Reza Sangari Abiz

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AI and soft-computing researcher (M.Sc., Damghan University, 2026, Excellent) specializing in hybrid metaheuristic optimization (MFO-BOA) and numerical PDE methods, and investigating physics-informed neural networks (PINNs) for stiff reaction–diffusion systems.

RESEARCH EXPERIENCE

Scientific Machine Learning Researcher (SciML & PINNs) — Independent Research (Nov 2026 – Present)

- Investigating PINNs and hybrid metaheuristic optimization for stiff reaction–diffusion PDEs, focusing on fitness-selection reliability and loss-landscape conditioning; preparing a manuscript for the First International Interdisciplinary Sciences Congress (MedLife 2027), Tehran. Preliminary analysis for this manuscript found short-training fitness to be an unreliable selection proxy for PINN configuration search in the tested stiff reaction–diffusion problems (pooled mean gap +0.3869 RMSE, final test error minus short-training fitness, across 51 configurations). Maintaining open-source numerical PDE solver benchmarks in Python.

M.Sc. Thesis Research — Damghan University (Oct 2024 – Oct 2026)

"Solving Nonlinear Partial Differential Equations Using the Hybrid Moth-Flame and Butterfly Metaheuristic Algorithm and Its Applications in Engineering Problems."

- Designed a hybrid MFO-BOA optimizer coupled with B-spline collocation for nonlinear PDEs; benchmarked across 30 independent runs, achieving mean RMSE of 3.2×10^{-5} (heat equation, analytical reference), 2.8×10^{-4} (Burgers' equation), and 3.9×10^{-4} (diffusion equation).
- Compared the hybrid against MFO and BOA using pairwise Wilcoxon signed-rank tests (MFO: $p = 0.003$; BOA: $p = 0.001$; Bonferroni-corrected $\alpha = 0.01$) and a Friedman test across the compared optimizers ($p < 0.001$).
- Supervisors: Dr. Sajjad Rahmani, Dr. Reza Pourgholi; Advisor: Dr. Saedeh Foadian. Code: github.com/RezaSangari/MFO-BOA-PDE-Solver; Zenodo DOI: 10.5281/zenodo.24222698 (v1.1.5)

PUBLICATIONS AND RESEARCH SUBMISSIONS

- "Artificial Intelligence and Machine Learning in Nanotechnology: A Selective Critical Narrative Review with Evidence-Type Stratification" (with Pooria Salehi Siuki) — submitted Oct 2026 to the 7th National Conference on Nanotechnology (NCWNN7), Iran. Oral presentation; code icnn2026-00630036. Conference website: icnn2026.ir.
- "A Hybrid Metaheuristic Algorithm (MFO-BOA) for Numerical Solution of Nonlinear Partial Differential Equations with Engineering Applications" — Dr. Reza Pourgholi, Dr. Sajjad Rahmani, Dr. Saedeh Foadian, Reza Sangari Abiz — submitted Oct 2026 to the Journal of Mathematical Research. Code MMR-2607-1000.

MANUSCRIPTS IN PREPARATION

- "Diagnosing Fitness-Selection Reliability in Metaheuristic Optimization of Physics-Informed Neural Networks for Stiff Reaction–Diffusion Systems: A Selected-Configuration (B1) Diagnostic Against the Corrected Baseline" (with Pooria Salehi Siuki) — manuscript in preparation for MedLife 2027; submission target 14 Feb 2027.

TEACHING EXPERIENCE

Teaching Assistant — Fundamentals of Computation Theory, Damghan University (Sep 2024 – Jan 2025)

- Delivered exercise sessions for the undergraduate course.

EDUCATION

M.Sc. in Soft Computing and Artificial Intelligence — Damghan University, Damghan, Iran (Oct 2024 – Oct 2026)

- Graduated with grade Excellent; GPA 17.49/20.

B.Sc. in Computer Science — Birjand University of Technology, Birjand, Iran (2019 – 2023)

CERTIFICATIONS & PROFESSIONAL DEVELOPMENT

- Hugging Face Agents Course — Certificate of Excellence (Nov 2026).
- Hugging Face Agents Course — Fundamentals of Agents — Certificate of Achievement (Oct 2026).

- OpenAI Academy — AI Foundations — Badge (Nov 2026).
- Claude Academy — Claude 101 — Badge (Nov 2026).
- Claude Academy — AI Fluency — Badge (Nov 2026).
- DataCamp — AI Fundamentals Skill Assessment — Score 189, 99th percentile (Nov 2026).
- DataCamp — AI Ethics — Statement of Accomplishment #50,822,477; 1 hour (Nov 2026).
- DataCamp — Introduction to AI for Work — Statement of Accomplishment #50,785,462; 2 hours (Nov 2026).
- DataCamp — Large Language Models (LLMs) Concepts — Statement of Accomplishment #50,797,316; 2 hours (Nov 2026).
- DataCamp — Understanding Machine Learning — Statement of Accomplishment #50,792,530; 2 hours (Nov 2026).
- DataCamp — Generative AI Concepts — Statement of Accomplishment #50,817,897; 2 hours (Nov 2026).
- DataCamp — Introduction to Deep Learning with PyTorch — Statement of Accomplishment #50,855,536; 4 hours (Nov 2026).
- Kaggle — 6 certificates, including Intro to Deep Learning.
- CS50's Introduction to Artificial Intelligence with Python — Harvard University; including twelve projects (2026). Certificate 3d3cc221-cb86-4d7d-b508-361740a15edf.
- CS50's Introduction to Computer Science — Harvard University (Oct 2026).
- CS50's Introduction to Programming with Python — Harvard University (Oct 2026).
- CS50's Introduction to Databases with SQL — Harvard University (Oct 2026). Certificate 59623581-b482-4d07-9567-03017a0adef8.
- CS50's Introduction to Cybersecurity — Harvard University (Oct 2026). Certificate bfb9b272-e544-4901-883d-a7e6176d3050.
- Elements of AI — University of Helsinki (2026).

PROFESSIONAL MEMBERSHIPS

- IAENG Member — Member ID 588946 (Nov 2026); Member, IAENG Society of Artificial Intelligence and IAENG Society of Computer Science (Nov 2026).

TECHNICAL SKILLS

- **Programming:** Python (NumPy, pandas, scikit-learn, Matplotlib).
- **Methods:** Metaheuristic optimization (MFO, BOA, hybrid design); numerical PDE solvers (B-spline collocation); physics-informed neural networks (PINNs); scientific machine learning (SciML).
- **Statistical methods:** Wilcoxon signed-rank test, Friedman test, Bonferroni correction, RMSE-based evaluation.
- **Tools:** Git/GitHub, LaTeX.
- **Research:** Academic writing, systematic literature review, scientific computing.