

# SHAN YE

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## EDUCATION

### University of Wisconsin-Madison

Aug. 2018 – May 2022 (exp)

Ph.D. in Geoscience, minor in GIS (planned)  
Advisors: Shaun Marcott & Shanan Peters  
Focuses: Geoinformatics and Paleoclimate

### University of Tulsa

Aug. 2016 – May 2018

M.S. in Geosciences  
Advisor: Bryan Tapp  
Focuses: Numerical simulation for geomechanics and  
geospatial method application in petroleum industry

### University of Michigan, Ann Arbor

Aug. 2013 – Aug. 2015

B.S. in Earth and Environmental Sciences  
Advisor: Kyger Lohmann  
Focuses: Economic geology and environment sustainability

### The Pennsylvania State University

Aug. 2011 – May 2013

Geography  
Advisor: Cynthia Brewer  
Focuses: GIScience and Cartography

## SKILLS

### Specialties

GIS, Cartography, Spatial Analysis, Paleoclimate, Oceanography, Climate Modelling, Geomechanics, Structural Geology, Tectonics, Data Science, Geostatistics, Numerical Modelling, Finite Element Method

### Programming

C++, Java, Python, R, HTML, CSS, JavaScript, SQL

### Software

ArcGIS, QGIS, GeoDa, PostGIS, Illustrator, CorelDraw, Photoshop, MS Office, MATLAB, Mathematica, ABAQUS, COMSOL, Petra, Petrel

### Others

Outreach Writing and Talking, Field Mapping, Field Work, Geospatial Data Visualization, Interactive Web Mapping (Mapbox/Leaflet/jQuery/D3), Web Design, Database, Numerical Algorithm, Historical Geography, Human Geography, Petroleum Geology, Glaciology, Geochronology, Video and Audio Editing

## WORKING AND INTERNSHIP EXPERIENCE

### **University of Wisconsin-Madison**

Madison, WI, USA

Research Assistant, The EarthCube Project (Aug. 2018 – Present)

Supervisors: The EarthCube Project committee

- The GeoDeepDive and Ice-Rafted Debris project: Using natural language process methods to construct R scripts to extract spatio-temporal information regarding ice-rafted debris from journal literature and ocean drilling records, and analyzed writing styles of related journal articles to locate common areas where authors would report the coordinate, depths and age information. Prepared information for further machine learning in order to pair up coordinates and ages (ongoing).
- The Macrostrat project: Conducted the validating of age models (mainly the late Cretaceous) of the Macrostrat database, a geospatial database containing stratigraphic data in North America. Prepared the How-To file regarding the Macrostrat API for potential users in the department.
- The Cosmogenic Lab database: Constructing a branch of Sparrow (a lab database and data archiver with a web interface and a standard API initially developed by Daven Quinn) for the Cosmogenic Lab at University of Wisconsin-Madison (ongoing). This infrastructure is written with PostgreSQL, Python and JavaScript and would be useful for other labs.
- Paleoclimate data: Retrieved global temperature anomaly data in the past 22,000 years from more than 140 sites across the world. Assigned them to spatial grids and conducted zonal statistics. Conducted spatial analysis and prepared the analytical result for further analysis and comparison to other numerical modelling results (o-going). Built an interactive web map (Leaflet) to showcase the data and spatial analysis results.

### **Institute of Geology and Geophysics, Chinese Academy of Sciences**

Beijing, China

Summer Research Internship (May – Aug. 2014)

Research Internship (Sept. 2015 – May 2016)

Supervisor: Fu Li-Yun

- Collected and reviewed literatures regarding shale gas reservoir modelling and evaluation
- Reported on seismic data analysis and visualization methods that could be applied to shale gas reservoir research and modelling

### **University of Michigan, Ann Arbor**

Ann Arbor, MI, USA

GIS Analyst and Cartographer (Oct. 2013 – May 2014)

Supervisor: Kyger Lohmann

- Retrieved sedimentology and stratigraphic data from well logs in Michigan and located depths of the target formation at different places.
- Conducted spatial interpolation and generated a 3D model of the target formation within Michigan Basin (with R, ArcMap and ArcScene).
- Based on the 3D model and the DEM data of Lake Michigan, located the intersection between the formation and the bottom of Lake Michigan, which is a potential source of water pollution.
- Prepared maps to illustrate the potential water pollution scenario in Lake Michigan.

Collaborative Group Facilitator (Aug. 2014 – May 2015)

Supervisor: Global Scholars Program at University of Michigan

- Worked as a group leader and an instructor for a social science research group with 15 students with various academic backgrounds and social identities
- Led weekly discussion sessions on global social justice issues, mainly on MDGs
- Gave instructions (mainly on spatial thinking on social issues, map design for visualizing those issues, and ArcGIS software) to the group and led the group in a research project on human trafficking issues in developing countries of Southeast Asia
- Promoted the community engagement by assisting the group to hold workshops, exhibitions, music events and talks open to the university and general public

WebGIS Developer and Cartographer (Sept. – Oct. 2014)

- Developed a website with interaction maps to display mineralogy and field work photos taken at Upper Peninsula, Michigan.

### **Yimin Open-Pit Coal Mine**

Inner Mongolia, China

Field GIS Technician Internship (Aug. 2012)

Supervisor: Huaneng Hulun Buir Company

- Basic operations on the GIS system built for the coal mine

## **RESEARCH EXPERIENCE**

### **Volcano-glacier interactions in Southern Andes, Chile**

University of Wisconsin-Madison (ongoing)

- Archived and processed volcanic eruption dating data and temperature data at Andes, New Zealand, Kamchatka and Antarctica from various sources
- Conducted statistics with R on whether the Andes volcanoes are sensitive to the retreating of ice sheets since the last glacial maximum
- Reported initial results, and further analysis with deeper spatial perspective is planned

### **Finite Element Method simulation on the final geometry of buckling folds embedded by heterogeneous matrices**

University of Tulsa (Dec. 2016 – March 2018)

Master's thesis

- Built numerical models (FEM) with ABAQUS and conducted simulation runs with different combinations of initial condition and boundary conditions
- Found out that the Biot-Ramberg equation, which was restricted to buckling layers embedded by homogeneous matrices, could also be used for approximately describing the final geometry of buckling layers within heterogeneous matrices by using the averaged competence ratio at upper and lower contacts of the buckling layer

### **Induced earthquakes in north-central Oklahoma: a spatial analysis**

University of Tulsa (Nov. 2016 – May 2018)

- Archived seismic data from OGS and OU databases and conducting spatial analysis to locate hot spots of earthquakes in Oklahoma since 2008
- Based on well log data provided by oil companies (processed with colleagues in Petra), conducted zonal analysis and hot spot analysis in ArcGIS, and located hot spots of porosity, pressure zones and faults in target formations
- Identified potential unmapped faults based on spatial analysis and providing reports on the over-saturation of target formations for wastewater injection

### **Oil prospects in Taranaki Basin, New Zealand**

University of Tulsa (Jan. – March 2017)

Imperial Barrel Award Competition, Mid-Continent Division

Roles in the team: Reporter, Structural Geologist, GIS Analyst, and Cartographer

- Analyzed geochemical data to locate potential source rocks
- Assisted the geophysicist team member to analyze seismic images in Petrel to identify potential structural traps for oil prospects
- Correlated well log data in Petra and did intensive literature reviews to reconstruct the geological history of the basin, and drew figures in CorelDraw and Illustrator to represent the paleo-temperature model and tectonic cross-section
- Conducted spatial analysis in R to locate hot spots on key signals based on well log data
- Located 3 potential oil prospects within the area of interests
- Prepared maps in Petrel and ArcGIS for the final report

### **A spatial meta-data analysis on the groundwater crisis of High Plains Aquifer in Nebraska**

University of Tulsa (Oct. – Dec. 2016)

- Retrieved water well data within the Nebraskan section of High Plains Aquifer from various sources, including University of Nebraska and agricultural and environmental departments of Nebraska, and conducted spatial analysis on the seasonal change and general trends of the water level with ArcGIS and R.
- Georeferenced satellite images on land use and land cover of Nebraska in ArcGIS, and studied the spatial correlation between the water level change and the land use/cover types. Conducted geostatistics and found out the significance of spatial correlations.
- Prepared maps with ArcGIS and Illustrator to visualize the challenge and crisis that Nebraska faces regarding the dropping trend of the water level of High Plains Aquifer.

### **Paleoenvironment of Green River Basin, Wyoming**

University of Michigan (Aug. 2015)

- Reconstructed a general history of Cenozoic paleoenvironment of Green River Basin from a spatial perspective, based on intensive field works including fossil collecting, rock formation identifying, and field mapping.
- Created a detailed map and stratigraphic unit (in ArcGIS, CorelDraw and Illustrator) to illustrate changes of precipitation and routes of Hoback River in Cenozoic

### **Auto-generator of geo-referenced travel logs**

University of Michigan (Jan. – April 2015)

- Developed Python scripts to train the computer with travel logs on Twitter
- Developed an auto-generator that can write travel logs based on provided key words and geographic locations
- Constructed an interactive map with Leaflet that could display generated travel logs
- Developed a web page to showcase the auto-generator on a project exhibition

### **Economic and environmental impacts of Mackinac Bridge, Michigan**

University of Michigan (Jan. – April 2015)

- Collected data from historical account and published journals regarding the economic, population, transportation, manufacture and mining activities in Upper Peninsula, Michigan, as well as in the Midwest states in general, both before and after the construction of Mackinac Bridge
- Georeferenced and digitized old maps before and after the construction of Mackinac Bridge in ArcMap
- Analyzed how this bridge reshaped the industrial manufacturing of Michigan and

Midwest in a combined perspective of economic and space

- Collected current and historical land cover images of Upper Peninsula, especially areas with copper and iron mines, and processed them in ArcGIS and Envi, and analyzed how the bridge potentially had influenced the logging activities in that region

### **Identities of Chinese empires when nomadic culture was at the gate**

University of Michigan (Nov. – Dec. 2014)

- Helped in archiving data from official historical accounts of China during late Southern and Northern Dynasties period, regarding when an emperor or highly ranked chancellor referred his empire as China.
- Helped in comparing these data spatially and temporally between three regimes: Northern Zhou (ruled by sinicized Xianbei people), Northern Qi (ruled by Xianbei-ized Han people) and Chen (ruled by purely Han people).
- Noticed the pattern of how identities of ruling class in these three rivalling empires changed through time and space, and generated a series of maps to demonstrate it

### **Primary and secondary education in Detroit area, Michigan**

University of Michigan (Sept. 2013 – May 2014)

Global Scholars Program

- Retrieved data regarding enrollment, graduating rate, teacher-student ratio, tuition and community household income data of primary and secondary schools in Detroit area.
- Retrieved key words from Twitter regarding positive and negative comments on schools and education in Detroit area, as well as crime rates of each school districts
- Applied spatial analysis to learn challenges that Detroit schools were facing, and presented visualized results to program supervisors and representatives from Detroit

## **TEACHING**

### **University of Tulsa**

Temporary instructor

GEOL 4083: GIS for Geologists (Spring 2018)

Taught in lectures when the professor was not available. Topics covered: GIS data types, vector data models and structures, topology types and validating, georeference, map digitization, map generalization algorithms, cases of GIS application in petroleum industry.

### **University of Michigan, Ann Arbor**

Course assistant and grader

UC 270: Social Justice (Winter 2015)

Duties: Teaching assistant for the affiliated course and facilitating and guiding a student research group on the topic of human trafficking issues in North America and Southeast Asian countries.

### **The Pennsylvania State University**

Teaching intern

GEOG 363: GIScience (Fall 2012)

Teaching Assistant in lab sessions of GEOG 363 (GIScience). Tested tools in the then newly-released ArcGIS software in the lab. Edited and rewrote portions of lab instructions on ArcMap, ArcScene and GeoDa based on their latest releases.

## GRANTS AND AWARDS

- Weeks RA, Dept. of Geoscience, University of Wisconsin-Madison (2018-19)
- Third-place award, Wonderful Geology outreach competition 2018, co-sponsored by China Geological Survey, China University of Geosciences, China Geology Library, and China Mining Newspaper. (April 2018)
- University Honors, University of Michigan, 2 Times (Winter 2014, Fall 2014)
- Recognition of Global Excellence, University of Michigan (2013 – 2014, top 1 student in each research group)
- Dean's List, The Pennsylvania State University, 3 Times (Spring 2012, Fall 2012, Spring 2013)
- Erickson Fund in Geography, The Pennsylvania State University (Spring 2013)
- Academic Award, Nanjing University (Summer School 2012, top 6 students)

## PROFESSIONAL ORGANIZATIONS

- American Association of Geographers (AAG)  
*Poster presentation on GIS application to open-pit coal mines at 2013 annual meeting*
- Association of American Petroleum Geologists (AAPG)  
University of Tulsa Chapter President (2017 – 2018): *Organized field trips, community service activities, outreach talks, workshops, and school-industry connection events; secured the L. Austin Weeks Grant for the chapter for the next academic year.*  
AAPG Young Professional (2018 – 2019)
- Society for Sedimentary Geology (SEPM)
- North American Cartographic Information Society (NACIS)
- Tulsa Geological Society (TGS)

## WORKSHOPS

- IsoAstro geochronology workshop and field trip, Rock Springs, Wyoming (2019)
- The EarthCube Project workshop, Madison, Wisconsin (2019)
- Web mapping for geoscience outreach, Tulsa, Oklahoma (2018 – *co-organizer*)
- Let's talk about sex trafficking, Ann Arbor, Michigan (2015 – *co-organizer*)
- Mapping with R, Ann Arbor, Michigan (2015 – *organizer*)
- Data visualization with R, Ann Arbor, Michigan (2014)
- Ontology and geospatial perspective in history research, Ann Arbor, Michigan (2014)
- Design a better map with ArcGIS, Ann Arbor, Michigan (2014 – *organizer*)
- Mapping for social science research, Ann Arbor, Michigan (2014 – *co-organizer*)

## WEB COURSES AND CERTIFICATIONS

- Data Science, Johns Hopkins University @ Coursera, 2019 (ongoing)
- Algorithmic Toolbox, UC San Diego @ Coursera, March 2016
- 3D Analysis of Surfaces and Features, Esri, November 2012
- Deriving Rasters for Terrain Analysis Using ArcGIS, Esri, November 2012
- Basics of Raster Data, Esri, September 2012
- Organizing Raster Data Using ArcGIS, September 2012
- Working with Coordinate Systems, Esri, September 2012
- Level 10 Piano Performing Certification, Chinese Musicians Association, 2005

## OUTREACH PUBLICATIONS

### Articles in CNKI library (in Chinese)

Shan YE. Blue Ridge Mountains: the spine of Appalachia. *Human and Nature*. 2019

Shan YE. Chapter of Geoscience. Special Volume on Aesthetics of Sciences. *Open Class-Science Fans*. 2019

Shan YE. Is the Little Ice Age somehow caused by the European colonization of American continents? *Newton-Science World*. 2018

Shan YE. Congaree National Park: known for the height. *Human and Nature*. 2018

Shan YE. The Keweenaw Peninsula. *Human and Nature*. 2018

Shan YE. The White Sand: from the blue sea to the white sandy sea. *Human and Nature*. 2018

Shan YE. Absaroka and Beartooth: a song of ice and fire near the Yellowstone. *Human and Nature*. 2018

Shan YE. Generating heat map visualizations of soccer players with R scripts: a guideline. *Office Informatization*. 2014.

Shan YE. Review on the adhibition of Volunteered Geographic Information on the natural disaster emergency management. *Office Informatization*. 2014.

### Other formally published outreach works

Shan YE. Fossil Hunters: A History of Dinosaur Research (eBook). 2016

Shan YE. The Chain of Great Lakes: tracing a history of deglaciation in North America. *Chinese National Geographic*. 2016

### Translation

Reynolds et al., Exploring Geology (textbook). Chinese version translated by Shan YE. In prep. Physical book is scheduled to be published in late 2019 or early 2020.

### Online Platforms

The total view count of my outreach articles and interviews on major Chinese media and online platforms has reached 4.5 million since January 2018.

## WORKSHOP INSTRUCTIONS AND INVITED OUTREACH TALKS

Famous pieces of rocks in human history, at Tulsa Rock and Mineral Society. 2018

Workshop: Web mapping for geoscience outreach, at AAPG & University of Tulsa. 2018

A hundred-year-long journey of National Park Service, *at* Zhihu platform. 2017

It all began with the continental drift: how scientists learned about our planet, *at* Zhihu platform. 2016

Workshops: Design a better map for your project with ArcGIS (2014) and R (2015). *at* Global Scholars Program and North Quad community, University of Michigan.

Workshop: How to use maps to visualize stories in your social science studies? *at* Global Scholars Program and North Quad community, University of Michigan. 2014

## FIELD WORKS

- Green River Basin, Wyoming (2019)
- Eastern Wisconsin (2018 and 2019)
- Ouachita Mountains, Arkansas (2018)
- North-Central Oklahoma (2017)
- Wind River Range, Wyoming (2015)
- Wyoming, Montana and Idaho (2015)
- Huron River in Suburban Detroit, Michigan (2015)
- Upper Peninsula, Michigan (2014)
- Central Pennsylvania (2011 and 2012)