

Nikan Doosti

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EDUCATION

- **Aalto University** Espoo, Finland
Doctor of Science (Technology) in Mechanical Engineering Mar 2025 - present
 - **Thesis:** AI-assisted Product Development
- **Iran University of Science and Technology (IUST)** Tehran, Iran
Master of Science in Computer Engineering - Artificial Intelligence Aug 2019 - Dec 2022
 - **Thesis:** High Resolution Neural Topology Optimization via Differentiable Physics Engine ([code](#))
 - **Defense:** Achieved **maximum thesis score** (20.5/20) accompanied with a peer-reviewed [publication](#)
 - **Honors:** Selected as an **Exceptional Talent** ($\leq 300/15000$) for direct admission to a **top-3 national university**
- **University of Guilan (UoG)** Rasht, Iran
Bachelor of Science in Computer Engineering Aug 2015 - Aug 2019
 - **Thesis:** Descreening and Rescreening of Halftone Images via Data-Driven Deep Learning Methods ([code](#))
 - **Honors:** Graduated **3rd** out of 55 (GPA: 18.64/20); **First-Class Honors** with outstanding thesis evaluation

RESEARCH INTERESTS

- Computer Graphics
- Inverse Problems
- Physics-based Simulation
- Applied Machine Learning
- Computational Fabrication

PUBLICATIONS

- Multimodal Ensemble Detection and Self-Healing of Defects in Laser-based Powder Bed Fusion. **Nikan Doosti**, Olli Nyrhilä, Jan Akmal. [Additive Manufacturing](#), 2025. Under review
- Topology Optimization via Frequency Tuning of Neural Design Representations. **Nikan Doosti**, Julian Panetta, Vahid Babaei. ACM Symposium on Computational Fabrication ([SCF](#)), 2021. ([Publisher](#), [Code](#))

TALKS

- [Invited] "Complementary Benefits of OT/MPM Imaging Sensors for AM Quality Monitoring." **Electro Optical Systems (EOS) GmbH**. Germany and Finland. Technical Talk (virtual). December, 2025. (Length: 60 mins.)
- [Invited] "Neural Design Representations" **Toronto Geometry Colloquium (TGC)** advised by Prof. Alec Jacobson, University of Toronto. Technical Talk (virtual). March, 2022. (Length: 10 mins., [Video](#))
- "Topology Optimization via Frequency Tuning of Neural Design Representations." **SCF 2021**. Technical Paper Presentation (virtual). October, 2021. (Length: 15 mins., [Video](#))

RESEARCH EXPERIENCE

- **Full-time Graduate Researcher** Espoo, Finland
Aalto University Mar 2025 - Present
Materials to Products Group ([M2P](#)) and Aalto Digital Design Lab ([ADDLAB](#))
 - Project Overview: Defect detection and compensation in laser-based powder bed fusion (PBF-LB) via multimodal neural fusion of cost-effective, commercial-grade in-situ monitoring sensors
 - Supervisors: Supervised by **Prof. Jan Akmal** from M2P and **Olli Nyrhilä** from Electro Optical Systems ([EOS GmbH](#)).
 - Method: Laser parameters were systematically varied to induce defects in PBF-LB. Developed a **multimodal ensemble learning framework** fusing Near-Infrared (NIR) optical tomography and Dual-Photodiode Melt-Pool Monitoring (MPM) data. This approach establishes complementary cross-modal confidence to detect and heal defects spanning up to seven layers.

- Outcome: **First researcher to demonstrate the complementary benefit of MPM sensors** for print quality monitoring. **Invited to present the findings to EOS GmbH's global R&D team** following strong endorsement from EOS's senior inventor.

Full-time Graduate Researcher

Saarbrücken, Germany

- *Max Planck Institute for Informatics (MPII)*

Jul 2020 - Mar 2021

Artificial Intelligence aided Design and Manufacturing Group (AIDAM)

- Project Overview: Novel self-supervised neural design representation for obtaining the optimum design as an inverse problem, showcased in topology optimization
- Supervisors: Supervised by **Dr. Vahid Babaei** from MPII and **Prof. Julian Panetta** from the University of California, Davis, USA.
- Method: Utilized **physics-informed deep learning** by integrating analytical **physical simulators of PDE-constrained density-based topology optimization** into **neural fields**, enabling **generative continuous design** through sub-voxel (pixel) tuning .
- Outcome: Resulted in a paper published and presented at the **ACM Symposium on Computational Fabrication 2021**. Among very few master's students whose thesis led to a publication in a highly regarded venue.

Undergraduate Research Assistant

Rasht, Iran

- *University of Guilan*

Sep 2018 - Aug 2019

Computer Engineering Group

- Project Overview: Worked on descreening and rescreening of halftone images via supervised deep learning methods
- Supervisors: Supervised by **Prof. Mahdi Aminian** and **Dr. Vahid Babaei** from MPII.
- Outcome: On top of deep study of visual computing, I became a top contributor of PyTorch forum, getting invited to the PyTorch Conference

INDUSTRIAL EXPERIENCE

Founder and Engineer

Tehran, Iran

- *AI Venture (toy example)*

Aug 2023 - Jul 2024

Specializing in Automated Document Image Analysis

- Problem: Many small to medium companies, **lack structured data pipelines** and use their own specific layout for their documents which degrades inter-company interactions.
- Method: Developed an automated document image analysis platform to **transform unstructured, denormalized documents into accessible, structured data**, semantically searchable. Then a **no-code/low-code configuration system** for domain-expert intuition integration and a **human-in-the-loop review process** for quality control and compliance of the business logic was developed.
- Outcome: **Secured a pre-seed grant** (=84X of monthly minimum wage) and **first commercial client** in quality control inspection of a bicycle factory, however bureaucratic challenges ended this venture.

Full-time Machine Learning Engineer

Karaj, Iran

- *Pana4*

Apr 2022 - Jan 2024

Specializing in Data-driven Decision Making for Business Optimization

- Problem: Growing customer volume made expert assignment inefficient; a real-time system was needed to identify high-value customers and route them to the right experts.
- Outcome: Decreased personnel error by 10% as a result of applicant prioritization. The **comprehensive screening process automation** (text/voice) coupled with filtering calls based on the complexity of inquiries, **reduced manual workload by 40%**. Furthermore, Oversaw the development of a proprietary data extraction and preprocessing pipeline, resulting in a **35% reduction in poor-quality data**. Finally, I established myself as **the primary person for onboarding and training** new team members.

Summer Intern

Tehran, Iran

- *Matris Corporation*

June 2018 - August 2018

Specializing in hardware inspection of manufactured personal computers

TECHNICAL SKILLS

Python, PyTorch, TensorFlow, NumPy, Linux, Git, LaTeX
Slurm, Docker, Shell, reproducible ML workflows (MLflow, DVC), DevOps

TEACHING EXPERIENCE

- **Head Teaching Assistant - Advanced Programming (AP)**
Supervisor: Dr. Ghasem Mirroshandel - University of Guilan Aug 2018 - Feb 2019
- **Head Teaching Assistant - Algorithms Design (AD)**
Supervisor: Dr. Mojtaba Shakeri - University of Guilan Aug 2018 - Feb 2019
- **Head Teaching Assistant - Computational Intelligence (CI)**
Supervisor: Dr. Mojtaba Shakeri - University of Guilan Feb 2018 - Jul 2018

Developed lectures for Java, gave recitation lectures, held office hours, designed and graded homework assignments, gave recitation lectures, and evaluated final projects in AP course (~60 students). Gave recitation lectures, graded homework assignments, and created programming tasks for AD (~60 students) and CI (~40 students) courses (partial [materials](#)).

COMMUNITY AND VOLUNTARY ACTIVITIES

Top Contributor

- *Official PyTorch Forum* 2018 - 2022
Official forum with 60K+ members and developers of the PyTorch
 - Ranked 15th (top 0.02%) as an active and helpful contributor with 183 solutions and 566 posts ([profile](#))
 - Publicly praised by Thomas Viehmann (author, *Deep Learning with PyTorch*) for insightful posts ([source](#))
 - Resulted in being awarded three consecutive, fully-waived invitations to the exclusive PyTorch Developer/Ecosystem Day and conference by the core team

Organizer and Mentor

- *IUST Projects* 2019 - 2021
An Open and Free Organization For Sharing Ideas, Showcasing Projects, and Mentoring Students
 - Mentored junior students in preparation for going through the MSc thesis process, from ideation to publishing, and job hunting. Few are now senior backend developers (feedback available upon request).

Mentor and Lecturer

- *Rasht School of AI* 2018 - 2021
An Open and Free Organization For Introducing AI and Mentorship ([meetup materials](#))

Teacher

- *Independent work* 2023 - 2024
Teaching Math and Programming to Underprivileged Teenagers in Low-income Regions

SELECTED AWARDS AND HONORS

- **Fully-funded PhD admission** to the Max Planck Institute for Informatics, Saarland University 2023
(unable to matriculate due to administrative delays in home country)
- **First-Class Honors** in BSc and MSc at UoG and IUST with **outstanding thesis** evaluations 2019,22
- MSc admission as an **Exceptional Talent** (top-300 of 15000), with **Tuition Waiver** at IUST 2019
- **Ranked 3rd** among BSc graduates in Computer Engineering, with **Tuition Waiver** at UoG 2019
- PyTorch Conference/Developer & Ecosystem Day **registration awards (3×)**, including invitation 2019-21

LANGUAGE SKILLS

- English: TOEFL 108 (Reading: 30, Listening: 27, Speaking: 23, Writing: 28)
- Persian & Gilaki: Native bilingual