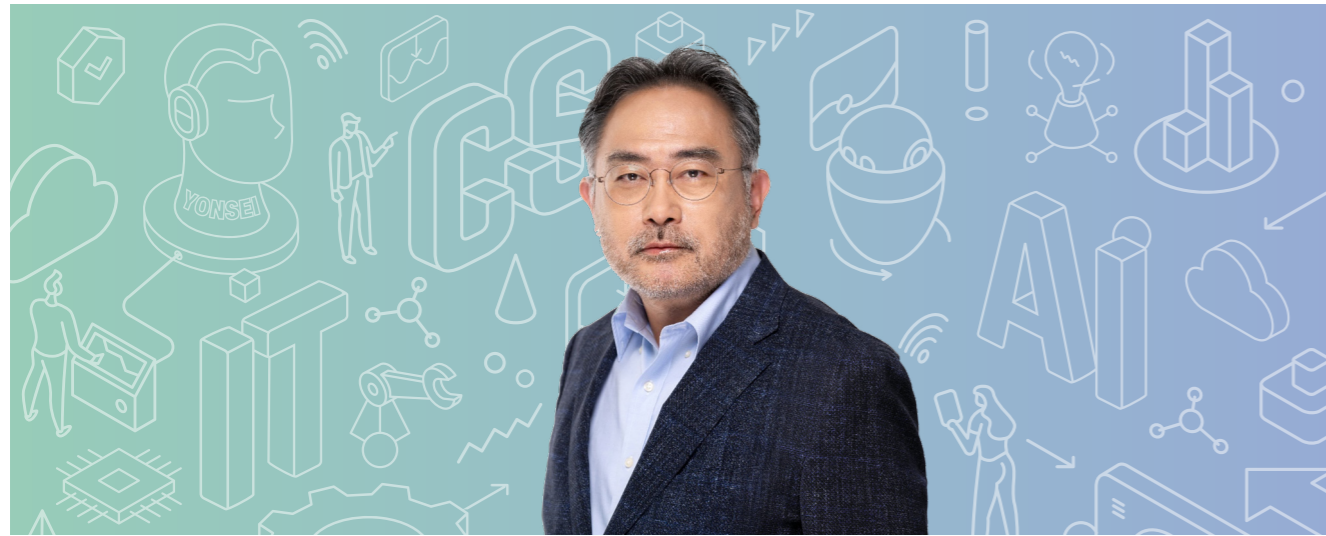
## Processing in Memory (PIM)

- Reduce bottleneck from memory-intensive computations
- Code partitioning and orchestration between CPU and PIM
- Language with sufficient abstraction and PIM support



# Mobile Embedded System Lab.

Cha, Hojung



✉ [hjcha@yonsei.ac.kr](mailto:hjcha@yonsei.ac.kr) 🌐 <https://moted.yonsei.ac.kr> ☎ +82-2-2123-5711

## Education

- Ph.D. in Computer Science, The University of Manchester, 1991
- MSc in Computer Engineering, Seoul National University, 1987
- BSc in Computer Engineering, Seoul National University, 1985

## Experience

- 2001 – Present: Professor, Dept. of Computer Science and Engineering, Yonsei University

## Research Areas

- On-device Machine Learning:

Designing efficient and flexible machine learning systems that meet resource constraints of target devices

- Cross-device Web for Heterogeneous Devices:

Developing web-based platforms for enabling new cross-device user experience

- Intermittent Computing for Batteryless IoT System:

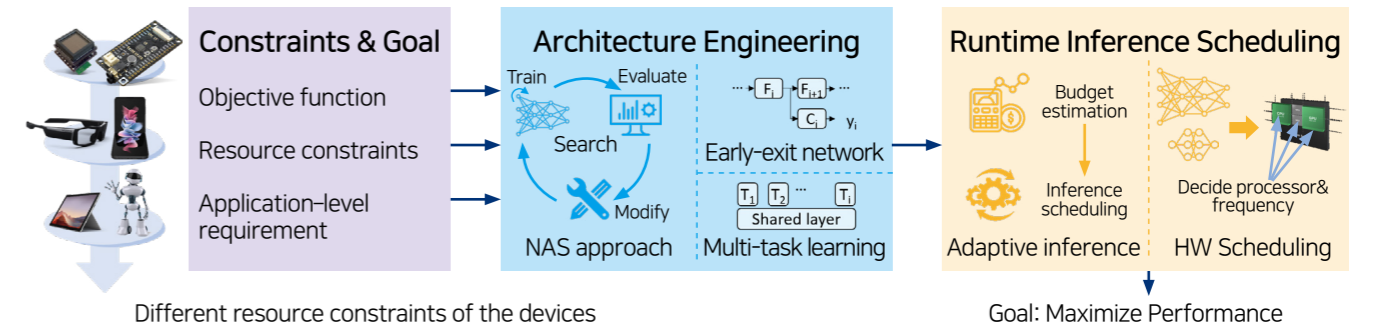
Developing system software and constructing energy harvesting hardware for batteryless IoT systems

## Publications

- OmniLive: Super-Resolution Enhanced 360° Video Live Streaming for Mobile Devices, MobiSys 2023.
- Controlling Action Space of Reinforcement Learning-based Energy Management in Batteryless Applications, IEEE IOT-J, 2023.
- Optimizing Energy Consumption of Mobile Games, IEEE TMC, 2022.

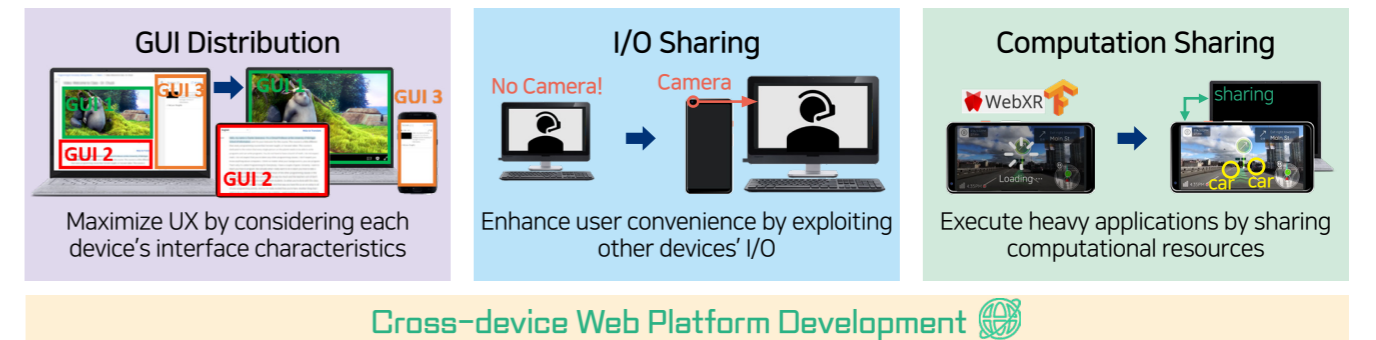
# On-device Machine Learning

- Real-time 3D object detection on 360-degree videos
- Adaptive super-resolution for 360-degree video live streaming
- Multi-task neural network for virtual youtubers



# Cross-device Web

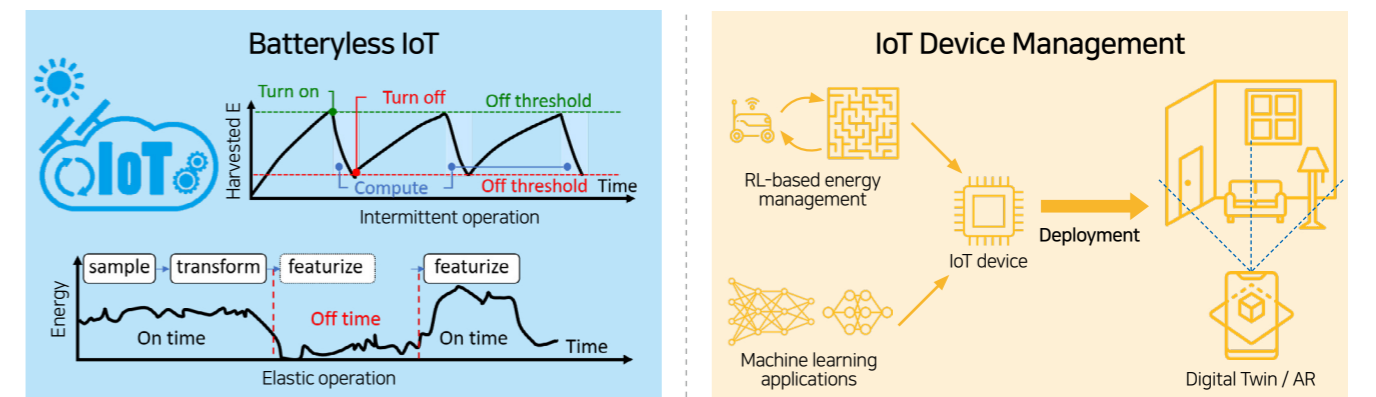
- Platforms for cross-device user interfaces of web applications
- Web-based systems for cross-device I/O sharing
- Applications with cross-device web techniques



Cross-device Web Platform Development

# Batteryless IoT

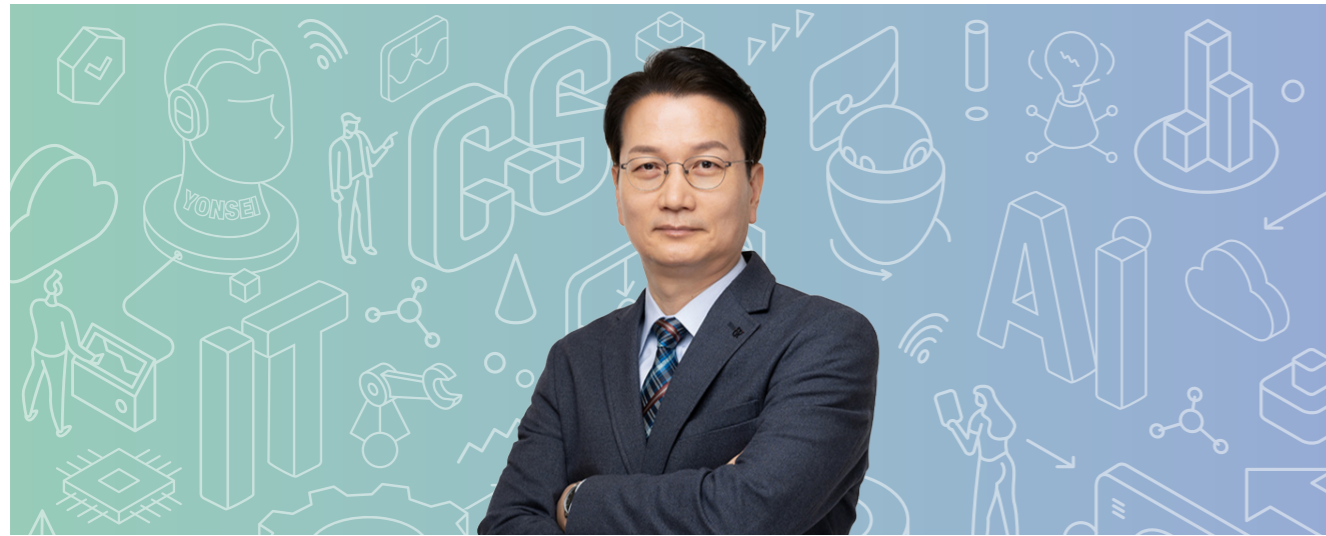
- RL-based energy management in batteryless applications
- Multi-exit DNN on energy harvesting devices
- Digital twin for batteryless IoT management





# Soft Computing Lab.

Cho, Sungbae



sbcho@yonsei.ac.kr <http://sclab.yonsei.ac.kr> +82-2-2123-2720

## Education

- Ph.D. in Computer Science, KAIST, Korea, 1993
- MS in Computer Science, KAIST, Korea, 1990
- BS in Computer Science, Yonsei University, Korea, 1988

## Experience

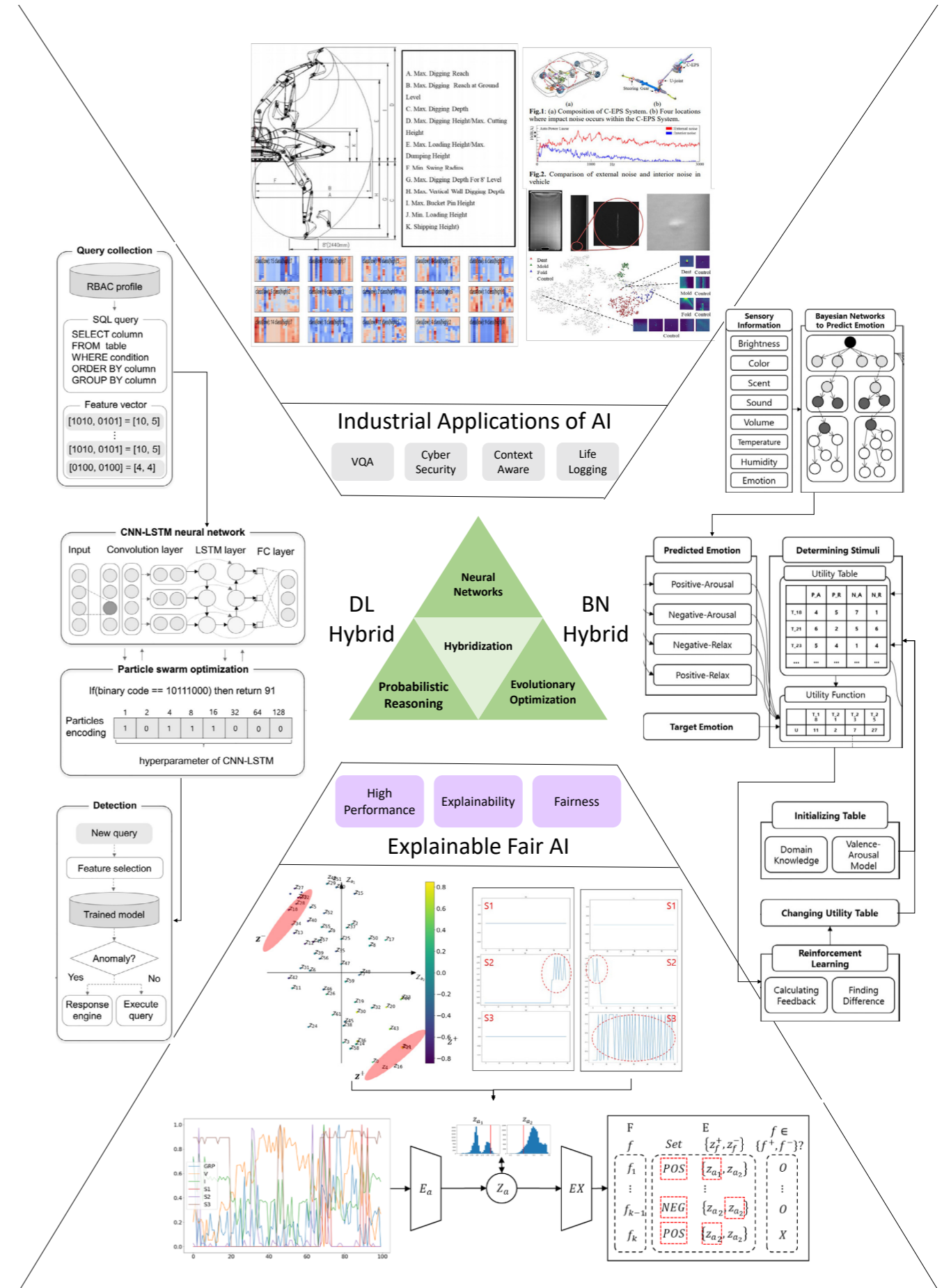
- 1995 – Present: Underwood Distinguished Professor, Dept. of Computer Science and Engineering, Yonsei University
  - 2020 – Present: Director, AI Graduate School, Yonsei University
    - 2022: Service Merit Medal, Korean Government
  - 2020 – 2021: Vice President, Korea Information Science Society
    - 2016 – 2017: President, Korea Data Mining Society
  - 2005 – 2006: Visiting Professor, Univ. of British Columbia, Canada
    - 1993 – 1995: Researcher, ATR HIP Labs, Japan

## Research Areas

- Hybrid Neuro-Symbolic AI: Realizing ultimate AI by combining several disciplines based on modularity
- Explainable Fair AI: Devising accountable fair learning algorithms with adversarial regularization
- Industrial Applications of AI: Solving real-world problems such as cyber security, fault diagnosis, life logging, VQA, etc.

## Publications

- 1,500+ Papers, 18,000+ Citations, H-index 62
- Ranked #5 in South Korea among Top Scientists, Research.com
- Human activity recognition with smartphone sensors using deep learning neural networks, Expert Systems with Applications, 2016 (Citation:1056)
- Predicting residential energy consumption using CNN-LSTM neural networks, Energy, 2019 (Citation:739)



# Mobile Networking Lab.

Han, Seungjae



seungjaehan@yonsei.ac.kr <http://mnet.yonsei.ac.kr> +82-2-2123-5723

## Education

- Ph.D. in Computer Science & Engineering, University of Michigan, Ann Arbor, MI, USA, 1998
  - MS in Computer Engineering, Seoul National University, 1991
  - BS in Computer Engineering, Seoul National University, 1989

## Experience

- 2005 – Present: Professor, Dept. of Computer Science and Engineering, Yonsei University
  - 1999 – 2005: Member of Technical Staff, Bell Labs, Murray Hill, NJ, USA

## Research Areas

- IoT (Internet of Things) Networking:

Efficiently providing Internet connectivity to IoT devices via various wireless networking technologies

- Mobile Edge Cloud Computing:

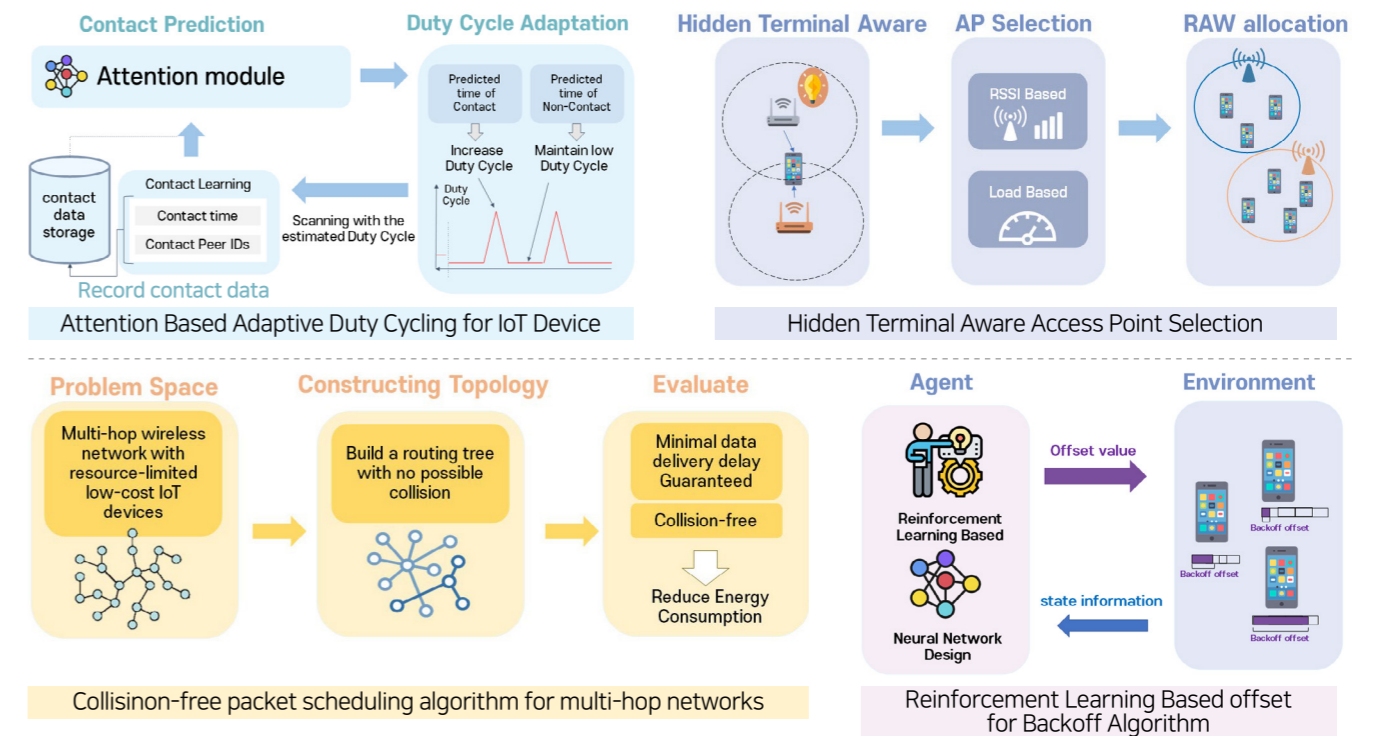
Managing the limited resources of edge cloud servers to accommodate various computing offload demands

## Publications

- “Collision-free optimal packet scheduling algorithm for multi-hop wireless IoT networks”, Computer Networks, Elsevier, April, 2022
- “Hidden terminal-aware access point selection for IEEE 802.11ah networks”, Computer Communications, Elsevier, March, 2021
- Data-bundling proxy to aggregate transmissions for energy-constrained devices”, Computer Communications, Elsevier, Jan, 2019

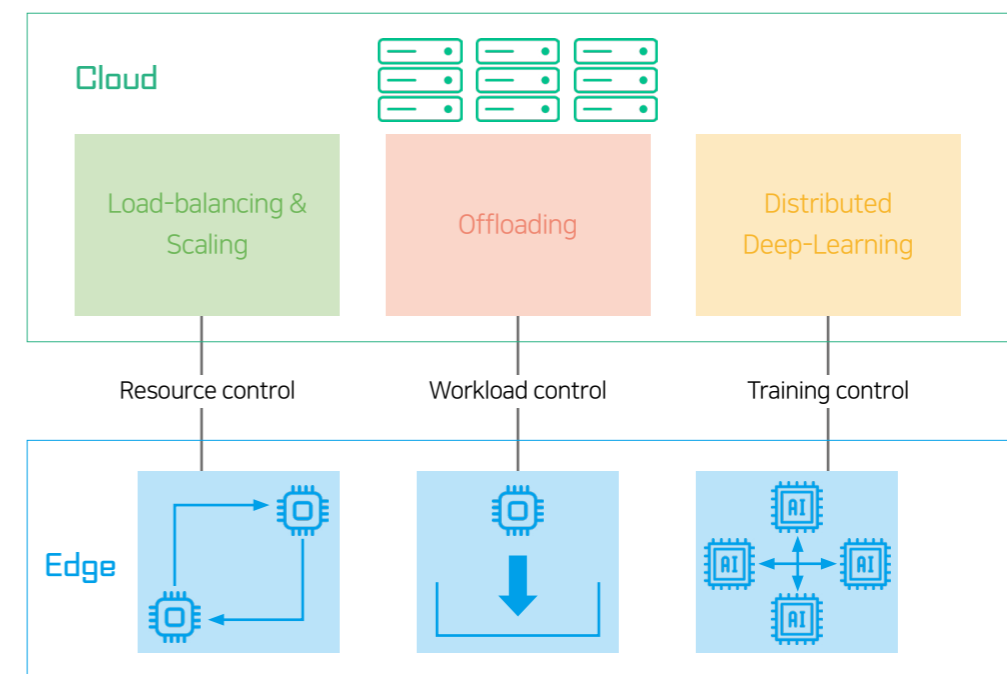
# IoT Energy efficient configuration

- Reduce energy consumption based on DNN in IoT device
- Minimize data delivery delay and reduce collision in wireless network



# Mobile Edge Cloud Computing

- Load balancing and scaling for latency & resource
- Efficient resource management between edge and cloud
- Distributed edge deep learning for massive data and privacy



# Theory of Computation Lab.

Han, Yosub



✉ [emmous@yonsei.ac.kr](mailto:emmous@yonsei.ac.kr) 🌐 <https://toc.yonsei.ac.kr> ☎ +82-2-2123-5725

## Education

- Ph.D. in Computer Science and Engineering, HKUST, 2006
- MPhil in Computer Science and Engineering, HKUST, 2002
- BS in Computer Science and Engineering, POSTECH, 2000

## Experience

- 2009 – Present: Professor, Dept. of Computer Science and Engineering, Yonsei University
  - 2005 – 2009: Senior Researcher, Korea Institute of Science and Technology

## Research Areas

- Theory of Computation
- Automata Theory and Formal Languages
  - Algorithm Design
- Information Retrieval, NLP
- Neural-Symbolic Models

## Publications

- Journals: Information and Computation, Theoretical Computer Science, Fundamenta Informaticae, Natural Computing
- Conferences: AAI, ACL, CIAA, DCFS, DLT, EMNLP

# Theory of Computation

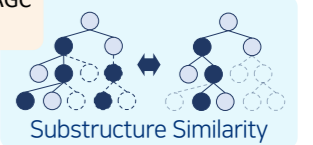
- Language Similarity
- Formal Grammar Inference
- Information Retrieval using Automata Theory

## Language Similarity

- Measure similarity between string/tree languages
- Design finite automata for computing similarity
- Implement efficient algorithms for computing similarity

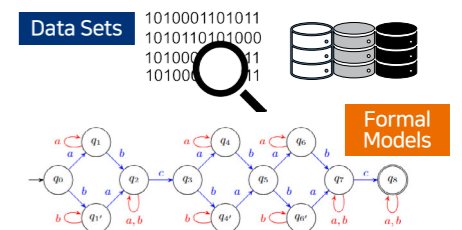
CTACTAGAG → TACTCAAGC  
CTACATGAG → TACTCAAGC  
CTAGAGCTA → TCTCAAGA  
ATAGAGATA → TACTCAAGC

Sequence Similarity



## Formal grammar Inference

- Design effective grammar representations for massive data
- Infer grammars from practical datasets
  - Identify hidden structural information
  - Find and merge similar structures
- Constructs probabilistic finite automata via grammar weights



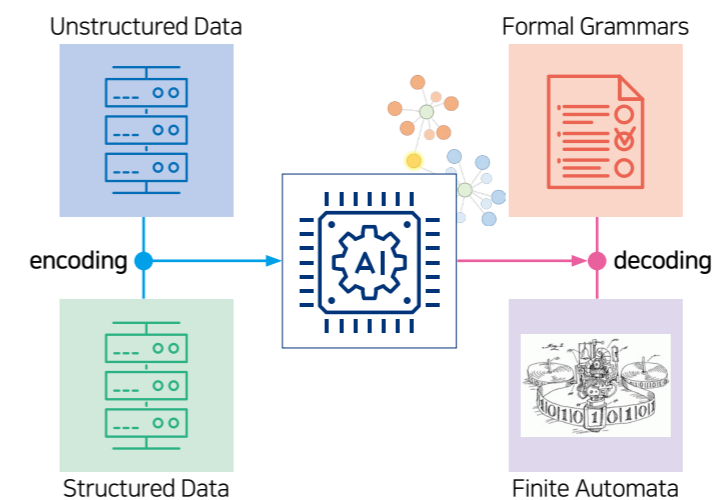
## Information Retrieval using Automata Theory

- Extract knowledge from structural grammars of documents
- Design specialized query-matching algorithms on weighted automata
- Similarity matching algorithms



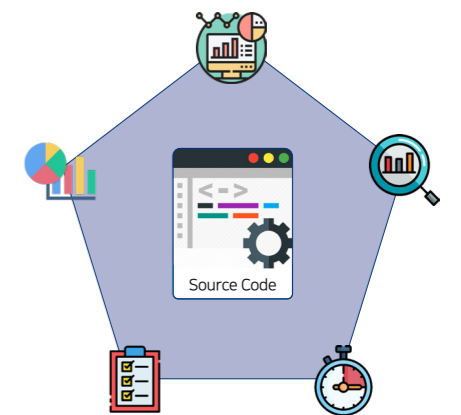
# Neural-Symbolic Models

- Formal Grammars vs Natural Language Descriptions
- Neural Model Representation using Weighted Automata
- Code Summary and Generation Models



Neural Models via Weighted Automata

## Code Analysis



Program Synthesis

Code Summary and Generation

# Scalable Systems Software Lab.

Jeong, Jinkyu



[jinkyu@yonsei.ac.kr](mailto:jinkyu@yonsei.ac.kr) <https://cslab.yonsei.ac.kr> +82-2-2123-2717

## Education

- Ph.D. in Computer Science, Korea Advance Institute of Science and Technology, 2013
- BS in Computer Science, Yonsei University, 2005

## Experience

- 2023 – Present: Associate Professor, Dept. of Computer Science and Engineering, Yonsei University
  - 2021 – 2022: Visiting Researcher, University of California, Irvine
- 2014 – 2023: Assistant, Associate Professor, Department of Semiconductor Systems Engineering, Sungkyunkwan University
  - 2013 – 2014: Post-doctoral researcher, Sungkyunkwan University

## Research Areas

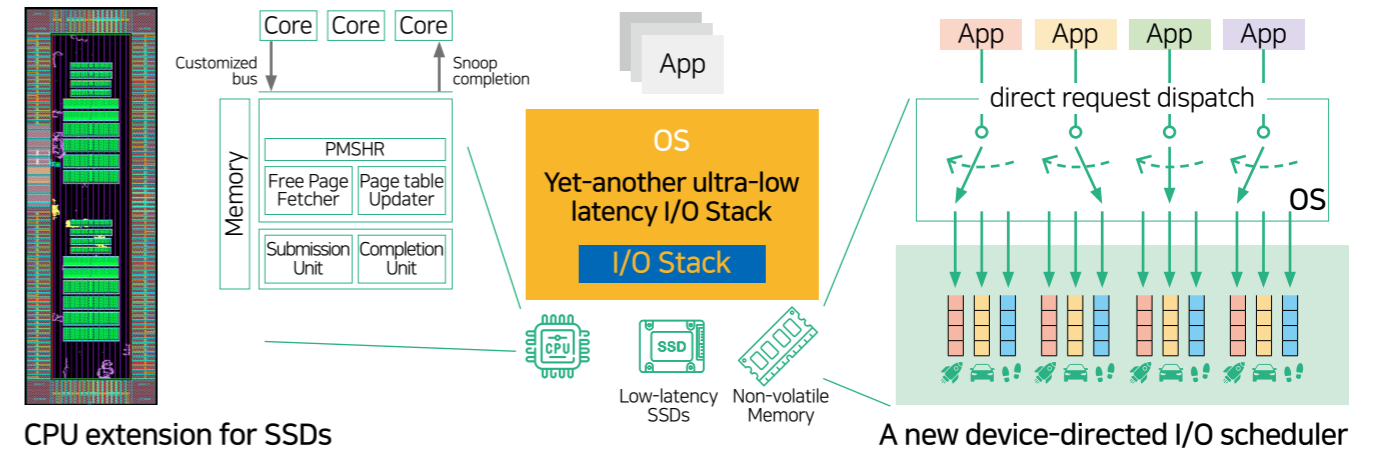
- Operating Systems / Systems Software:
  - Storage I/O stack for emerging high-performance SSDs / System-driven artificial intelligence
    - Cloud Computing:
      - High-performance, secure cloud computing architecture
    - Mobile Systems:
      - Low-latency, energy-efficient, machine-learned mobile systems

## Publications

- Z-Journal: Scalable Per-Core Journaling, USENIX ATC'21
- ASAP: Fast Mobile Application Switch via Adaptive Prepaging, USENIX ATC'21
  - D2FQ: Device-Direct Fair Queueing for NVMe SSDs, FAST'21
    - A Case for Hardware-based Demand Paging, ISCA'20
- DMazeRunner: Executing perfectly nested loops on dataflow accelerators, TECS, 2019

# Operating Systems / Systems Software

- Storage I/O stack for high-performance SSDs
- I/O systems software for Peta-scale SSDs
- System-driven artificial intelligence, machine learning

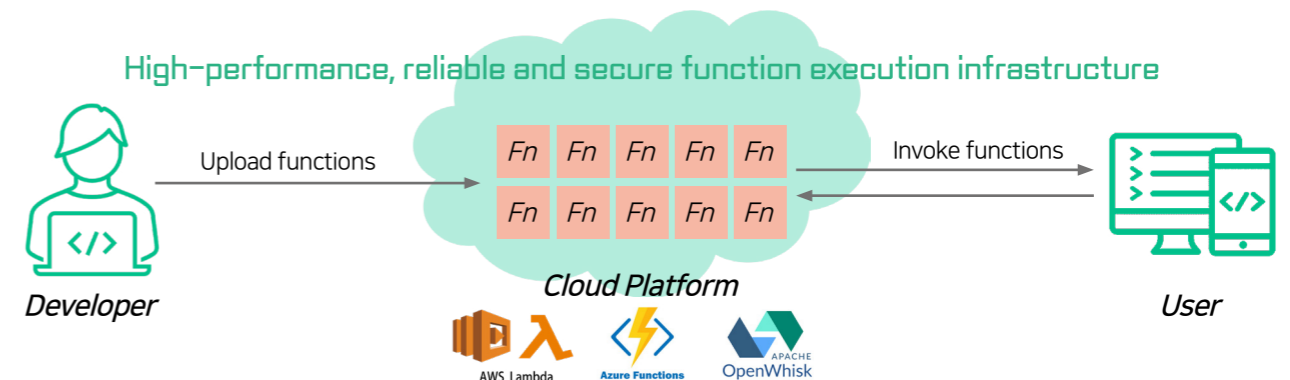


CPU extension for SSDs

A new device-directed I/O scheduler

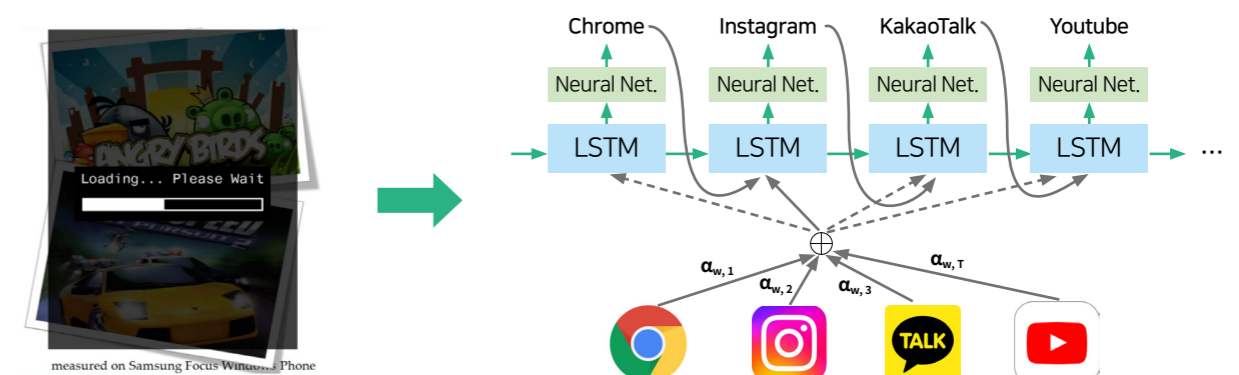
## Cloud Computing

- High-performance machine virtualization technologies
- High-performance, secure, reliable cloud computing infrastructure



## Mobile Systems

- High-performance, energy-efficient mobile memory management
- Machine-learned system management
- System optimization under constrained computing/memory resources



# Computational Intelligence & Photography Lab.

Kim, Seonjoo



seonjookim@yonsei.ac.kr | https://sites.google.com/site/seonjookim | +82-2-2123-5709

## Education

- Ph.D. in Computer Science, University of North Carolina at Chapel Hill, 2008
- MS in Electrical and Electronics Engineering, Yonsei University, 2001
- BS in Electronics Engineering, Yonsei University, 1997

## Experience

- 2022 - 2025: Underwood Distinguished Professor, Dept. of Computer Science and Engineering, Yonsei University
- 2013 - Present: Professor, Dept. of Computer Science and Engineering, Yonsei University
- 2019 - 2022: Visiting Scientist, Facebook

## Research Areas

- Computer Vision: Video Understanding, Video Processing
- Computational Photography: Capturing & Processing new types of images & videos
- Machine Learning: Employing deep learning for various tasks in computervision & photography

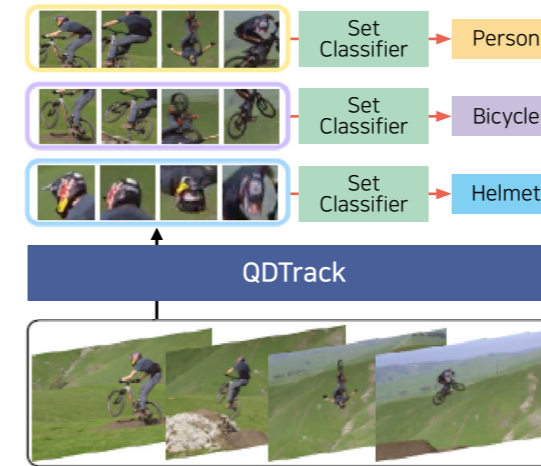
## Publications

- 22 Top Conference Papers from 2018-2022
- VISOLO: Grid-Based Space-Time Aggregation for Efficient Online Video Instance Segmentation, CVPR 2022
- Video Instance Segmentation using Inter-Frame Communication Transformers, NeurIPS, 2021
- Tackling the Ill-Posedness of Super-Resolution through Adaptive Target Generation, CVPR 2021

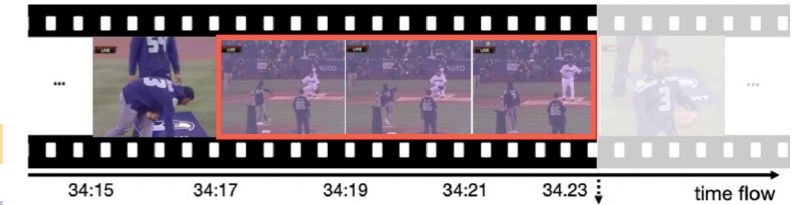
# Computer Vision

We are working on understanding videos to enable practical use of video related application

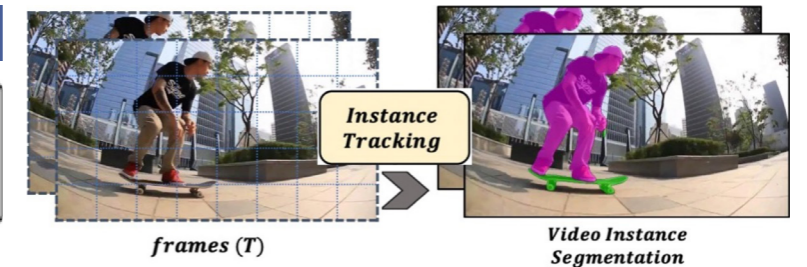
- Video Recognition
- Video Segmentation



Object Tracking in Videos



Online Video Action Recognition



Online Video Instance Segmentation

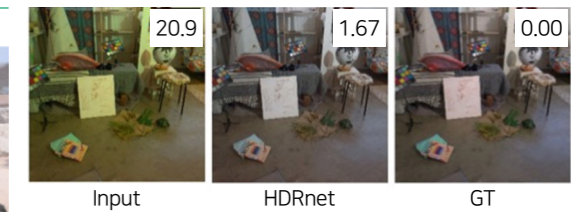
# Computational Photography

We are also very interested in capturing new types of Image & videos, as well as processing & editing images and videos.

- Video Super-Resolution
- Video Inpainting
- Color Processing
- Non-line-of-Sight Imaging



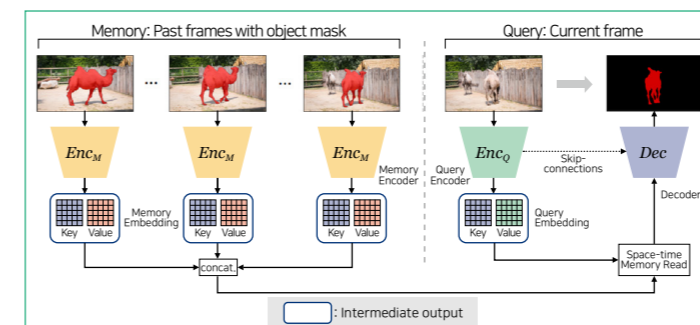
Video Inpainting



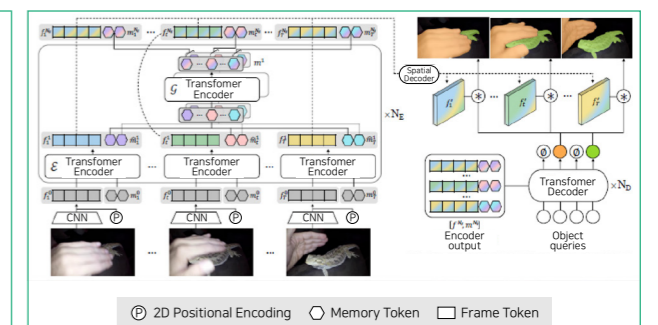
Color Correction (White Balancing)

# Machine Learning

We develop different types of deep learning algorithms to solve computer vision problems.



Space-time Memory Networks



Inter-Frame Communication Transformers

## High Performance Computing Platforms Lab.

Kim, Youngsok



[youngsok@yonsei.ac.kr](mailto:youngsok@yonsei.ac.kr) <https://hpcp.yonsei.ac.kr> +82-2-2123-2714

### Education

- Ph.D. in Computer Science and Engineering, POSTECH, 2017
- BSc in Computer Science and Engineering, POSTECH, 2012

### Experience

- 2019 – Present: Assistant Professor, Dept. of Computer Science and Engineering, Yonsei University
- 2017 – 2019: Postdoctoral Researcher, Seoul National University
- 2016: H/W Engineering Intern, Consumer Hardware, Google Inc.

### Research Areas

- Computer architecture:

Next-generation CPU and GPU microarchitecture design / Application-specific hardware accelerators

- System software:

Architecture-aware performance optimizations / Process scheduling for higher performance and fairness

- Performance modeling:

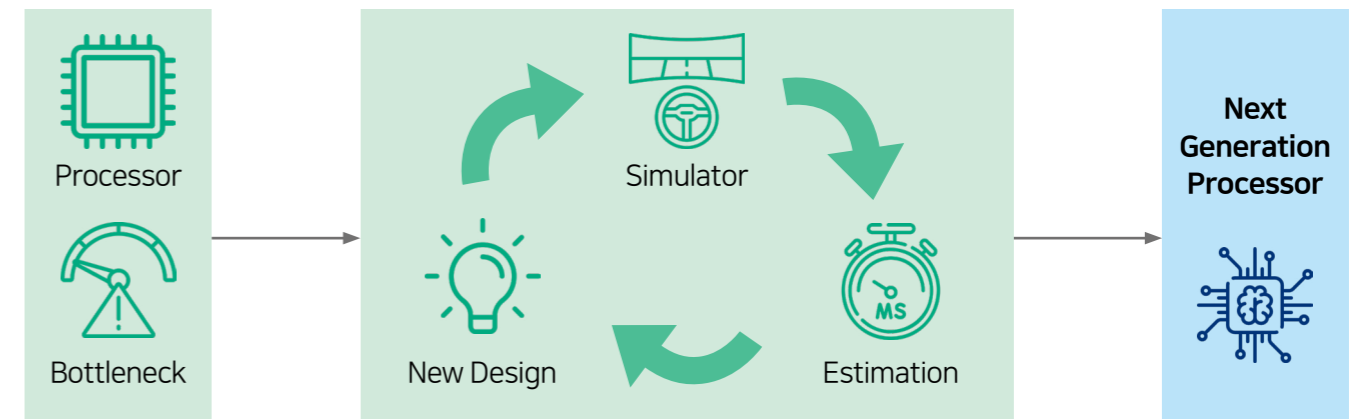
Fast and accurate CPU and GPU performance modeling / Analytical CPU and GPU modeling

### Publications

- GCoM: A Detailed GPU Core Model for Accurate Analytical Modeling of Modern GPUs, ISCA 2022
  - GuardiaNN: Fast and Secure On-Device Inference in TrustZone Using Embedded SRAM and Cryptographic Hardware, Middleware 2022
- Dataflow Mirroring: Architectural Support for Highly Efficient Fine-Grained Spatial Multitasking on Systolic-Array NPUs, DAC 2021

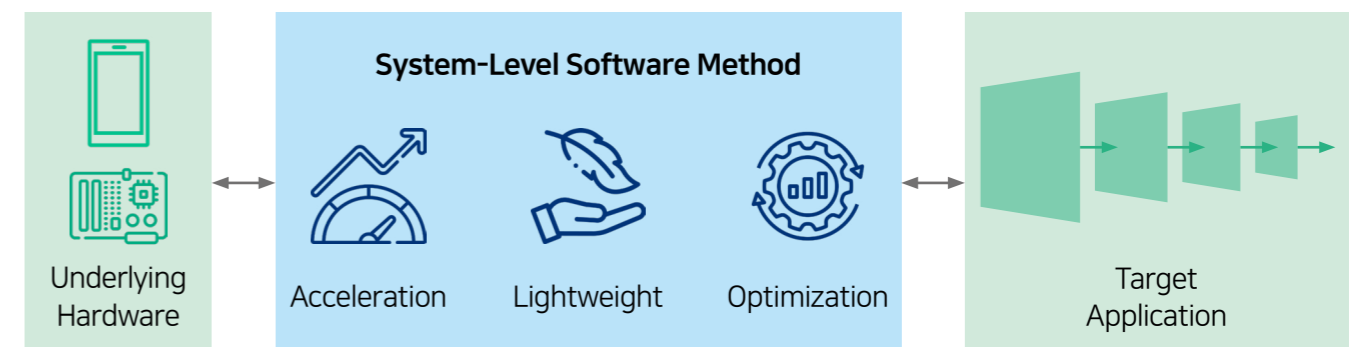
## Next-Generation Processor Microarchitectures

- Propose architectural support/enhancements/modifications
- Design the state-of-the-art CPU and GPU microarchitectures
- Performance improvement of the target applications



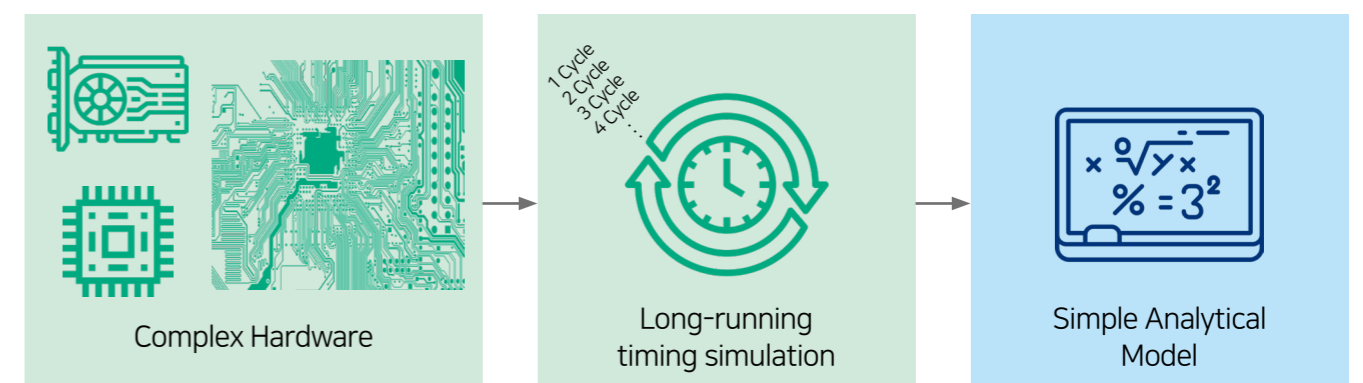
## System-Level Performance Optimizations

- Propose System-level software method
- Optimization by the characteristics of underlying hardware
- Performance improvement of the target applications



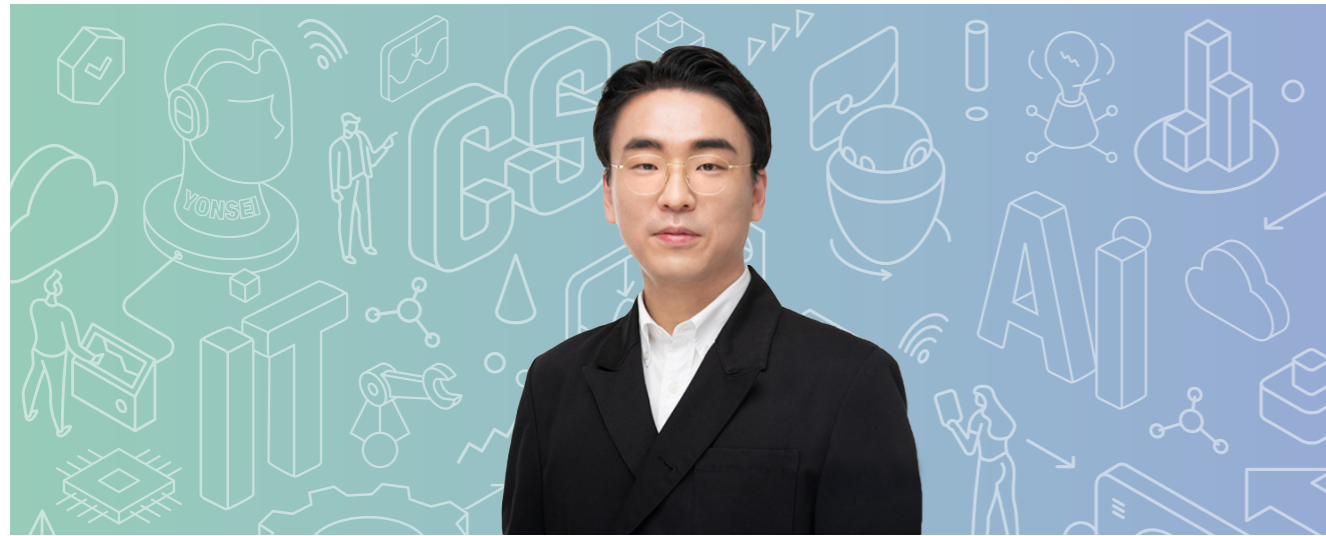
## Analytical Performance Modeling

- Propose fast analytical performance models
- Give detailed insights into performance bottlenecks
- Replace the long-running timing simulations



# Yonsei Esports Lab. (YES Lab)

## Lee, Byungjoo



byungjoo.lee@yonsei.ac.kr | https://esports.yonsei.ac.kr | +82-2-2123-5724

### Education

- Ph.D. in Mechanical Engineering, SNU, 2014
- MS in Mechanical Engineering, KAIST, 2010
- BS in Mechanical Engineering, KAIST, 2008

### Experience

- 2021 – Present: Associate Professor, Dept. of Computer Science and Engineering, Yonsei University
  - 2020 – 2021: Associate Professor, KAIST
  - 2016 – 2020: Assistant Professor, KAIST

### Research Areas

- Human-Computer Interaction (HCI):

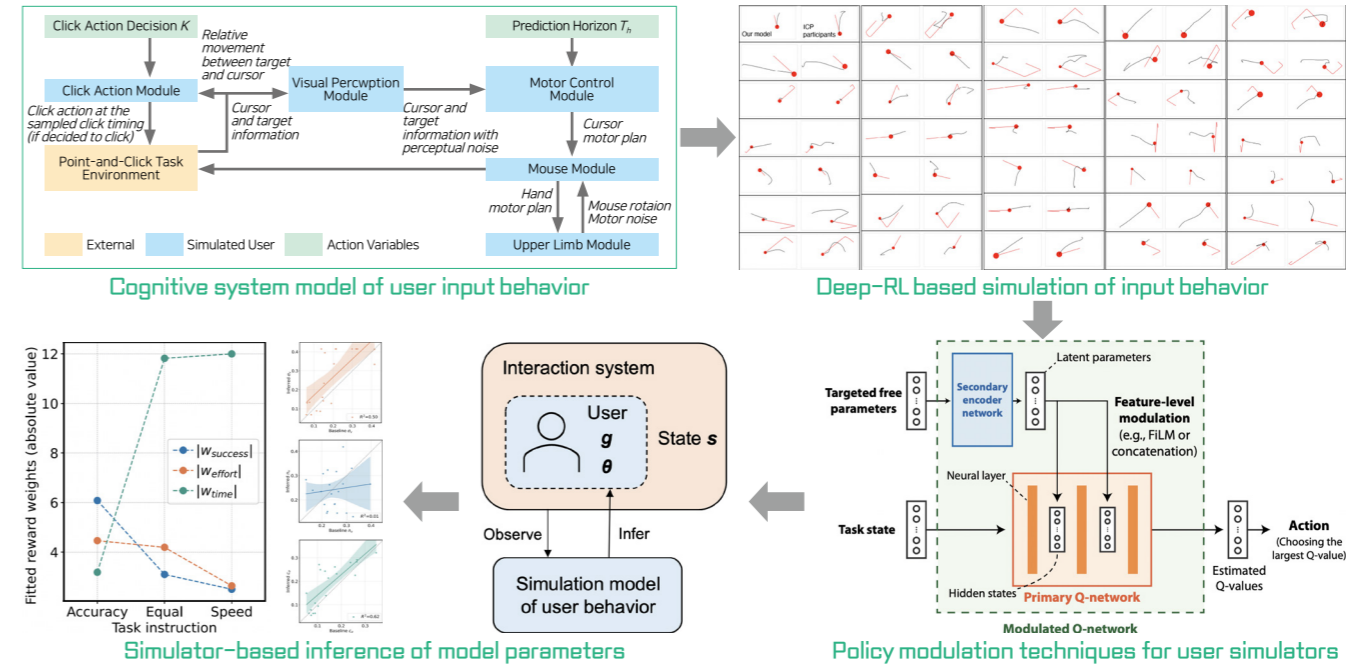
User performance and behavior modeling / Inverse user modeling / Computational interface design and optimization / Novel user interfaces / Esports data science / Esports performance engineering

### Publications

- Published 16 regular CHI papers from 2016-2022 with 5 Best Paper Honorable Mention Awards
  - Quantifying Proactive and Reactive Button Input, CHI'2022
  - Speeding up Inference with User Simulators through Policy Modulation, CHI'2022
  - A Simulation Model of Intermittently Controlled Point-and-Click Behavior, CHI'2021
  - Secrets of Gosu: Understanding Physical Combat Skills of Professional Players in First-Person Shooters, CHI'2021

# User Behavior and Performance Modeling

- Cognitive model of user behavior system
- Deep-RL based simulation of user behavior
- Simulator-based inference of user characteristics



# Esports Performance Engineering

- Analyzing behavior of esports players
- Model-based player performance evaluation
- Optimizing user interface design for esports

**Player behavior logging system (both lab and field data)**

	Professional	Amateur	MNC (std)
<b>Descriptive Statistics</b>			
Number of effective shots per minute	5.26	4.33	0.41
Reaction time of shooting - Assault rifle (ms)	426.27	36.96	451.26
Reaction time of shooting - Sniper rifle (ms)	494.91	244.19	504.15
<b>Aiming</b>			
Enemy crosshair stickiness - Assault rifle & no shooting (ps)	22.50	14.58	4.49
Enemy crosshair stickiness - Assault rifle & no shooting (ms)	44.88	20.01	26.08
Angular velocity of mouse - Assault rifle (rad/ms)	0.69	0.62	0.01
Angular velocity of mouse - Sniper rifle (rad/ms)	0.69	0.62	0.01
Angular velocity of mouse - sensitivity - Assault rifle	0.69	0.61	0.01
Angular velocity of mouse - sensitivity - Sniper rifle	0.69	0.62	0.01
Amplitude of the recoil compensating movement - Assault rifle (ps)	190.82	162.31	62.48
Amplitude of the recoil compensating movement - Assault rifle (ms)	232.31	143.63	153.75
Force inefficiency - Assault rifle	4.15	0.47	4.37
Force inefficiency - Sniper rifle	2.75	1.89	2.07
<b>Character Movement</b>			
M-1 Entropy of ground layer - Movement combination	1.55	0.12	1.63
M-2 The number of starting step pattern (ADA or DADA)	1547	4818	4873
M-3 The number of crossing pattern (A/N/D/W = Clat)	437	342	349
M-4 Refuel efficiency - Assault rifle	7.41	1.33	7.48
Refuel efficiency - Sniper rifle	0.84	0.25	0.82
<b>Physical Skills</b>			
P-1 Retention ratio of elbow and wrist (yaw/roll)	2.95	2.21	1.32
P-2 Muscle activity	1.07	0.12	1.11
P-3 Duration of fixation - visible (ms)	713.71	264.99	462.60
Duration of fixation - invisible (ms)	2.75	2.19	3.21
Number of accurate - visible (count/s)	0.99	0.82	1.01
Number of accurate - invisible (count/s)	1.67	0.89	0.87
Composure - beats per minute (under/over)	1.01	0.84	1.02
Composure - pupil diameter (under/over)	1.01	0.84	1.02
<b>Device and Settings</b>			
D-1 Used area of mousepad (cm <sup>2</sup> )	1470	845	453
D-2 Keyboard perpendicularity (degree)	18.32	34.99	2.81

**Hypothesis testing**

**Optimizing esports interfaces**

# Computer Graphics & Applications Lab.

Lee, Inkwon



✉ [iklee@yonsei.ac.kr](mailto:iklee@yonsei.ac.kr) 🌐 <http://cga.yonsei.ac.kr> ☎ +82-2-2123-5713

## Education

- Ph.D. in Computer Science and Engineering, POSTECH, 1997
- MS in Computer Science and Engineering, POSTECH, 1992
- BS in Computer Science, Yonsei University, 1989

## Experience

- 2003 – Present: Professor, Dept. of Computer Science and Engineering, Yonsei University
  - 2001 – 2003: Assistant Prof., Division of Media, Ajou University
  - 1997 – 2001: Researcher, Institute of Geometry, Vienna, Austria

## Research Areas

- Computer Graphics:

Physics based animation with AI based methods / Human and cloth modeling and simulation

- Virtual Reality:

Improving user experience in VR with AI-based methods / Redirected walking with AI-based methods

## Publications

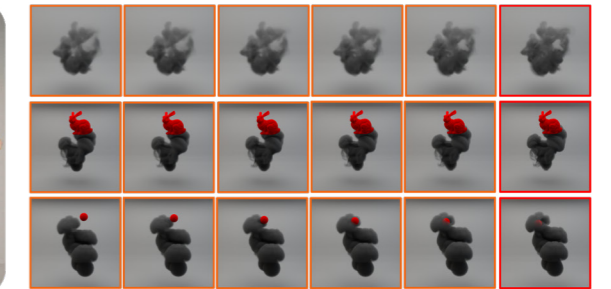
- Studying the Effects of Congruence of Auditory and Visual Stimuli on Virtual Reality Experiences. IEEE TVCG, 2022
- Optimal Planning for Redirected Walking Based on Reinforcement Learning in Multi-user Environment with Irregularly Shaped Physical Space, IEEE VR, 2020

# Computer Graphics

- Physics based animation with AI based methods
- Human and cloth modeling and simulation using AI
- Emotion based Stylization of Image and Video
- Music-Synchronized Animation and Video



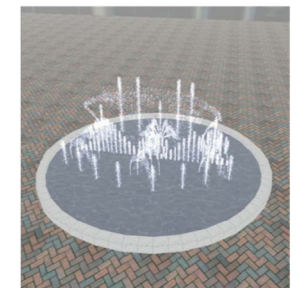
Human and cloth modeling and simulation using AI



Physics based Fluid Animation Using AI



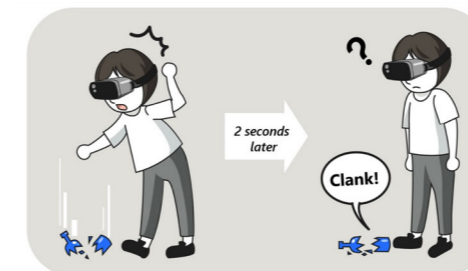
Emotion based Image Stylization



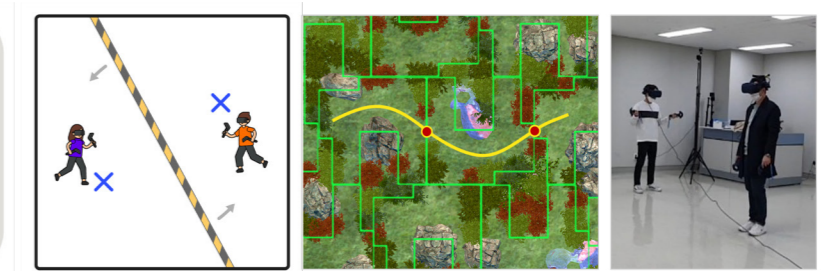
Music-Synchronized Animation and Video

# Virtual Reality

- Improving user experience in VR with AI-based methods
- Redirected walking with AI-based methods
- Motion Sickness Detection and Reduction in VR
- Avatars in Virtual Reality



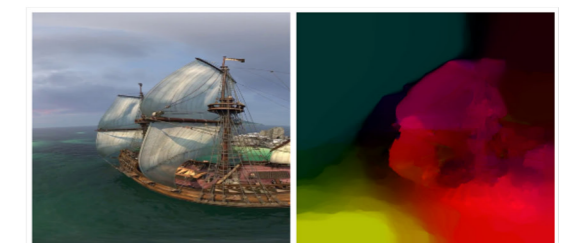
Immersion and Presence Enhancement



Redirected Walking for Simultaneous Walking in Virtual and Real Environments



Avatars in Virtual Reality



Motion Sickness Detection and Reduction



# Internet Computing Lab.

Lee, Kyongho



✉ khlee89@yonsei.ac.kr    🌐 <http://icl.yonsei.ac.kr>    ☎ +82-2-2123-5712

## Education

- Ph.D. in Computer Science, Yonsei University, 2001
- MS in Computer Science, Yonsei University, 1997
- BS in Computer Science, Yonsei University, 1995

## Experience

- 2002 – Present: Professor, Dept. of Computer Science and Engineering, Yonsei University
  - 2008 – 2009: Visiting Professor, UCI, USA
  - 2002: Researcher, NIST, USA

## Research Areas

- Knowledge Graph Representation and Reasoning:

Handling complex reasoning with relational path and symbolic logic via deep representation learning techniques on knowledge graphs / Constructing and completing knowledge graphs by extracting and predicting factual knowledge from unstructured sources

- Knowledge based Service & Applications:

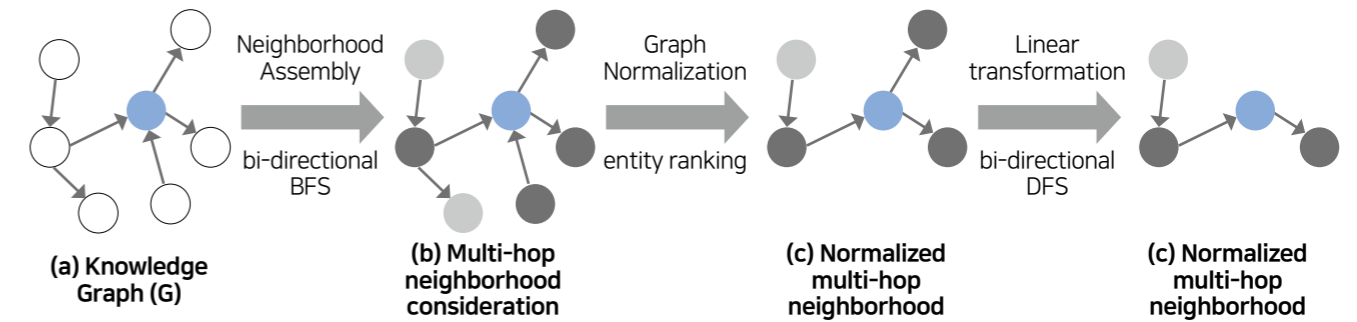
Utilizing knowledge graphs to a variety of downstream tasks like recommender systems and dialogue models / Injecting structural knowledge into downstream neural architectures such as graph neural networks

## Publications

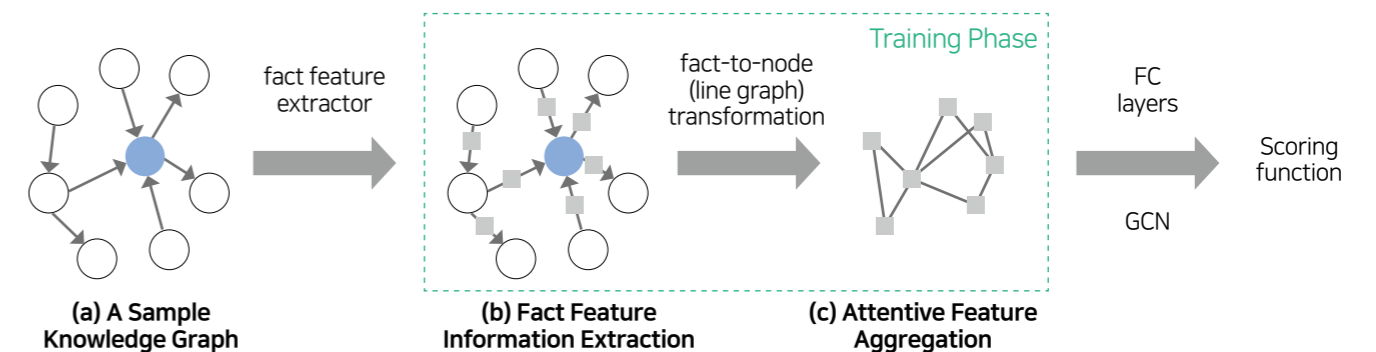
- Confident Action Decision via Hierarchical Policy Learning for Conversational Recommendation, WWW 2023
- CLICK: Contrastive Learning for Injecting Contextual Knowledge to Conversational Recommender System, EACL 2023
- Persona Expansion with Commonsense Knowledge for Diverse and Consistent Response Generation, EACL 2023
- Active Learning on Pre-trained Language Model with Task-Independent Triplet Loss, AACL, 2022
  - Active Learning for Knowledge Graph Schema Expansion, IEEE TKDE, 2022

# Knowledge Graph Representation & Reasoning

- Representation learning on knowledge graphs
- Knowledge graph construction and completion



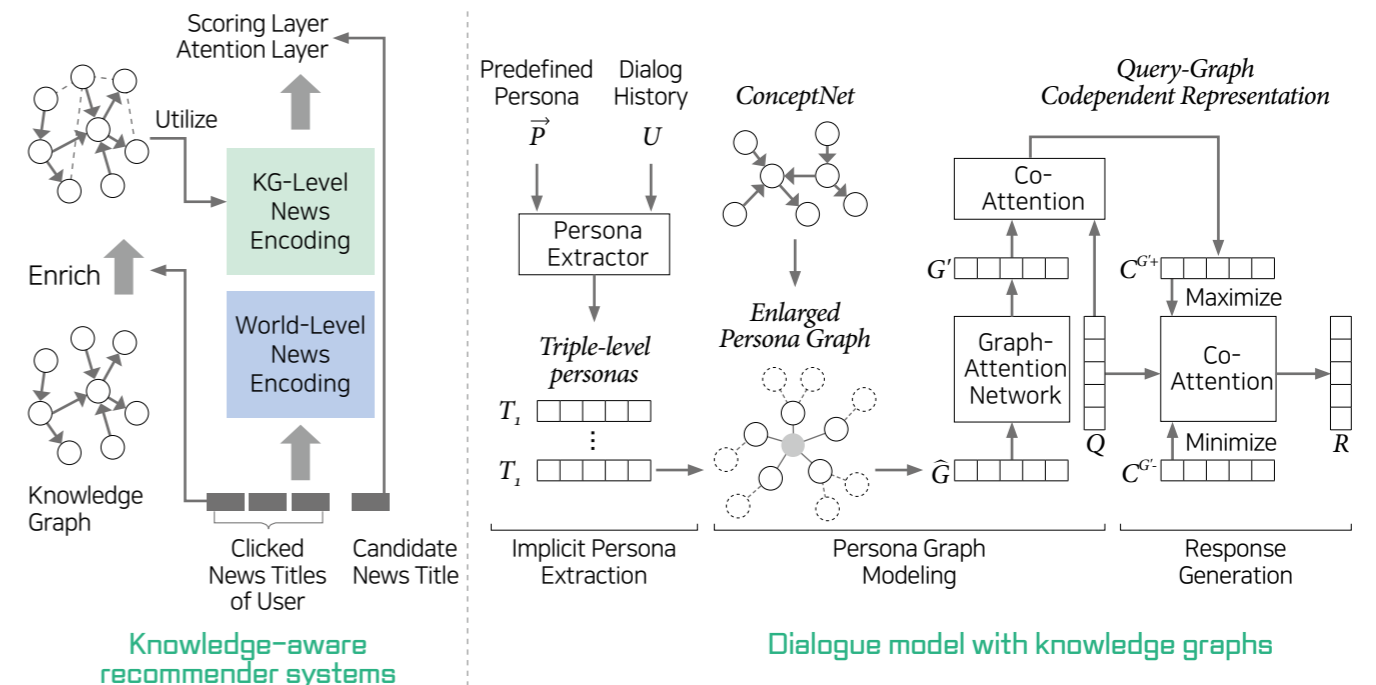
## Knowledge Graph Completion by Context-Aware Convolutional Learning



## Knowledge Graph Completion via Attentive Feature Aggregation

# Knowledge-based Service & Applications

- Knowledge-aware recommendation systems
- Dialogue model with knowledge graphs



# Dependable Computing Lab.

Lee, Kyoungwoo



kyoungwoo.lee@yonsei.ac.kr | http://dclab.yonsei.ac.kr | +82-2-2123-5710

## Education

- Ph.D. in Information and Computer Sciences, University of California, Irvine, 2008
- MS in Computer Science, Yonsei University, 1997
- BS in Computer Science, Yonsei University, 1995

## Experience

- 2011 - Present: Professor, Dept. of Computer Science and Engineering, Yonsei University
  - 2018: Visiting Researcher, Samsung Research
- 1997 - 2003: Senior Research Engineer, Digital TV Research Lab., LG Electronics, Inc.

## Research Areas

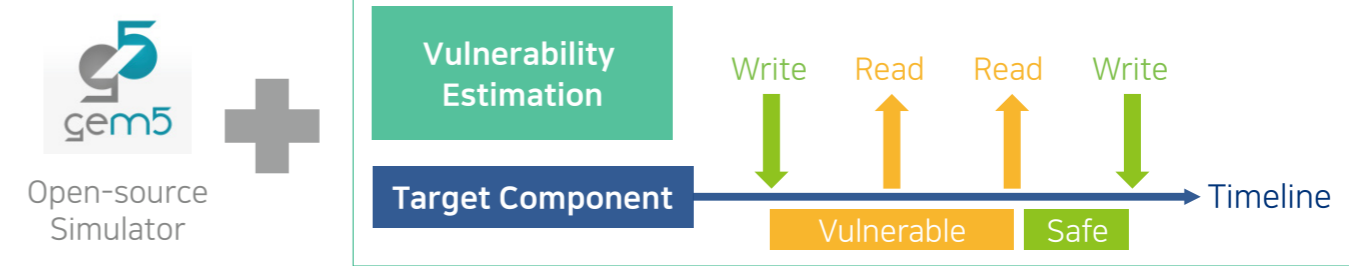
- Dependable System Design
- Internet of Things (IoT) Healthcare
- Optimizations for Machine Learning Accelerators

## Publications

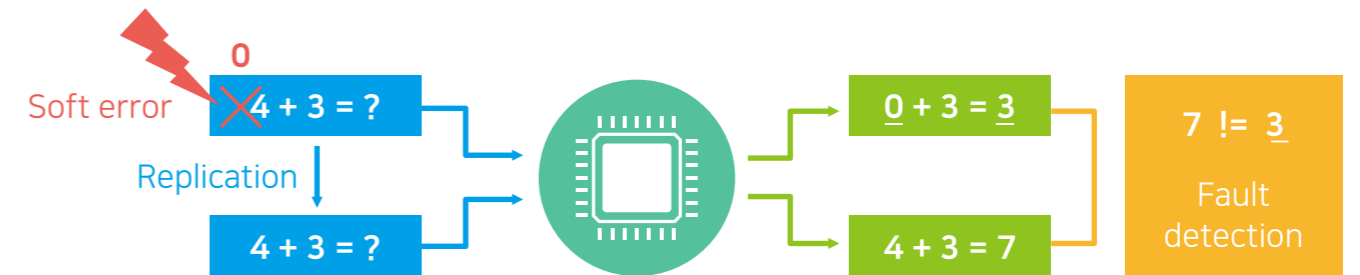
- CHITIN: A Comprehensive In-thread Instruction Replication Technique Against Transient Faults, DATE, 2021
- Continuous body impedance measurement to detect bladder volume changes during urodynamic study: A prospective study in pediatric patients, Neurourology and Urodynamics, 2021
- DMazeRunner: Executing perfectly nested loops on dataflow accelerators, TECS, 2019

# Dependable System Design

## Quantitative vulnerability estimation

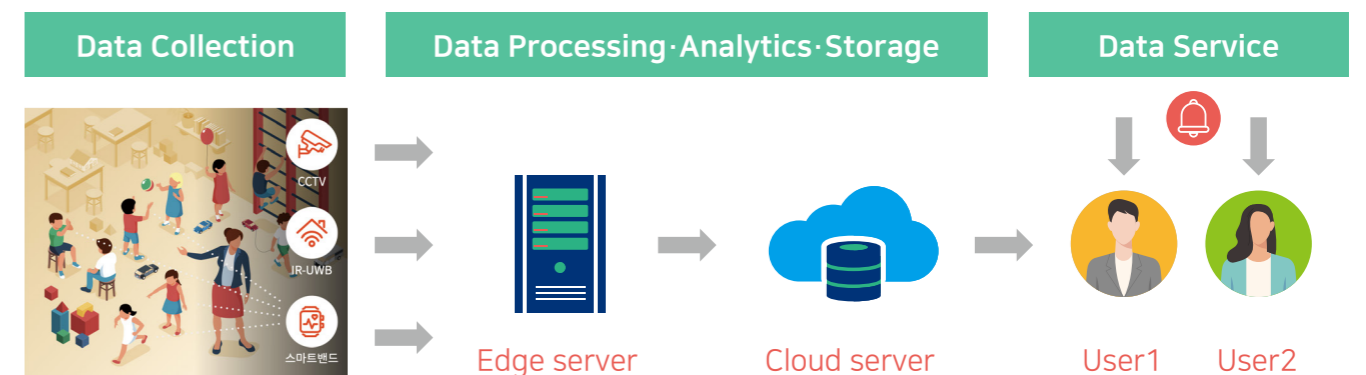


## Redundancy-based fault detection / correction solutions

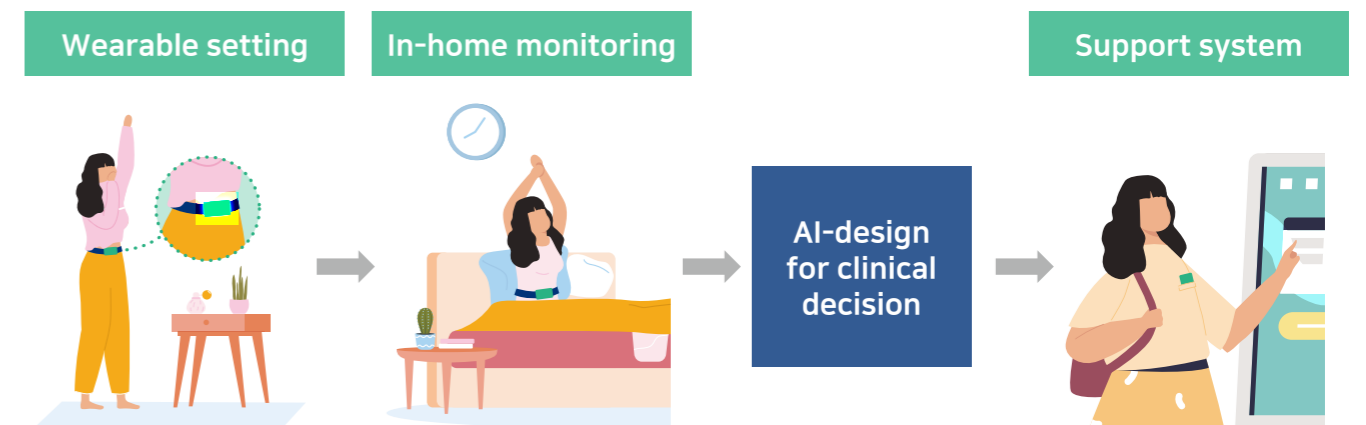


# IoT Healthcare

## IoT-based healthcare system

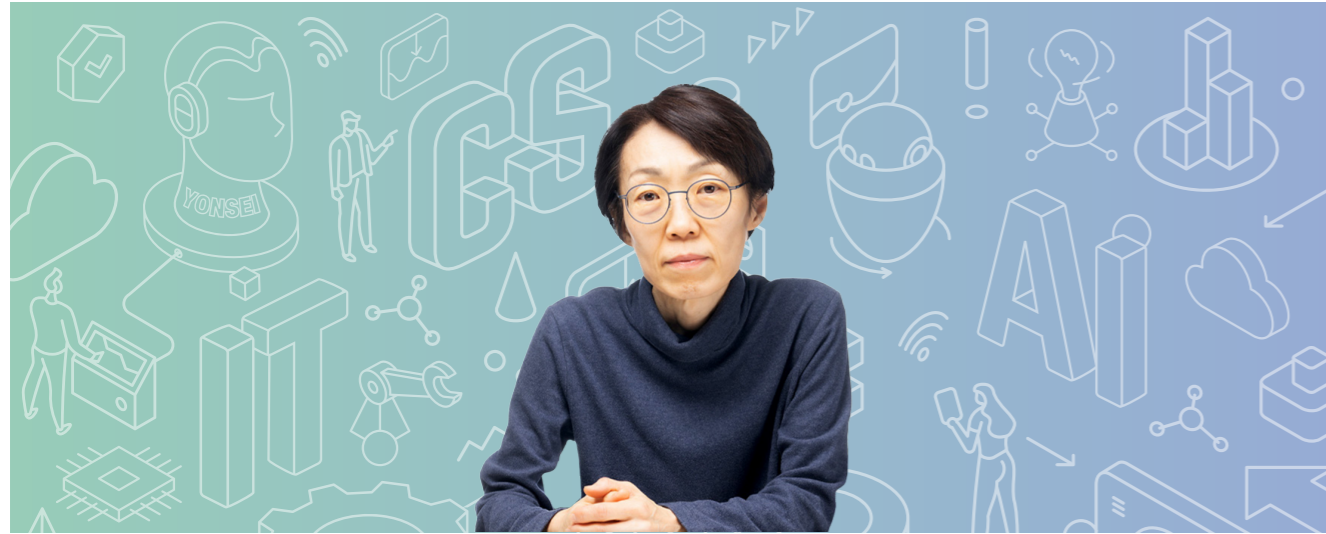


## AI-based clinical decision and its support systems



# Wireless Networking Lab.

Lee, Sukyoung



✉ sklee@yonsei.ac.kr    🌐 <http://winet.yonsei.ac.kr>    ☎ +82-2-2123-5722

## Education

- Ph.D. in Computer Science from Yonsei University, 2000
- MS in Computer Science from Yonsei University, 1995
- BS in Computer Science from Yonsei University, 1992

## Experience

- 2005 – Present: Professor, Dept. of Computer Science and Engineering, Yonsei University
- 2003 – 2005: Assistant Professor, Computer Science and Engineering, Sejong University
  - 2000 – 2009, 2011 – 2012: Researcher at NIST, Wireless Networks Division

## Research Areas

- 6G Wireless Networks:

Machine Learning(ML)-based content request/traffic prediction for Mobile Edge Computing (MEC) / Real-time service for Internet of Vehicles (IoV) / Dynamic network configuration using Software Defined Network (SDN)

- AIoT-based System:

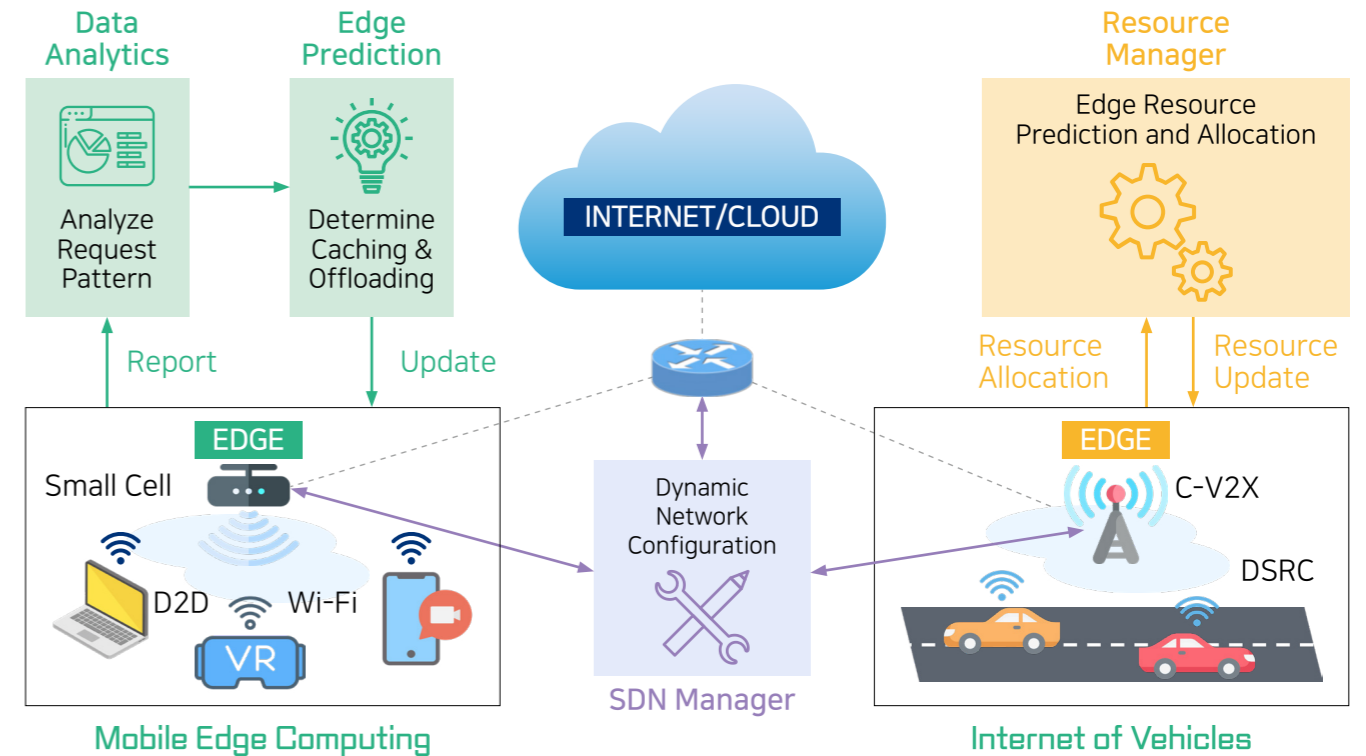
Distributed deep learning system and AI-based network resource optimization / Fault-tolerant service management and real-time prediction for Digital Twin (DT)

## Publications

- Partition Placement and Resource Allocation for Multiple DNN-based Applications in Heterogeneous IoT Environments, IEEE IoT Journal, 2023
- Resource Allocation for Vehicular Fog Computing using Reinforcement Learning Combined with Heuristic Information, IEEE IoT Journal, 2020

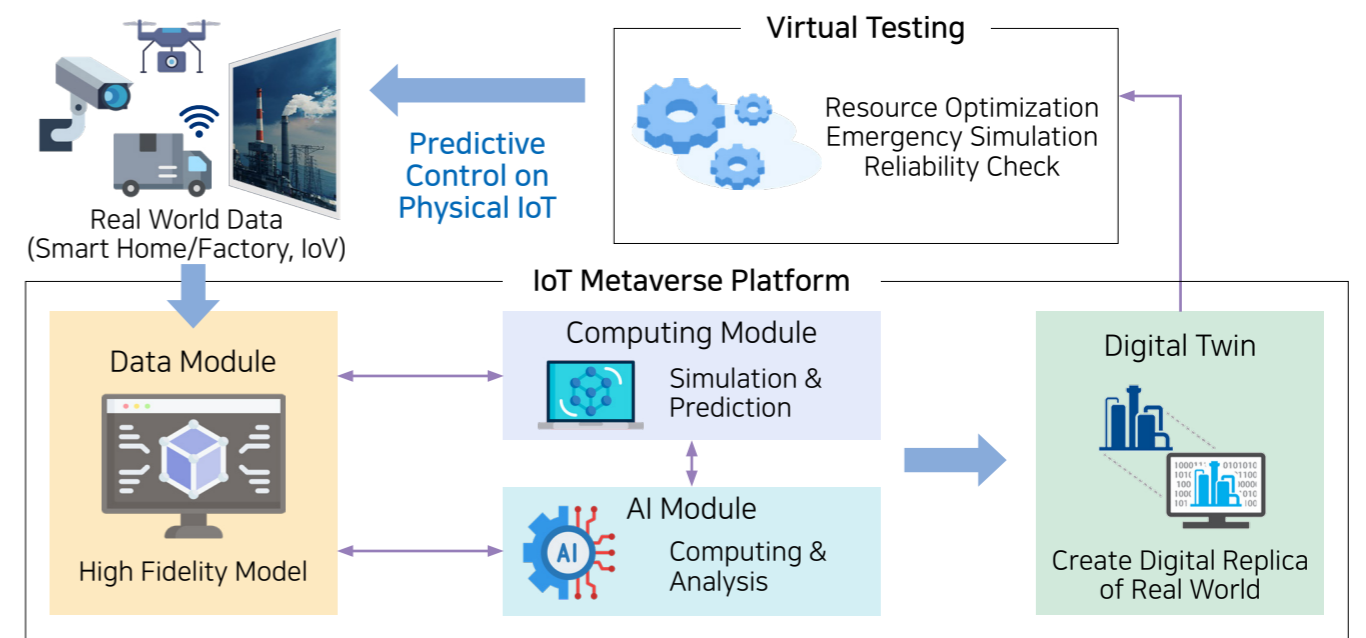
# 6G Wireless Networks

- ML-based content request/traffic prediction
- Network resource management
- Dynamic network configuration



# AIoT-based System

- AI-based IoT system network resource optimization
- Real-time prediction for user context in IoT
- Fault-tolerant service management in smart home/farm, IoV, and Industrial IoT



# Database Lab.

Lee, Wonsuk



leewo@Yonsei.ac.kr | http://database.yonsei.ac.kr | +82-2-2123-2716

## Education

- Ph.D. in Computer Science, Purdue University, 1990
- MS in Computer Science, Purdue University, 1987
- BS in Computer Science, Boston University, 1985

## Experience

- 1993 – Present: Professor, Dept. of Computer Science and Engineering, Yonsei University
- 2019 – 2021: Professor, Digital Analytics, Yonsei University

## Research Areas

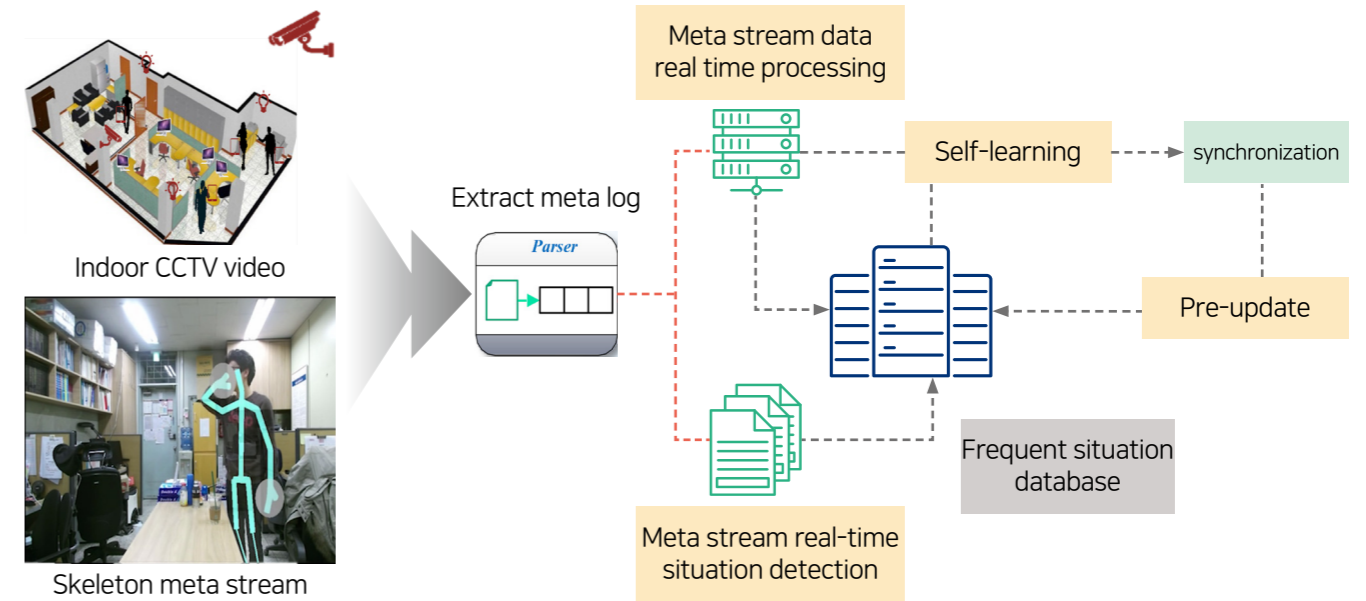
- Edge based real-time situation engine:
  - Self-learning and situation detection by analyzing skeleton, CCTV images, computer logs, etc.
  - Real-time anonymity synthetic data:
    - Real-time anonymity synthetic data generation and re-identification verification
- Big-data parallel processing and distribution hub System:
  - Parallel processing algorithm for optimization / Establishment of synthetic data hub system for distribution

## Publications

- Matrix-based continuous query evaluation for multisensor data streams in IOT environments
- Finding context association rules instantly over data streams of sensor networks for human life
- Adaptive run-time overhead adjustments for optimizing multiple continuous query processing

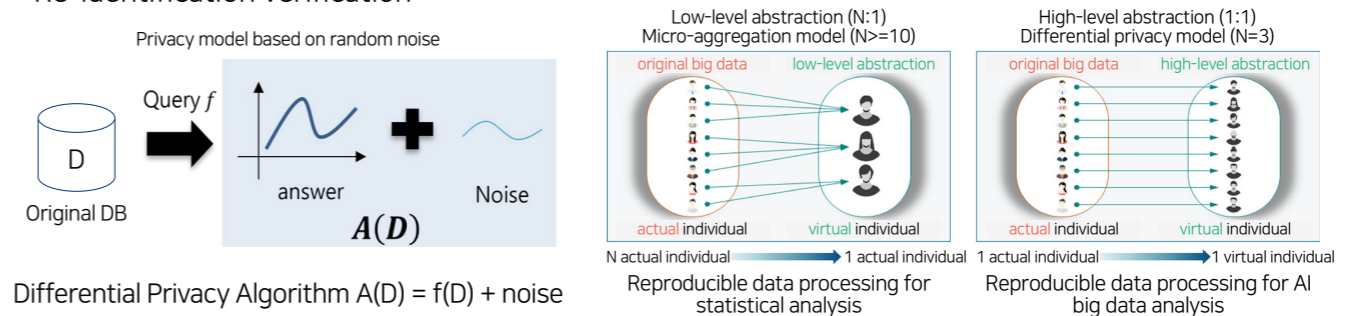
# Edge Based Real-time Situation Engine

- Technique of synchronizing time and position coordinates by analyzing image meta-logs
- Detects and learns and analyzes movement situations through human skeleton information



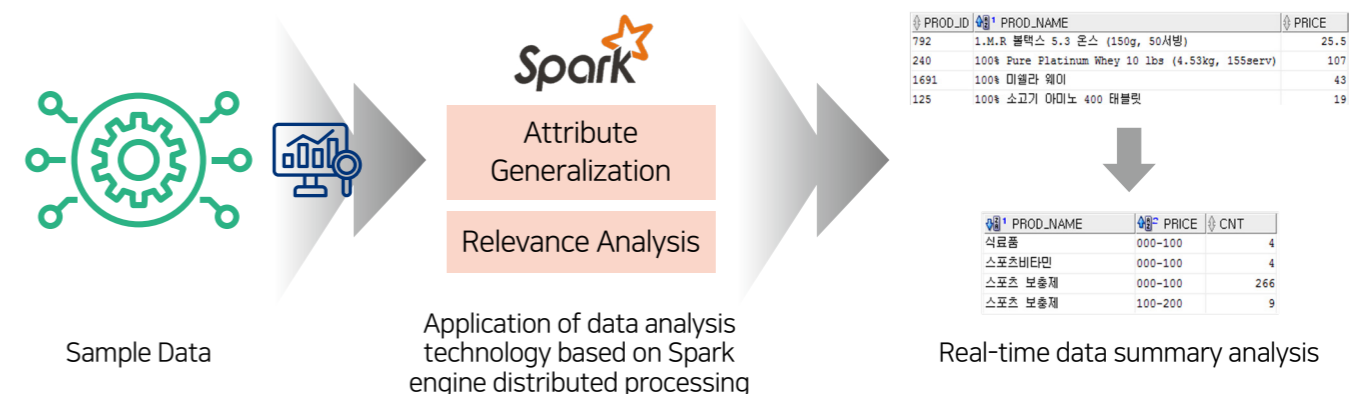
# Real-time Anonymity Synthetic Data

- Data distribution applying differential privacy model
- Personal information anonymization and de-identification algorithm
- Re-identification verification



# Big-data Parallel Processing and Distribution Hub System

- Support the combination of anonymous data and pre-analysis
- Parallel processing algorithm for optimization
- Establishment of synthetic data hub system for distribution



# Big Data Systems & AI Lab.

Park, Kwanghyun



kwanghyun.park@yonsei.ac.kr | https://bdai.yonsei.ac.kr | +82-2-2123-2718

## Education

- Ph.D. in Computer Science, University of Wisconsin-Madison, 2016
- M.Sc. in Computer Science, University of Wisconsin-Madison, 2013
- B.S. in Computer Science and Applied Mathematics & Statistics, State University of New York at Stony Brook, 2010

## Experience

- 2023 - Present: Assistant Professor, Dept. of Computer Science and Engineering, Yonsei University
- 2016 - 2023: Senior Research Engineer, Microsoft Gray Systems Lab
- 2013, 2014: Research Intern, Samsung Research America

## Research Areas

- Systems for ML
- Instance-optimized (learned) systems
- H/W and data platform co-design

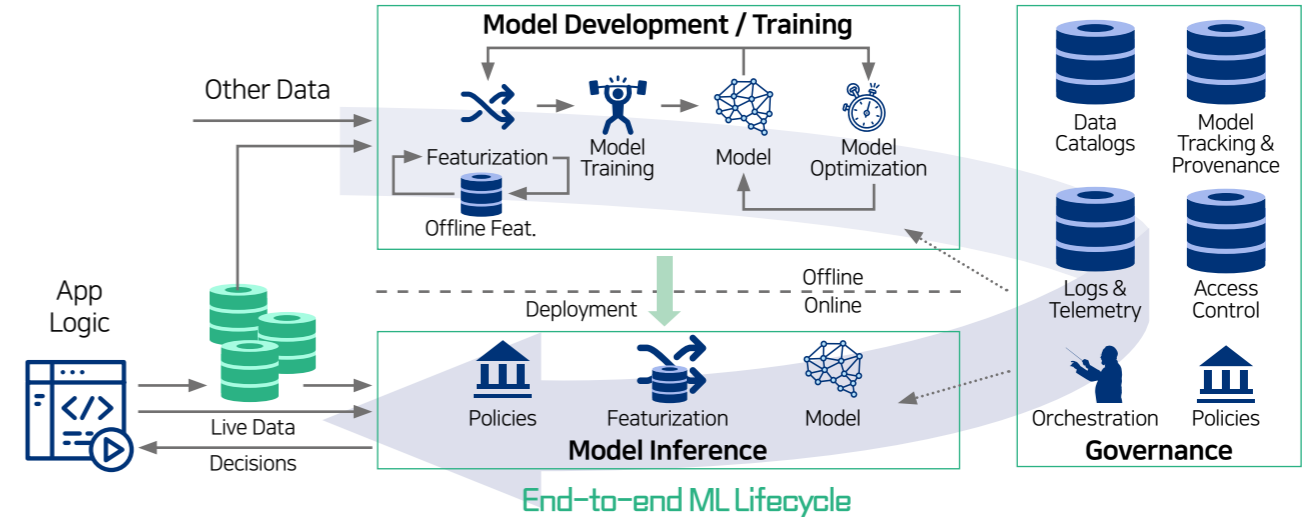
## Publications

- Pushing ML Predictions into DBMSs, TKDE, 2023
- End-to-end Optimization of Machine Learning Prediction Queries, SIGMOD, 2022
  - VIP Hashing - Learning the Skew in Popularity, VLDB, 2022
  - Query Processing on Tensor Computation Runtimes, VLDB, 2022
- NyxCache: Flexible and Efficient Multi-tenant Persistent Memory Caching, FAST, 2022

# Systems for ML

Design and optimize data/ML systems for the ML lifecycle

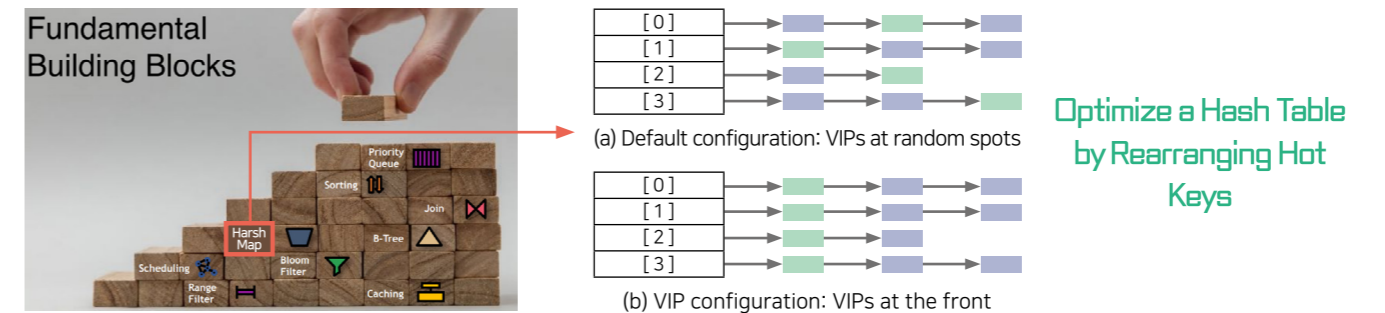
- Understand the end-to-end lifecycle of ML
- Explore inefficiency in each step
- Design an optimized framework/system



# Instance-optimized (learned) systems

Data-driven Instance-optimized systems

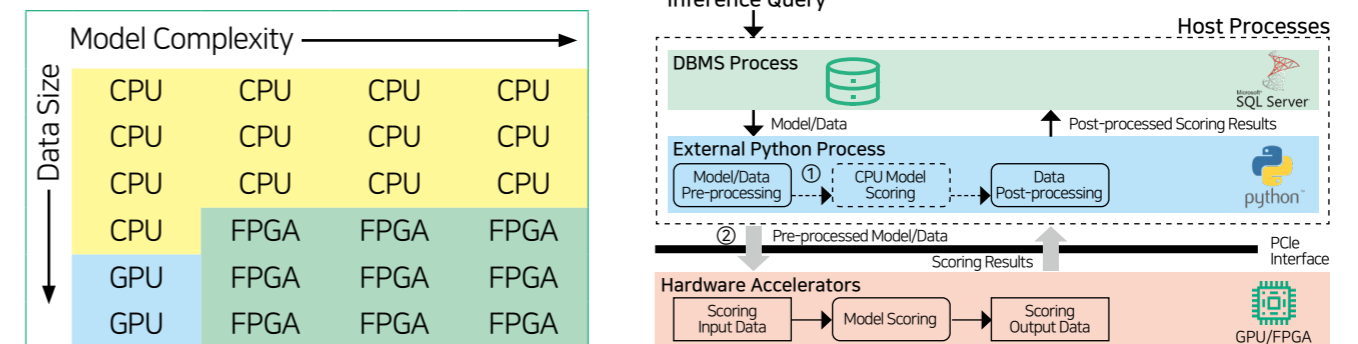
- Collect and featurize historical data for each instance/workload
- Optimize building blocks of systems by using various techniques (including ML)



# H/W and data platform co-design

Co-design H/W and data platform per workload/application

- Understand characteristics of H/W and workloads/applications
- Build an optimized end-to-end system



The best-performing hardware for scoring a RandomForest model depends on the model complexity and data size

High-level architecture of ML scoring, using CPUs or hardware accelerators, in SQL Server with Python

# Data Engineering Lab.

Park, Sanghyun



✉ sanghyun@yonsei.ac.kr    🌐 <http://delab.yonsei.ac.kr>    📞 +82-2-2123-5714

## Education

- Ph.D. in Computer Science, UCLA, 2001
- MS in Computer Engineering, Seoul National University, 1991
- BS in Computer Engineering, Seoul National University, 1989

## Experience

- 2003 – Present: Professor, Dept. of Computer Science and Engineering, Yonsei University
  - Aug. 2002 – Aug. 2003: Assistant Professor, POSTECH
- Feb. 2001 – Jun. 2002: IBM Watson Research Center (Postdoc)

## Research Areas

- Autonomous Database Tuning System:

Deriving the optimal configuration for various workloads in the DBMS that user wants to tune

- AI-based drug discovery:

To learn about pharmacology and drug development process, and development compounds defective for targeted therapy

- Video anomaly detection:

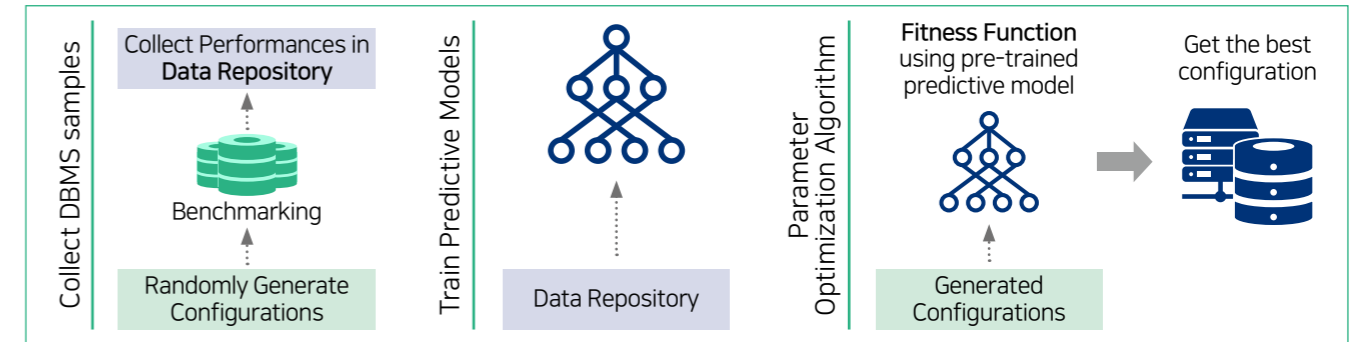
Analyze the divided frames using various computer vision techniques to detect outliers

## Publications

- DeepGate: Global-local decomposition for multivariate time series modeling, Information Sciences, 2022
- AGCN: Attention-based Graph Convolutional Networks for Drug-Drug Interaction Extraction, Expert Systems With Applications, 2020
- MV-FTL: An FTL that Provides Storage-Level Multi-Version Management, IEEE Transactions on Knowledge and Data Engineering, 2018

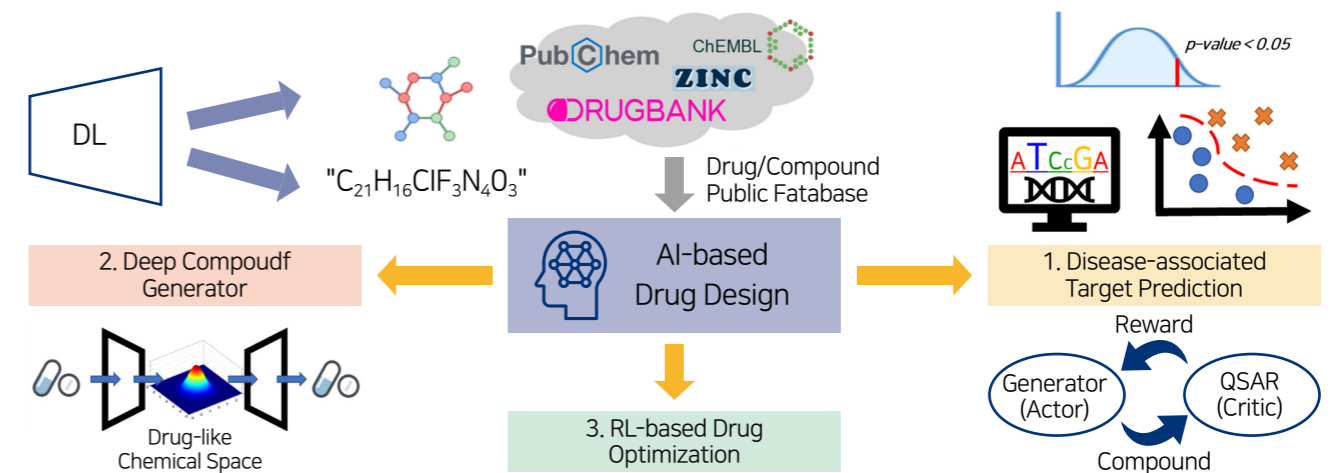
# Autonomous Database Tuning System

- Build dataset for parameter tuning such as MySQL, PostgreSQL
- Identify Knobs that have high impact on DBMS performance
- Recommend optimal configuration for various workloads



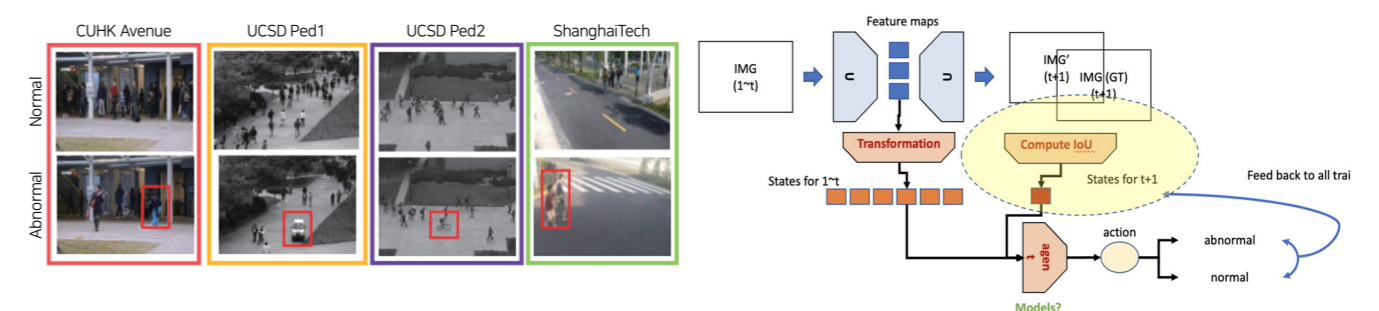
# AI-based drug discovery

- Process through which potential new drugs are identified
- Deep generative model research that can represent molecular
- Generate compounds effective for targeted therapy



# Video anomaly detection

- Detection of abnormal samples in video datasets
- Anomaly detection using CV methods in divided frames
- Analyze the movement of an object through object detection



# Application-aware System Optimization Lab.

Park, Yongjun



✉ yongjunpark@yonsei.ac.kr 🌐 <https://sites.google.com/view/asolabysu> ☎ +82-2-2123-5718

## Education

- Ph.D. in Electrical Engineering, University of Michigan, Ann Arbor, 2013
- MSE in Electrical Engineering, University of Michigan, Ann Arbor, 2009
  - BS in Electronic and Electrical Engineering, POSTECH, 2007

## Experience

- 2022 - Present: Associate Professor, Dept. of Computer Science and Engineering, Yonsei University
  - 2017 - 2022: Associate Professor at Hanyang University
  - 2014 - 2017: Assistant Professor at Hongik University
  - 2013 - 2014: Software Architect at Intel, Santa Clara, CA, USA

## Research Areas

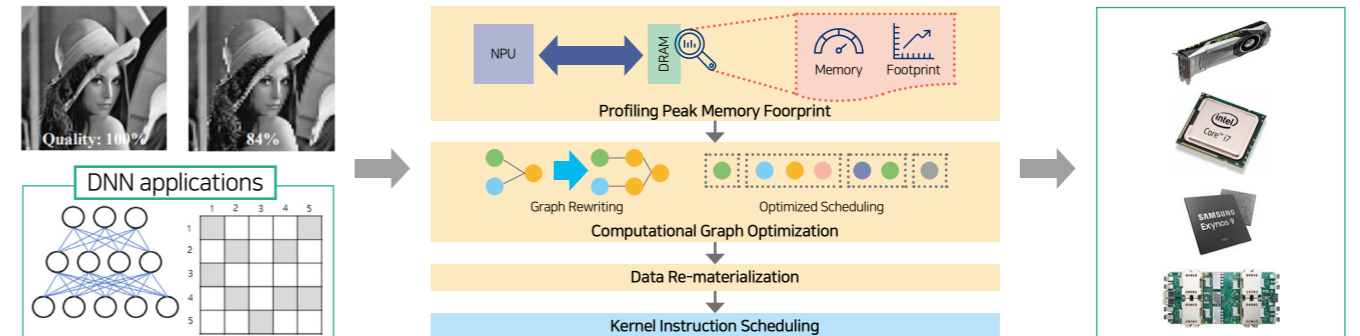
- Compiler/Architecture Level Solutions for Performance and Energy-efficiency on Heterogeneous Systems (ILP (CPU, CGRA), DLP (SIMD, GPU), and NPU Accelerators)
  - Compiler Optimization for Deep Learning and Big Data Processing Applications on CPU/GPU/NPU/PIM-based Systems
  - Efficient Multitasking Support for Multiple Deep Learning Applications
    - Compiler/OS Support for Neural Processing Units
  - Compiler Support for Processing-in-Memory (PIM) and In-Storage Processing (ISP)

## Publications

- Convergence-Aware Neural Network Training, DAC 2020
  - Navigator: Dynamic Multi-kernel Scheduling to Improve GPU Performance, DAC 2020
- Optimization of a GPU-based Sparse Matrix Multiplication for Large Sparse Networks, ICDE 2020
- PreScaler: An Efficient System-aware Precision Scaling Framework on Heterogeneous Systems, CGO 2020
- GATE: A Generalized Dataflow-level Approximation Tuning Engine For Data Parallel Architectures, DAC 2019

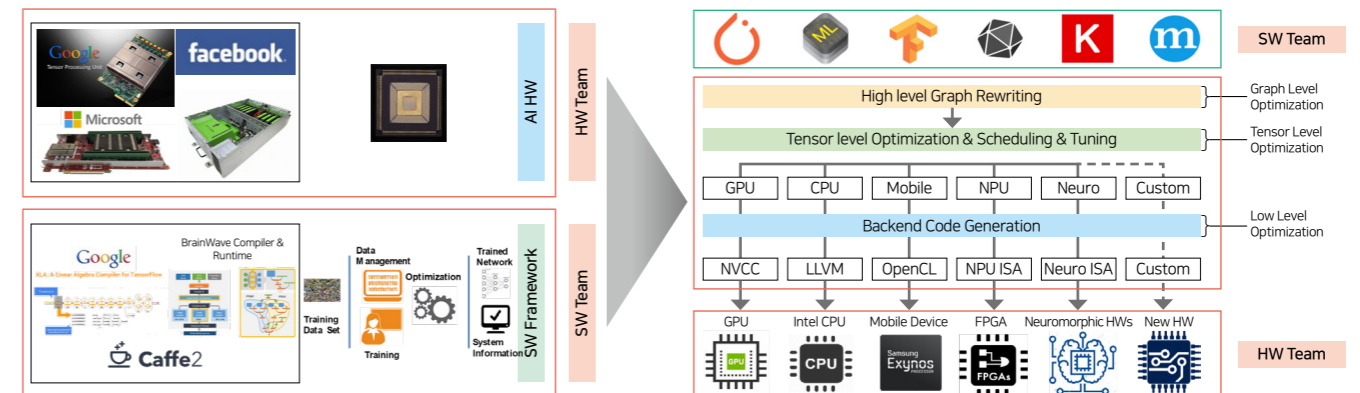
# Compiler Optimization for Deep Learning and Big Data Processing Applications on CPU/GPU/NPU/PIM-based Systems

- To develop various compiler-level techniques that optimize memory utilization and perform efficient instruction scheduling on the heterogeneous environments



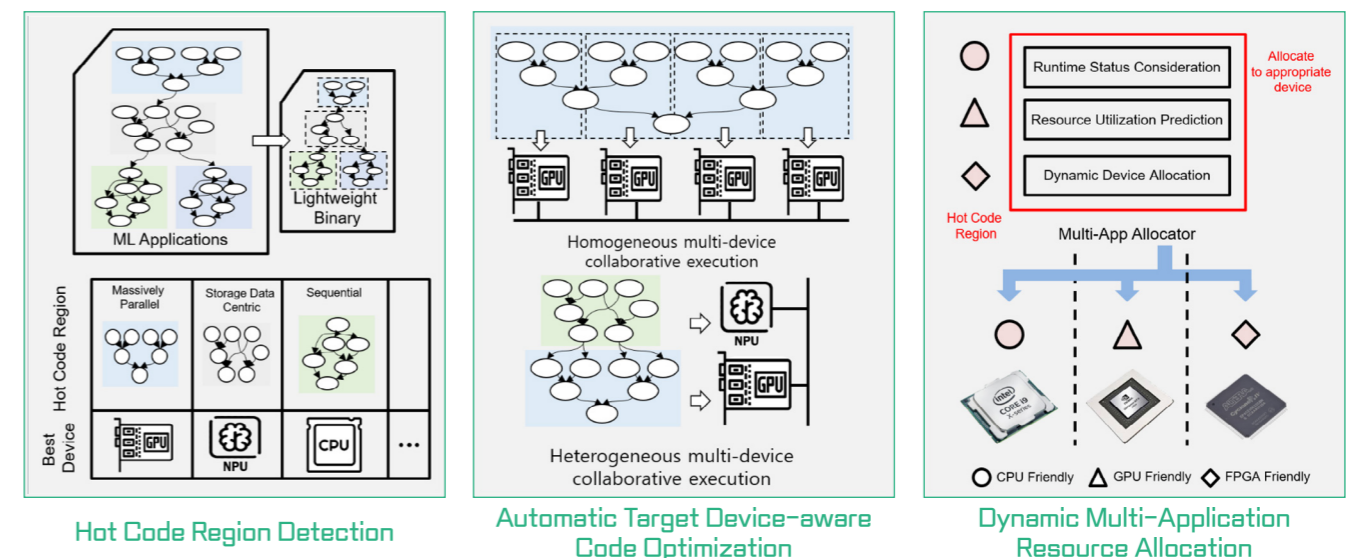
# Efficient AI Platform Development for Various HWs

- Propose system-level optimization techniques
- Optimization by considering the characteristics of underlying hardwares
- Performance improvement of target applications



# Efficient Multitasking Support for Multiple Deep Learning Applications on Heterogeneous Architectures

- To achieve maximum efficiency through runtime and compilation level optimizations



# Cyber Security Lab.

Song, Dokyung



dokyungs@yonsei.ac.kr <https://cysec.yonsei.ac.kr> +82-2-2123-2715

## Education

- Ph.D. in Computer Science, University of California, Irvine, 2020
- MS in Computer Science, University of California, Irvine, 2019
- BS in Electrical and Computer Engineering, Seoul National University, 2014

## Experience

- 2021 – Present: Assistant Professor, Dept. of Computer Science and Engineering, Yonsei University

## Research Areas

- Building Secure Systems:

Designing and implementing software systems that provide high security guarantees at low overheads

- Vulnerability Scanning:

Developing techniques to find vulnerabilities in low-level software systems such as OS kernels

- Binary Analysis:

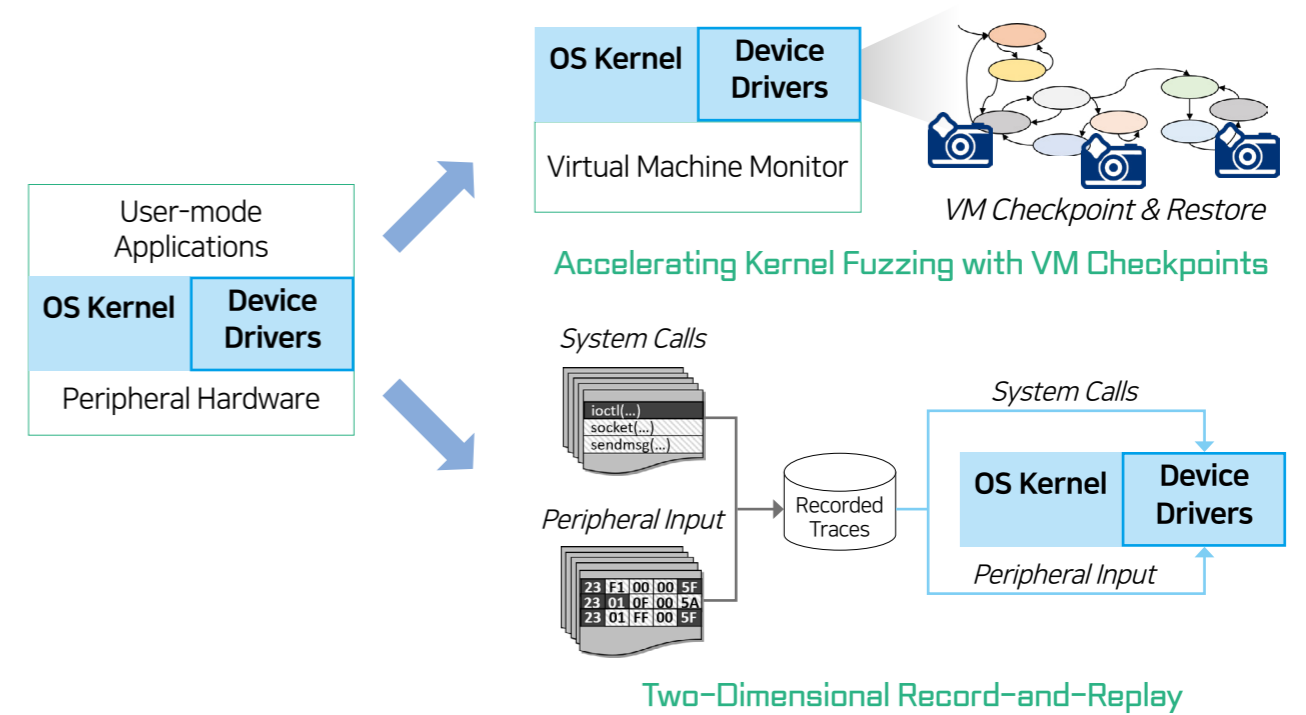
Developing techniques that can recover rich semantics information from binaries without their source code

## Publications

- Improving Cross-Platform Binary Analysis using Representation Learning via Graph Alignment, ISSTA, 2022
- Agamoto: Accelerating Kernel Driver Fuzzing with Lightweight Virtual Machine Checkpoints, USENIX Security, 2020
- SoK: Sanitizing for Security, IEEE S&P, 2019

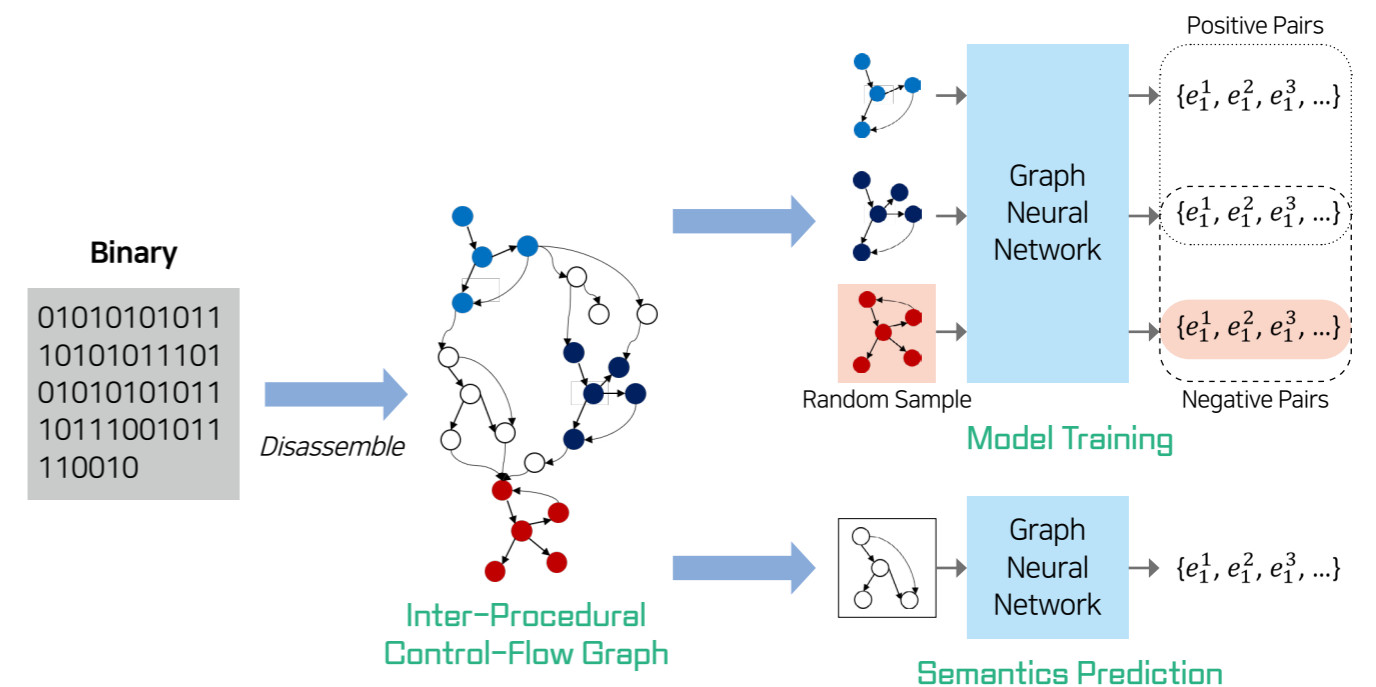
# System Software Vulnerability Scanning

- Accelerating kernel fuzzing with VM checkpoints
- Kernel fuzzing with two-dimensional record-and-replay
- Dynamic bug detection techniques



# Binary Analysis using Machine Learning

- Unsupervised & supervised binary representation learning
- Graph-structured binary representation for using GNNs
- Cross-platform binary analysis using Siamese architecture



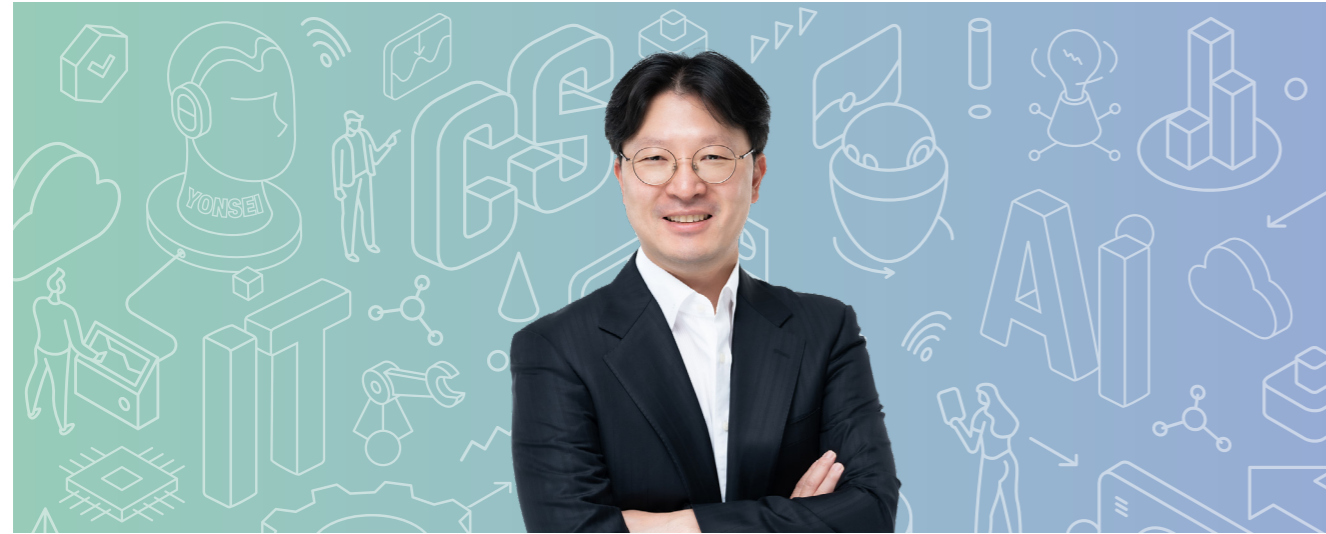




# Department of Artificial Intelligence

# AI Powered Medical Imaging Systems Lab.

Baek, Jongduk



✉ [jongdukbaek@yonsei.ac.kr](mailto:jongdukbaek@yonsei.ac.kr) 🌐 <https://sites.google.com/view/yonsei-medisyslab> ☎ +82-2-2123-5737

## Education

- Ph.D. in Electrical Engineering, Stanford University, 2009
- MS in Electrical Engineering, Stanford University, 2007
- BS in Electrical Engineering, Yonsei University, 2004

## Experience

- 2022 - Present: Professor, Dept. of Artificial Intelligence, Yonsei University
  - Aug. 2022 - : Founder and CEO, BareuneX Imaging Inc.
- Mar. 2019 - Feb. 2020: Visiting Professor at Stanford University, CA, U.S.A.

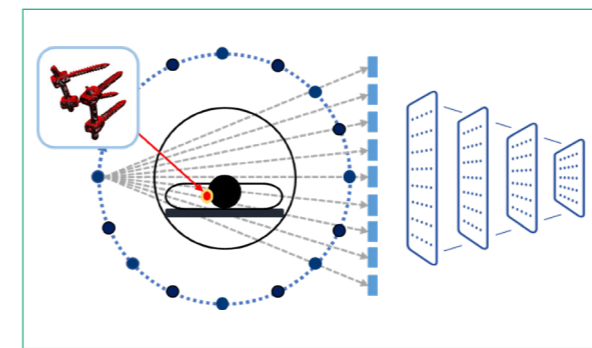
## Research Areas

- Medical Image processing: CT artifacts correction, reconstruction
- Development of X-ray imaging system: Inverse geometry CT, semi-stationary CT system
  - Image Perception: Recognition of lesion on medical images

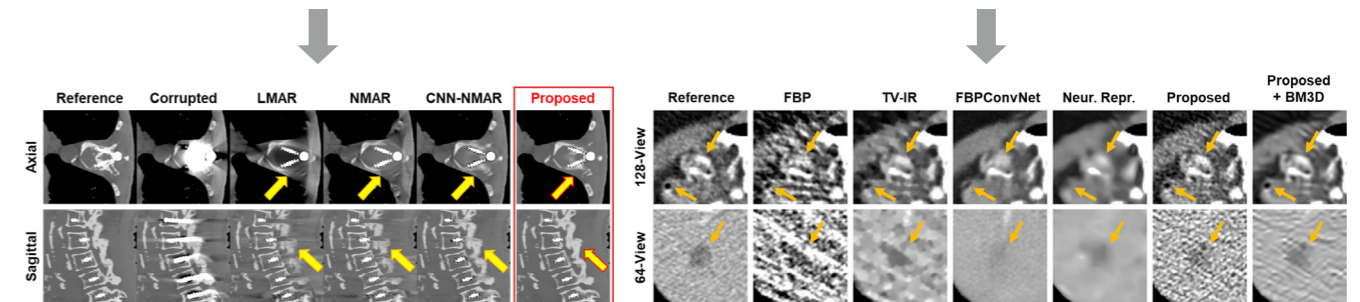
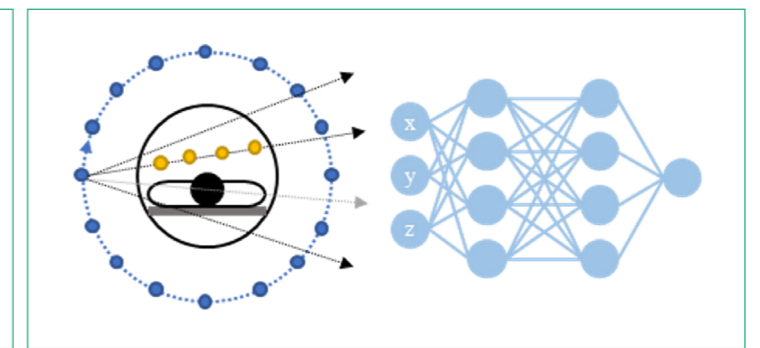
## Publications

- A streak artifact reduction algorithm in sparse-view CT using a self-supervised neural representation, *Medical Physics* (Editor's Choice), 2022
- Weakly-Supervised Progressive Denoising with Unpaired CT images, *Medical Image Analysis*, 2021
  - Rigid and non-rigid motion artifact reduction in X-ray CT using attention module, *Medical Image Analysis*, 2021
- Geometry calibration and image reconstruction for carbon-nanotube-based multisource and multidetector CT, *Physics in Medicine and Biology*, 2021
- Evaluation of human observer performance on lesion detectability in single-slice and multislice dedicated breast cone beam CT images with breast anatomical background, *Medical Physics* (Editor's Choice), 2018

## CT simulation & Deep learning



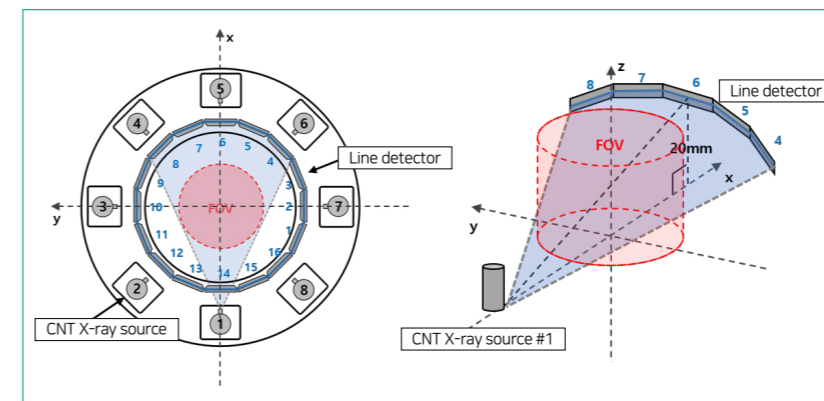
## Coordinate-based NeRF



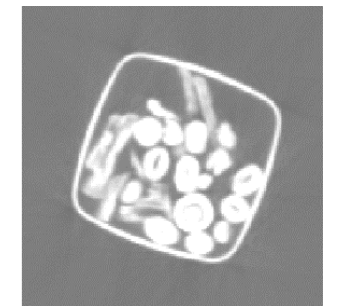
Metal artifacts reduction

Streak artifacts reduction

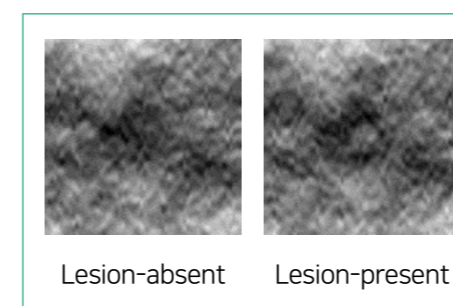
## Semi-stationary CT system



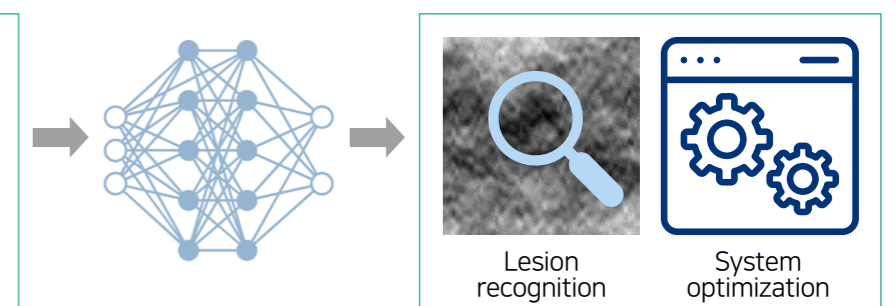
## Reconstructed CT image



## Breast image



## Image perception



## Vision and Learning Lab.

Choi, Jonghyun



✉ [jc@yonsei.ac.kr](mailto:jc@yonsei.ac.kr) 🌐 <https://yonseivnl.github.io> 📞 +82-2-2123-5731

### Education

- Ph.D. in Electrical and Computer Engineering, University of Maryland, College Park, 2015
- MS, BS in Electrical Engineering and Computer Science, Seoul National University, 2008, 2003

### Experience

- 2022 – Present: Associate Professor, Dept. of Artificial Intelligence, Yonsei University
  - 2018 – 2022: Assistant Professor, GIST
  - 2016 – 2018: Research Scientist, Allen Institute for AI (AI2)
- 2013 – 2015: Research Intern, Microsoft Research, Disney Research, Adobe Research

### Research Areas

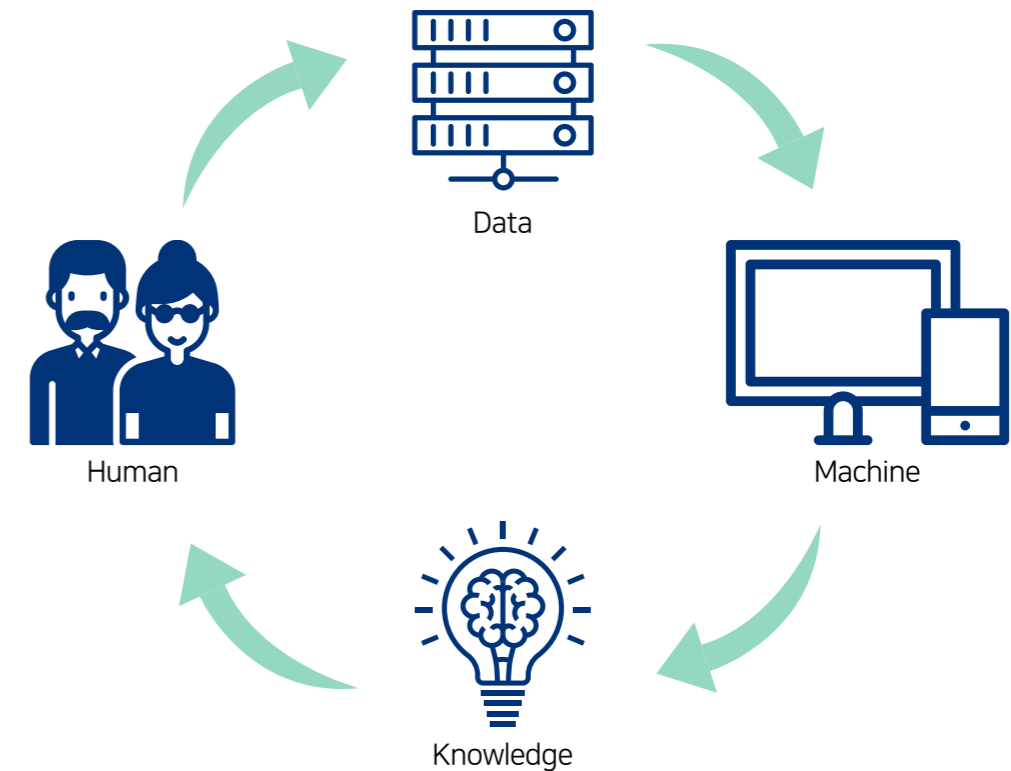
- Visual recognition on resource constrained scenarios: Learning with a few annotated samples / Learning a small model with high accuracy
  - Continual learning: Continuously updating a recognition model with a streamed data
- Embodied AI for a robotic butler: Learning an embodied AI agent to do a household task by understanding visual input and natural language commands
  - Multimodal recognition: Vision and language recognition system for video and text
- Neuromorphic (event) vision system: Building non-RGB vision system for superhuman visual capability

### Publications

- Online Boundary-Free Continual Learning by Scheduled Data Prior, ICLR 2023
- Ask4Help: Learning to Leverage an Expert for Embodied Tasks, NeurIPS 2022
- Self-Supervised Learning for Binary Networks by Joint Classifier Training, CVPR 2022
- Online Continual Learning on a Contaminated Data Stream with Blurry Task Boundaries, CVPR 2022
  - Online Continual Learning on Class Incremental Blurry Task Configuration with Anytime Inference, ICLR 2022
- Iconary: A Pictionary-based Game for Testing Multimodal Communication with Drawings and Text, EMNLP 2021 (oral)

## Few-shot, Continual Visual Recognition

- Learning a high-performance AI models with a few labeled data
- Continually update already learned model with a streamed data



## Embodied AI

- Learning a robotic AI agent that can understand the environment and language directives
- Learning common sense without direct supervision



# Medical Imaging & Computer Vision Lab.

Hwang, Seongjae



✉ seongjae@yonsei.ac.kr 🌐 <https://micv.yonsei.ac.kr> 📞 +82-2-2123-5719

## Education

- Ph.D. in Computer Science, University of Wisconsin-Madison, 2019
- MS in Robotics, University of Pennsylvania, 2013
- BS in Computer Science, University of Illinois at Urbana-Champaign, 2011

## Experience

- 2022 – Present: Assistant Professor, Dept. of Artificial Intelligence, Yonsei University
- 2019 – 2022: Assistant Professor, Dept. of Computer Science, University of Pittsburgh

## Research Areas

- Brain Imaging Analysis:

Predicting brain diseases and Alzheimer's disease via computer vision and deep learning

- Domain Adaptation / Generalization:

Training robust deep learning models under domain shifts in natural, medical, and NLP datasets

- Multi-site Neuroimaging:

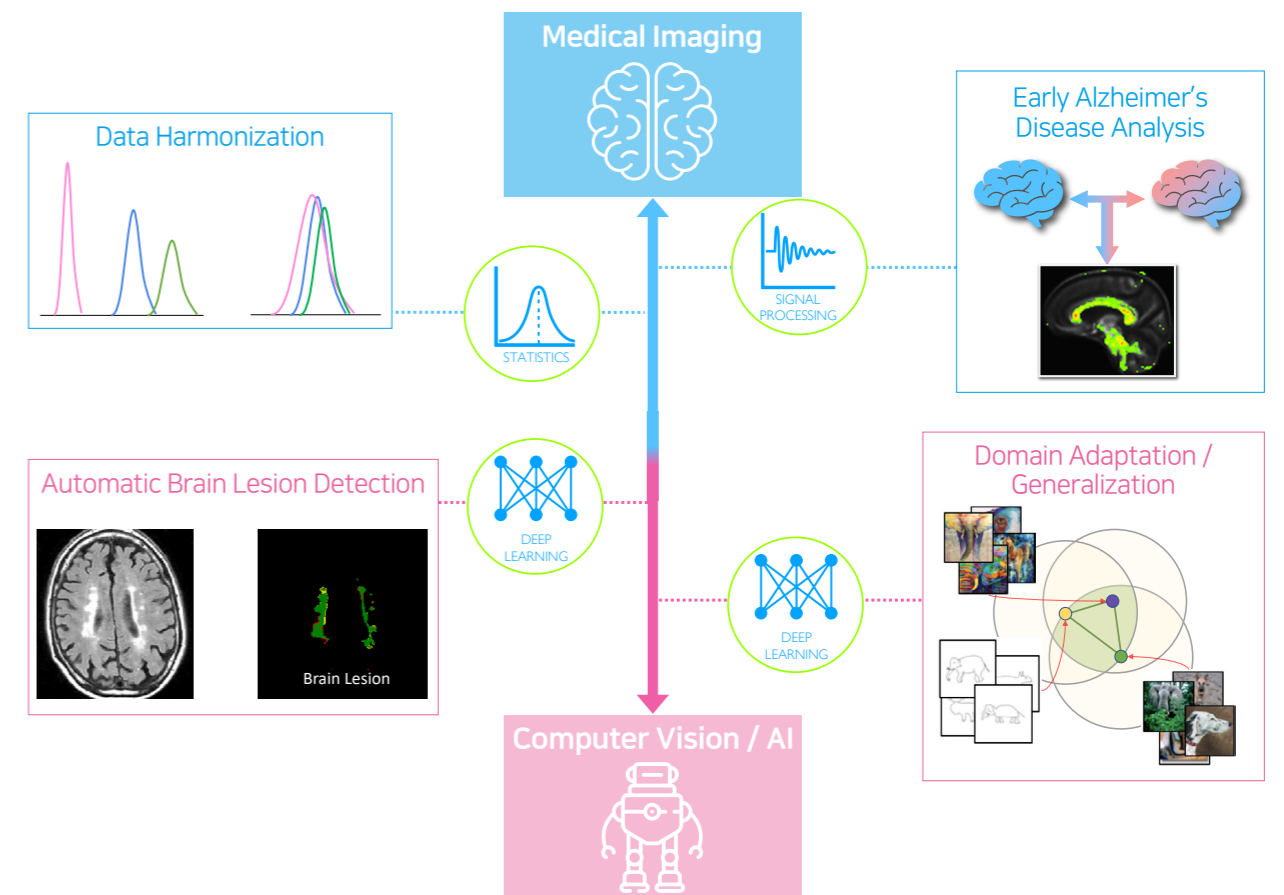
Combining multiple neuroimaging datasets for robust multi-site analysis and applications

## Publications

- PAC-Bayesian Domain Adaptation Bounds for Multiclass Learners, UAI, 2022 [Best Paper Award]
- PAC Bayesian Performance Guarantees for Deep (Stochastic) Networks in Medical Imaging, MICCAI, 2021
- A multi-scanner neuroimaging data harmonization using RAVEL and Combat, NeuroImage, 2021

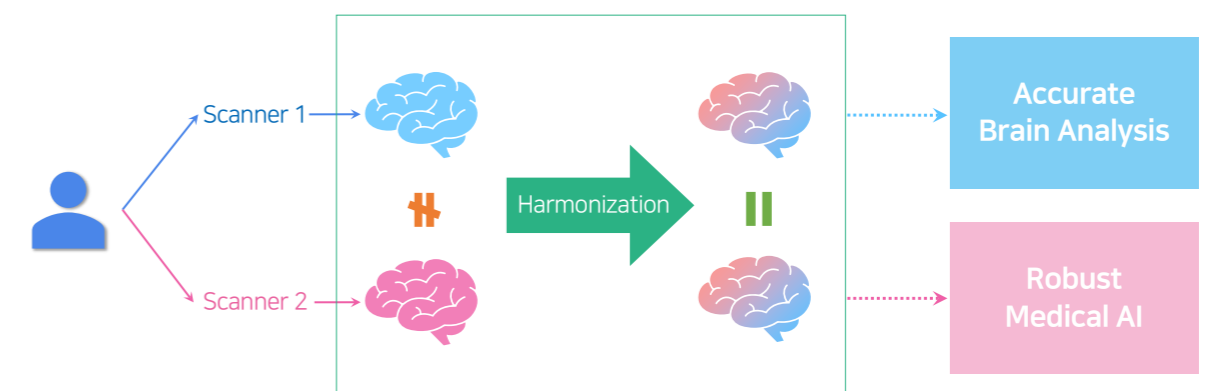
# Medical Imaging + Computer Vision

- Medical imaging analysis / application with computer vision
- Build generalizable deep learning models
- Detect brain lesions and predict Alzheimer's disease



## Multi-site Neuroimaging

- Combine multiple neuroimaging datasets
- Robust Alzheimer's disease analysis
- Generalizable applications of deep learning models



## Data Intelligence Lab.

Lee, Dongha



✉ donalee@yonsei.ac.kr 🌐 <https://diyonseinotion.site> 📞 +82-2-2123-5732

### Education

- Ph.D. in Computer Science and Engineering, POSTECH, 2020
- BS in Computer Science and Engineering, POSTECH, 2015

### Experience

- 2023 – Present: Assistant Professor, Dept. of Artificial Intelligence, Yonsei University
  - 2021 - 2022: Postdoc Researcher, University of Illinois at Urbana-Champaign
  - 2020 - 2021: Postdoc Researcher, POSTECH Institute of Artificial Intelligence
  - 2018: Visiting Researcher, University of Texas Health Science Center at Houston

### Research Areas

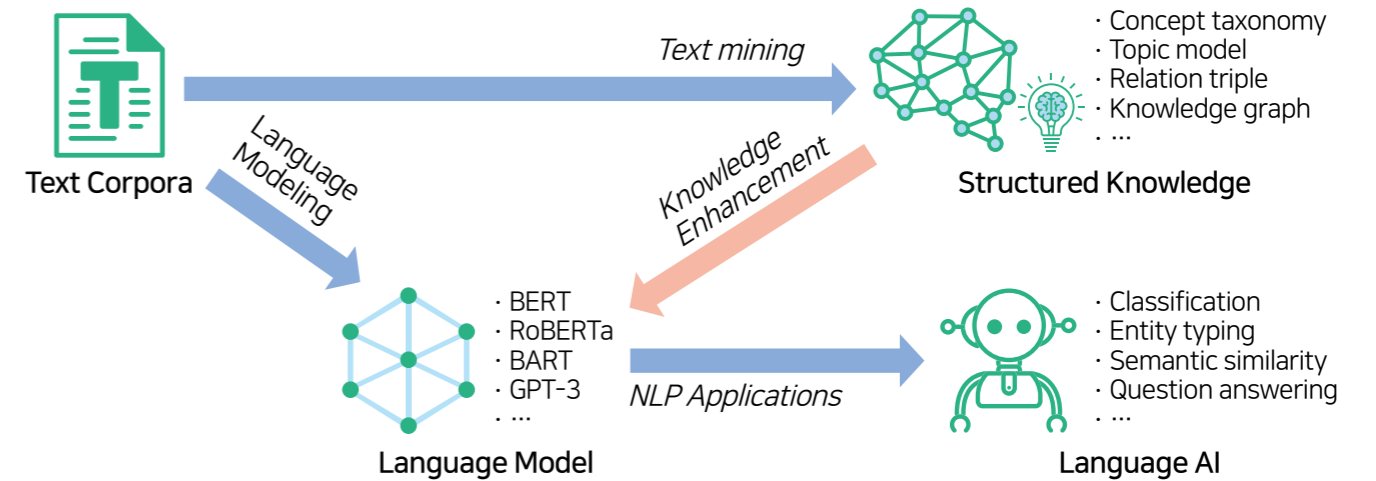
- Text Mining & NLP Applications,
- Reasoning over Knowledge Graph
- Information Retrieval & Recommendation

### Publications

- TaxoCom: Topic Taxonomy Completion with Hierarchical Discovery of Novel Topic Clusters, WWW 2022
- Bootstrapping User and Item Representations for One Class Collaborative Filtering, SIGIR 2021
  - Learnable Dynamic Temporal Pooling for Time Series Classification, AAAI 2021

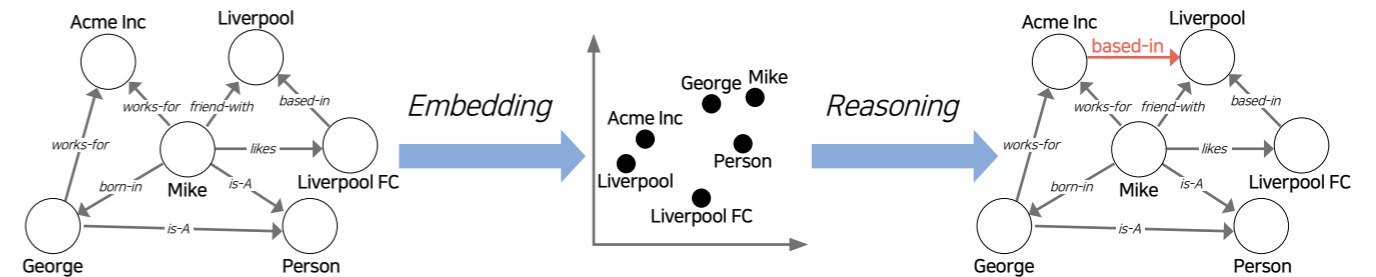
## Text Mining & NLP Applications

- Building structured knowledge from unstructured text corpora
- Enhancing language models to explicitly utilize external knowledge



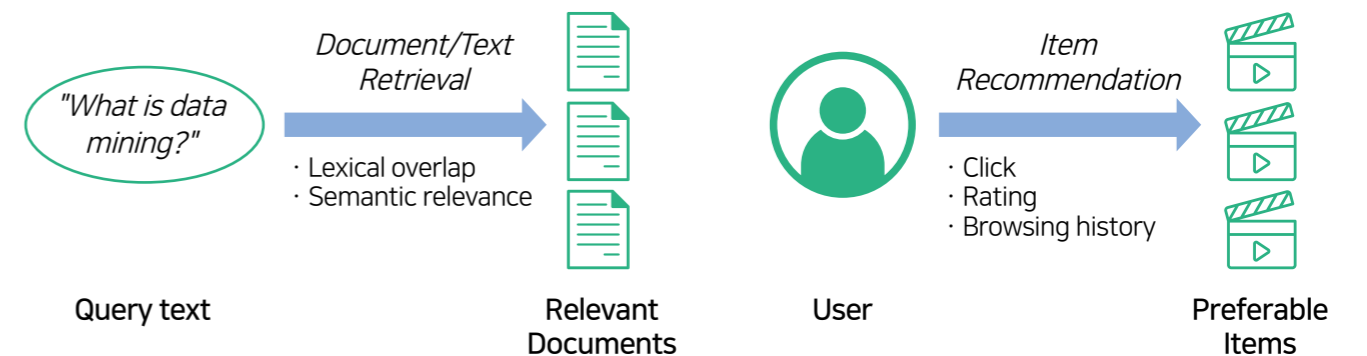
## Reasoning over Knowledge Graph

- Learning effective representations of knowledge graph
- Reasoning over knowledge graph using the representations



## Information Retrieval & Recommendation

- Ranking documents by their semantic relevance to a query text
- Recommending items according to the preference of a user



# Big Data Analytics Lab.

Park, Noseong



✉ noseong@yonsei.ac.kr 🌐 <https://sites.google.com/view/npark> 📞 +82-2-2123-3286

## Education

- Ph.D. in Computer Science, University of Maryland, College Park, 2016
- MS in Information and Communications Engineering, KAIST, 2005
- BS in Computer Science, Soongsil University, 2003

## Experience

- 2020 – Present: Associate Professor, Dept. of Artificial Intelligence, Yonsei University
- 2018 – 2019: Assistant Professor, George Mason University

## Research Areas

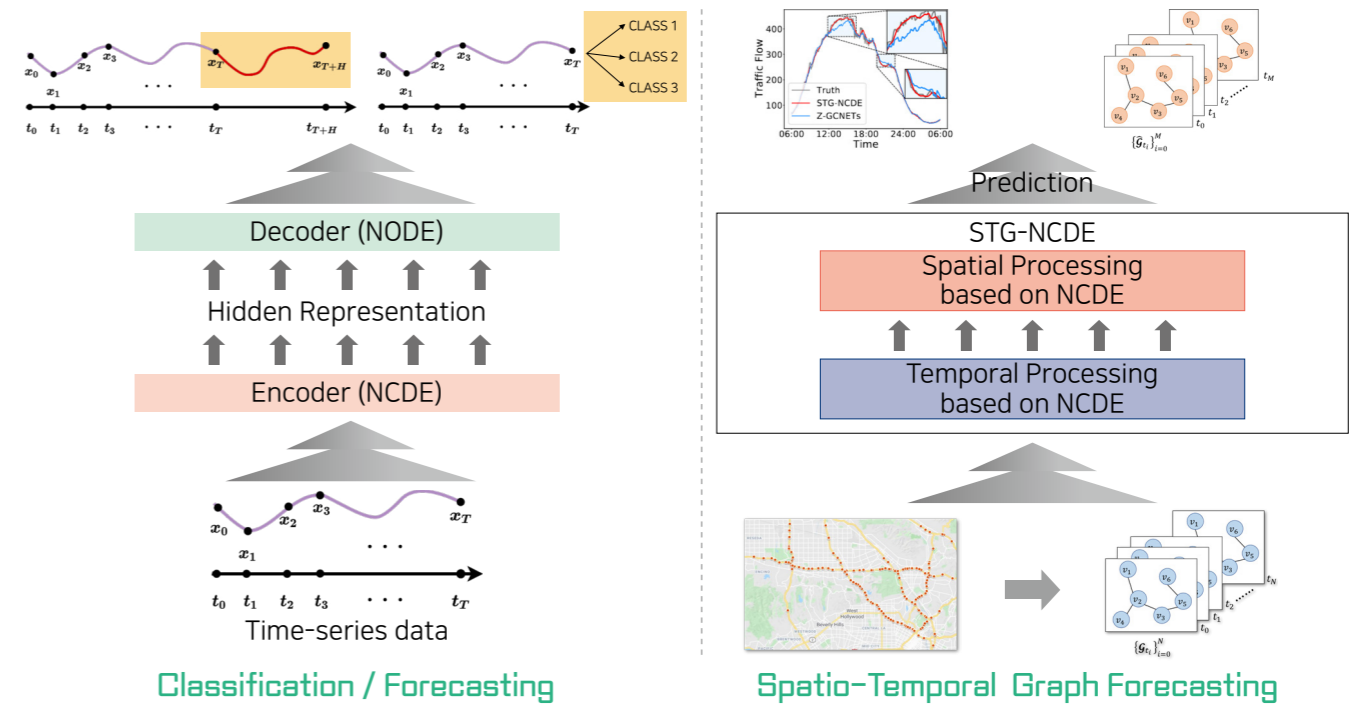
- Generative Model:  
Generating fake data using deep generative models
- Time Series Processing:  
Time series forecasting · classification / Time series synthesis
- Differential Equation-inspired Deep Learning:  
Solving differential equations with deep learning
- Big Data Analytics:  
Real-world AI applications

## Publications

- Jeongwhan Choi, Seoyoung Hong, Noseong Park, and Sung-Bae Cho, "GREAD: Graph Neural Reaction-Diffusion Networks," International Conference on Machine Learning (ICML), 2023
- Chaejeong Lee, Jayoung Kim, and Noseong Park, "CoDi: Co-evolving Contrastive Diffusion Models for Mixed-type Tabular Synthesis," International Conference on Machine Learning (ICML), 2023
- Jeongwhan Choi, Seoyoung Hong, Noseong Park, and Sung-Bae Cho, "Blurring-Sharpener Process Models for Collaborative Filtering," International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR), 2023
- Jayoung Kim, Chaejeong Lee, and Noseong Park, "STaSy: Score-based Tabular Data Synthesis," International Conference on Learning Representations (ICLR), 2023
- Jeongwhan Choi, Hwangyong Choi, Jeehyun Hwang, Noseong Park, "Graph Neural Controlled Differential Equations for Traffic Forecasting," AAAI Conference on Artificial Intelligence (AAAI), 2022

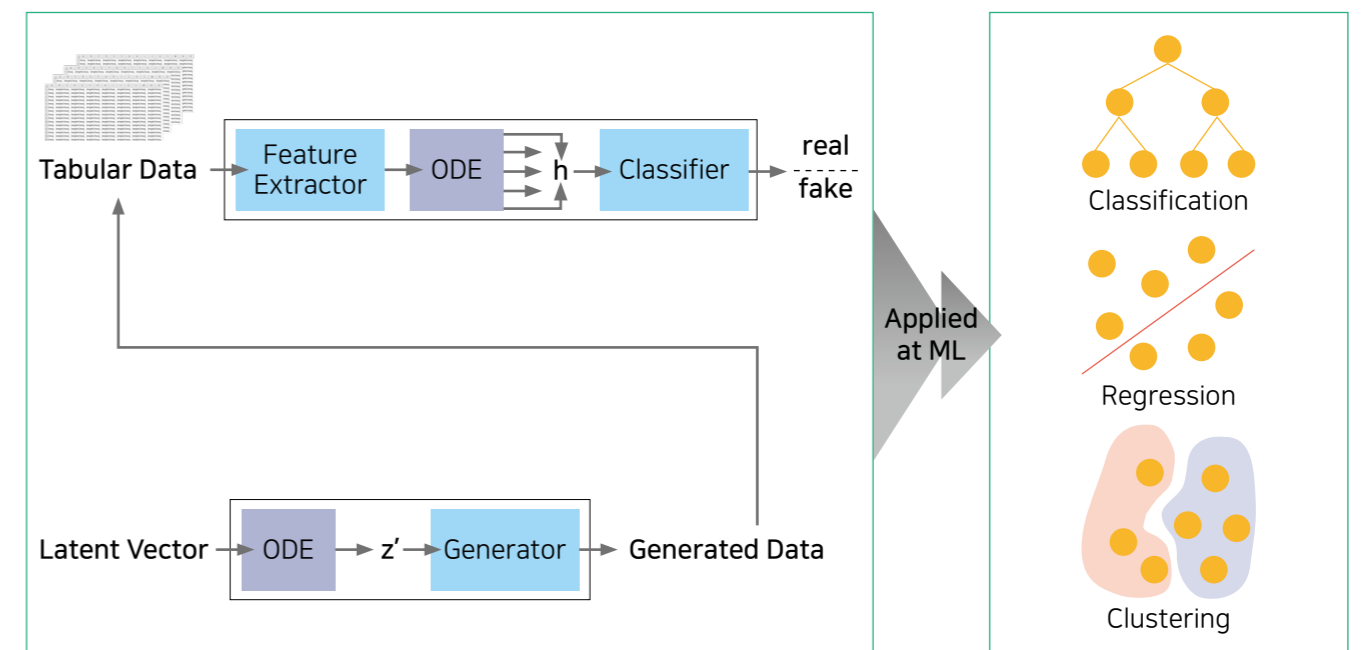
## Time-Series Task

- Change a discrete time-series to a continuous time-series
- Using the latest continuous models (ODE, CDE, RDE, etc.)
- Various time-series task



## Data Generation

- Generating tabular (synthetic) data
- Using the latest generative models (GAN, Diffusion model, etc.)
- Dealing with oversampling issues



# Language Intelligence Lab.

Yeo, Jinyoung



[jinyeo@yonsei.ac.kr](mailto:jinyeo@yonsei.ac.kr) <https://diyonsei.notion.site> +82-2-2123-3287

## Education

- Ph.D. in Computer Science and Engineering, POSTECH, 2018
- BS in Computer Science and Engineering, Kyungpook National University, 2012

## Experience

- 2020 – Present: Assistant Professor, Dept. of Artificial Intelligence, Yonsei University
  - 2018 – 2020: Research Scientist, SK T-Brain
  - 2015 Winter, 2016 Summer: Research Intern, Adobe Systems

## Research Areas

- Dialogue Generation:

Building open-domain chatbots that are able to use different human-like communicative skills

- Commonsense Reasoning:

Empowering machine to have human-like ability about commonsense knowledge

- Neural Information Retrieval:

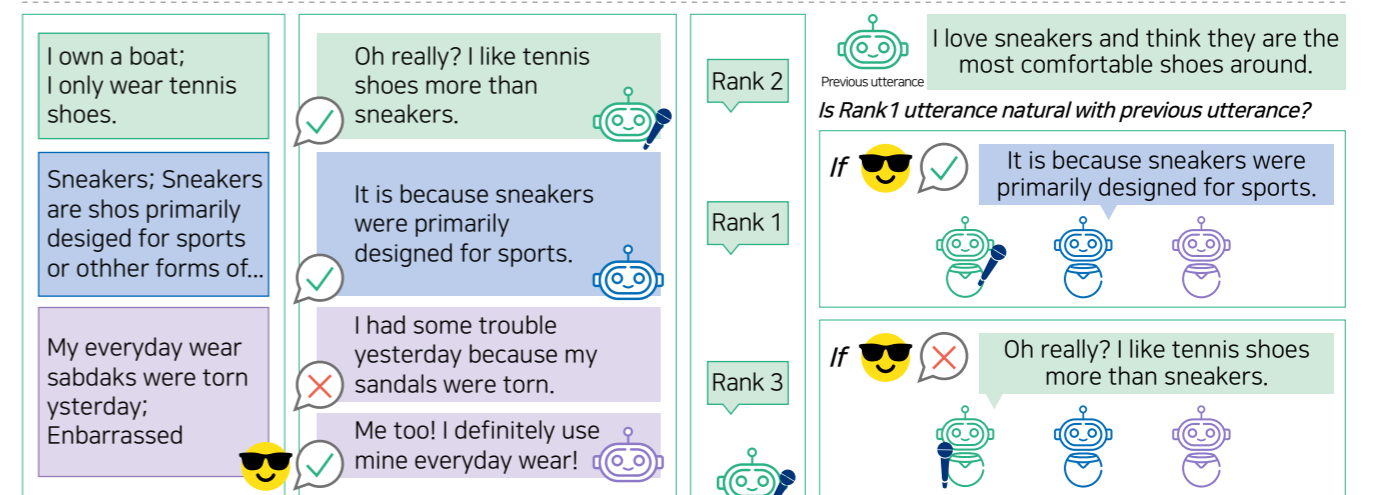
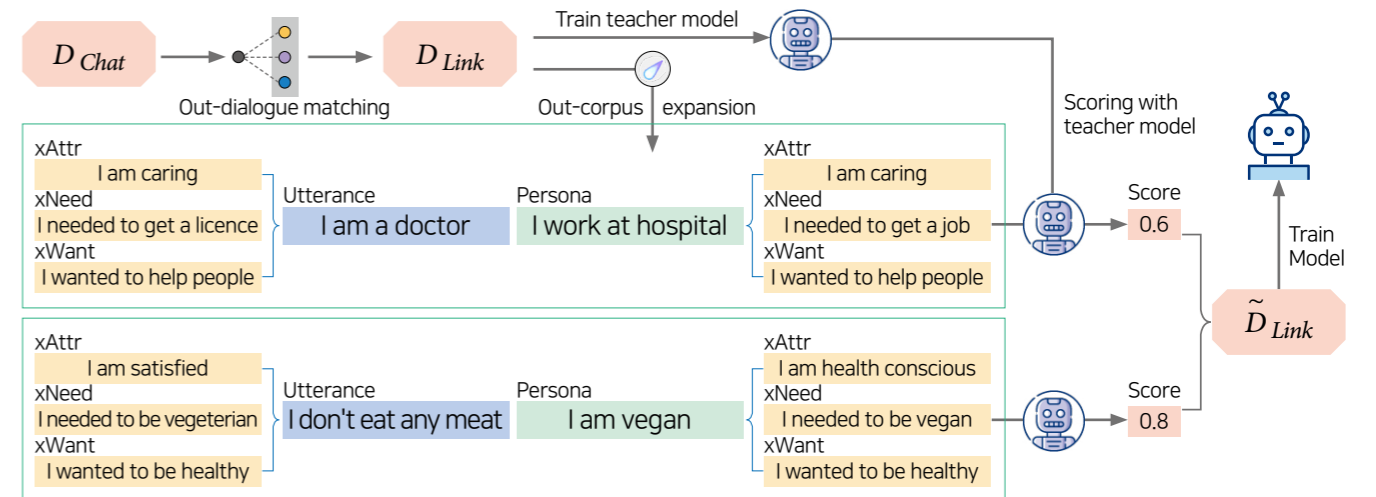
Ranking search results in response to query by using deep neural networks

## Publications

- Modularized Transfer Learning with Multiple Knowledge Graphs for Zero-shot Commonsense Reasoning, NAACL, 2022
- Dual Task Framework for Improving Persona-grounded Dialogue Dataset, AACL, 2022
  - TrustAL: Trustworthy Active Learning using Knowledge Distillation, AACL, 2022

# Dialogue Generation

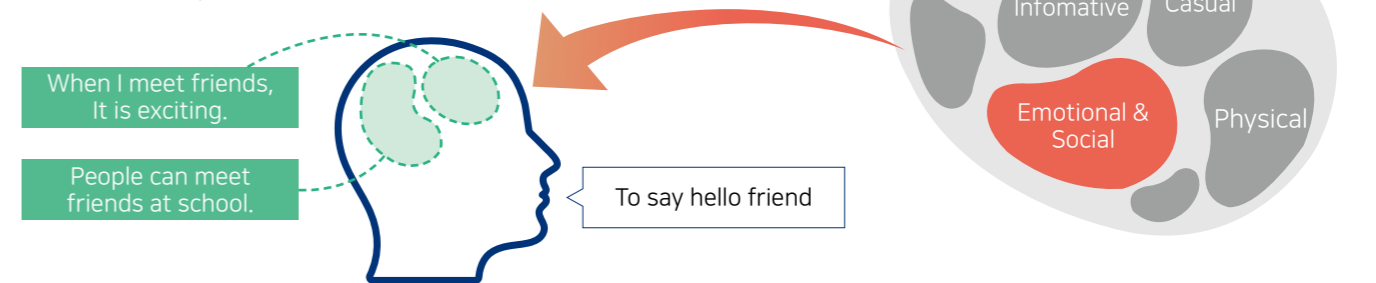
- Personalized dialogue agent
- Blending different dialogue skills into a single chatbot
- Long-term open-domain chatbot



# Commonsense Reasoning

- Injecting commonsense knowledge into neural models
- Blending different types of reasoning abilities
- Open-ended commonsense reasoning

**Context** Carson was excited to wake up to attend school.  
**Question** Why did Carson do this?



# Multimodal Intelligence Research Lab.

Yu, Youngjae



✉ [yjy@yonsei.ac.kr](mailto:yjy@yonsei.ac.kr) 🌐 <https://mirmlab.yonsei.ac.kr> ☎ +82-2-2123-2713

## Education

- Ph.D. in Computer Science and Engineering, Seoul National University, 2021
- BS in Computer Science and Engineering, Seoul National University, 2015

## Experience

- 2023 - Present: Assistant Professor, Dept. of Artificial Intelligence, Yonsei University
- 2021 - 2023: Young Investigator/Postdoc, Allen Institute for AI & University of Washington
  - 2018: Research Intern, Microsoft Redmond

## Research Areas

- Computer Vision:

Video Understanding / Multimodal perception for machine (Video, Speech, Embodied AI, AR/VR)

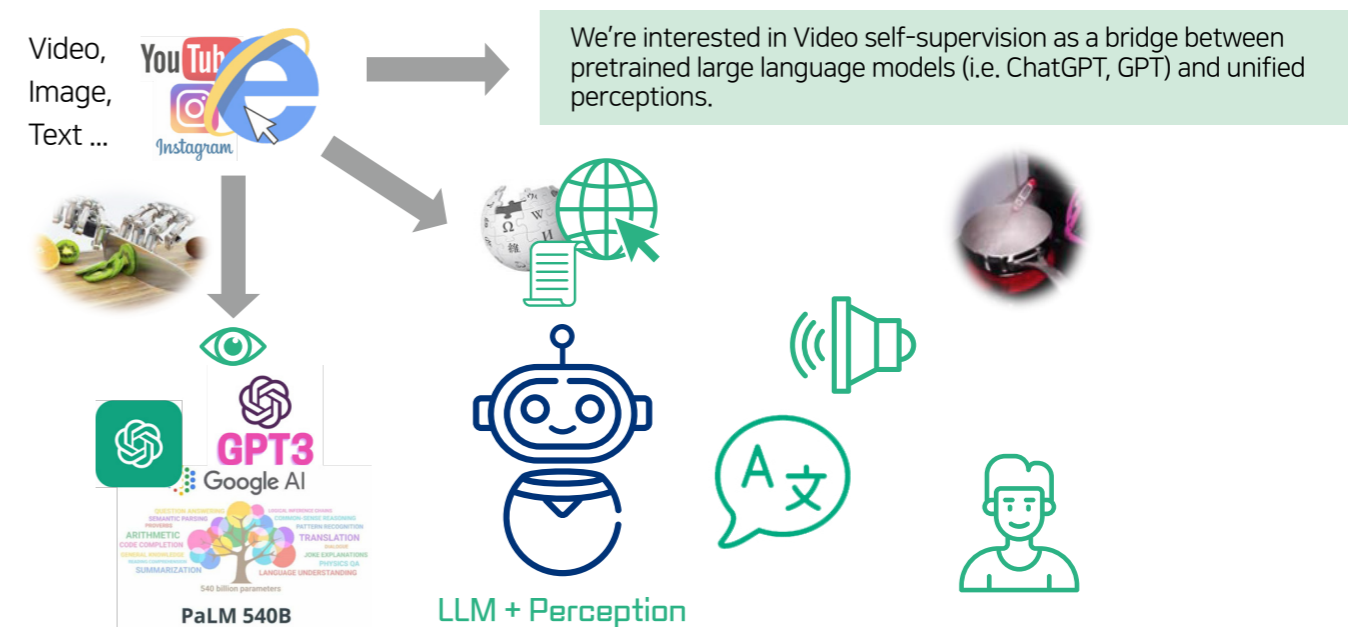
- Natural Language Processing:

Perception  $\cap$  Language {knowledge, society, mind} / Commonsense reasoning

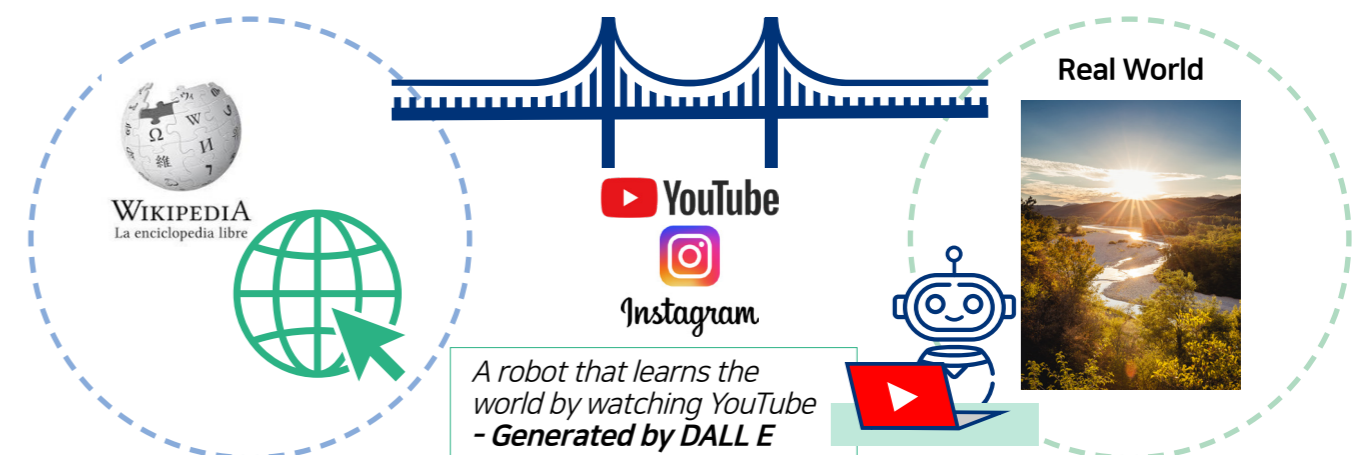
## Publications

- Prosocialdialog: A prosocial backbone for conversational agents, EMNLP 2022
  - Merlot: Multimodal neural script knowledge models, NeurIPS 2021
- End-to-end concept word detection for video captioning, retrieval, and question answering, CVPR 2017

# Computer Vision (Integrated Perception)

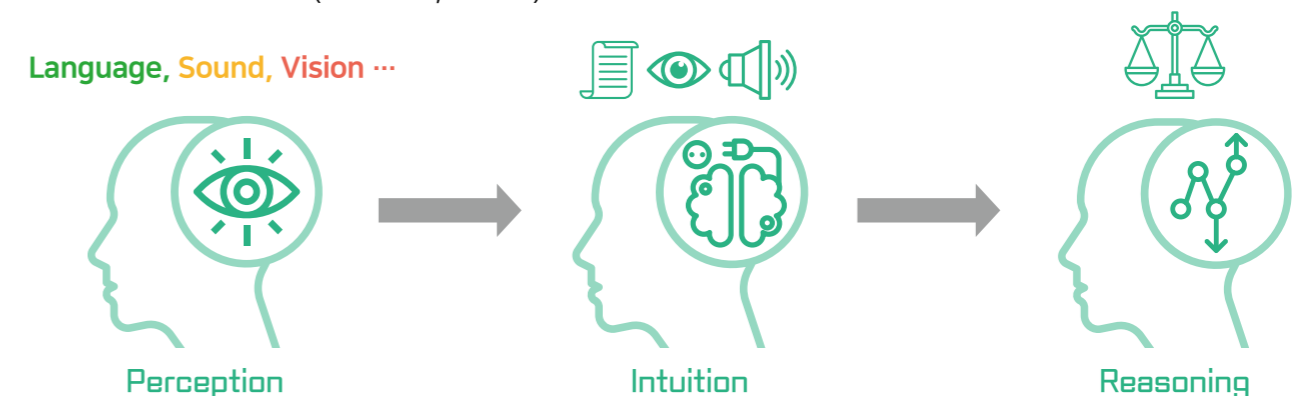


# Natural Language Processing (Self-supervised Multimodal Knowledge)



# Natural Language Processing (Multimodal Commonsense Reasoning)

- **Perception** level  $\rightarrow$  Intuition, Reasoning Level
- Better **conceptual representation**, guided by language
- Make blinded LLM (ChatGPT, GPT-X) interact with the real world





# Reinforcement Learning and Robot Learning Lab.

Lee, Youngwoon



lywoon89@gmail.com youngwoon.github.io

## Education

- Ph.D. in Computer Science, University of Southern California, 2022
  - MS in Computer Science, KAIST, 2013
  - BS in Computer Science, KAIST, 2011

## Experience

- Mar. 2024(expected): Assistant Professor, Dept. of Artificial Intelligence, Yonsei University
  - 2022 – 2023: Postdoctoral Scholar, UC Berkeley (Prof. Pieter Abbeel)
  - 2013 – 2017: Researcher, ETRI

## Research Areas

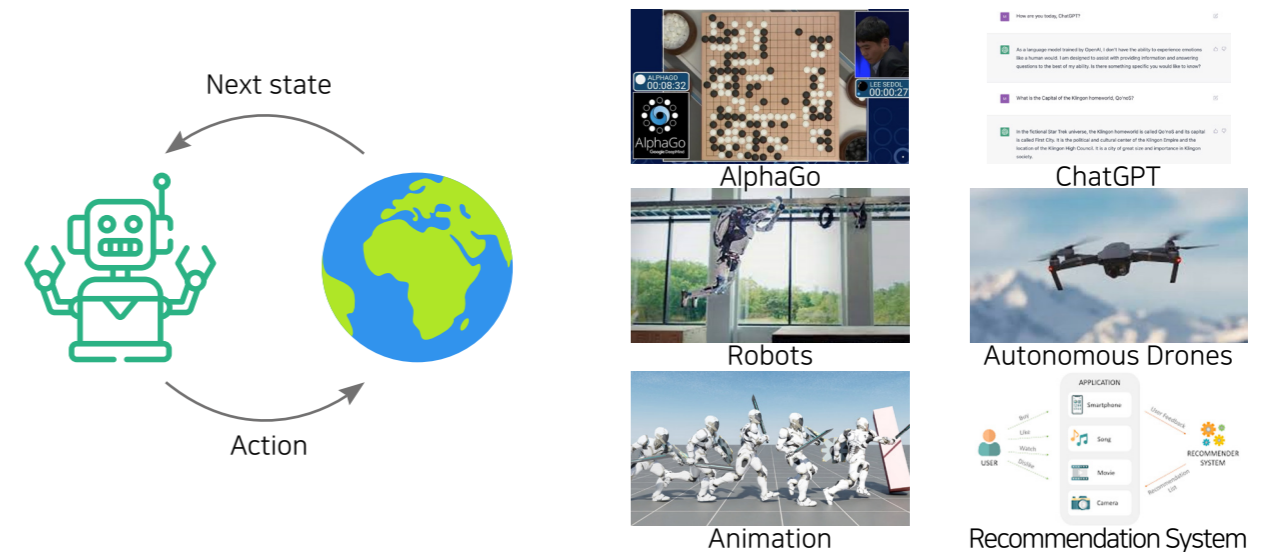
- Reinforcement learning
- Unsupervised learning of skills, representations, models, and priors
  - Robot learning and real-world decision making applications

## Publications

- Skill-based Model-based Reinforcement Learning, CoRL 2022
- Generalizable Imitation Learning from Observation via Inferring Goal Proximity, NeurIPS 2021
- IKEA Furniture Assembly Environment for Long-Horizon Complex Manipulation Tasks, ICRA 2021
  - Accelerating Reinforcement Learning with Learned Skill Priors, CoRL 2020
- FurnitureBench: Reproducible Real-World Furniture Assembly Benchmark for Long-Horizon Complex Manipulation, RSS 2023
- Controllability-Aware Unsupervised Skill Discovery, ICML 2023

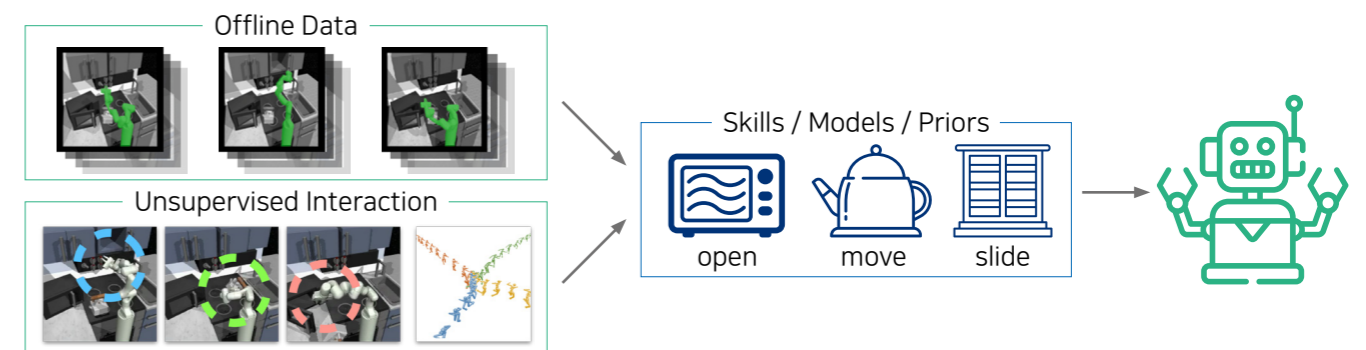
# Reinforcement Learning

- Reinforcement learning allows for finding solutions better than the ones from humans, like AlphaGo. Our lab works on scaling reinforcement learning to complex and long-horizon real-world tasks.



# Unsupervised Learning

- Humans develop a repertoire of skills and general understanding of the world over the course of our lives. Our lab works on scalable approaches to autonomously learn this knowledge without labels.



# Robot Learning

- Developing a general-purpose robot requires high sample efficiency, generalization, and safe exploration. Our lab focuses on leveraging huge online data (videos, text) to achieve intelligent robots.





# School of Integrated Technology

# Intelligence Networking Lab.

Chae, Chanbyoung



cbchae@yonsei.ac.kr

http://www.cbchae.org

## Education

- Ph.D. in Electrical and Computer Engineering, The University of Texas at Austin, 2018

## Experience

- 2011 - Present: Underwood Distinguished Professor, School of Integrated Technology, Yonsei University
  - 2020: IEEE Fellow
  - 2020: National Academy of Engineering of Korea Fellow
  - 2019 - 2022: Editor-in-Chief, IEEE Trans. MBMC
  - 2021 - Present: IEEE Distinguished Lecturer
  - 2017: Visiting Professor, Stanford University, CA, USA
- 2009 - 2011: Member of Technical Staff, Bell Laboratories, Alcatel-Lucent, NJ, USA
- 2008-2009: Post. Doc./Lecturer, Harvard University, MA, USA
- 2005-2008: Research/Teaching Assistant, The University of Texas at Austin, TX, USA
- 2001-2005: Research Engineer, Telecommunications R&D Center, Samsung Electronics

## Research Areas

- 6G/Future Communications and Networks
  - Molecular Communications
- Brain Networking (Alzheimer's treatment)
- Applied Mathematics/Applied Machine Learning

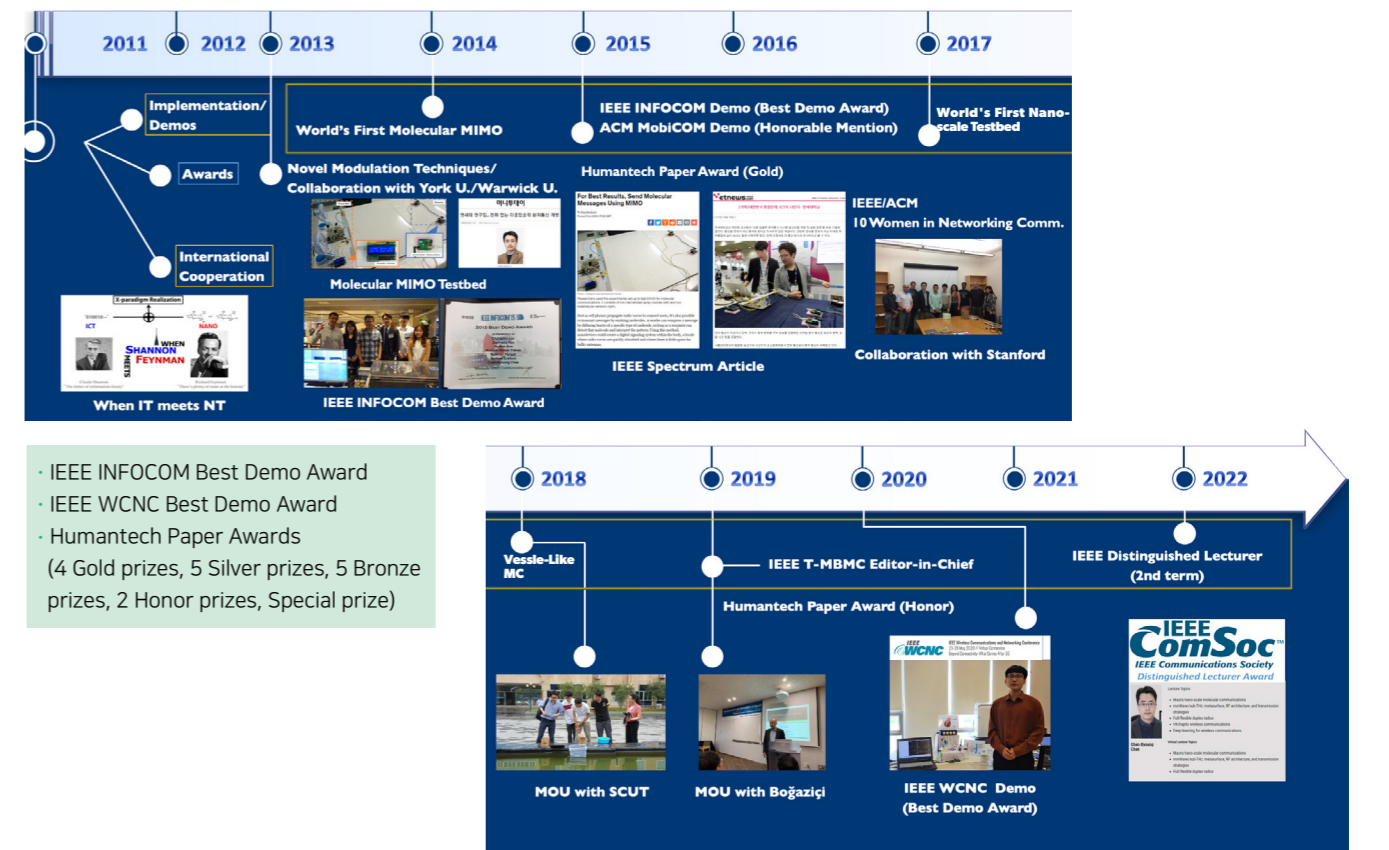
## Publications

- Shifting the MIMO Paradigm, IEEE Sig. Proc. Mag., 2008 (Best Paper Award)
- A Comprehensive Survey of Recent Advancements in Molecular Communications, IEEE Comm. Surveys and Tutorials, 2016 (FWCI 0.1%)
- Molecular MIMO: From Theory to Prototype, IEEE Jour. Sel. Areas in Comm., 2016 (featured in IEEE Spectrum)
- Prototyping Real-Time Full Duplex Radios, IEEE Comm. Mag., 2015 (world's first real-time demo)
- Reconfigurable Intelligent Surface-based Wireless Communications: Antenna Design, Prototyping, and Experimental Results, IEEE Access, 2020 (FWCI 1%)
- Deep Learning-based mmWave Beam Selection for 5G NR/6G with Sub-6 GHz Channel Information: Algorithms and Prototype Validation, IEEE Access, 2020 (FWCI 1%)

# 12 Years of Innovation [6G Communications]



# 12 Years of Innovation [Molecular Communications]



# Radar Systems and Wave Sensing Lab.

Ka, Minho



✉ kaminho@yonsei.ac.kr 🌐 <http://radar.yonsei.ac.kr> ☎ +82-32-749-5840

## Education

- Ph.D. in Radar Engineering, Moscow Power Engineering Institute, 1997
  - MS in Electronic Engineering, Yonsei University, 1991
- BS in Electric and Electronic Engineering, Yonsei University, 1989

## Experience

- Professor, School of Integrated Technology, Yonsei University
- Visiting Scholar, Radar Institute of German Aerospace Center (DLR), Germany
  - Visiting Scholar, Virginia Tech, USA
- Deputy Director, Korea-Russia Industrial Technology Cooperation Centre
  - Senior Researcher, Agency for Defense Technology (ADD)
  - Senior Researcher, Matra Marconi Space, UK

## Research Areas

- Space and Air Reconnaissance and Surveillance Radar Systems
  - Space Monitoring Radar Systems
  - Modeling & Simulation of Synthetic Aperture Radar
- Electromagnetic Virtual Synthetic Environment for Radar Remote Sensing

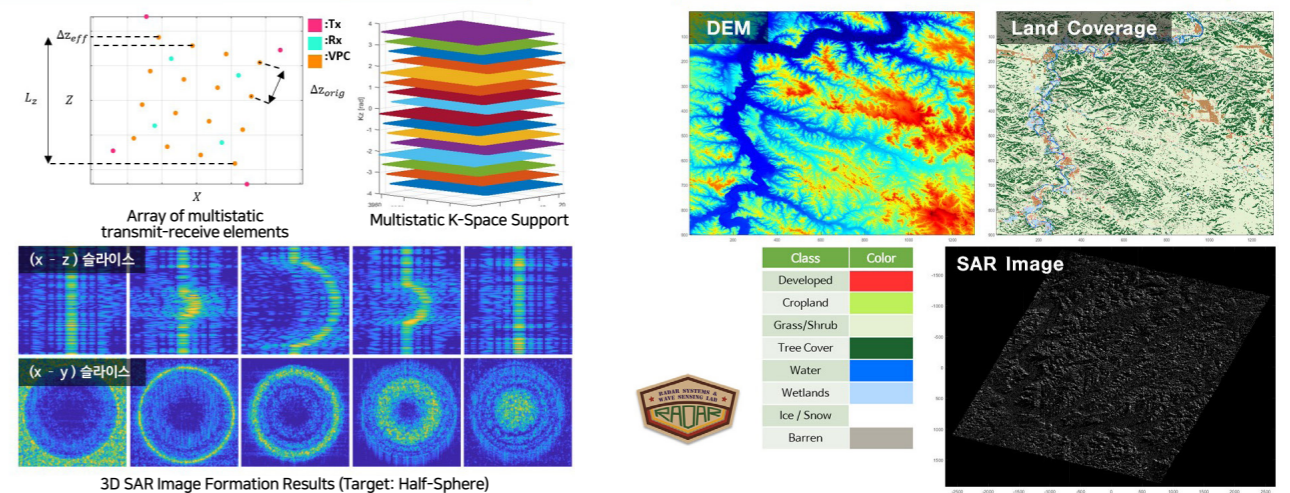
## Publications

- "Derivation and Validation of a Three-dimensional Microwave Imaging Using a W-band MIMO Radar", IEEE Transactions on Geoscience and Remote Sensing, Vol. 60, pp.1-16, 20 Sept. 2022,
- "Forward-looking Electromagnetic Wave Imaging Using a Radial Scanning Multi-Channel Radar", IEEE Geoscience and Remote Sensing Letters, 03 May 2021
  - "Multichannel W-Band SAR System on a Multirotor UAV Platform With Real-Time Data Transmission Capabilities", IEEE ACCESS, pp. 144413 - 144431, Vol. 8, 6 August 2020
  - "W-Band FMCW MIMO Radar System for High-Resolution Multimode Imaging With Time- and Frequency-Division Multiplexing", IEEE Transactions on Geoscience and Remote Sensing, pp. 5042-5057, Vol. 58, No. 7, July 2020

# Modeling and Simulation of Microsatellite Radar Remote Sensing Systems

- Mission design, system modeling, and performance evaluation for radar remote sensing systems of various platforms such as satellites, aircrafts, and drones
- Development of robust image formation algorithms obtained from arbitrary imaging modes and satellites geometry
- Building a virtual synthetic environment with radar scattering information from various remote sensing data with a complex composition of the land, sea, and artificial objects

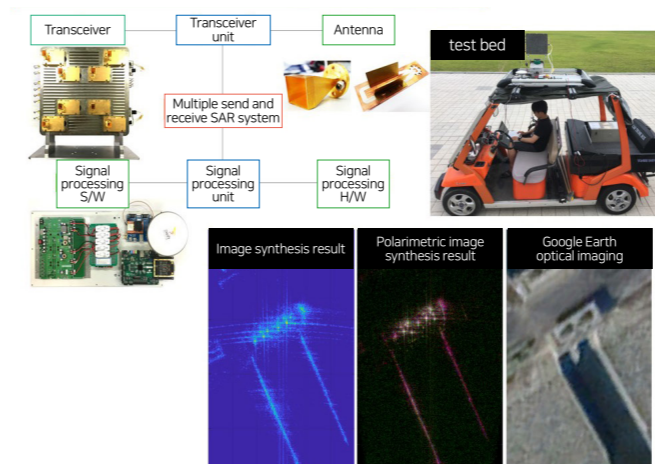
## Bistatic/Multi-static SAR Imaging Technology



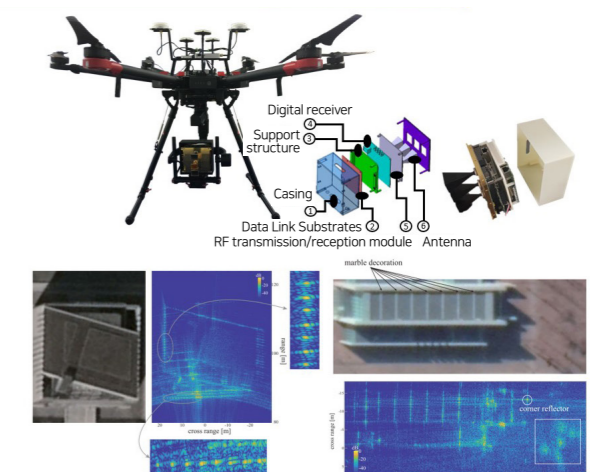
## Multifunctional Microwave Imaging Systems

- 94GHz W-band multiple-input-multiple-output (MIMO) radar imaging system with time-and frequency division multiplexing
- Multichannel 77GHz W-band SAR system mounted on a multirotor unmanned aerial vehicle (UAV)

### 94 GHz 4-by-4 MIMO SAR System



### 77 GHz UAV Mounted SAR System



# Materials Chemistry Lab.

Kim, Jiwon



✉ [jiwon.kim@yonsei.ac.kr](mailto:jiwon.kim@yonsei.ac.kr) 🌐 <https://sites.google.com/site/jiwonkimlaboratory> ☎ +82-32-749-3602

## Education

- Ph.D in Chemistry, Northwestern University, 2013
- M.S. Course in Chemistry, Seoul National University, 2007
- B.S. in Chemistry, KAIST, 2006

## Experience

- 2021 – Present: Associate Professor, School of Integrated Technology, Yonsei University
- 2015 – 2021: Assistant Professor, School of Integrated Technology, Yonsei University
- 2013 – 2015: Postdoctoral Fellow, Harvard University

## Research Areas

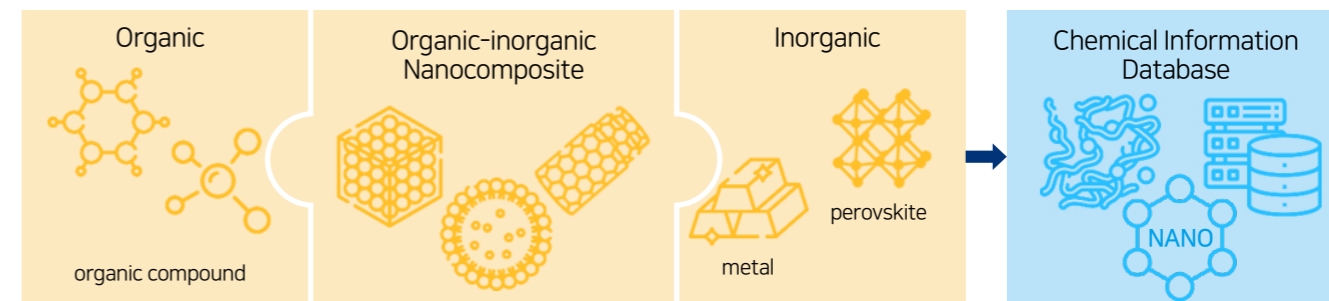
- Organic-Inorganic Nanocomposite Materials
- Healthcare- and Energy-related Devices
- Real-time Monitoring and Prediction

## Publications

- A Systematic Correlation between Morphology of Porous Carbon Cathode and Electrolyte in Li-S battery, *J. Energy Chem.*, 2021
- Dual-Doping of Sulfur on Mesoporous Carbon as a Cathode for Oxygen Reduction Reaction and Lithium-Sulfur Battery, *ACS Sustain. Chem. Eng.*, 2020
- Independent Multi-states of Photo-responsive Polymer/Quantum Dot Nanocomposite Induced via Different Wavelengths of Light, *Scientific Reports*, 2019
- Stimuli-responsive Switchable Organic-Inorganic Nanocomposite Materials, *Nano Today*, 2018

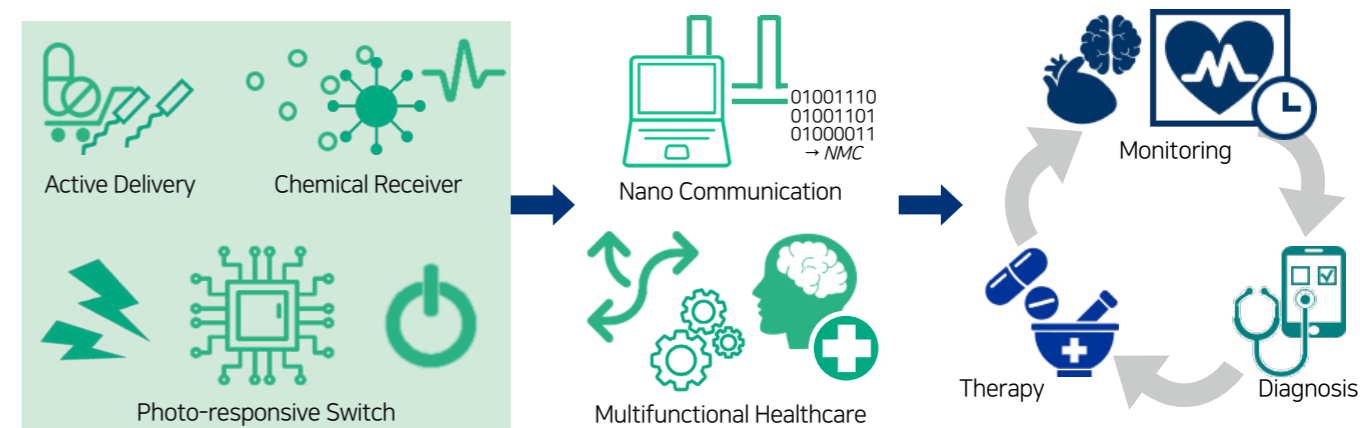
# Stimuli-responsive Organic-inorganic Nanocomposite

- Nanocomposite synthesis by taking advantages from both organic and inorganic materials
- Application of nanocomposites in healthcare- and energy-related fields and building the database for regulation and prediction by real-time accumulation of chemical information



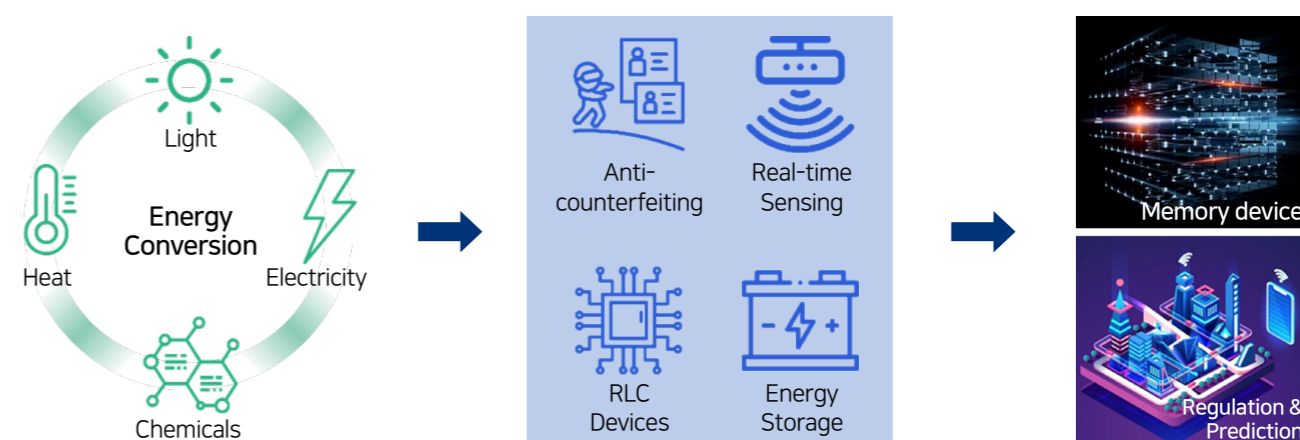
## Nano-bio Device for Healthcare System

- Study of nanoscale molecular communication via active nanoscale cargo delivery and reception systems
- Construction of non-invasive real-time treatment system utilizing photo-responsive nanocomposite materials



## Nano-energy Device for Information System

- Study of energy transfer, conversion, and storage mechanisms in various nano-energy devices
- Real-time accumulation of chemical information for increasing the efficiencies and regulating the devices by precise prediction



# Seamless Trans-X Lab.

Kim, Shiho



shiho@yonsei.ac.kr | http://stl.yonsei.ac.kr | +82-32-749-5836

## Education

- Ph.D. in Electrical and Electronics Engineering, KAIST, 1995
- M.S. in Electrical and Electronics Engineering, KAIST, 1988
- B.S. in Electronics Engineering, Yonsei University, 1986

## Experience

- Present: Professor, School of Integrated technology, Yonsei University
  - Korea Intellectual Property office(특허청), Patent Examiner
    - LG semicon (currently, SK Hynix) Engineer
    - IMEC (Belgium) Visiting professor
- i4ft(Interuniversity alliance for future vehicular technology) Founder and Director

## Research Areas

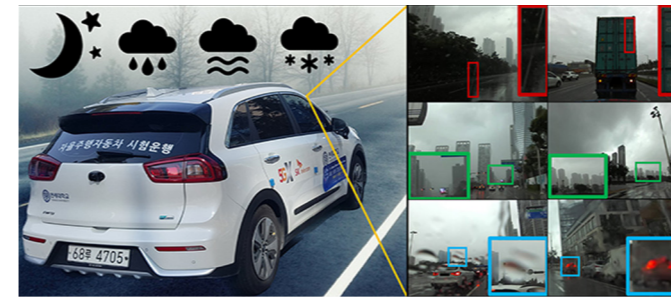
- Autonomous and intelligent mobility for Transportation: Hardware / Software / AI for Intelligent and Autonomous Vehicles
  - Artificial Intelligence for Transformation: Reinforcement Learning, Quantum Machine Learning
  - Metaverse, VR for Transition: Cyber to real space interaction

## Publications

- (co-)authored more than 65 high-10 indexed papers and 50 patents
- co-edited 3 books on Hardware accelerators for machine Learning and other 3 technical books on Blockchain Technology and automotive cybersecurity (Publisher- Elsevier and Springer Nature).
  - Learning unsupervised disentangled skill latents to adapt unseen task and morphological modifications, Engineering Applications of Artificial Intelligence, 2022

# Autonomous and intelligent mobility for Transportation

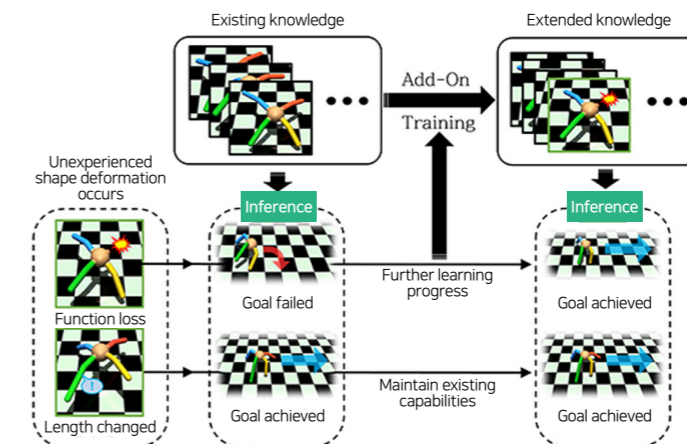
- Rationale-aware Autonomous Driving Policy utilizing Reinforcement Learning
- Vision Sensing
  - AI for Vision under Adverse Weather Conditions
  - AI for Multi Multi-spectral Camera for sensing the adverse & irregular environment
- Simulator : Autonomous Driving Simulation on CARLA(CAR Learning to Act)



Vision Sensing under Adverse Environments

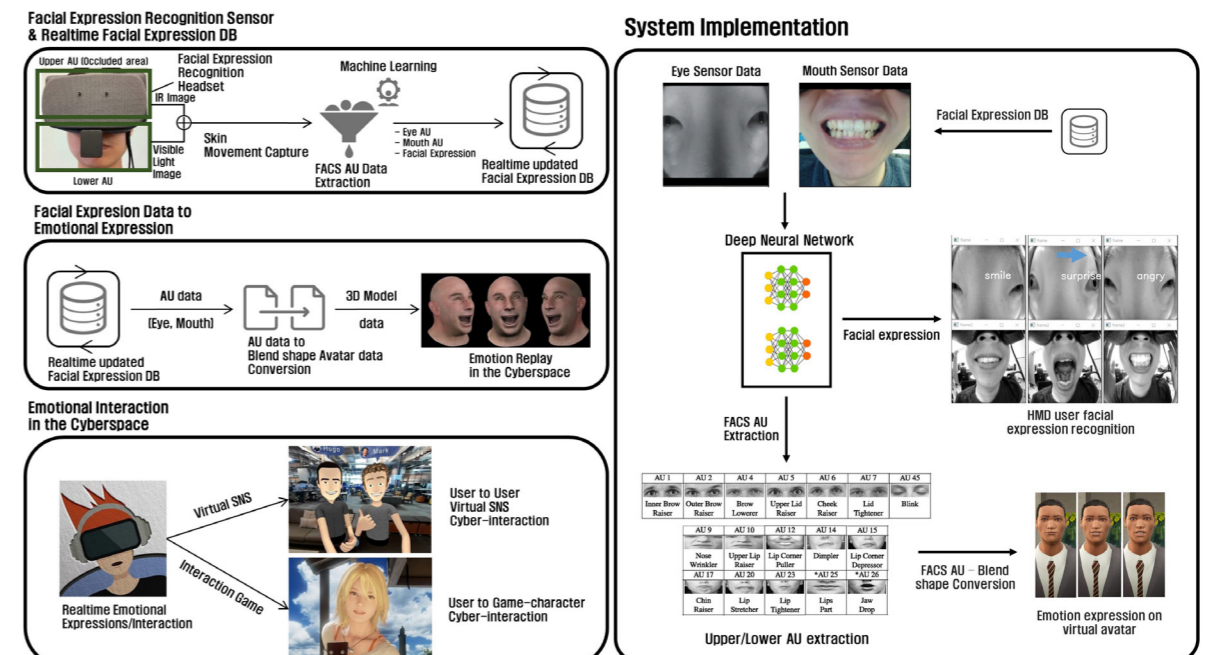
## AI for transformation

- Deep Reinforcement Learning Processor(DRLP)
- Reinforcement Learning for Real-world Problems



## Metaverse, VR for Transition

- Telepresence Interface using facial expression information
- Facial Expression Recognition (FER) • User Interface for Interactions in Virtual / Augmented Reality • Personalized Metaverse Platform in Fully Autonomous Environment



# Statistical Artificial Intelligence Lab.

Kim, Songkuk



songkuk@yonsei.ac.kr +82-32-749-5842

## Education

- Ph.D. in Computer Science, University of Michigan, 2005
- M.S. in Computer Science and Engineering, Seoul National University, 1999
- B.S. in Computer Science and Engineering, Seoul National University, 1997

## Experience

- Software Engineer, Google Research & Infrastructure 2007 - 2011
- Research Staff, Xerox Research Center 2005 - 2007

## Research Areas

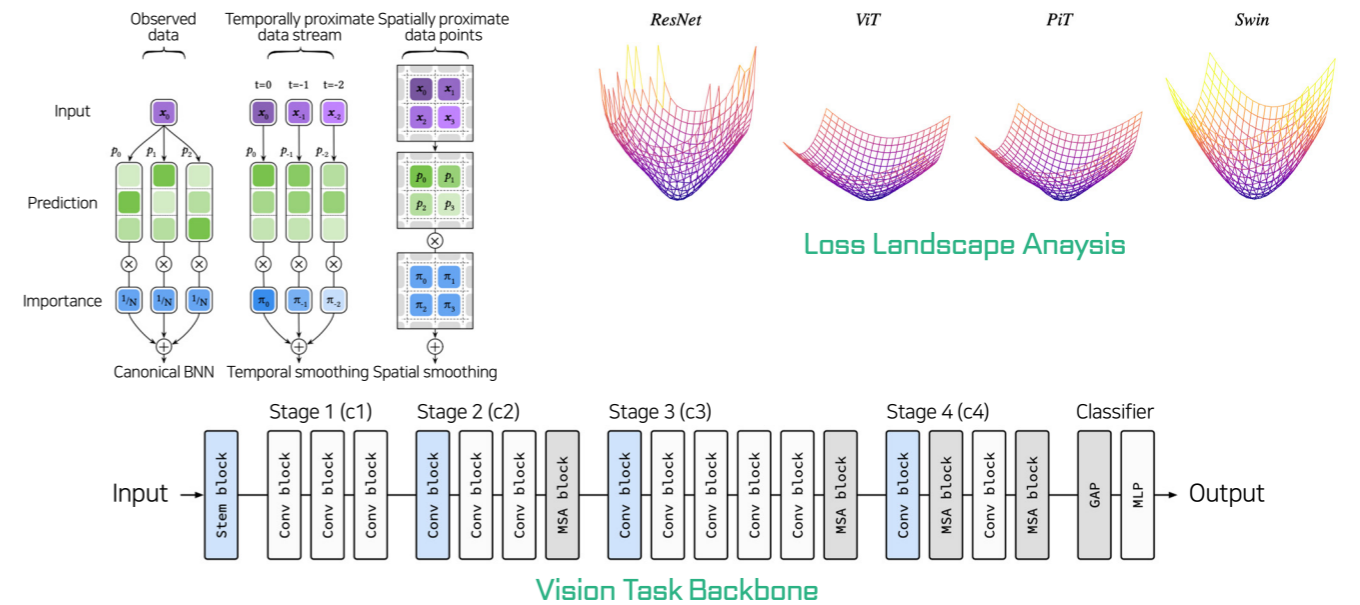
- Machine Learning
  - Big Data
- Cloud Computing

## Publications

- How Do Vision Transformers Work?, ICLR 2022
- Blurs behave like ensembles: Spatial smoothings to improve accuracy, uncertainty, and robustness, ICML 2022
- Vector Quantized Bayesian Neural Network Inference for Data Streams, AAI 2021

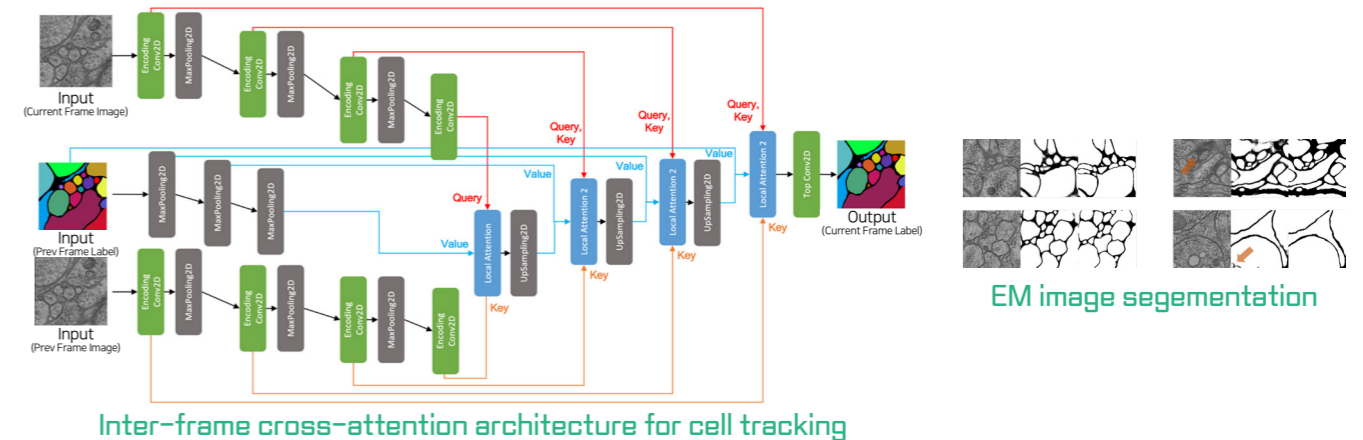
# Machine Learning

- How Neural Networks Work
- Neural Networks Comparison
  - Uncertainty Analysis



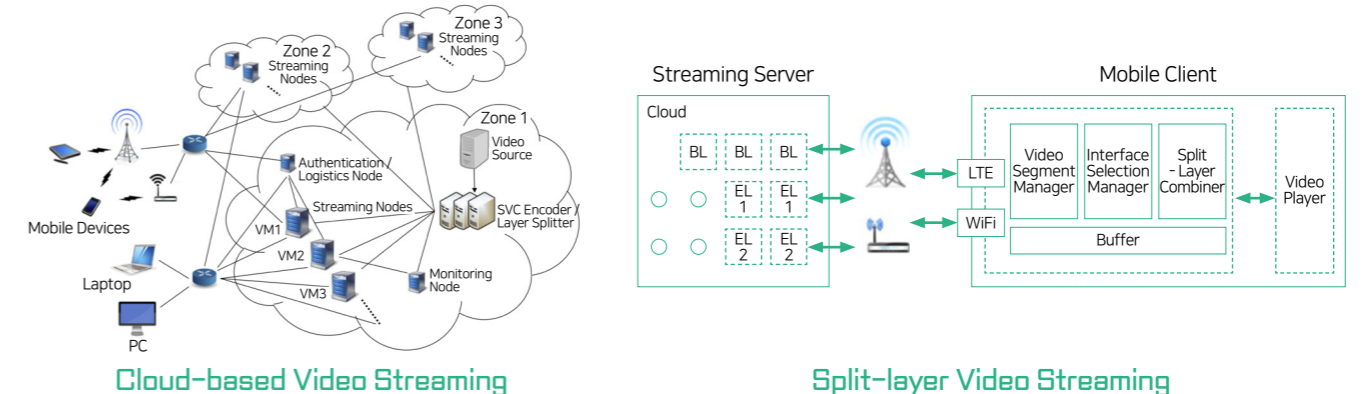
# AI for Bio-Images

- We apply computer vision methods to automate bio-image analysis



# Cloud Computing

- We investigate efficient streaming method for videos



# Embedded Intelligent Systems Lab.

Ko, Jeonggil



jeonggil.ko@yonsei.ac.kr | http://www.eis-lab.org | +82-32-749-5813

## Education

- Ph.D. in Computer Science, Johns Hopkins University 2012
- B.Eng in Computer Science and Engineering, Korea University 2007

## Experience

- 2019 - Present: Associate Professor, School of Integrated Technology, Yonsei University
- 2015 - 2019: Assistant Professor, Dept. of Software and Computer Engineering, Ajou University
- 2012 - 2015: Senior Researcher, Electronics and Telecommunications Research Institute (ETRI)
- 2010: Visiting Researcher, Dept. of Computer Science, Stanford University

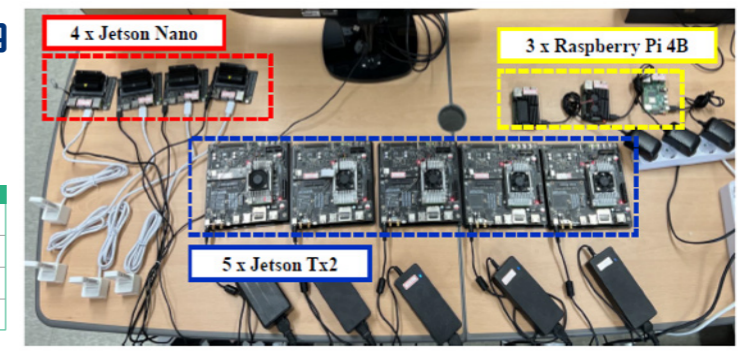
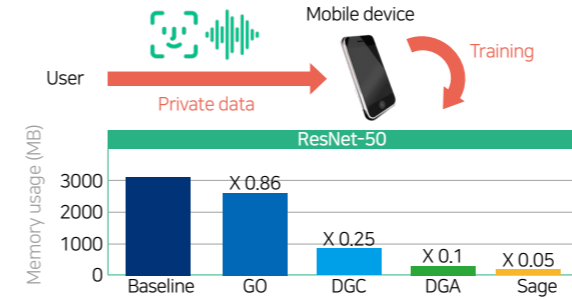
## Research Areas

- Human-centered mobile and ubiquitous computing systems
- Mobile and embedded sensing-based machine learning system design
  - Mobile healthcare application systems
  - Mobile AR and VR systems and applications

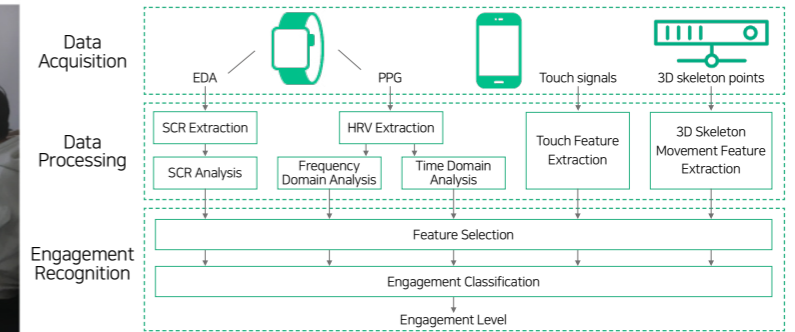
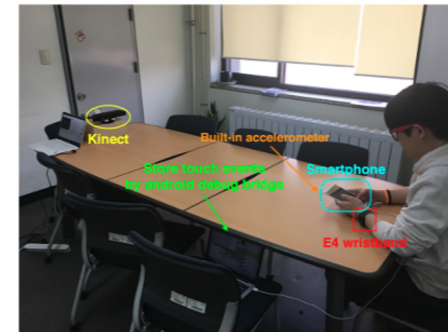
## Publications

- "Memory-efficient DNN Training on Mobile Devices", ACM MobiSys 2022
- "iMon: Appearance-based Gaze Tracking System on Mobile Devices", ACM UbiComp 2022
- "Enabling Real-time Sign Language Translation on Mobile Platforms with On-board Depth Cameras", ACM UbiComp 2021
- "HeartQuake: Accurate Low-Cost Non-Invasive ECG Monitoring Using Bed-Mounted Geophones", ACM UbiComp 2020 (Distinguished Paper Award)

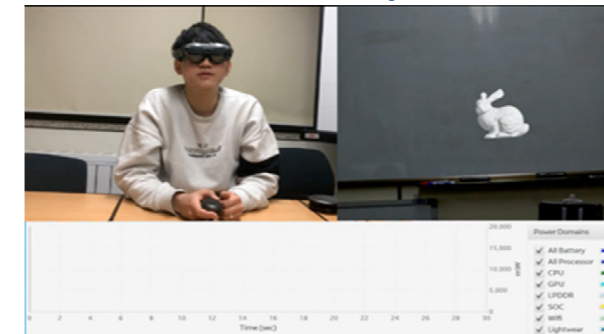
## On-device Machine Learning



## Mobile-Human Sensing Systems



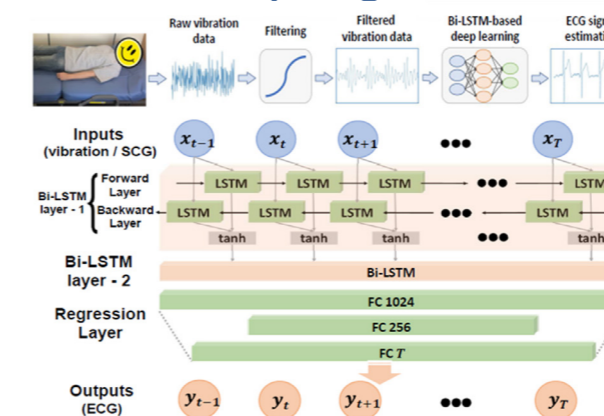
## Mobile Platform Optimization



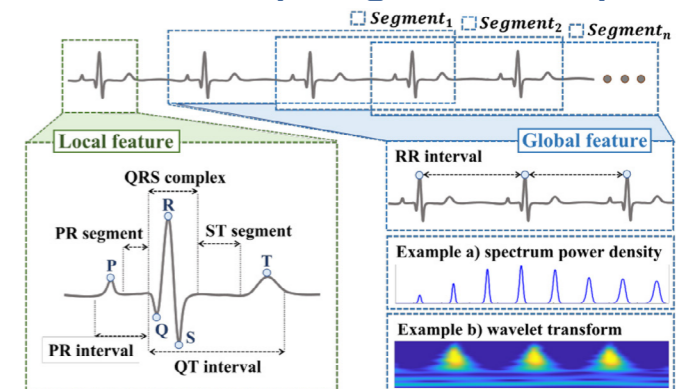
## Assistive Computing Systems



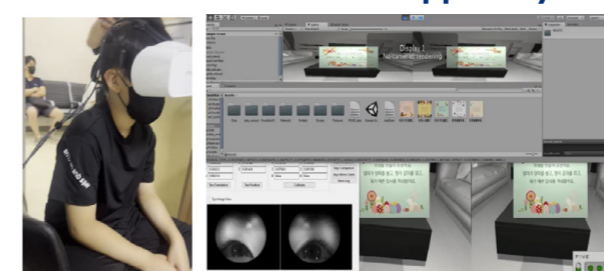
## Contactless Physiological Data Sensing



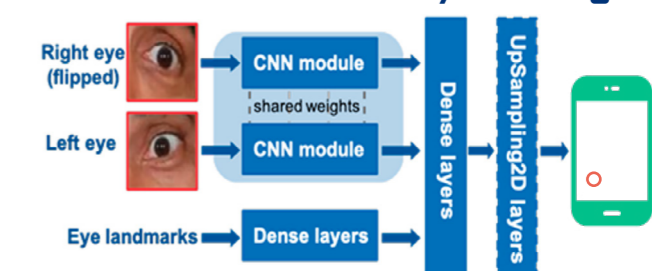
## Time-series Physiological Data Analysis



## VR/AR-assisted Clinical Support Systems



## Mobile Human Activity Sensing





# Nano Inspired Lab.

Kwon, Jangyeon



✉ jangyeon@yonsei.ac.kr    🌐 <https://nil.yonsei.ac.kr>    ☎ +82-32-749-5837

## Education

- Ph.D. in Material Science & Engineering, Seoul National University, 2002
- M.S. in Material Science & Engineering, Seoul National University, 1999
- B.S. in Material Science & Engineering, Seoul National University, 1997

## Experience

- Sep. 2011 - Present: Professor, School of Integrated Technology, Yonsei University
- Feb. 2002 - Jan. 2010: Principal Researcher, Samsung Advanced Institute of Technology (SAIT)

## Research Areas

- Oxide semiconductors
- Neuromorphic electronics
- Bioelectronic devices

## Publications

- Proton-enabled activation of peptide materials for biological bimodal memory, Nature Communication, 2020
- Energy scavenging artificial nervous system for detecting rotational movement, Nano Energy, 2020
- Effect of X-ray irradiation on a-IGZO and LTPS thin-film transistors for radiography applications, Applied Surface Science, 2021

# Oxide Semiconductors

- Oxide semiconductors for application to devices such as displays, sensors and neuromorphic devices under research with varied approaches

**Material**

- ITZO, BIZO, CIZO, etc.
- Various Oxide-based Semiconductors

**Mechanism**

- Oxygen Vacancy, Interface Control, Crystallization, etc.
- Understanding the Mechanism and Optimizing the Performance

**Doping**

- Nitrogen, Metals, etc.
- Doping for Performance Enhancement

**Application**

- Searching for New Applications
- Sensors, Neuromorphic Devices, Solar Cells, etc.

# Neuromorphic Devices

- Neuromorphic devices emulating the function of biological neurons in the brain are being researched to develop new types of computing system based on artificial neural networks

Bio-inspired Materials

Memristor

Protonic Memory

Brain-like Devices for Artificial Biosystems

Flexible Ionic Materials

Artificial Nerve

Deep Neural Network

# Bioelectronics

- Biosensors and devices based on biomaterials which can be introduced into human body with no harm are being researched for biosensing and bioelectronic applications

Implantable Device

Bio-degradable Device

Bio-implantable & Wearable Electronics

Diabetes Diagnosis

Electronic Skin

# Multimedia Computing and Machine Learning Group

Lee, Jongseok



✉ [jong-seok.lee@yonsei.ac.kr](mailto:jong-seok.lee@yonsei.ac.kr) 🌐 <https://mcml.yonsei.ac.kr> ☎ +82-32-749-5846

## Education

- Ph.D. in Electrical Engineering, KAIST, 2006
- MS in Electrical Engineering, KAIST, 2001
- BS in Electrical Engineering, KAIST, 1999

## Experience

- 2011 – Present: Professor, School of Integrated Technology, Yonsei University
- 2008 – 2011: Postdoctoral Researcher, Swiss Federal Institute of Technology Lausanne (EPFL)

## Research Areas

- Image and video processing:
  - Image and video compression / Image and video enhancement (super-resolution, deblurring, etc.) / Image and video quality assessment
- Machine learning:
  - Efficient deep learning models and algorithms / Evaluating and enhancing robustness of deep learning models / Deep learning for graph data

## Publications

- Demystifying randomly initialized networks for evaluating generative models, AAI, 2023
- Joint global and local hierarchical priors for learned image compression, CVPR, 2022
- Just one moment: Structural vulnerability of deep action recognition against one frame attack, ICCV, 2021
- EEG-based emotional video classification via learning connectivity structure, IEEE Trans. Affective Computing, 2021

# Image and video processing

- Image and video compression
- Image and video enhancement (super-resolution, deblurring, etc.)
- Image and video quality assessment

**Image Compression**  
Overview of Informer, a learned entropy model capturing global dependencies in a content dependent manner using the attention mechanism.

Method	(bpp, PSNR, MS-SSIM)
Original	(0.058, 31.640, 0.946)
Ours [MSE]	(0.063, 29.383, 0.962)
Ours [MS-SSIM]	(0.060, 30.175, 0.922)
BPG	(0.159, 22.379, 0.718)
JPEG	(0.159, 22.379, 0.718)

**Super-Resolution**  
Overview of VMNet (volatile-nonvolatile memory network), an image super-resolution method based on a recursive architecture.

**GAN Evaluation**  
The features from random networks can evaluate generative models well, with focusing on lower-level information than trained networks.

# Machine Learning

- Efficient deep learning models and algorithms
- Evaluating and enhancing robustness of deep learning models
- Deep learning for graph data

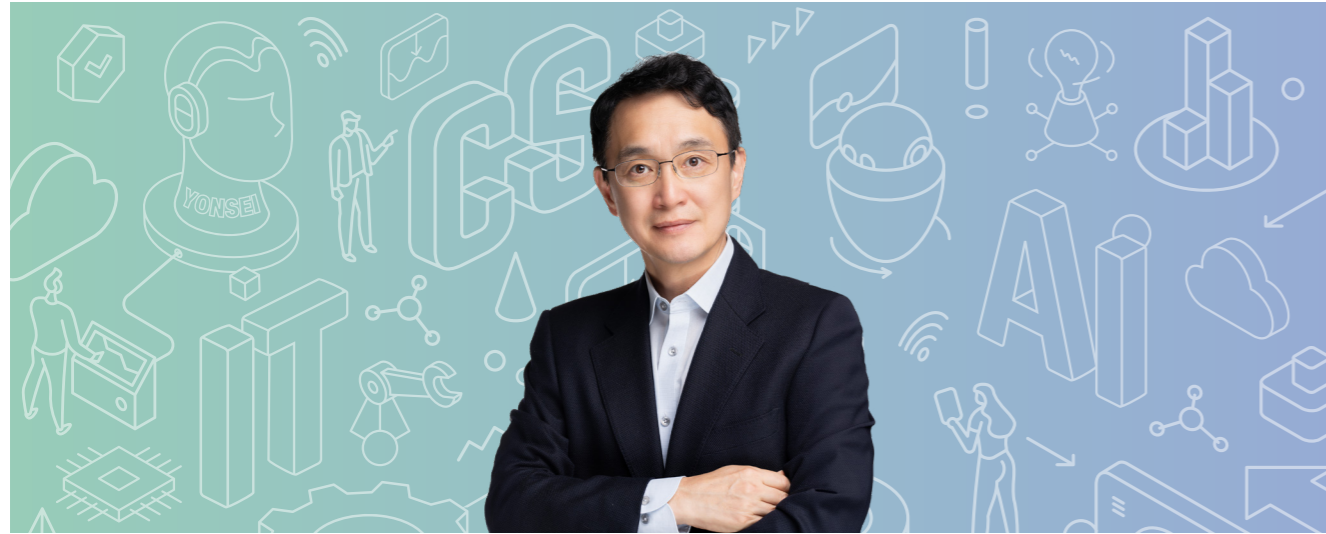
**Model-Parallel Learning**  
Illustration of the local critic learning method for model-parallel training of deep neural networks including both CNNs and RNNs.

**Graph Neural Network**  
An end-to-end neural network model for EEG-based emotional video classification.

**Adversarial Attack**  
(Top) Overview of one-frame attack, which adds an inconspicuous perturbation to only a single frame of a given video clip. (Bottom) Visual comparison of the super-resolved outputs for the attacked inputs.

# Intelligent Semiconductor Lab.

Oh, Jungwoo



✉ jungwoo.oh@yonsei.ac.kr 🌐 <https://sites.google.com/view/yonsei-jungwoo-oh> ☎ +82-32-749-5831

## Education

- Ph.D. The University of Texas at Austin, Supervisor: Dr. Joe C. Campbell, 2004
  - M.S. POSTECH, Department of Materials Science and Engineering, 1999
  - B.S. Yonsei University, Department of Metallurgical Engineering, 1997

## Experience

- 2012 - Present: Associate/Assistant Professor, School of Integrated Technology, Yonsei University
- 2004 - 2012: Member Technical Staff, SEMATECH, Advanced CMOS & Emerging Technology, Austin TX
- 2000 - 2004: Research Assistant, Microelectronic Research Center, The University of Texas at Austin

## Research Areas

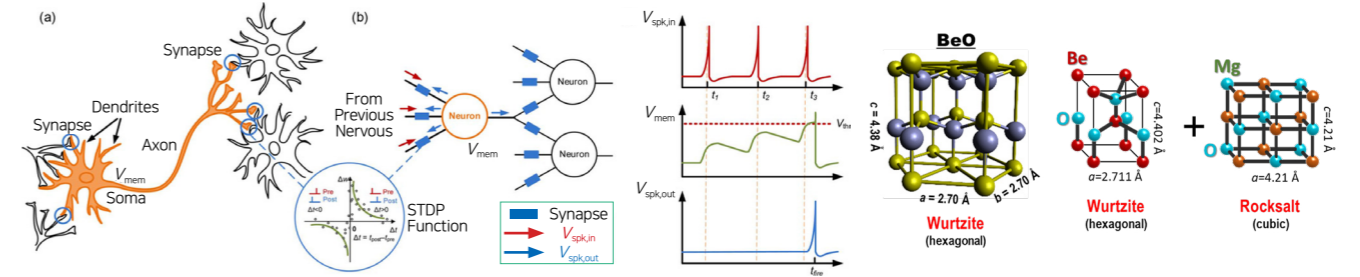
- Intelligent semiconductors : Ferroelectric synaptic devices and processing
- Atomic layer deposition (ALD): ALD BeO for intelligent and power devices
  - Alternative Lithography and Etching: Metal-assisted chemical etching

## Publications

- Heterostructured Mo<sub>2</sub>N-Mo<sub>2</sub>C Nanoparticles Coupled with N-Doped Carbonized Wood to Accelerate the Hydrogen Evolution Reaction: Small Structures, 2200283 (2023)
- Polarization-Induced Two-Dimensional Electron Gas at BeO/ZnO Interface: Applied Surface Science, 154103 (2022)
  - Energy band offsets of BeO dielectrics grown via atomic-layer deposition on β-Ga<sub>2</sub>O<sub>3</sub> substrates: Journal of Alloys and Compounds 922, 166197 (2022)
- Anodic imprint lithography: Direct imprinting of single crystalline GaAs with anodic stamp: ACS Nano 13 (11), 13465-13473 (2019)
- Chemical imprinting of crystalline silicon with catalytic metal stamp in etch bath: ACS Nano 12 (1), 609-616 (2018)
  - Atomic-layer deposition of single-crystalline BeO epitaxially grown on GaN substrates: ACS applied materials & interfaces 9 (48) (2017)
  - Highly elastic and conductive n-doped monolithic graphene aerogels for multifunctional applications: Advanced Functional Materials 25 (45), 6976-6984 (2015)

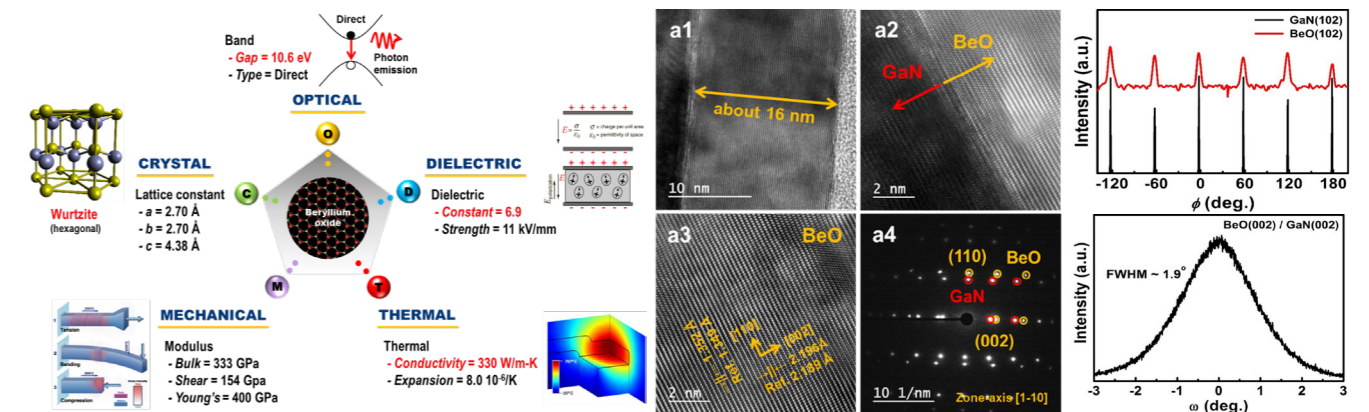
# Artificial Intelligent Semiconductors/Synaptic Devices

- Electronic devices to mimic the behavior of synapses in the human brain
- Ferroelectric characteristic of materials to emulate the behavior of synapses
- Engineered wurtzite crystals of Be(Mg)O can exhibit neuromorphic behavior



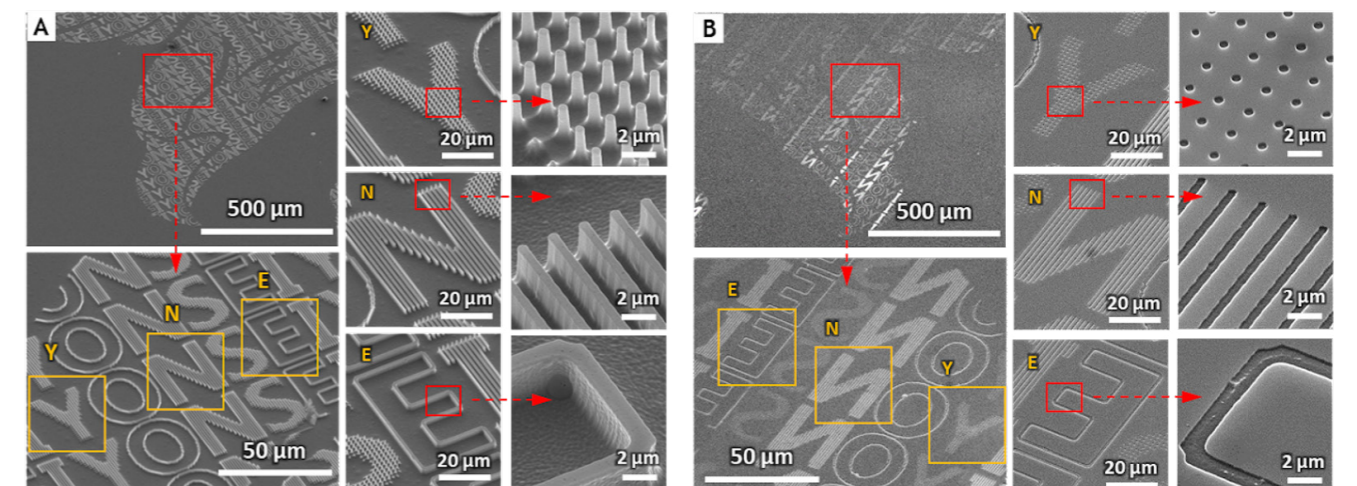
# Atomic Layer Deposition (ALD) of Beryllium Oxide (BeO)

- BeO has an extremely high thermal conductivity next to diamond
- Heterogeneous epitaxy of various semiconductors using ALD of BeO
- Promising for power transistors, artificial intelligent semiconductors



# Metal-assisted Chemical Etching & Imprinting Technology

- Metal-assisted chemical etching is an anisotropic etching technique
- The chemical imprinting integrates lithography and etching processes
- This technology addresses the challenges in modern optical lithography



# Intelligent Unmanned Systems Lab.

Seo, Jiwon



[jiwon.seo@yonsei.ac.kr](mailto:jiwon.seo@yonsei.ac.kr) <https://www.gnss.kr> +82-32-749-5833

## Education

- Ph.D. in Aeronautics and Astronautics, Stanford University, 2010
  - M.S. in Electrical Engineering, Stanford University, 2008
- M.S. in Aeronautics and Astronautics, Stanford University, 2004
  - B.S. in Mechanical Engineering, KAIST, 2002

## Experience

- 2012 – Present: Associate Professor, School of Integrated Technology, Yonsei University
  - 2010 - 2012: Postdoctoral Scholar, Department of Aeronautics and Astronautics, Stanford University

## Research Areas

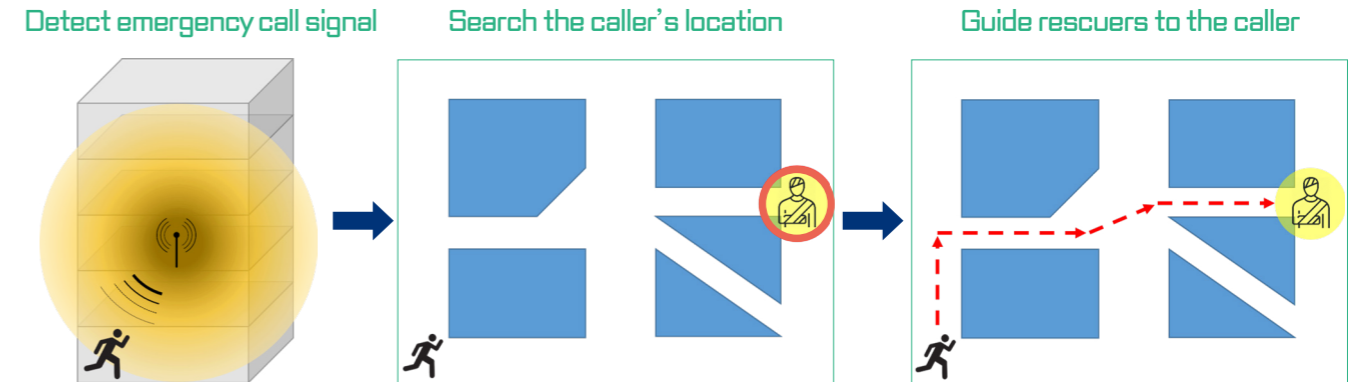
- Positioning and Navigation Systems:
  - Global Navigation Satellite Systems / Terrestrial Radionavigation Systems (eLoran, R-Mode, DME) / Emergency Location Services
- Intelligent Unmanned Systems:
  - Unmanned Vehicles / Urban Air Mobility

## Publications

- Optimal parameter inflation to enhance the availability of single-frequency GBAS for intelligent air transportation, IEEE Transactions on Intelligent Transportation Systems, 2022.
  - First demonstration of the Korean eLoran accuracy in a narrow waterway using improved ASF maps, IEEE Transactions on Aerospace and Electronic Systems, 2022.
- Optimal action-based or user prediction-based haptic guidance: Can you do even better?, CHI, 2021.

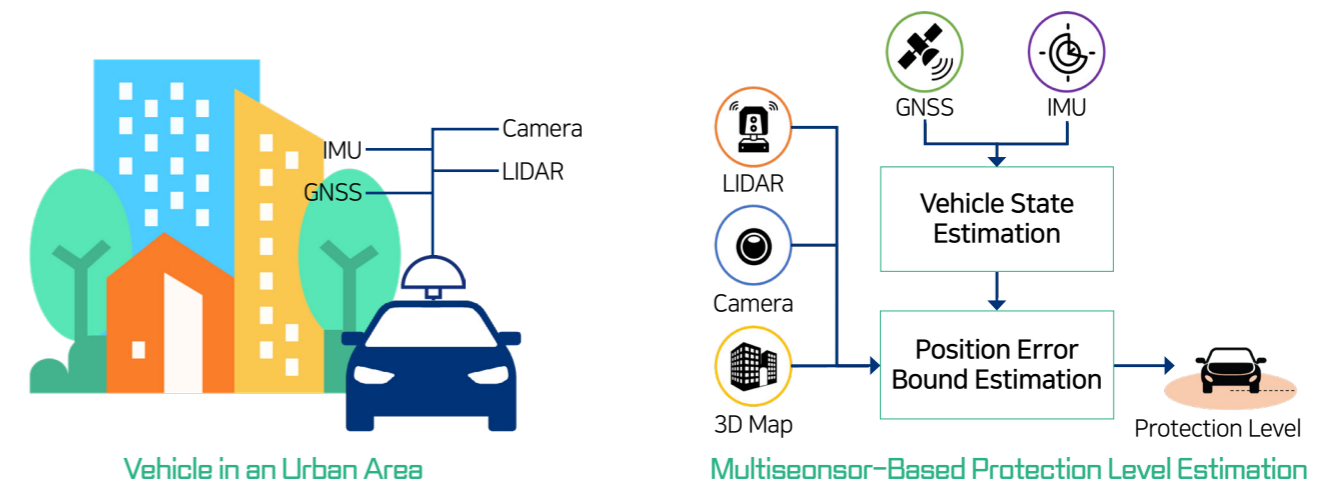
# Emergency Location Services

- Emergency location services in GPS-denied environment



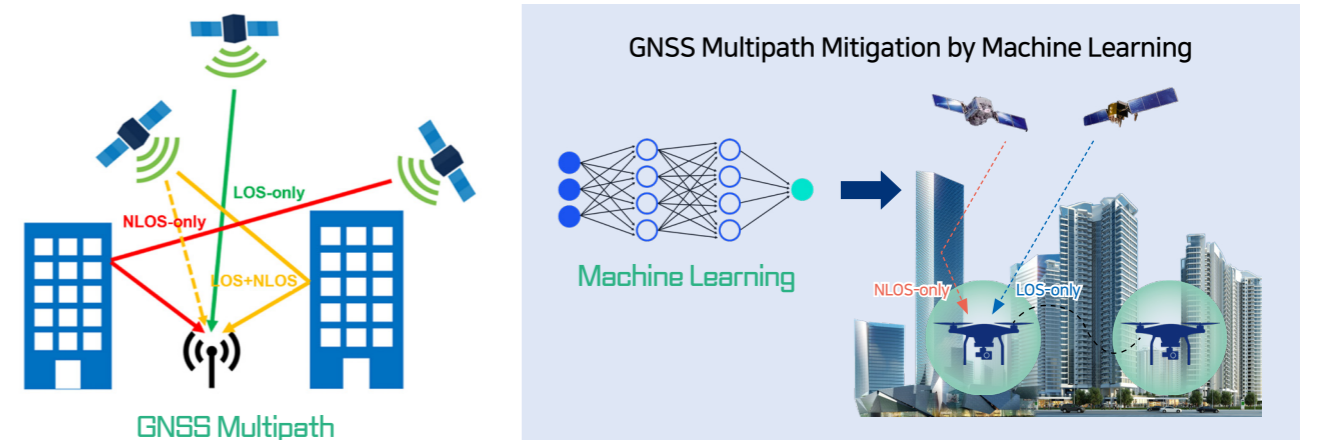
# Navigation Safety of Unmanned Vehicles

- Multisensor-based navigation safety monitoring for unmanned ground vehicles in urban areas



# GNSS Multipath+Machine Learning

- GNSS multipath mitigation by machine learning approach
- ML classification of signal reception conditions
- Multipath estimation and correction



## Shin, Moowhan



✉ mwshin@yonsei.ac.kr 🌐 <https://sites.google.com/view/nest-lab> ☎ +82-32-749-5839

## Education

- BA in Metallurgy Eng, Yonsei University, 1986
- Master in Materials Science & Engineering, North Carolina State University, Raleigh, NC, USA, 1998
- Ph.D. in Materials Science and Engineering, North Carolina State University, Raleigh, NC, USA, 1991

## Experience

- 2011 - Present: Professor, School of Integrated Technology, Yonsei University
- 1995 -2011: Professor of Materials Science & Engineering, Myong Ji University
- 1994 - 1995: Engineer III, EEAP Case Western Reserve University, Cleveland, OH, USA
- 1991 - 1993: Post Doctoral Research Fellow ECE, North Carolina State University, Raleigh, NC, USA

## Research Areas

- High Performance Energy Storage Devices
- Development of New Resistive Random Access Memory Devices

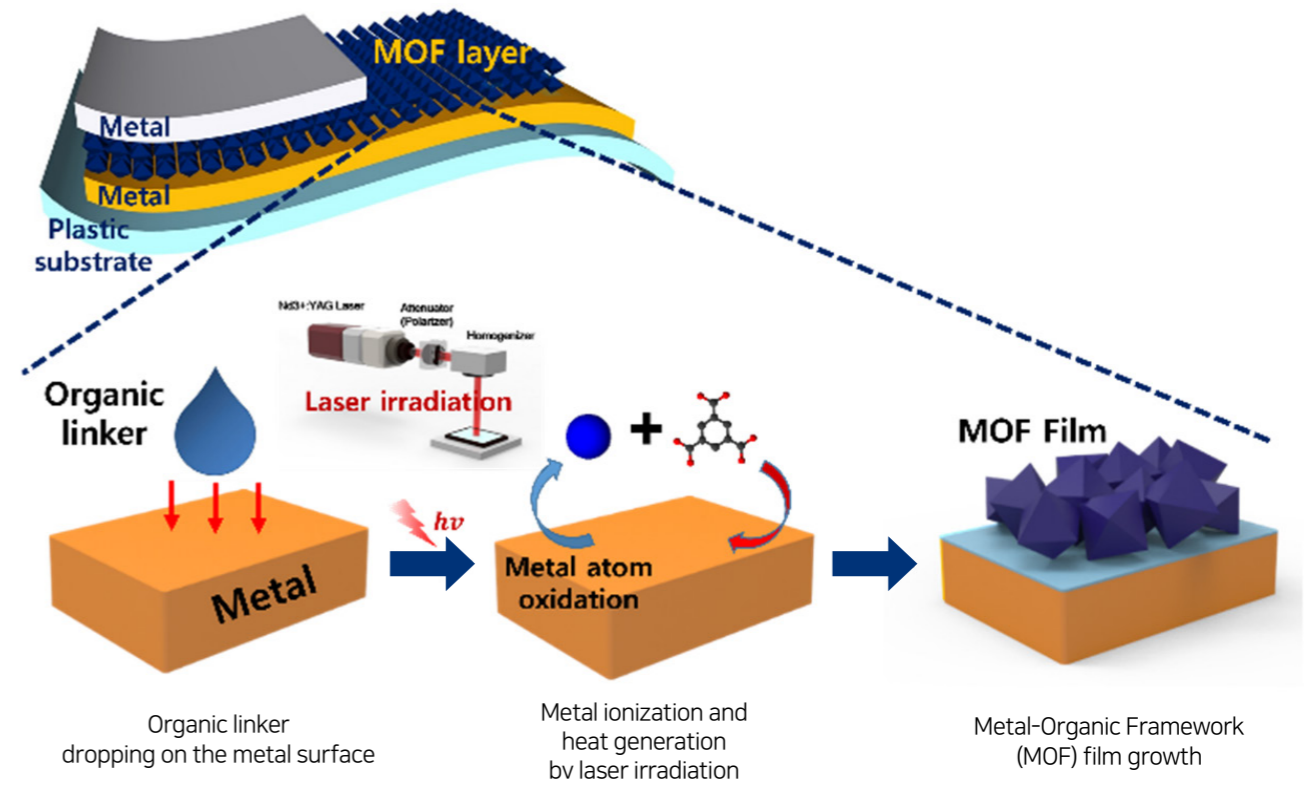
## Publications

- Seoyoon Shin, and Moo Whan Shin, "Nickel metal-organic framework (Ni-MOF) derived NiO/C@CNF composite for the application of high performance self-standing supercapacitor electrode", *Applied Surface Science*, 540, 148295, 2021
- Chul Jin Park, Seung Woo Han, and Moo Whan Shin, "Laser-Assisted Interface Engineering for Functional Interfacial Layer of Al/ZnO/Al Resistive Random Access Memory (RRAM)", *ACS Appl. Mater. Interfaces*, 12, 32131-32142, 2020
- Chul Jin Park, Jin Hwan Kim, Seok Daniel Namgung, Jang Yeon Kwon, and Moo Whan Shin, "Selective photo-thermal modulation of ZnO/Pt interface for monolithic 3D integration of oxide-based resistive random access memory", *Applied Surface Science*, 520, 146380-146380, 2020

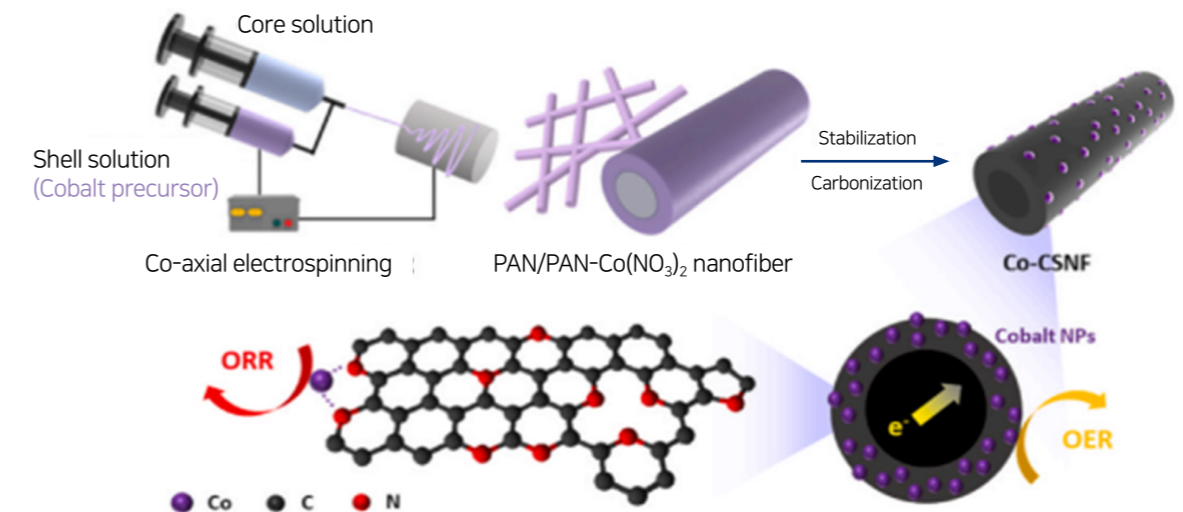
## Development of New Fabrication Process for Resistive Random Access Memory Device

MOF-based flexible RRAM

- MOF direct growth on the surface of metal
- Excellent Interfacial adhesion
- Ultrafast and simple fabrication process

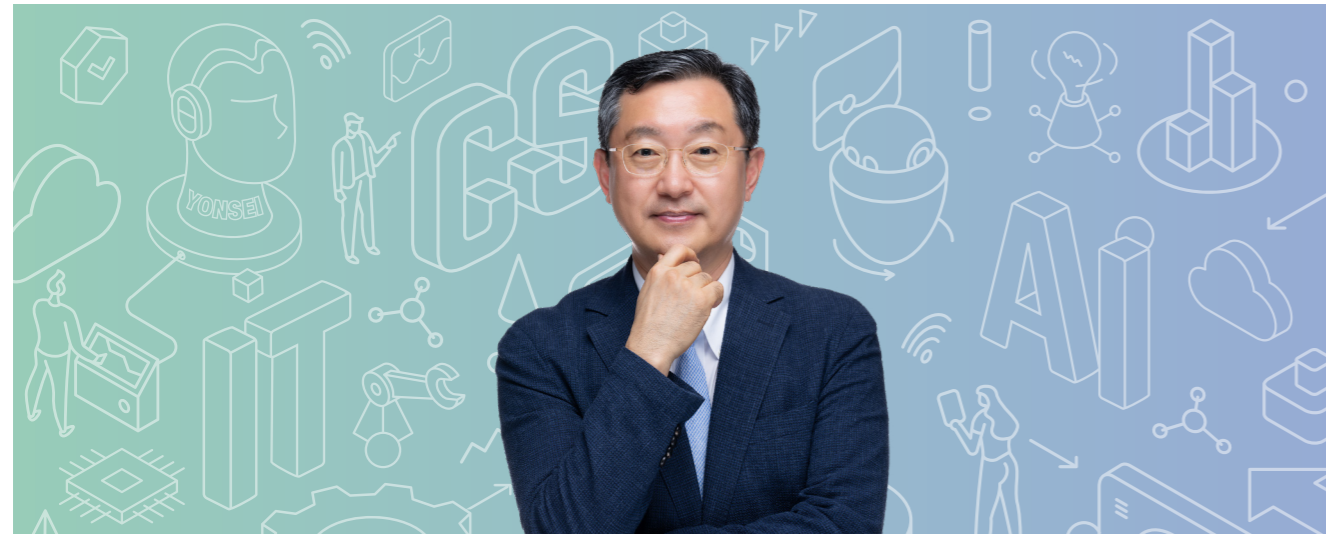


## Development of High Performance Batteries



# Nano Convergence Systems Lab.

Yeo, Jongsouk



[jongsoukyeo@yonsei.ac.kr](mailto:jongsoukyeo@yonsei.ac.kr) <http://ncs.yonsei.ac.kr> +82-32-749-5838

## Education

- Ph.D. in Materials Science and Engineering, Ph.D. Minor in Electrical Engineering, Stanford University, Stanford, CA, USA, 1998
- M.S. in Metallurgical Engineering, Seoul National University, 1991
- B.S. in Metallurgical Engineering, Seoul National University, 1989

## Experience

- 2011 - Present: Professor, School of Integrated Technology, Yonsei University
- 2002 - 2011: Research Scientist, Hewlett-Packard Company, OR, USA
- 1999 - 2002: Member of Technical Staff, Lucent Technologies, PA, USA
- 1998 - 1999: Post-Doctoral Scholar, Electrical Engineering, Stanford University, USA

## Research Areas

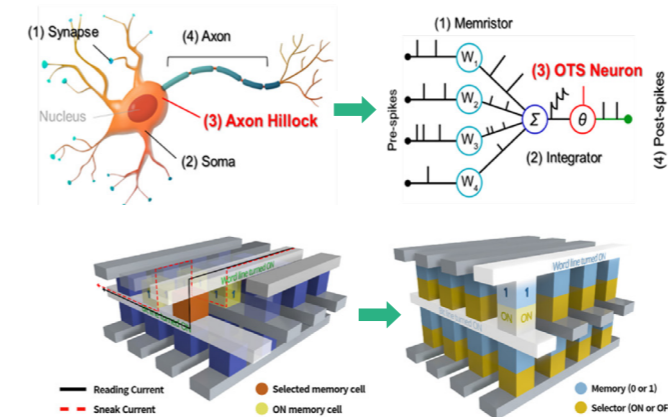
- Neuromorphic Semiconductors and Nature-Inspired Nanotechnologies
  - Quantum Devices and Computational Materials Science
  - Nano-Bio Sensorics and Nano-Bio Interface

## Publications

- How the Eurasian Jay Expands its Color Palette by Optimizing Multiple Scattering, *Advanced Optical Materials* (Front Cover), 2023
- Quantum Plasmonics: Energy Transport Through Plasmonic Gap, *Advanced Materials*, 2021
- Highly Stretchable and Reliable, Transparent and Conductive Entangled Graphene Mesh Networks, *Advanced Materials*, 2018
- Atomic Migration Induced Crystal Structure Transformation and Core-Centered Phase Transition in Single Crystal Ge<sub>2</sub>Sb<sub>2</sub>Te<sub>5</sub> Nanowires, *Nano Letters*, 2016

## Neuromorphic Semiconductors

- Low power nanoelectronics for brain-inspired computing
- Ovonic threshold selectors and non-volatile memories for 3D cross point neuromorphic applications



## Nature-Inspired Nanotechnologies

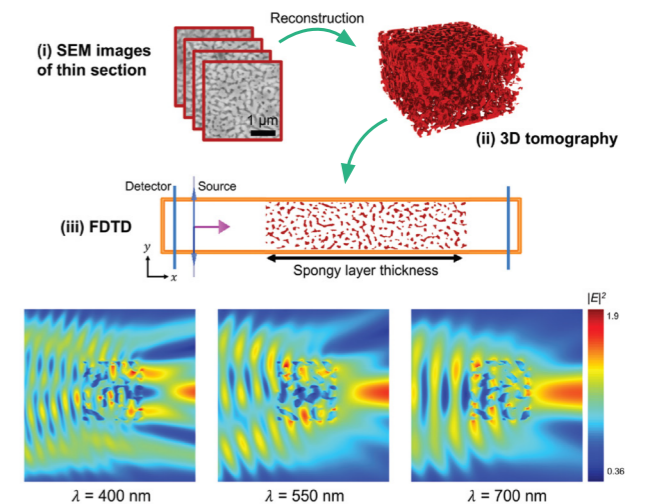
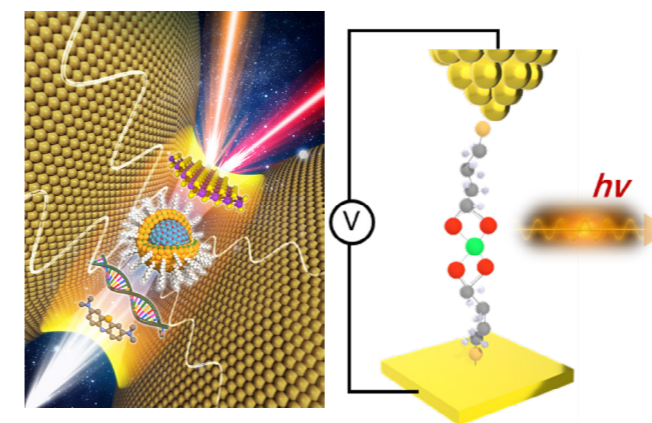
- Efficient functionalities enabled by biomimicry
- Brilliant colors from sustainable organic nanostructures inspired by avian feathers



Img. Source Link: <https://doi.org/10.1002/adom.202370010>

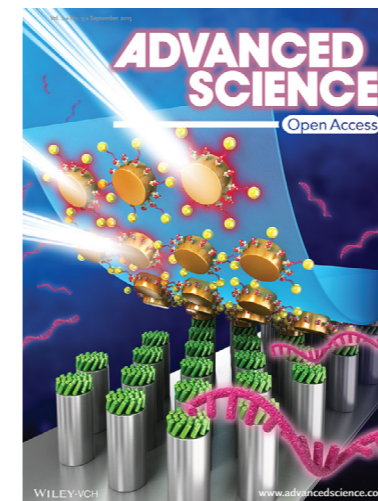
## Quantum and Atomic Scale Devices Computational Materials Science

- Quantum tunneling based metasurfaces for on-chip nanophotonics
- Atom-mediated quantum energy transport in molecule junction
- Finite-Difference Time-Domain analysis of optical nanostructures
- Simulation of microfluidics and devices for advanced designs
- Molecular dynamics simulation to explain switching mechanism



## Nano-Bio Sensorics

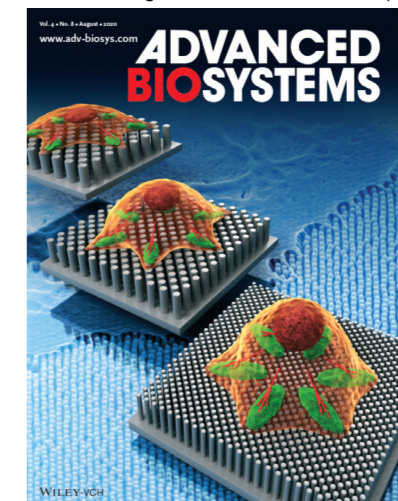
- Point-of-care biosensor system for early diagnosis of diseases
- Scalable fabrication of ultrasensitive nano-biosensing platform



Img. Source Link: <https://doi.org/10.1002/advs.201570034>

## Nano-Bio Interface

- Nanotopography control of adipose-derived stem cells
- Understanding mechanotransduction for proliferation and differentiation



Img. Source Link: <https://doi.org/10.1002/adbi.202070082>

# Epilogue



June, 2022



October, 2022



February, 2023



June, 2023

Please refer to the web page for more information.



College of Computing, Yonsei University

#03722, 50, Yonsei-ro, Seodaemun-gu, Seoul, Republic of Korea

+82-2-2123-5703~5    computing@yonsei.ac.kr    <https://computing.yonsei.ac.kr>



YONSEI UNIVERSITY  
COLLEGE OF COMPUTING

