ZHIANG CHEN

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EDUCATION

Ph.D., Exploration Systems Design *2022*
School of Earth and Space Exploration
Arizona State University (ASU), Tempe, AZ

M.S., Mechanical Engineering (Robotics) *2017*
Department of Mechanical and Aerospace Engineering
Case Western Reserve University (CWRU), Cleveland, OH

B.Eng., Mechanical Design, Manufacture and Automation (Mechatronics) *2015*
College of Mechanical and Electrical Engineering
Central South University (CSU), Changsha, Hunan

EMPLOYMENT

Postdoctoral Research Scholar *Dec 2022 - present*
School of Earth and Space Exploration, ASU, Tempe, AZ

RESEARCH INTEREST

Automated Geoscience, Robotic Exploration Systems, Environmental Robots
Machine Learning, Unpiloted Aircraft Systems, Remote Sensing, Disaster Assessment

PUBLICATIONS

In preparation

J7. **Chen, Z.**, Das, J., & Arrowsmith, R. (2023). Machine Learning Approaches for 3D Rock Segmentation with Unpiloted Aircraft Systems. *Remote Sensing*. In prep.

J6. **Chen, Z.**, Arrowsmith, R., Das, J., Wittich, C., Madugo, C., & Kottke, A. (2023). Virtual Shake Robot: Simulating Dynamics of Precariously Balanced Rocks for Overturning and Large-displacement Processes. *Seismica*. In review.

J5. **Chen, Z.**, Das, J., & Arrowsmith, R. (2023). Mapping Precariously Balanced Rocks: Demonstrating A Target-oriented Mapping System for Field Unpiloted Aerial Vehicles. *Journal of Field Robotics*. In prep.

J4. **Chen, Z.**, Das, J., & Arrowsmith, R. (2023). Instance Segmentation Algorithms for Remote Sensing. *IEEE Transactions on Geosciences and Remote Sensing*. In prep.

C4. **Chen, Z.**, Keating, D., Shethwala, Y., Pandian Saravanakumaran, A., Arrowsmith, R., Kottke, A., Wittich, C., & Das, J. (2023). Shakebot: A Low-cost, Open-sourced Shake Table for Earthquake Research and Education. *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems*. In review.

Journals

J3. **Chen, Z.**, Scott, C., Keating, D., Clark, A., Das, J., & Arrowsmith, R. (2023). Quantifying and Analyzing Rock Trait Distributions of Rocky Fault Scarps Using Deep Learning. *Earth Surface Processes and Landforms*. 1– 17.

J2. **Chen, Z.**, Wagner, M., Das, J., Doe, R. K., & Cerveny, R. S. (2021). Data-Driven Approaches for Tornado Damage Estimation with Unpiloted Aerial Systems. *Remote Sensing*, 13(9), 1669.

J1. Wagner, M., Doe, R. K., Johnson, A., **Chen, Z.**, Das, J., & Cerveny, R. S. (2019). Unpiloted aerial systems (UASs) application for tornado damage surveys: Benefits and procedures. *Bulletin of the American Meteorological Society*, 100(12), 2405-2409.

Peer-reviewed conferences

C3. Antervedi, P., **Chen, Z.**, Anand, H., Martin, R., Arrowsmith, R., & Das, J. (2021, August). Terrain-Relative Diver Following with Autonomous Underwater Vehicle for Coral Reef Mapping. In *2021 IEEE 17th International Conference on Automation Science and Engineering* (pp. 2307-2312). IEEE.

C2. Anand, H., Rees, S. A., **Chen, Z.**, Poruthukaran, A. J., Bearman, S., Antervedi, L. G. P., & Das, J. (2021, August). OpenUAV Cloud Testbed: a Collaborative Design Studio for Field Robotics. In *2021 IEEE 17th International Conference on Automation Science and Engineering* (pp. 724-731). IEEE. (Best Application Paper Award Finalists)

C1. **Chen, Z.**, Scott, T. R., Bearman, S., Anand, H., Keating, D., Scott, C., Arrowsmith, R., & Das, J. (2020, August). Geomorphological analysis using unpiloted aircraft systems, structure from motion, and deep learning. In *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems* (pp. 1276-1283). IEEE.

Contributed papers and abstracts

12. **Chen, Z.**, Keating, D., Shethwala, Y., Pandian Saravanakumaran A., Arrowsmith, R., Das, J., Madugo, C., & Kottke A. (2022). Shakebot: a low-cost, open-source shake table for structural seismology research. Poster Presentation at 2022 SCEC Annual Meeting.

11. **Chen, Z.**, Das, J., & Arrowsmith, R. (2022). Leveraging Robotics and AI for Geoscience: Rock Search, Mapping, and Dynamics Analysis. In 2022 SAGE/GAGE Community Science Workshop.

10. **Chen, Z.**, Das, J., Wagner, M, & Arrowsmith, R. (2022). High-resolution Tornado Damage Estimation Using UAV and Machine Learning. In ICRA Workshop on Robotics for Climate Change.

9. Keating, D., **Chen, Z.**, Das, J., & Arrowsmith, R. (2021, December). Machine Learning Approach to Wildfire Effects on Debris Flow Hazard in Tonto, Arizona. In AGU Fall Meeting 2021.

8. **Chen, Z.**, Arrowsmith, R., & Das, J. (2021, December). Autonomous 3D Rock Detection for Geomorphology. In AGU Fall Meeting 2021.

7. Collins, C., Anand, H., **Chen, Z.**, Aparecido, L. M. T., Das, J., & Throop, H. (2021, December). Artificial Intelligence Assists in the Estimation of Hypolith Distribution in the Namib Desert. In AGU Fall Meeting 2021.

6. **Chen, Z.**, Keating, D., Das, J., Wittich, C., & Arrowsmith, R. (2021, August). Virtual Shake Robot: Dynamics Simulation of Precariously Balanced Rocks for Hazard Analysis . Poster Presentation at 2021 SCEC Annual Meeting.

5. Das, J., **Chen, Z.**, Scott, T., Scott, C., Keating, D., & Arrowsmith, R. (2020, December). Robotics and AI weave surface process narratives from rock geomorphology. In AGU Fall Meeting Abstracts.

4. Raming, L. W., **Chen, Z.**, Keating, D., Whipple, K. X., Yager, E., Strauch, A. M., & Das, J. (2020, December). Extreme Discharges and Thresholds of Boulder Mobility in Steep Mountainous Streams on Maui, Hawai'i. In AGU Fall Meeting Abstracts.

3. **Chen, Z.**, Bearman, S., Arrowsmith, J. R., & Das, J. (2020). Localization and Mapping of Sparse Geologic Features with Unpiloted Aircraft Systems. In RSS Workshop on Robots in the Wild.

2. Bearman, S., **Chen, Z.**, Anand, H., Sprague, S., Gagnon, J., & Das, J. (2019). Towards Automated Monitoring of Animal Movement using Camera Networks and AI. In RSS Workshop on Robots in the Wild.

1. **Chen, Z.**, & Zhang, Y. (2018). Explain by Goal Augmentation: Explanation Generation as Inverse Planning. In RSS Workshop on Adversarial Robotics.

Theses

Ph.D. Dissertation: Automated Geoscience with Robotics and Machine Learning: A New Hammer of Rock Detection, Mapping, and Dynamics Analysis. Arizona State University. 2022.

M.S. Thesis: Deep-learning Approaches to Object Recognition from 3D Data. Case Western Reserve University. 2017.

ACADEMIC ACTIVITIES

Presentation

IEEE International Conference on Robotics and Automation Workshop on Robotics for Climate Change. High-resolution Tornado Damage Estimation Using UAV and Machine Learning. May 2022. Philadelphia.

AGU Fall Meeting 2021 on Decoding Geophysical Signatures With Machine Learning. Autonomous 3D Rock Detection for Geomorphology. Dec 2021. Online.

IEEE/RSJ International Conference on Intelligent Robots and Systems. Geomorphological Analysis Using Unpiloted Aircraft Systems, Structure from Motion, and Deep Learning. Oct 2020. Online.

Robotics: Science and Systems Workshop on Robots in the Wild. Localization and Mapping of Sparse Geologic Features with Unpiloted Aircraft Systems. July 2020. Online.

Invited talk

UW Data Science Seminar. eScience Institute. University of Washington. Feb 2023. Online

Researcher Seminar. Lawrence Berkeley National Laboratory. March 2023. Berkeley CA.

Brown Bag Seminar. Division of Geological and Planetary Sciences. Caltech. March 2023. Pasadena CA.

Publication review

Journal of Field Robotics

IEEE International Conference on Robotics and Automation, 2019, 2020, 2022

IEEE/RSJ International Conference on Intelligent Robots and Systems, 2021, 2023

ICLR 2023 Workshop on Machine Learning for Remote Sensing

Earth Surface Dynamics

Natural Hazards

Cogent Engineering

Grant review

Research Grant Reviewer, ASU Graduate and Professional Student Association

TEACHING

Teaching interest

Robotics & AI Education for Natural Science Students, DEI in STEM Education

Teaching experience

Instructor, SES 598 Autonomous Exploration Systems, ASU *Spring 2023*

Guest Lecturer, SES 230 Coding for Exploration, ASU *Fall 2021*

Graduate Teaching Associate, SES 230 Coding for Exploration, ASU *Fall 2020*

Professional training

GRD 593, Impacting Inequality: Inequities and Education, ASU *Spring 2022*

GRD 791, Preparing Future Faculty & Scholars, ASU *Fall 2021*

International Teaching Assistant Training, ASU *Summer 2018*

OUTREACH AND COMMUNITY ACTIVITIES

Organized education and outreach event at Percy L. Julian Elementary School, understanding STEM identifies from planning Mar exploration missions *May 2022*

Interviewed for ABC15 News, ASU scientists say drones could play major role in tornado disaster rescue efforts (`https://shorturl.at/ghJP2`) *Dec 2021*

EXPERIENCE

Founder *Feb 2022 - present*
EcoLauncher LLC, Tempe, AZ
wildlife conservation focused UAV platforms for mapping and payload distribution

Research Grant Reviewer *Aug 2022 - Dec 2022*
ASU Graduate and Professional Student Association, Tempe, AZ

Member *Nov 2019 - present*
Center for Global Discovery and Conservation Science, ASU, Tempe, AZ

Graduate Research Associate *Aug 2018 - Dec 2022*
Distributed Robotic Exploration and Mapping Systems Laboratory, ASU, Tempe, AZ

Teaching Associate *Aug 2020 - Dec 2020*
SES 230 Coding for Exploration, ASU, Tempe, AZ

Member *Apr 2018 - Aug 2018*
Cooperative Robotic Systems Lab, ASU, Tempe, AZ

Graduate Research Associate *Aug 2017 - Dec 2017*
Robotics and Intelligent SystEms Laboratory, ASU, Mesa, AZ

Research Assistant *Sep 2016 - Oct 2016*
Sponsored by Bendix Commercial Vehicle Systems LLC, CWRU, Cleveland, OH

COMPETITIONS

Mathematical Contest in Modeling, Meritorious Winner award *2014*

Mixed Dynamic Traffic Stream Model Based on the Keep-right-except-to-pass Rule

National Undergraduate Mechanical Innovation Competition, Notional Second Prize *2014*

Intelligent Cam Mechanism Studying Instrument with Visual Motor Integration

PATENT

Zhiang Chen, Xing Zhang. **Cam Mechanism Studying Instrument**. Utility Model Patent CN201420378143, State Intellectual Property Office of the P.R.C.

GRANTS

Pacific Gas and Electric Research Gift, USD 99,986	*2022*
Pacific Gas and Electric Research Gift, USD 99,568	*2021*
Southern California Earthquake Center (SCEC) Award #20129, USD 26,801	*2020*
Southern California Earthquake Center (SCEC) Award #19179, USD 26,502	*2019*

AWARDS AND RECOGNITIONS

Registration Grant for 2023 EERI Annual Meeting, Computers and Structures, Inc.	*2023*
Travel Scholarship for 2023 GAGE/SAGE Workshop, EarthScope	*2023*
SESE Safety Star Winner, ASU	*2022*
Graduate Student Designer Award for Mutually Enriching Mentorship, ASU	*2022*
Student Scholarship for 2022 SAGE/GAGE Workshop, IRIS	*2022*
Graduate College Online/Remote Travel Award, ASU	*2021*
Graduate Excellence Award, ASU	*2021*
Graduate College Online/Remote Travel Award, ASU	*2020*
Fulton Fellowship, ASU	*2017*
Outstanding Graduate, CSU	*2015*
Meritorious Winner, Mathematical Contest in Modeling	*2014*

TECHNICAL SKILLS

Programming Languages:	C++, Python, Matlab
Robotics:	ROS, Gazebo, RViz, Pixhawk, PX4
Machine Learning:	PyTorch, Tensorflow, scikit-learn
Mechanical Engineering:	Pro/ENGINEER, AutoCAD, Adams, ANSYS, Mitsubishi PLC
GIS:	ArGIS, QGIS, StraboSpot, GeoPandas, GDAL, Google Earth Engine

REFERENCES

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