

AADITYA L. KACHHADIYA

Surat, Gujarat, India

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RESEARCH INTERESTS

Scientific machine learning; nonlinear inverse problems; learned optimization methods; numerical optimization; physics-informed learning; PDE-governed systems; reliability and diagnostics for learned solvers.

EDUCATION

Senior Secondary, Class 12

Shardayatan School, Surat, India

Gujarat State Board (GSEB), ongoing

2026–March 2027

Secondary, Class 10

Shardayatan School, Surat, India

Gujarat State Board (GSEB), 90.0%

2024–2025

PUBLICATIONS AND PREPRINTS

Under Review

[1] Aaditya L. Kachhadiya, Meet Dabgar, Tanmoy Hazra, and Anupam Shukla. “Component-Access Subspace Optimization for Heterogeneous Scalarized Learning.” *Manuscript under review, IEEE Transactions on Neural Networks and Learning Systems*, 2026.

[2] Aaditya L. Kachhadiya. “Local Inverse Geometry Can Be Amortized.” *arXiv preprint; under review at NeurIPS*, 2026. [arXiv:2605.13068](#) [cs.LG].

Code:

github.com/AadityaKachhadiya/deceptron.

Conference and Workshop Papers

[3] Aaditya L. Kachhadiya. “Deceptron: Learned Local Inverses for Fast and Stable Physics Inversion.” *NeurIPS Machine Learning for Physical Sciences Workshop*, 2025. [Paper](#).

RESEARCH EXPERIENCE

Independent Researcher

2024–present

Research on learned local inverse geometry and optimization for nonlinear inverse problems.

- Developed Deceptron Inverse-Preconditioned Gradient (D-IPG), a learned local-inverse optimization method for PDE-governed inverse problems.
- Introduced Jacobian-consistency training and runtime diagnostics for evaluating local inverse reliability.
- Produced a NeurIPS ML4PS workshop paper, arXiv preprint, open-source PyTorch implementation, and reproducible PDE inverse-problem benchmarks.

Research Collaborator, Department of Artificial Intelligence

2026–present

Sardar Vallabhbhai National Institute of Technology (SVNIT), Surat, India

- Collaborating with Dr. Tanmoy Hazra (supervisor) and research group on optimization methods for physics-informed and scalarized learning.
- First author on manuscript under review at *IEEE Transactions on Neural Networks and Learning Systems*.
- Research focus: subspace optimization, Physics-Informed Neural Networks (PINNs), Multi-task learning, numerical optimization.

SELECTED RESEARCH SOFTWARE

Deceptron / D-IPG

Open-source PyTorch implementation of Deceptron Inverse-Preconditioned Gradient for nonlinear inverse problems. The repository includes learned forward–reverse modules, D-IPG inference, Jacobian-consistency training, runtime diagnostics, PDE inverse-problem benchmarks, and reproducibility scripts.

github.com/AadityaKachhadiya/deceptron

2025–2026

TALKS AND PRESENTATIONS

NeurIPS 2025, San Diego

Poster presentation, Machine Learning for Physical Sciences Workshop.

“Deceptron: Learned Local Inverses for Fast and Stable Physics Inversion.”

[Poster](#).

December 6, 2025

Shardayatan School, Surat, India

Invited classroom lecture on machine learning for senior secondary students.

Duration: 35 minutes.

June 2025

TECHNICAL SKILLS

Programming	Python, PyTorch, NumPy, pandas, Matplotlib, L ^A T _E X
Scientific ML	Nonlinear inverse problems, PDE-governed systems, physics-informed learning, surrogate modeling, learned solvers
Optimization	Nonlinear least squares, Gauss–Newton, Levenberg–Marquardt, L-BFGS/BFGS, line search, trust-region methods, subspace methods
Mathematics	Linear algebra, singular value decomposition, calculus, PDEs, automatic differentiation, dynamical systems

HONORS AND ACTIVITIES

New York Academy of Sciences Junior Academy

Participant.

2025

LANGUAGES

English, Hindi, Gujarati

REFERENCES

References available upon request.