

Education

University of Texas at Austin

2023–Present Ph.D. Student in Sustainable Systems Engineering with Minor in Energy Studies.

2023–Present Joint M.Sc. Student in Economics, Department of Economics.

Sharif University of Technology

2019–2022 M.Sc. Water Resources Engineering, Highest Distinction (Class Rank: 1st/23).

Graduate Thesis Title (Excellent A+): "A spatio-temporal analysis of climate variability and its economic impacts on agriculture in Iran", Advisors: Prof. A. Safaie & Prof. L. Shiva.

2015-2019 B.Sc., Civil Engineering with Minor in Economics, Highest Distinction (Class Rank: 7th/72) .

Visiting Positions

Summer 2024 Visiting Ph.D. Researcher (Special Student) at the Department of Economics, California Institute of Technology, hosted and funded by Prof. Hannah Druckenmiller.

Spring 2021 Visiting M.Sc. Student (Exchange Program) at the Department of Applied Mathematics, Saint Petersburg State University.

Research Interest

Primary: Causal Machine Learning, Environmental and Energy Economics

Secondary: Public Economics, Household Finance, Industrial Organization

Publications

Working Papers/Work in Progress

In Progress The Impact of Solar PV Adoption on Household Financial Health, with Sergio Castellanos, Gallen Barbose, & Erik O'Shaughnessy.

In Progress A Multimodal Causal Framework for Large-Scale Ecosystem Valuation: Application to Wetland Benefits for Flood Mitigation, with Hannah Druckenmiller, Connor Jerzack, & Georgia Gkioxari. [Draft Available Upon Request] Will be Presented at AGU 2024 & NeurIPS Workshop 2024

Working Paper The Heterogeneous Role of Initial Seeds in Solar PV Diffusion Patterns by Race and Ethnicity, with Sergio Castellanos. [Draft Available Upon Request] Presented at AGU 2023 & Macro Energy Systems 2024

Peer-reviewed Published Papers

1<sup>st</sup>-Author [3] Malaek, S., Shiva, L., Safaie, A. (2024) Investigation of the economic impact of climate change on agriculture in Iran: spatial spillovers matter, Agricultural Economics, 55 (6), pp.433-453. https://doi.org/10.1111/agec.12821. Presented at EGU 2022 & SWELL 2023, (Replication Data and Methods).

Co-Author [2] Danesh-e-Yazdi, M., Malaek, S. (2023) Investigating water resources and agricultural economy in the Mahabad study area (located in the southern part of Lake Urmia) by hydro-economic modeling, Iran-Water Resources Research, 19(2), pp. 87-105..

1<sup>st</sup>-Author [1] Malaek, S., Safaie, A., Shiva, L., Tabari, H. (2022). Spatio-temporal variation of hydro-climatic variables and extreme indices over Iran based on reanalysis data, Stochastic Environmental Research and Risk Assessment, 36, pp. 3725–3752. https://doi.org/10.1007/s00477-022-02223-0. Presented at EGU 2021 .

Technical Reports

Co-Author Bayati, M., Malaek, S., Azimi, F., Danesh-e-Yazdi, M. Monitoring agricultural land-use change by combining remote sensing and machine learning algorithms over Miandoab regions, Iran, Sharif Remote Sensing Research Center, October 2019.

Accomplishments & Awards

2024 Grad Camp Fellowship (\$750), Berkeley/Sloan Summer School in Environmental and Energy Economics

2024 Travel Grant (\$505), Macro Energy Systems, Princeton University

2023-2024 Research PhD Fellowship, Lawrence Berkeley National Laboratory

2015–2022 Winner of Educational Awards, Iran’s National Elite Foundation

Jan 2020 Exchange Program Scholarship (\$2000), International Affairs Office, Sharif University of Technology

Sep 2019 Exceptional Talented Student Title and Exempted from the M.Sc. Program Entrance Exam

Aug 2019 Ranked 9th/10000 (99.9% Percentile) in Iranian National Economics Olympiad for University Students

June 2018 Distinguished Student Award, Department of Civil Engineering, Sharif University of Technology

Apr 2018 First-place Outstanding Research Recognition Award (Bachelor’s Thesis), Lake Urmia Restoration Program

Sep 2015 Ranked 272th/181846 (99.9% percentile) in Iranian Nationwide University Entrance Exam (Konkur)

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## Conference/Seminar Presentation

NeurIPS Workshop 2024 (Scheduled); American Geophysical Union 2024 (Scheduled); Berkeley/Sloan Summer School in Environmental and Energy Economics 2024 (Egg Timer); Macro Energy Systems 2024; Seminar in Water Economics on LLine 2023; European Geosciences Union 2022; European Geosciences Union 2021

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## Research/Work Experience

### California Institute of Technology

- October 2023 – Present **The Ronald and Maxine Linde Center for Science, Society, and Policy**, Primary Advisor: Prof. Hannah Druckenmiller, Other Advisors: Prof. Georgia Gkioxari, & Prof. Connor Jerzak.  
*Visiting PhD Researcher (Special Student) - (On-campus from May to August 2024)*
- Developing a multimodal causal inference framework to estimate Conditional Average Treatment Effect (CATE) using image-based covariates by integrating the R-Learner framework with a vision transformer architecture.
  - Applying the algorithm to evaluate the economic benefits of wetlands in mitigating flood damage across the U.S.
  - Preparing to present the initial findings of this research at AGU 2024 and NeurIPS 2024.

### Lawrence Berkeley National Laboratory

- Jun 2023 – Present **Energy Markets & Policy Department**, Advisors: Gallen Barbose, & Dr. Erik O'Shaughnessy.  
*Graduate Research Assistant*
- Lead the \$133k acquisition of credit reports data for 13 million people from Experian, covering solar PV adopters and non-adopters across the US (Supervised by Prof. Sergio Castellanos and Joint Work with RESET LAB)
  - Analyze the financial and economic outcomes of solar PV adoption, particularly its impact on individual financial health and stability using Difference-in-difference (DiD) with staggered adoption approach
  - Analyze the impact of credit constraint on Solar PV adoption using a Fuzzy Regression Discontinuity (FRD) design

### University of Texas at Austin

- Jan 2023 – Present **RESET (Rapid, Equitable & Sustainable Energy Transitions) Lab**, Advisor: Prof. Sergio Castellanos.  
*Graduate Research Assistant*
- Study the peer effect and diffusion of solar PV adoption, analyzing heterogeneity across race and ethnicity in the US (Research presented at AGU 2023 and MES 2024) – Paper in progress
  - Develop a new method of assessing community resilience to blackouts to help inform utility investment decisions

### Tehran Institute for Advanced Studies

- May 2022 – Dec 2022 **Department of Economics and Finance**, Senior Researcher, Advisor: Prof. Shiva & Dr. Jalali-Tabar.  
*Research Fellow*
- Analyze the disproportionate impacts of extreme flood events on low- and high-income communities in Iran

### Technology Studies Institute

- Oct 2020 – Sep 2021 **Policy Research in Agricultural Economics**, Senior Researcher, Advisors: Dr. Soltani & Prof. Shiva.  
*Research Fellow*
- Develop a Statewide Agricultural Production model to simulate market conditions, trade, and water resources

### Sharif Policy Research Institute

- Oct 2019 – Sep 2020 **Policy Research in Government and Technology**, Advisor: Dr. Honarvar.  
*Research Assistant*
- Study gig workers' livelihood on online taxi platforms using the Sustainable Livelihood Framework
  - Survey +600 workers and produce a policy report for legislative recommendations.

### Urmia Lake Restoration Program

- June 2019 – Oct 2019 **Sharif Remote Sensing Research Center**, Advisors: Prof. Danesh-e-Yazdi & Prof. Tajrishi.  
*Undergraduate Summer Research Internship*
- Classify croplands near Lake Urmia using machine learning algorithms and remote sensing
  - Apply supervised learning on Google Earth Engine's cloud platform for large-scale analysis.
- June 2018 – June 2019 **Bachelor's Thesis**, Advisor: Dr. Danesh-e-Yazdi.  
*Research Assistant*
- **Title:** Developing a coupled hydro-economic model to assess Lake Urmia restoration policies from agricultural, socio-economic, and hydrological perspectives using system dynamics modelling (Paper published in IWRR).

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## Teaching Experience

### Workshops and Courses Taught

- Nov 2022 **GIS & Remote Sensing Applications for Economists**, Tehran Institute for Advanced Studies.  
May 2021 **Spatial Econometrics**, Saint Petersburg State University.  
Dec 2021 **GIS & Remote Sensing**, Sharif University of Technology.  
2018-2021 **Introduction to Programming with MATLAB**, Sharif University of Technology.

### Teaching Assistant

- 2018-2021 **Water and Wastewater Management, Undergraduate, Prof. Safaie**, Sharif University of Technology.  
Spring 2020 **Engineering Probability and Statistics, Undergraduate, Prof. Abdos**, Sharif University of Technology.  
Spring 2020 **Hydraulic Laboratory, Undergraduate, Prof. Jamali**, Sharif University of Technology.

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## Computer skills

Python (DL/ML: PyTorch, Jax, Scikit-Learn, EconML, DoWhy), MATLAB, R, POSTGRES/MySQL, STATA, Git, AWS, Google Cloud, Linux, Google Earth Engine, ArcGIS, Adobe Illustrator

## Selected Certifications

- **Data Engineering Professional Certificate**, DeepLearning AI, 2024
- **Generative AI with Large Language Models**, DeepLearning AI and Amazon Web Services, 2024
- **Causal Modeling in Machine Learning Workshop**, AltDeep, 2023
- **Causal Generative Machine Learning**, AltDeep, 2023
- **Causal Agents and Reinforcement Learning**, AltDeep, 2023
- **Summer School in Climate Change AI**, Climate Change AI, 2023
- **Summer School in Advanced Empirical Economics**, University of Tehran, 2022
- **Mini-MBA Program**, University of Tehran, 2021

## Language

- **Persian**: Native or bilingual proficiency
- **English**: TOEFL ibt: 113 (R: 28, L: 28, W: 29, S:28), GRE: Q: 170 (96%), V: 155 (67%), AWA: 4.5 (80%)

## Service and Activities

- **Program Committee**: NeurIPS Workshop in GenAI for Health
- **Reviewer**: NeurIPS Workshop in GenAI for Health, Agricultural Economics, Theoretical and Applied Climatology
- **Board of Directors**, Persian Student Society, UT Austin
- **Peer Mentor**, UT Austin
- **Teacher**, Yarigaran Education Charity Group
- **Admin/Basketball Analyst and Writer**, 3Sanieh.com
- **Varsity Basketball Athlete**, Sharif University of Technology
- **Hobbies**, Hiking; Reading Books; Listening to Music; Basketball and Running; Theater and Movies; Cooking Food

## References

### **Prof. Sergio Castellanos**

*Assistant Professor, Department of  
Civil, Architectural, and  
Environmental Engineering*

Univesity of Texas at Austin, USA

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### **Prof. Joydeep Ghosh**

*Professor, and Schlumberger Centennial  
Chair in Electerical Engineering*

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Computer Engineering,

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### **Prof. Sheila Olmstead**

*Professor*

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Cornell University, USA

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### **Prof. Hannah Druckenmiller**

*Assistant Professor of Economics*

Division of Humanities and Social Sciences

California Institute of Technology, USA

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### **Prof. Connor Jerzack**

*Assistant Professor, Department of  
Government*

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