Mohammadreza Narimani

PhD Candidate in Biological Systems Engineering

University of California, Davis

Biological and Agricultural Engineering Department

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Research Interests

Remote Sensing of Agriculture and Environment • Earth Observation • Digital Agriculture • Machine Learning • Computer Vision • Precision Agriculture • Hyperspectral Imaging • LiDAR • Satellite Data Analysis • IoT Systems • Plant Phenotyping • 3D Radiative Transfer Modeling • Wildfire Detection

Education

Ph.D. Candidate of Biological Systems Engineering 2022–Present

University of California, Davis, US **GPA: 4.0/4.0**
Thesis: AI-Driven Remote Sensing and Spectral Modeling for Advanced Monitoring of Tomato Crops
Advisors: Prof. Alireza Pourreza, Prof. Ali Moghimi

M.Sc. of Biosystem Mechanical Engineering 2019–2021

University of Tehran, Iran **GPA: 4.0/4.0 (First Rank)**
Thesis: Designing and Manufacturing an Experimental Smart Greenhouse for High-Throughput Stress Phenotyping and Plant Disease Detection by Implementing Internet of Things System and Machine Learning

B.Sc. of Biosystem Mechanical Engineering 2015–2019

University of Tehran, Iran **GPA: 4.0/4.0 (First Rank)**
Thesis: Design and construction of electric turning machine for urban agriculture

Research Experience

Research Assistant 2022–Present

Digital Agriculture Laboratory, University of California, Davis

- AI-Driven Remote Sensing and Spectral Modeling for Advanced Monitoring of Tomato Crops
- 3D Radiative Transfer Modeling for Specialty Crops
- Wildfire Detection and Monitoring Using Satellite Imagery and Deep Learning

- Image semantic segmentation using FCN_AlexNet, SegNet, and U-Net for Agricultural Vision Competition

Research Assistant 2016–2022

University of Tehran, Iran

- High-Throughput Wheat Phenotyping for Agricultural Research Institute of Iran, Wheat Species Bank
- Detecting fungal disease of lettuce with thermal camera and CNNs
- Image processing algorithms for measuring friction coefficient and angle of repose in rice grain
- IoT device development using Arduino, Raspberry Pi, Ethernet, and ESP8266
- Designing novel fogponic and centrifugal irrigation systems for aeroponic greenhouses
- Deep learning algorithms for detecting powdery tomato disease
- Designing strawberry harvester robot

Internship 2017–2022

Agricultural Engineering Research Institute of Iran (AERI)

Technical Skills

Remote Sensing Tools: Sentinel-2, Landsat-9, EMIT, ECOSTRESS, DJI Phantom 4 Multispectral, Aerial Pika-L Hyperspectral Sensor, Aerial Phoenix LiDAR Systems

Programming Languages: Python, R, MATLAB, C++

Amazon Web Services: Lambda, S3, App Runner, API Gateway, EC2, Elastic Container Registry, IAM, CloudFormation, CloudWatch

Techniques: Computer Vision, Image Processing, Deep Learning, Machine Learning, Web App Development, Internet of Things, Robotics

Prominent Libraries: Keras, TensorFlow, PyTorch, scikit-learn, geemap, rasterio, gdal, pandas, NumPy, OpenCV, PlantCV, scikit-image

GIS: ArcGIS, QGIS, Google Earth Engine, ENVI, Pix4D, Resonon, Spatial Explorer, Microstation, Terrasolid

Computer-Aided Design and Engineering: CATIA, SolidWorks, AutoCAD, Abaqus, Ansys, Keyshot

Journal Publications

1. Farajpoor, P., Pourreza, A., **Narimani, M.R.**, El-Kereamy, A., Fidelibus, M. (2025). Multi-Trait Spectral Modeling for Estimating Grapevine Leaf Traits and Nutrients. *Plant Phenomics*. DOI Link
2. **Narimani, M.R.**, Pourreza, A., Moghimi, A., Farajpoor, P., Jafarbiglu, H., Mesgaran, B. (2025). Early Detection of Branched Broomrape (Phelipanche Ramosa) Infestation in Tomato Crops by Using Leaf Spectral Analysis and Machine Learning. *IFAC-PapersOnLine*. arXiv Link
3. Alimardani, R., Adedeji, A.A., **Narimani, M.R.** (2025). A Review of IoT Applications in Food Processing and Related Fields. *Journal of Food Processing and Preservation*. DOI Link
4. **Narimani, M.R.**, Pourreza, A., Moghimi, A., Farajpoor, P., Jafarbiglu, H., Mesgaran, B. (2025). Branched broomrape detection in tomato farms using satellite imagery and time-series analysis. *SPIE Defense + Commercial Sensing*. DOI Link
5. Farajpoor, P., Pourreza, A., **Narimani, M.R.**, El-Kereamy, A., Fidelibus, M. (2024). Leaf spectral reflectance prediction using multihead attention neural networks. *SPIE Defense + Commercial Sensing*. DOI Link
6. **Narimani, M.R.**, Pourreza, A., Moghimi, A., Mesgaran, B., Farajpoor, P., Jafarbiglu, H. (2024). Drone-based multispectral imaging and deep learning for timely detection of branched broomrape in tomato farms. *SPIE Defense + Commercial Sensing*. DOI Link
7. Akpenpuun, T.D., Ogunlowo, Q.O., Na, W.H., Dutta, P., Rabiu, A., Adesanya, M.A., **Narimani, M.R.**, et al. (2024). Dynamic neural network modeling of thermal environments of two adjacent single-span greenhouses. *Journal of Agricultural Engineering*. DOI Link
8. **Narimani, M.R.**, Hajiahmad, A., Moghimi, A., Alimardani, R., Rafiee, S., Mirzabe, A.H. (2021). Developing an aeroponic smart experimental greenhouse for controlling irrigation and plant disease detection using deep learning and IoT. *ASABE Journal*. Publication Link
9. Kianmehr, M., Elyasi, M., **Narimani, M.R.** Design and construction of electric turning machine for urban agriculture. *Journal of Tarbiyat Modares University*. Publication Link

Conference Presentations

1. **Narimani, M.R.**, et al. (2025). Early Detection of Branched Broomrape Infestation in Tomato Crops. *8th IFAC Conference on Sensing, Control and Automation Technologies for Agriculture*. Conference Link
2. **Narimani, M.R.**, et al. (2024). Drone-based multispectral imaging and deep learning for timely detection of branched broomrape. *SPIE Defense + Commercial Sensing*. Presentation Link
3. **Narimani, M.R.**, et al. (2024). Early Detection of Branched Broomrape in Tomato by Hyperspectral Sensing. *ASABE 2024*.
4. Jafarbiglu, H., Pourreza, A., **Narimani, M.R.**, Sanden, B., Marino, G., Culumber, M., Mehata, M., Ferguson, L. (2024). Determining the best irrigation strategy for pistachio orchards with saline water and soil. *SPIE Defense + Commercial Sensing*. Presentation Link
5. **Narimani, M.R.**, et al. (2024). Remote Sensing of Branched Broomrape in Tomato. *65th Weed Day, UC Davis*. Event Link
6. **Narimani, M.R.**, et al. (2023). Wildfire Detection and Monitoring Using Satellite Imagery and Deep Learning. *ASABE 2023*. Schedule Link
7. Jafarbiglu, H., Pourreza, A., **Narimani, M.R.**, Williams, D., Ferguson, L. (2023). Determining the best irrigation practices for pistachio orchards with saline water and soil. *ASABE 2023*. Schedule Link
8. **Narimani, M.R.**, Hajiahmad, A., Moghimi, A., Alimardani, R., Rafiee, S., Mirzabe, A.H. (2021).

Developing an aeroponic smart experimental greenhouse for controlling irrigation and plant disease detection using deep learning and IoT. *ASABE 2021.*

Conference Posters

1. **Narimani, M.R.**, Pourreza, A., Moghimi, A., Farajpoor, P., Jafarbiglu, H., Mesgaran, B. (2025). Branched broomrape detection in tomato farms using satellite imagery and time-series analysis. *SPIE Defense + Commercial Sensing.* Poster Link
2. Jafarbiglu, H., Pourreza, A., **Narimani, M.R.**, Bailey, J., Taylor, G. (2024). Seam Carving for Tree Segmentation in Dense Tree Farms. *ASABE 2024.*
3. **Narimani, M.R.**, Hajiahmad, A., Moghimi, A., Alimardani, R., Rafiee, S., Mirzabe, A.H. (2021). Developing an aeroponic smart experimental greenhouse for controlling irrigation and plant disease detection using deep learning and IoT. *ASABE 2021.*

Teaching Experience

Teaching Assistant, University of California, Davis 2022–Present

- Applied Statistics in Agricultural Sciences Lab Materials
- Introduction to Unmanned Aerial Systems for Agriculture & Environmental Science
- Communications and Computing Technology (IoT in Ag) Lab Materials

Teaching Assistant, University of Tehran, Iran 2016–2022

- Programming with Python and MATLAB
- Computer Vision and Artificial Intelligence
- Industrial drawing with CATIA, SolidWorks and AutoCAD

Teaching Physics, Bonyad Amoozeshi Ghalamchi 2014–2016

Awards and Honors

- Future Undergraduate Science Educators (FUSE) Program Scholarship 2025–Present
- Best Presentation Award, ASABE Annual International Meeting 2024
- Agricultural Genome to Phenome Initiative Scholarship 2024
- Bill And Jane Fischer Vegetation Management Scholarship 2024
- Member of SPIE Defense + Commercial Sensing 2024–Present
- Peter J. Shields and Henry A. Jastro Research Award 2023
- Dean's Distinguished Graduate Fellowship 2022
- Member of ASABE (American Society of Agricultural and Biological Engineers) 2021–Present
- First rank prize, Iran IoT and Computer Vision Competition 2020
- Member of Iran Elite Foundation (Bonyad Melli Nokhbegan) 2017–2022

Leadership and Service

Leadership Positions

- Vice President, Graduate Student Association, BAE Department, UC Davis 2024–Present
- Representative, Graduate Student Association, BAE Department, UC Davis 2023–2024
- Election Committee Member, Graduate Student Association, BAE Department 2025

Mentorship

- Mentor, E-SEARCH Program, UC Davis (4 undergraduate students) 2024–Present
- Mentor, AgTech Workshop (Drone & IoT), AI Institute for Next Generation Food Systems 2023–Present
- Mentor, Young Scholar Program, UC Davis (high school students) 2023

Mentees' Research Posters

- Sun, V.J., **Narimani, M.R.** Deep Learning-Based Snow Monitoring in California Using Sentinel-2 Satellite Data. ESEARCH Summer 2025.
- Kumar, S., **Narimani, M.R.**, et al. Enhancing Orchard Management with Deep Learning: Tree Segmentation Using Geospatial SAM2 Model. ESEARCH Fall 2024.
- Richmond, N., **Narimani, M.R.**, et al. Global Vegetation and Climate Insights Portal (GVCIP). ESEARCH Summer 2024.
- Tran, Q., **Narimani, M.R.**, et al. Enhancing Wildfire Monitoring Through Remote Sensing. ESEARCH Spring 2024.

Editorial and Peer Review Activities

Reviewer for the following journals: 2024–Present

- Scientific Reports (Springer Nature)
- Journal of Agriculture and Food Research (Elsevier)
- Journal of Food Science (Wiley)
- Smart Agricultural Technology (Elsevier)
- Computers and Electronics in Agriculture (Elsevier)
- Information Processing in Agriculture (Elsevier)
- Remote Sensing Applications: Society and Environment (Elsevier)
- NJAS: Impact in Agricultural and Life Sciences (Taylor & Francis)

Media Coverage

Parasitic Weeds Threaten Tomato Plants on California Farms - Featured in:

- UC Davis Newsletter Read Article
- UC Davis College of Agricultural and Environmental Sciences Read Article
- Daily Democrat Newspaper Read Article
- Ag Alert Magazine Read Article
- Capital Press Newsletter Read Article
- Organic Growers Newsletter Read Article
- UC Davis Plant Sciences Newsletter Read Article
- Tomato News Read Article
- California Fruit and Vegetable Read Article

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