Mohammadreza Narimani

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Education

• Ph.D. Candidate of Biological Systems Engineering, University of California, Davis, US 2022-Present

First rank – GPA: 4/4

Thesis: AI-Driven Remote Sensing and Spectral Modeling for Advanced Monitoring of Tomato Crops.

• M.Sc. of Biosystem Mechanical Engineering, University of Tehran 2019-2021

First rank – GPA: 4/4

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, University of Tehran 2015-2019

First rank – GPA: 4/4

Thesis: Design and construction of electric turning machine for urban agriculture

Skills

Remote Sensing Tools	Sentinel 2 Satellite, Landsat 9 Satellite, EMIT Satellite, ECOSTRESS Satellite, DJI Phantom 4 Multispectral Drone, Aerial Pika-L Hyperspectral Sensor, Aerial Phoenix LiDAR Systems
Programming Languages	Python, R, MATLAB, C++
Technique	Computer Vision, Image Processing, Deep Learning, Machine Learning, Web App Development, Internet of things, Robotics
Prominent Library	Keras, TensorFlow, PyTorch, scikit-learn, geemap, rasterio, gdal, pandas, NumPy, OpenCV, PlantCV, scikit-image
Computer-Aided Design and Engineering	CATIA, SolidWorks, Autocad, Abaqus, Ansys, Keyshot
GIS	ArcGIS, QGIS, Google Earth Engine, ENVI, Pix4D, Resonon, Spatial Explorer, Microstation, Terrasolid, Google Earth Engine

Research Experience

• Remote Sensing for Early Detection of Branched Broomrape in Tomato from Leaf to Canopy Level

• 3D Radiative Transfer Modeling for Specialty Crops

• Wildfire Detection and Monitoring Using Satellite Imagery and Deep Learning

• Image semantic segmentation and implement a convolutional neural network based on FCN_AlexNet, SegNet, and U-Net for getting aerial and drone images which have four bands (RGB+NIR) and classify them to [background, double-plant, dry-down, end-row, nutrient-deficiency, planter-skip, water, waterway, and weed-cluster] classes for “Agricultural Vision 2021 Competition.”

• High-Throughput Wheat Phenotyping for Agricultural Research Institute of Iran, Wheat Spices Bank.

• Detecting fungal disease of lettuce in early growth steps with a thermal camera and convolutional neural networks, and reporting the disease severity of lettuce to the client with the Internet of things system.

• Image processing algorithms with OpenCV and Python were implemented to simultaneously measure friction coefficient and angle of repose in rice grain via the rotating cylinder.

• Monitoring the environmental condition of plants growing in the greenhouse by making an IoT device using Arduino, Raspberry Pi, Ethernet, and ESP8266 module for data analysis and optimization.

• Designing and implementing novel fogponic and centrifugal irrigation systems for aeroponic greenhouses.

• Deep learning and image processing algorithms with OpenCV and Python were applied to detect powdery tomato disease at the first growth steps.

Teaching Experience

Introduction to Unmanned Aerial Systems for Agriculture & Environmental Science TA at the University of California, Davis

Communications and Computing Technology TA at the University of California, Davis

Programming with Python and MATLAB TA at University of Tehran

Computer Vision and Artificial Intelligence TA at University of Tehran

Industrial drawing with CATIA and SolidWorks and Autocad TA at University of Tehran

Leadership and Mentorship

• Vice President of Graduate Student Association of Biological and Agricultural Engineering Department of UC Davis 2024-Present

• Representative of Graduate Student Association of Biological and Agricultural Engineering Department of UC Davis 2023-2024

• Mentoring Four Undergraduate Students at E-SEARCH Program Scholarship at the University of California, Davis 2024-Present

• Mentoring high school students in digital agriculture through engaging lectures and hands-on projects in the Young Scholar Program 2023

Honors, Awards, and Membership

• Winning Best Presentation Award of American Society of Agricultural and Biological Engineering Annual International Meeting 2024

• Winning Agricultural Genome to Phenome Initiative scholarship 2024

• Winning Bill And Jane Fischer Vegetation Management Scholarship of the University of California Agriculture and Natural Resources 2024

• Member of SPIE Defense + Commercial Sensing 2024-Present

• Winning the Peter J. Shields and Henry A. Jastro Research Award at the University of California, Davis 2023

• Winning the Prestigious Dean's Distinguished Graduate Fellowship of the University of California, Davis 2022

• Member of ASABE (The most important Biosystem engineering society in the world) 2021-Present

• Member of Iranian Elite Foundation (Bonyad Melli Nokhbegan) 2017-2022

• Wining the first rank prize of Iran Internet of Things and Computer Vision Competition among all Iranian master students 2020

Work Experience

Research Assistant at Digital Agriculture Laboratory of the University of California, Davis	2022-Present
Research and Teaching Assistant at the University of Tehran	2018-2022
Teaching Physics at Bonyad Amoozeshi Ghalamchi	2014-2016

Internship

Agricultural Engineering Research Institute of Iran (AERI)	2017-2022

Journal Publications

Narimani MR, Pourreza A, Moghimi A, Mesgaran B, Farajpoor P, Jafarbiglu H. Drone-based multispectral imaging and deep learning for timely detection of branched broomrape in tomato farms

(SPIE Defense + Commercial Sensing 2024 – Link: https://doi.org/10.1117/12.3021219)

Akpenpuun TD, Ogunlowo QO, Na WH, Dutta P, Rabiu A, Adesanya MA, Narimani MR, Zakir E, Kim HT, Lee HW. Dynamic neural network modeling of thermal environments of two adjacent single-span greenhouses with different thermal curtain positions

(Journal of Agricultural Engineering. 2024– Link: https://doi.org/10.4081/jae.2024.1563)

Narimani MR, Hajiahmad A, Moghimi A, Alimardani R, ShRafiee, Mirzabe AH. Developing an aeroponic smart experimental greenhouse for controlling irrigation and plant disease detection using deep learning and IoT

(ASABE 2021 Journal – Link: https://elibrary.asabe.org/abstract.asp?aid=52586)

Kianmehr M, Elyasi M, Narimani M.R. Design and construction of electric turning machine for urban agriculture

(Journal of Tarbiyat Modares University – Link: https://civilica.com/doc/838593/)

Conference Presentations

Narimani MR, Pourreza A, Moghimi A, Mesgaran B, Farajpoor P, Jafarbiglu H. Drone-based multispectral imaging and deep learning for timely detection of branched broomrape in tomato farms

(Oral Presentation - Machine Learning Session - SPIE Defense + Commercial Sensing 2024 – Link:

https://www.spiedigitallibrary.org/conference-proceedings-of-spie/13053/1305304/Drone-based-multispectral-imaging-and-deep-learning-for-timely-detection/10.1117/12.3021219.full)

Narimani MR, Pourreza A, Moghimi A, Mesgaran B, Farajpoor P, Jafarbiglu H. Early Detection of Branched Broomrape in Tomato by Hyperspectral Sensing

(Oral Presentation - Hyperspectral Imaging: Advances in Technologies, Analytics, and Applications Session – ASABE 2024)

Jafarbiglu H, Pourreza A, Narimani MR, Sanden B, Marino G, Culumber M, Mehata M, Ferguson L. Determining the best irrigation strategy for pistachio orchards with saline water and soil

(Oral Presentation – Sustainability Session - SPIE Defense + Commercial Sensing 2024 – Link:

https://www.spiedigitallibrary.org/conference-proceedings-of-spie/PC13053/PC1305301/Determining-the-best-irrigation-strategy-for-pistachio-orchards-with-saline/10.1117/12.3021227.full)

Narimani MR, Pourreza A, Mesgaran M, Hanson B, Hosseini P, Fatino M, Moghimi A. Remote Sensing of Branched Broomrape in Tomato

(Oral Presentation – 65th Weed Day of the University of California, Davis - 2024 – Link: https://wric.ucdavis.edu/events/weed_day_2024.html)

Narimani MR, Moghimi A, Pourreza A. Wildfire Detection and Monitoring Using Satellite Imagery and Deep Learning

(Machine Learning in Agriculture and Natural Resources Session - ASABE 2023, Lightning Talk – Link:

https://www.asabe.org/Portals/0/Events/2023%20AIM/Tech.Schd.wPres.pdf?ver=ohVLdXxMSPWeCWX4sOG98A%3D%3D)

Jafarbiglu H, Pourreza A, Narimani MR, Williams D, Ferguson L. Determining the best irrigation practices for pistachio orchards with saline water and soil

(ITSC-348 Electromagnetics & Spectroscopy Session – ASABE 2023, Lightning Talk – Link:

https://www.asabe.org/Portals/0/Events/2023%20AIM/Tech.Schd.wPres.pdf?ver=ohVLdXxMSPWeCWX4sOG98A%3D%3D)

Narimani MR, Hajiahmad A, Moghimi A, Alimardani R, ShRafiee, Mirzabe AH. Developing an aeroponic smart experimental greenhouse for controlling irrigation and plant disease detection using deep learning and IoT

(Oral Presentation – ASABE 2021)

Conference Posters

Jafarbiglu H, Pourreza A, Narimani MR, Bailey J, Taylor G. Seam Carving for Tree Segmentation in Dense Tree Farms

(Poster – ASABE 2024)

Narimani MR, Hajiahmad A, Moghimi A, Alimardani R, ShRafiee, Mirzabe AH. Developing an aeroponic smart experimental greenhouse for controlling irrigation and plant disease detection using deep learning and IoT

(Poster – ASABE 2021)

My Mentees' Posters

Kumar S, Narimani MR, Moghimi A, Pourreza A. Enhancing Orchard Management with Deep Learning: Tree Segmentation Using Geospatial SAM2 Model and NAIP Aerial Imagery

(Poster – University of California, Davis – ESEARCH Fall Program 2024 – Link: https://engineering.ucdavis.edu/e-search)

Richmond N, Narimani MR, Moghimi A, Pourreza A. Global Vegetation and Climate Insights Portal (GVCIP): A Google Earth Engine-Based Monitoring Tool

(Poster – University of California, Davis – ESEARCH Summer Program 2024 – Link: https://engineering.ucdavis.edu/e-search)

Tran Q, Narimani MR, Moghimi A, Pourreza A. Enhancing Wildfire Monitoring Through Remote Sensing With Sentinel-2 Imagery And Python Programming

(Poster – University of California, Davis – ESEARCH Spring Program 2024 – Link: https://engineering.ucdavis.edu/e-search)

Newsletter, Newspaper, Magazine, and Media Coverage

• Parasitic Weeds Threaten Tomato Plants on California Farms. UC Davis Teams Utilize Innovative Research Techniques to Battle an Invasive Species (University of California newsletter, 2023. Link:

https://www.ucdavis.edu/food/news/parasitic-weeds-threaten-tomato-plants-on-california-farms)

• Parasitic Weeds Threaten Tomato Plants on California Farms. UC Davis Teams Utilize Innovative Research Techniques to Battle an Invasive Species (University of California newsletter, 2023. Link:

https://caes.ucdavis.edu/news/parasitic-weeds-threaten-tomato-plants-california-farms)

• Parasitic weeds threaten tomato plants on California farms (Daily Democrat Newspaper [Woodland Newspaper] - Link:

https://www.dailydemocrat.com/2024/03/20/parasitic-weeds-threaten-tomato-plants-on-california-farms)

• Researchers target parasitic weed in tomato fields (Ag Alert Magazine - Link:

https://california-farm-bureau-publications.cfbf.com/view/617470051/8)

• The enemy underground: California researchers target parasitic weed (Capital Press Newsletter - Link:

https://www.capitalpress.com/ag_sectors/research/the-enemy-underground-california-researchers-target-parasitic-weed/article_708c3668-613b-11ee-9e7f-137682d06e8c.html)

• Researchers fight weeds threatening California tomatoes (organic Growers newsletter - Link:

https://organicgrower.info/news/researchers-fight-weeds-threatening-california-tomatoes)

• Parasitic weeds threaten California tomato farmers (University of California, Davis, Plant Science Newsletter - Link:

https://www.plantsciences.ucdavis.edu/news/parasitic-weeds-tomato-hanson)

• Broomrape: Parasitic weeds threaten California tomato fields (Tomato News - Link:

https://www.tomatonews.com/en/broomrape-parasitic-weeds-threaten-california-tomato-fields_2_2117.html)

• Parasitic Weeds Threaten Tomato Plants (California Fruit and Vegetable - Link:

https://calfruitandveg.com/2024/04/29/read-2024-issue)