Wonyeol Lee

Assistant Professor, Computer Science, POSTECH
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Education

- **Ph.D. in Computer Science**, Stanford University, USA. 2014–2023
  Advisor: Alex Aiken. Thesis: Reasoning about Floating Point in Real-World Systems.
  On leave for 3-year military service (2017–2020).
- **B.S. in Computer Science & Mathematics**, POSTECH, South Korea. 2010–2014
  Graduated with the highest GPA ever at POSTECH (GPA: 4.26/4.30).

Employment

- **Assistant Professor**, POSTECH, South Korea. 2024–
- **Postdoctoral Associate**, Carnegie Mellon University, USA. 2023–2024
- **Research Scientist**, KAIST, South Korea (Military Service). 2017–2020
- **Research Intern**, Microsoft Research India, India. 2017
- **Research Intern**, Microsoft Research Redmond, USA. 2016

Honors

Scholarships

- **Samsung Scholarship** (for graduate study abroad). 2014—2017, 2020—2022
- **KFAS Overseas PhD Scholarship** (for graduate study abroad; declined). 2014
- **KFAS Undergraduate Scholarship** (for undergraduate study). 2011—2014
- **Korea Presidential Science Scholarship** (for undergraduate study). 2010—2014

Awards

- **Valedictorian of POSTECH**. 2014
- **Samsung HumanTech Paper Award**, Bronze Prize (University Division). 2013
- **Samsung HumanTech Paper Award**, Gold & Bronze Prizes (High School Division). 2008, 2009

Research

- Areas: **Programming Languages**, **Numerical Computation**, **Machine Learning**.
- Goal: Make **foundational software** more **reliable and scalable**.

Publications

[1] Optimising Density Computations in Probabilistic Programs via Automatic Loop Vectorisation.
Sangho Lim, Hyoungjin Lim, Wonyeol Lee, Xavier Rival, Hongseok Yang.
POPL 2026.

[2] Floating-Point Neural Networks Are Provably Robust Universal Approximators.
Geonho Hwang*, Wonyeol Lee*, Yeachan Park, Sejun Park, Feras Saad.
CAV 2025.

[3] Floating-Point Neural Networks Can Represent Almost All Floating-Point Functions.
Geonho Hwang, Yeachan Park, Wonyeol Lee, Sejun Park.
ICML 2025.

[4] Random Variate Generation with Formal Guarantees.
Feras Saad, Wonyeol Lee.
PLDI 2025.

[5] Semantics of Integrating and Differentiating Singularities.
Jesse Michel, Wonyeol Lee†, Hongseok Yang.
PLDI 2025.

[6] What Does Automatic Differentiation Compute for Neural Networks?
Sejun Park, Sanghyuk Chun, Wonyeol Lee.
ICLR 2024. **Spotlight** (453/7262=6%).

[7] Expressive Power of ReLU and Step Networks under Floating-Point Operations.
Yeachan Park, Geonho Hwang, Wonyeol Lee, Sejun Park.
Neural Networks, 2024.

[8] On the Correctness of Automatic Differentiation for Neural Networks with Machine-Representable Parameters.
Wonyeol Lee, Sejun Park, Alex Aiken.
ICML 2023.

[9] Training with Mixed-Precision Floating-Point Assignments.
Wonyeol Lee, Rahul Sharma, Alex Aiken.
TMLR, 2023.

[10] Smoothness Analysis for Probabilistic Programs with Application to Optimised Variational Inference.
Wonyeol Lee, Xavier Rival, Hongseok Yang.
POPL 2023.

[11] On Correctness of Automatic Differentiation for Non-Differentiable Functions.
Wonyeol Lee, Hangyeol Yu, Xavier Rival, Hongseok Yang.
NeurIPS 2020. **Spotlight** (385/9454=4%).

[12] Differentiable Algorithm for Marginalising Changepoints.
Hyoungjin Lim, Gwonsoo Che, Wonyeol Lee, Hongseok Yang.
AAAI 2020.

[13] Towards Verified Stochastic Variational Inference for Probabilistic Programs.
Wonyeol Lee, Hangyeol Yu, Xavier Rival, Hongseok Yang.
POPL 2020.

[14] Reparameterization Gradient for Non-Differentiable Models.
Wonyeol Lee, Hangyeol Yu, Hongseok Yang.
NeurIPS 2018.

[15] On Automatically Proving the Correctness of math.h Implementations.
Wonyeol Lee, Rahul Sharma, Alex Aiken.
POPL 2018.

[16] Verifying Bit-Manipulations of Floating-Point.
Wonyeol Lee, Rahul Sharma, Alex Aiken.
PLDI 2016.

[17] A Proof System for Separation Logic with Magic Wand.
Wonyeol Lee, Sungwoo Park.
POPL 2014.

[18] CT-IC: Continuously Activated and Time-Restricted Independent Cascade Model for Viral Marketing.
Wonyeol Lee, Jinha Kim, Hwanjo Yu.
ICDM 2012.

[19] Edge Detection Using Morphological Amoebas in Noisy Images.
Wonyeol Lee, Seyun Kim, Youngwoo Kim, Jaeyoung Lim, Dong Hoon Lim.
ICIP 2009.

Talks

- **Life and Work of Peter Naur**.
  Open Turing 2026, Daejeon, South Korea. May 2026
- **Foundations of Continuous Computation**.
  KMS Annual Meeting 2025, Seoul, South Korea. Oct 2025
  SIGPL 2025, Seoul, South Korea. Aug 2025
- **Floating-Point Neural Networks Are Provably Robust Universal Approximators**. [2]
  POSTECH, Pohang, South Korea. Dec 2025
  CAV 2025, Zagreb, Croatia. Jul 2025
- **Random Variate Generation with Formal Guarantees**. [4]
  INRIA Nancy, Nancy, France. Jan 2026
  POSTECH, Pohang, South Korea. Jul 2025
- **On Correctness of Numerical Libraries**.
  POSTECH, Pohang, South Korea. Mar 2025
  STAAR Workshop, Yeosu, South Korea. Feb 2025
- **What Does Automatic Differentiation Compute for Non-Differentiable Functions?** [6, 8, 11]
  KAIST, Daejeon, South Korea. Dec 2024
  KAIST-INRIA Joint Workshop, Daejeon, South Korea. Nov 2024
- **Bridging the Theory and Practice of Continuous Computations**.
  Carnegie Mellon University, Pittsburgh, PA, USA. Feb 2024
  POSTECH, Pohang, South Korea. Aug 2023
- **Smoothness Analysis for Probabilistic Programs and Optimised Variational Inference**. [10]
  PROBPROG 2024. (Virtual) Mar 2024
  Stanford University, Stanford, CA, USA. Feb 2023
  POPL 2023, Boston, MA, USA. Jan 2023
- **On Numerical Programs in Machine Learning**.
  Bay Area K-Group, San Jose, CA, USA. (Virtual) Mar 2022
  KAIST, Daejeon, South Korea. Dec 2021
  Seoul National University, Seoul, South Korea. Dec 2021
  POSTECH, Pohang, South Korea. (Virtual) Aug 2021
- **On Correctness of Automatic Differentiation for Non-Differentiable Functions**. [11]
  Stanford University, Stanford, CA, USA. Dec 2022
  Workshop on Differentiable Programming, Paris, France. Jun 2022
  NeurIPS 2020 (Spotlight). (Virtual) Dec 2020
- **Towards Verified Stochastic Variational Inference for Probabilistic Programs**. [13]
  Stanford University, Stanford, CA, USA. (Virtual) Oct 2020
  POPL 2020, New Orleans, LA, USA. Jan 2020

- **Implementing Non-Linear Functions with Floating Point**.
  FuriosaAI, Seoul, South Korea. (Virtual) Jan 2021
  FuriosaAI, Seoul, South Korea. Dec 2019
- **Reparameterization Gradient for Non-Differentiable Models**. [14]
  NAVER Corp., Seongnam, South Korea. Jan 2019
- **On Automatically Proving the Correctness of math.h Implementations**. [15]
  FPTalks 2020. (Virtual) Jun 2020
  Korea Science Academy, Busan, South Korea. Jun 2018
  FuriosaAI, Seoul, South Korea. May 2018
  POPL 2018, Los Angeles, CA, USA. Jan 2018
  KAIST, Daejeon, South Korea. Sep 2017
- **Verifying Bit-Manipulations of Floating-Point**. [16]
  SRI International, Menlo Park, CA, USA. Oct 2016
  Microsoft Research, Redmond, WA, USA. Jul 2016
  PLDI 2016, Santa Barbara, CA, USA. Jun 2016
- **CT-IC: Continuously Activated and Time-Restricted Independent Cascade Model**. [18]
  ICDM 2012, Brussels, Belgium. Dec 2012

Service

Conferences

- 2026: **POPL** (Program Committee), **PLDI** (External Reviewer), **APLAS** (SRC Committee).
- 2025: **POPL** (External Reviewer), **NeurIPS** (Reviewer).
- 2024: **OOPSLA** (Artifact Evaluation Committee), **ICML** (Reviewer).
- 2023: **PLDI** (External Reviewer), **ICML** (Reviewer).
- 2022: **POPL** (External Reviewer), **ICML** (Reviewer), **NeurIPS** (Reviewer).
- 2021: **NeurIPS** (Reviewer).
- 2020: **POPL** (Artifact Evaluation Committee), **ESOP** (External Reviewer).
- 2019: **CAV** (External Reviewer).

Journals

- 2024: **ACM Transactions on Probabilistic Machine Learning** (Reviewer).

Teaching

- 2026: **Foundations of Continuous Computation** (Instructor), **Programming Languages** (Instructor).
- 2025: **Foundations of Continuous Computation** (Instructor), **Algorithms** (Instructor).
- 2022: **Compilers** (Course Assistant).
- 2021: **Programming Languages** (Course Assistant).

References

- **Alex Aiken**, Professor, Stanford University, USA.
- **Hongseok Yang**, Professor, KIAS, South Korea.
- **Xavier Rival**, Research Director, INRIA/ENS, France.