Nikan Doosti

Email: nikan.doosti@outlook.com
Homepage: nikronic.com
GitHub: github.com/Nikronic

Education

- **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** and **Distinction for thesis** research.

Publications

- [Under review] Multimodal Ensemble Detection and Self-Healing of Defects in Laser-based Powder Bed Fusion. **Nikan Doosti**, Olli Nyrhilä, Jan Akmal. Additive Manufacturing, 2025.
- 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 MPM Modality for AM Quality Monitoring." **Electro Optical Systems (EOS) GmbH**. Krailling, Germany and Turku, Finland. Technical Talk. January, 2026.
- [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. (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: Real-time defect detection and compensation in laser-based powder bed fusion (PBF-LB) through multimodal neural fusion of non-destructive, cheap, and widely available in-situ monitoring sensors, verified through lab experimentation
  - Supervisors: Supervised by **Prof. Jan Akmal** from M2P and **Olli Nyrhilä** from Electro Optical Systems (EOS GmbH).
  - Outcome: **First researcher to demonstrate the complementary benefit of MPM modality** for print quality monitoring, leading to a paper under review in Additive Manufacturing journal, being **invited to present the findings to EOS's global R&D teams following strong endorsement from EOS's senior inventor and researchers**.
  - Method: Laser parameters were systematically varied to induce defects in PBF-LB. In-situ images were acquired using **near-infrared, sCMOS-based optical tomography and dual-photodiode melt-pool monitoring**. We developed a **multimodal ensemble learning** approach that leverages these widely used yet independent modalities and demonstrates **complementary cross-modal confidence**. Defects spanning up to seven layers were healed. .

Full-time Graduate Researcher Saarbrücken, Germany

- ***Max Planck Institute for Informatics (MPII)*** *Jul 2020 - Mar 2021*
  Artificial Intelligence aided Design and Manufacturing Group
  - 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.
  - 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, and independently collaborated with a well-respected research institute.
  - 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 .

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 **Dr. 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

- *Panafor* *Apr 2022 - Jan 2024*
  Specializing in Data-driven Decision Making for Business Optimization
  - Problem: As the number of customers grows, assigning experts to each one becomes critical, as only a few result in contracts. An "smart operator" that can monitor all customers in real-time, identify high-value ones, and assign experts based on their fitness would help prevent wasted effort.
  - 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

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.
  - Couple of the mentees from the start of master's, started working as senior backend developer in large software companies (feedback available upon request)

Mentor and Lecturer

- *Rasht School of AI* *2018 - 2021*
  An Open and Free Organization For Introducing AI and Mentorship
  - Held lectures around classical and neural-based digital image processing (Slides)
  - Mentored students who were interested in artificial intelligence and its applications

Teacher

- *Independent work* *2023 - 2024*
  Teaching Math and Programming to Underprivileged Teenagers in Low-income Regions
  - Held weekly discussion sessions to teach math and programming
  - Provided mentorship to a select few on pursuing college degrees in STEM fields

Technical Skills

Deeply Involved:	Python, PyTorch, Tensorflow, Git, Windows, Linux/Debian, MLFlow, DVC, Pandas, Sklearn, ExplainableAI, Sphinx Doc
Have Experience With:	Docker, DevOps, CI/CD, Slurm, PostgreSQL, FastAPI, Shell Scripting, HTML/CSS, Latex

Research Interests

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

Selected Awards and Certificates

- Invited by EOS GmbH to present research at the company's global R&D summit in Germany 2025
- Accepted in MSc program as a **National Exceptional Talent**, with **Tuition Waiver** at IUST 2019
- **Ranked 3rd** among BSc graduates in Computer Engineering, with **Tuition Waiver** at the UoG 2019
- Selected to participate in the Deep Learning Summer School at Gdańsk University of Technology 2020
- PyTorch Conference/Developer/Ecosystem Day registration **scholarship and invitation** (**3x**) 2019-21
- MOOC including Coursera ML and DL specialization, NYU DLSP, and many more. -

Language Skills

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