

Xiaomeng Shi

Assistant Teaching Professor, Electrical and Robotics Engineering, Widener University
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Education

Ph.D., M.S., & B.S. (2015, 2010, & 2008), Mechanical Engineering
School of Mechatronics Engineering, Harbin Institute of Technology, China

Research & Teaching Experiences

January 2021 - present **Assistant Teaching Professor**
Department of Robotics Engineering, School of Engineering, Widener University, Chester, PA

Teaching:

- Courses taught:
 - ENGR-111 Engineering Techniques
 - ENGR-115 Intro to Computer Programming in MATLAB (hybrid)
 - ENGR-213 Statics
 - ENGR-214 Dynamics
 - ENGR-320 Fluid Mechanics
 - ENGR-323 Mechanics of Deformable Bodies
 - ENGR-401/402 Senior Project I/II
 - ME-351 Kinematics
 - ME-353 Engineering Vibrations
 - RE-101 Intro to Robotic Systems
 - RE-302 Mechanics of Robotic Systems
 - RE-303 Programmable Logic Controller Lab
 - RE-403 Intro to Mechatronics
 - RE-404 Mechatronics Laboratory (writing enriched)
 - RE-606/488 Robot Operating System
 - RE-694 Soil and Robot
 - EE-471 Controls I
- Courses developed:
 - RE-403 Intro to Mechatronics
 - RE-404 Mechatronics Laboratory (writing enriched)
 - RE-606 Robot Operating System
 - RE-694 Soil and Robot

Advising:

- Academic advisor:
 - Classes of 2023-2028: 100 students
 - Widener Robotics Club
- Faculty advisor:
 - Senior Project: Touchless Mechatronics Laboratory (Best Poster Presentation Academic Year 2021)
 - Senior Project: Voice Controlled Intelligent Mobile Arm

Research:

- PI: Development of Heavy-Duty Wheel-Legged Robot (Widener Provost Grant academic year 25/26)
- PI: Enhancing Teleoperation in Remote Learning Systems: A Comparative Study on Haptic Feedback (Widener Provost Grant academic year 24/25)
- PI: Remote Learning System with Dexterous Hands (Widener Provost Grant academic year 23/24)
- PI: Remote Learning System for Hands-on Activities in Engineering Laboratories (Widener Provost Grant academic year 22/23)
- Consultant: Field tests at Russell E. Larson Agricultural Research Center for Deeper Phenotyping Platform funded by Department of Energy (5/1–7/31/2021)

Media:

- Widener Newsroom: [Advancing Industries Through the Power of Robotics Automation](#), by Emily Barrett, July 22, 2021.

November
2017
- 2020

Postdoctoral Scholar & Lab Supervisor

Smart Agriculture Lab, Department of Agricultural and Biological Engineering

Penn State University, State College, PA

Funded Project:

- Development of an automatic maize roots phenotyping system, RootRobot

Teaching:

- Teaching assistant for *ASM424 Selection and Management of Agricultural Machinery*, Fall 2020 (online), Fall 2019 & Fall 2018
- Teaching assistant for *BE497 Design Principles of Bio-Mechatronic Systems*, Spring 2019
- Seminar: “An Extraterrestrial Autonomous Drilling and Coring Method: Modeling and Validation”, March 18, 2019

Advising:

- Advised graduate students in the Department of Agricultural and Biological Engineering on projects related with agricultural machinery
- Advised undergraduate students in the Department of Agricultural and Biological Engineering for their capstone projects

September
2016
- November
2017

Assistant Professor

Shanxi Key Laboratory of Fully Mechanized Coal Mining Equipment
School of Mechanical Engineering, Taiyuan University of Technology,
China

Teaching:

- Taught courses on long wall mining and excavation

Advising:

- Class of 2016: Graduate thesis committee member

Research:

- PI: Research on simulation test of coal cutting trajectory planning based on online prediction of coal seam three-dimensional structure (applied for NSFC)

September
2015
- May 2016

Volunteer Researcher

Construction Materials Lab, Department of Civil Engineering
Northern Arizona University, Flagstaff, AZ

- Reassembled the Dynamic Shear Rheometer
- Implemented mechanical performance tests with asphalt specimens

September
2008
- May 2015

Graduate Research Assistant

State Key Laboratory of Robotics and System
School of Mechatronics Engineering, Harbin Institute of Technology,
China

Funded Projects:

- Research on the autonomous soil sampling strategy
- Research on the reparation and mechanical measurement of soil simulant
- Development of a rudder mechanism performance test-bed
- Development of a screw sampler prototype for surface soil collecting
- Research on a small-diameter industrial pipeline robot and its driving performance

Supervised Projects and Research Project

- Fall 2025 **Development of Modular Robotic Arm (Nexus Arm)**
Department of Robotics Engineering, School of Engineering, Widener University, Chester, PA
- All-in-one design of joint modules
 - Wireless control and status monitoring
 - Compatible with cloud-based software
- Spring 2025 **Development of Wheel-Soil Interaction Testbed Based on Robotic Arm**
Department of Robotics Engineering, School of Engineering, Widener University, Chester, PA
- Velocity control and Force/Torque monitoring of 6 DOFs robotic arms (Universal Robot UR3e)
 - EDEM simulation for wheel-soil interaction
 - Gazebo simulation for the whole vehicle with new wheels
- July 2022 - present **Development of Remote Learning Systems**
Department of Robotics Engineering, School of Engineering, Widener University, Chester, PA
- VR teleoperation of a 26 DOFs humanoid robot (one Baxter Research Robot and two robotic hands) (2022-2023)
 - Haptic feedback (2024)
 - Wheel-Legged platform design (2025)
- July 2022 - May 2023 **Development of Voice Controlled Intelligent Mobile Arm**
Department of Robotics Engineering, School of Engineering, Widener University, Chester, PA
- Voice recognition and control of a mobile robot (Festo Robotino3) and a 4 DOFs robotic arm (Lynxmotion AL5D)
 - Vision guided grasping and navigation
- July 2021 - May 2022 **Development of Touchless Mechatronics Laboratory**
Department of Robotics Engineering, School of Engineering, Widener University, Chester, PA
- Touchless teleoperation of two 6 DOFs robotic arms (Universal Robot UR3e)
 - Two-hand gesture recognition

- November 2017 - 2020 **Development of the RootRobot**
Smart Agriculture Lab, Department of Agricultural and Biological Engineering, Penn State University, State College, PA
- Development and field test of a prototype of an automatic maize roots phenotyping system, RootRobot, capable of detecting, excavating, slicing, transferring, cleaning, and imaging the root spices.
- September 2010 - May 2015 **Development of Autonomous Soil Sampling System**
School of Mechatronics Engineering, Harbin Institute of Technology, China
- Developed an algorithm for the autonomous subsurface soil sampling strategy
 - Research on the preparation and mechanical measurement of subsurface soil simulant
 - Development of a screw sampler prototype for surface soil collecting
- September 2008 - May 2010 **Development of a small-diameter industrial pipeline robot**
School of Mechatronics Engineering, Harbin Institute of Technology, China
- Design of the pipeline robot for 50 mm diameter petroleum pipe
 - Performance evaluation for curve pipe and obstacles

Publications & Presentations

1. **Shi X.** RooRobot, Development of the field-based imaging unit for maize roots architecture phenotyping. *The Northeast Agricultural and Biological Engineering Conference*, State College, PA, July 28, 2020.
2. **Shi X.** RootRobot: A field-based platform for maize root system architecture phenotyping. *Penn State University Postdoc Exhibition*, State College, PA, September 18, 2019.
3. **Shi X,** Choi D, Heinemann P, Hanlon M, Lynch J. RootRobot: A Field-based Platform for Maize Root System Architecture Phenotyping. *American Society of Agricultural and Biological Engineers Annual International Meeting 2019*, Boston, MA, July 7-10, 2019.
4. **Shi X,** Quan Q, Deng Z, Tang D, Jiang S. DMT-based estimation of mechanical properties for subsurface lunar soil simulant. *Journal of Aerospace Engineering*, 2016, 29(4): 04016003.
5. Chen C, Quan Q, **Shi X,** Deng Z, Tang D, Jiang S. Multi-state autonomous drilling for lunar exploration. *Chinese Journal of Aeronautics* 2016, 29(5): 1397-1404.

6. Quan Q, **Shi X**, Tang D, Deng Z, Jiang S. Extraction and recognition of drilling characteristics on interface between simulants of lunar soil and lunar rock. *Robot*, 2015, 37(3): 351-360.
7. Quan Q, **Shi X**, Tang D, Jiang S, Deng Z. Analysis and test research on influencing factors of drilling and coring quantity of lunar soil simulant. *Journal of Beijing University of Aeronautics and Astronautics*, 2015, 14(11): 2052-2060.
8. **Shi X**, Quan Q, Tang D, Jiang S, Hou X, Deng Z. Development of a drilling and coring test-bed for lunar subsurface exploration and preliminary experimental research. *Chinese Journal of Mechanical Engineering*, 2014, 27(4): 673-682.
9. **Shi X**, Jie D, Quan Q, Tang D, Jiang S, Deng Z. Experimental research on lunar soil simulant drilling and drilling load analysis. *Journal of Astronautics*, 2014, 35(6): 648-656.
10. **Shi X**, Tang D, Quan Q, Jiang S, Hou X, Deng Z. Development of a drilling and coring test-bed for lunar surface exploration. *IEEE International Conference on Robotics and Biomimetics 2013*, Shenzhen, China, December 12-14, 2013.
11. **Shi X**, Quan Q, Tang D, Jiang S, Hou X, Deng Z. Experimental research on drilling and sampling of lunar soil simulant. *16th International Conference on Fluid Dynamic and Mechanical & Electrical Control Engineering*, Chong Qing, China, November 10-11, 2012.
12. **Shi X**, Tan Q, Yang X, Chen H, Tian Y, Guo H. Development of a lunar surface soil sampler based on screw conveyor principles. *9th Annual Conference of Chinese Society of Astronautics Deep Space Exploration Technical Committee*, Hang Zhou, China, October 17, 2012.

Patents

1. Chen M, Li J, Quan Q, Shen Y, **Shi X**, Gao X. Squirrel cage type linear stretching mechanism. China: CN102874700B.
2. Deng Z, Jiang S, Tang D, Quan Q, **Shi X**, Gao X, Wang Q, Wang Y. Wire harness managing device without twisting. China: CN102862875B.

Service & Professional Development

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| Since Fall 2021 | Widener Academic Review Committee meeting Serve as RE representative in the committee meeting |
| Since 2024 | Widener SOE Faculty Affairs Committee |
| 2024 | Widener First Year Experience Coordinating Group |
| Since 2024 | Widener Master thesis committee members |
| Since 2022 | Widener Girls' Camp |
| 2021, 2022, 2024 | Widener Engineering Summer Camp |
| Since 2022 | South Jersey Robot Run and Walk event |
| Since 2021 | Widener Joint RE/EE/BME workshop |
| Since 2021 | Widener Engineering Mini Camp |
| April 8, 2023 | Frank Institute outreach |
| February 25, 2023 | Widener Girls' Camp |
| Since 2021 | Admitted/Accept Student Day Widener Day Introduced the Robotics Lab and the Robotics graduate and undergraduate programs at Widener to the perspective students and their parents. |
| January 2 – 5, 2023 | Attended The National Effective Teaching Institute (NETI) workshop |
| December 6, 2022 | Attended Mini Bridge Week activities: Social Media Ambassadors and Microsoft Time Savers and "Suite" Tips! |
| November 6 – 8, 2022 | ABET Accreditation Campus Interview |
| September 2, 2022 | Dropout Detective Retention Software Training Attended the training for the online software “Dropout Detective” that |

works with Canvas.

- August 19, 2022 **Academic Convocation / Robotics Engineering Orientation**
- April 28, 2022 **Reception for the graduating RE seniors**
- Since 2022 **Widener University Commencement**
- Since 2022 **Robotics Engineering Graduation ceremony**
- April 4, 2022 **NBC Universal presentation & social**
- March 15, 2022 **Attended Perspective RE faculty member campus visit**
- February 7 – 9, 2022 **ABET Fundamentals of Program Assessment Workshop**
Attended the workshop to learn to design assessment processes, develop measurable student outcomes and apply data collection and reporting methods.
- October 18, 2021 **Widener Engineering Advising Training**
Attended the training series for faculty advisors
- October 16, 2021 **Widener Homecoming Weekend**
Developed and demonstrated the Touchless Control Robotic Arms and the Vision Controlled Mobile Robot to represent the School of Engineering
- February 25, 2021 **Widener Student Planning Training**
Attended the training of the online Student Planning system for faculty advisors
- April 14 -16, 2021 **The ABET Symposium 2021**
Attended the 2021 ABET Symposium for Widener Engineering accreditation
- April 12, 2021 **ABET Pre-Symposium 2021 Workshop**
Attended the 2021 ABET Pre-Symposium for Widener Engineering accreditation
- July 2020 **ASABE (American Society of Agricultural and Biological Engineers) Committee Member**

Served as the MS-48 Specialty Crop Engineering committee member in the ASABE

August 2019

Penn State's Ag Progress Days

Developed and demonstrated the Vision Controlled Mushroom Harvester to represent the Department of Agricultural and Biological Engineering

April 2019

Academic Job Search Workshop

Hosted by the Office of Postdoctoral Affairs at the Penn State University

February 2018

Grants and Fellowships Workshop

Hosted by the Office of Postdoctoral Affairs at the Penn State University

February 2017

Attended Fazlur Rahman Khan Distinguished Lecture

“Getting More Out of Existing Bridges” presented by Dr. Eugen Brühwiler at the Lehigh University and received the American Society of Civil Engineers certificate

August 2015

Manuscript Reviewer

Reviewed manuscripts for the journal of *Advances in Mechanical Engineering*

May 2011

Academic Workshop

Attended an academic workshop, “Tactile Robotic Mapping of Unknown Surfaces, with Application to Oil Wells,” presented by Professor Steven Dubowsky from the Massachusetts Institute of Technology

October 2010

CAE Technology

Participated the training program on a market-leading software for granular material simulation, EDEM, presented by the Hi-key Technology company in Beijing

September 2007

Manufacture Internship

FAW Group Corporation, Changchun, Jilin

The Mazda assembly plant, the heavy truck assembly line, the engine assembly plant, foundry plant, the forging workshop, the gearbox components processing plant

March 2007

Internship

Harbin Measuring & Cutting Tool Group Co. Ltd., Harbin,
Heilongjiang

Harbin Bearing Manufacturing Co. Ltd., Harbin, Heilongjiang

Harbin Turbine Co. Ltd., Harbin, Heilongjiang

Skills

Teaching /
Design
Software

- Canvas
- Robot Operating System (ROS) / AWS RoboMaker
- CAD: Inventor, SolidWorks, AutoCAD, Creo (Pro/ENGINEER)
- CAE: ANSYS, ADAMS, EDEM
- LabVIEW
- MATLAB (Simulink, xPC-target, Curve/Surface Fitting, Neutral Network, Wavelet, Robotics Toolbox)
- Microsoft Office: Word, Excel, PowerPoint, Visio

Robotics
Hardware

- Universal Robot
- NI ELVIS
- Festo Servo Robot Training Systems
- Rethink Baxter robot
- Robotino mobile robot
- Depth cameras (Intel RealSense, Leap Motion Hand Tracker, Kinect) for motion control
- Designed an RGB cameras array for a rotatable imaging chamber
- Ethernet, serial, and CAN bus communication
- High Speed Imaging for kinematic analysis
- LiDAR for navigation
- Meta Quest 2 VR headset

Manufacture

- CNC Milling
- FDM 3D Printing (PLA thermoplastic)
- Lathe, drill, band saw, sheet metal cutter / bender, solder, welding

Programming
Language

- C/C++
- Python
- MATLAB
- Basic
- Delphi / Pascal

- Experimental Method
- Motion analysis based on high-speed camera
 - Flat dilatometer test
 - Triaxial shear test
- Language
- English
 - Chinese (Native)