Mastiyage Don Sudeera Hasaranga Gunathilaka

sudeera.gunathilaka@aist.go.jp   Website   Google Scholar
Languages: English (Fluent), Japanese (Fluent), Sinhala (Native)
Reviewer: IEEE

RESEARCH INTERESTS

Unconventional computing architectures (coherent, quantum, quantum-inspired etc.)
Artificial intelligence (LLM for scientific discovery, numerical optimisation, etc.)
High-performance computing (GPU computing, large-scale simulation, etc.)

EDUCATION

Ph.D., Artificial Intelligence, Tokyo Institute of Technology, Japan   Mar 2025
M.Eng., Artificial Intelligence, Tokyo Institute of Technology, Japan   Mar 2022
B.Eng., Information Science, Shonan Institute of Technology, Japan   Mar 2020
H.S.Dip., Physical Science, Nalanda College, Colombo 10, Sri Lanka   Aug 2015

WORK EXPERIENCE

Research Scientist (Permanent), National Institute of Advanced Industrial Science and Technology – G-QuAT   Apr 2025 – Present

RESEARCH EXPERIENCE

Research Intern, NTT PHI Laboratories, CA, USA   Jun 2021 - Mar 2025
Advisors: Dr. Yoshitaka Inui, Prof. Timothee Leleu, Prof. Yoshihisa Yamamoto
Term 1: Jun 2021 – Aug 2021 and Term 2: Jul 2023 – Mar 2025
– Incorporated Zeeman terms into Gaussian SDE models of coherent Ising machines
– Improved solution success probability on benchmark optimisation problems
– Developed GPU-parallelised CUDA code for large-scale CIM simulations
– Experimented on Wishart Planted Ensembles for Ising machines

Intern, Jij Inc., Tokyo, Japan   Feb 2022 – Mar 2022
Advisors: Dr. Yu Yamashiro,
– Evaluated Hybrid Simulated Quantum Annealing performance
– Benchmarked optimisation accuracy and convergence behaviour

Research Assistant, Tokyo Institute of Technology, Japan   Nov 2020 – Dec 2021
Advisors: Prof. Toru Aonishi,
– Improved compressed sensing image reconstruction accuracy with CIMs
– Worked on quantum–classical hybrid system (CIM–CDP)
– Proposed the closed-loop CIM models for with effective Zeeman term realization

PUBLICATIONS

[1] Aonishi, T., Nagasawa, T., Koizumi, T., **Gunathilaka, M.D.S.H.**, Mimura, K., Okada, M., Kako, S., Yamamoto, Y. *Highly versatile FPGA-implemented cyber coherent Ising machine.* IEEE Access. LINK   2024
[2] **Gunathilaka, M.D.S.H.**, Inui, Y., Kako, S., Yamamoto, Y., Aonishi, T. *Mean-field coherent Ising machines with artificial Zeeman terms.* Journal of Applied Physics, 134(23):234901. LINK   2023
[3] **Gunathilaka, M.D.S.H.**, Kako, S., Inui, Y., et al. *Effective implementation of ℓ_0-regularised compressed sensing with chaotic-amplitude-controlled coherent Ising machines.* Scientific Reports 13, 16140. LINK   2023

[4] Inui, Y., **Gunathilaka, M.D.S.H.**, Kako, S., et al. *Control of amplitude homogeneity in coherent Ising machines with artificial Zeeman terms.* Communications Physics 5, 154. LINK 2022

[5] **Gunathilaka, M.D.S.H.**, Mahboubi, S., Ninomiya, H. *Acceleration technique of two-phase quasi-Newton method with momentum for optimization problems.* ThinkMind. LINK 2020

PREPRINTS

[1] Leleu, T., **Gunathilaka, M.D.S.H.**, Ghimenti, F. and Ganguli, S., *Contrastive Concept-Tree Search for LLM-Assisted Algorithm Discovery..* arXiv:2602.03132. LINK 2026

[2] **Gunathilaka, M.D.S.H.**, Inui, Y., Kako, S., Mimura, K., Okada, M., Yamamoto, Y. and Aonishi, T., *L0-regularized compressed sensing with Mean-field Coherent Ising Machines..* arXiv:2405.00366. LINK 2024

TALKS AND POSTER PRESENTATIONS

Invited Talk, Atsumi foundation workshop 2025, Nirasaki	Jul 2025
Talk, International Workshop on Ising Machines 2025, Chicago	May 2025
Talk, International Network on Quantum Annealing 2024, Tokyo	Oct 2024
Talk, Asia Future Conference, Bangkok (*Best Presentation Award*)	Aug 2024
Talk and Poster, Adiabatic Quantum Computing 2024, Glasgow	Apr 2024
Talk, NTT Retreat Meeting, San Francisco	Apr 2024
Invited Talk, NTT–RIKEN Workshop on Photonics, Neural Networks, etc.	Feb 2024
2 Talks, Spring Meeting of the Physical Society of Japan 2024, Online	Mar 2024
Talk, 2nd Quantum Annealing workshop, Tokyo	Dec 2023
Poster, Quantum Information Processing 2024, Taipei	Jan 2024
Poster, StatPhys28, University of Tokyo, Japan	Aug 2023
Invited Talk, NTT Basic Research Laboratories, Atsugi	Jun 2023
Poster, Conference on Neural Computation, Stanford University	Oct 2022
Invited Talk, Atsumi foundation workshop 2025, Nirasaki	Jul 2025

TEACHING EXPERIENCE

Student Assistant, Shonan Institute of Technology   Apr 2019 – Mar 2020
– Assisted teaching a course in artificial intelligence
– Assisted teaching a course in logic circuits and Java programming

HONORS, SCHOLARSHIPS AND AWARDS

Atsumi International Foundation Scholarship	3,000,000 JPY
Kobayashi Scholarship Foundation Scholarship	6,480,000 JPY
Rotary–Yoneyama Memorial Scholarship (Club Support)	1,680,000 JPY
Rotary–Yoneyama Memorial Scholarship	1,200,000 JPY
Monbukagakusho Honors Scholarship	576,000 JPY

EXTRA ACTIVITIES (2025 ONWARDS)

Supercomputing conference 2025 mentor	Nov. 2025
16th QS conference volunteer	Oct. 2025
CEATEC AIST booth volunteer	Oct. 2025