Murat Güven

PhD Candidate

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Profile

PhD candidate at Politecnico di Milano working on computational and AI-based decision support for structural engineering and sustainable construction. Develops optimization methods, BIM-integrated workflows, and computational tools for steel fabrication, with experience in MSc thesis supervision.

Keywords: AI for AEC; structural optimization; sustainable steel construction; laser cutting; scientific computing.

Technical Skills

- **Programming:** Python, Julia, JavaScript, React, HTML, CSS, Git, LaTeX, MATLAB/Octave, Fortran.
- **Scientific computing:** TRUBA HPC, SLURM, NumPy, SciPy, SymPy, Pandas, Matplotlib.
- **Engineering tools:** ABAQUS, COMSOL, SAP2000, ETABS.
- **BIM and CAD:** Tekla Structures, AutoCAD.
- **Languages:** English: advanced; Italian: intermediate (B1 reading/listening); Turkish: native

Education

- **Politecnico di Milano** — Milan, Italy
  PhD Candidate, Architecture, Built Environment and Construction Engineering (ABC) — *Nov. 2024 – present*
  Thesis: BIM-integrated decision support for laser and plasma cutting process selection in steel construction. PNRR-funded position. Advisor: Assoc. Prof. Alper Kanyilmaz.
- **İzmir Institute of Technology** — İzmir, Turkey
  M.Sc. in Civil Engineering; GPA: 3.79/4.00 — *Sep. 2020 – Aug. 2023*
  Thesis: "Topology Optimization of Nonlinear Elastic Microstructures"; Advisor: Assoc. Prof. İzzet Özdemir.
- **Kocaeli University** — Kocaeli, Turkey
  B.Sc. in Civil Engineering; GPA: 3.35/4.00 — *Jul. 2016 – Jun. 2020*
  Thesis: "Bending Analysis of Thin Plates with Variable Thickness"; Advisor: Assoc. Prof. Fuad Okay.

Publications

Journal Articles

- M. Güven and İ. Özdemir, "Topology Optimization of Nonlinear Elastic Micro-structures by a Domain Reduction Technique," *Finite Elements in Analysis and Design*, vol. 260, article no. 104599, 2026. doi:10.1016/j.finel.2026.104599.

Book

- A. Kanyilmaz and M. Güven, *Metals Driving Sustainable Construction*, Wiley, forthcoming, ISBN 9781394351657.

Conference Contributions

- A. Kanyilmaz, M. Güven, and B. Previtali, "Laser Cutting of Key Metals in the Construction Industry," [extended abstract], *7th European Steel Technology and Application Days (ESTAD 2025)*, Verona, Italy, 6–9 Oct. 2025.

Research and Professional Experience

- **Research Fellow**, Politecnico di Milano, DABC, Milan, Italy. — *Mar. 2024 – Nov. 2024*
  Conducted research on advanced structural design and fabrication for steel construction, with emphasis on laser cutting, metal 3D printing, optimized structural solutions, fabrication methods, and environmental impact assessment.

Research Projects and Grants

- **Researcher**, TÜBİTAK 1002 – 122M134, "Development of a Low Computational Cost Approach for the Topology Optimization of Nonlinear Elastic Microstructures," ARDEB. — *May 2022 – May 2023*

Teaching and Training Experience

- **Guest lecturer**, "AI Workshop," Life Cycle Driven Design, Sustainable Architecture and Landscape Design, Politecnico di Milano, Piacenza Campus. *12 Nov. 2025*
  Delivered training on AI conceptual foundations, agentic AI, AEC use cases, and no-code agent development.
- **Co-instructor**, "AI for Architecture," MaBa.DESIGN, Politecnico di Milano. *13 Oct. 2025*
  Delivered a four-hour hands-on training centered on an AI-agent exercise for AEC workflows and AI-assisted design applications.
- **Teaching Assistant**, "Life-Cycle Driven Structures: from Concept to Construction," Politecnico di Milano. *Nov. 2024 – Jan. 2025*
- **Co-instructor**, executive AI strategy training, Braun Engineering Group, Munich, Germany. *8 Aug. 2024*
  Delivered a full-day training to the company's executive board (CEO, COO, CFO, and division heads), covering AI foundations and AEC applications, and facilitating a workshop that mapped operational pain points to three prioritized AI adoption pathways.

Thesis Supervision

- **Co-supervisor**, MSc thesis, title to be defined, Politecnico di Milano. *ongoing*
- **Co-supervisor**, MSc thesis, title to be defined, Politecnico di Milano. *ongoing*
- **Co-supervisor**, MSc thesis, "Sensitivity Analysis in Steel Cutting Method Selection for the Construction Industry," Politecnico di Milano. *A.Y. 2024–2025*

Invited Talks and Presentations

- **Speaker**, "Digital Innovation of Construction: How can digital innovation make construction processes more efficient?," PropTech Day 2025, Workshop 3 "Industry for Research," Politecnico di Milano. *26 Nov. 2025*
- **Speaker**, "ChatGPT as an Engineering Assistant," within "New Ways to Build Structures with Robots and Artificial Intelligence," Festival Internazionale dell'Ingegneria, Politecnico di Milano. *21 Sep. 2025*

Professional Training and Certifications

- **Laser technology training (40 hours)**, BLM Group, Levico Terme, Trento, Italy. *17–21 Feb. 2025*
  Basic Laser Technology Course (12h) and Laser Technology Advanced LP-LJU Training (28h).

Innovation and Competitions

- **Audience Prize winner**, EWSHM 2026 Students & Young Professionals Challenge, Team N°1, Toulouse, France. *Jul. 2026*
  Team member; developed an unsupervised anomaly-detection framework combining an attention-based multi-modal autoencoder with a statistical baseline to derive health indicators from long-term bridge monitoring data.
- **Top 25 finalist**, Switch2Product 2024 ClimateTech & Circular Economy, concApp, an early-stage structural design app for cost and embodied-carbon optimization. *Nov. 2024*
  Team member; completed the S2P Innovation Boost pre-acceleration program, with mentoring and training on project positioning, market-opportunity assessment, and pitch development.

Academic and Industry Engagement

- **Organizational support**, "AI Training in Milano," organized with Microsoft, Arup, Intellimech, Edinnova, and Italian PropTech Network. *7–8 Mar. 2025*
- **Organizational support**, "Artificial Intelligence for Engineering Offices and Construction Companies," FUNDEC/AecFoundry. *26–28 Feb. 2025*
- **Organizational support**, "How to Enable AI for Architecture, Engineering & Construction Companies?," online workshop with round-table discussion, Politecnico di Milano. *2–3 Oct. 2024*