

Core Competency

- Computational: MD, Semi-empirical, DFT, HPC, Python, Bash, SQL, HTML, CSS, R, etc.
- Experimental: crystal growth, leaching test, NMR, ICP-MS, IR, Raman, SEM, XRD, UV-Vis, etc.
- Machine Learning: Linear/Logistic Regression, Random Forests, Gradient Boosting, Scikit-learn, Pandas, NumPy, SciPy, Matplotlib, Seaborn, etc.

Education

Louisiana State University, Geology & Geophysics, Baton Rouge, LA Anticipated Sep 2020

Ph. D. Geology (Geochemistry) Advisor: Dr. Jianwei Wang

Dissertation: Investigating Geochemical Processes of Fluid-rock Interactions of Materials Related to Energy and Environment, 78 p.

Stony Brook University, Department of Geosciences, Stony Brook, NY May 2014

M. Sc. Geosciences (Geochemistry) Advisor: Dr. Brian L. Phillips

Thesis: NMR Investigation of Organic Phosphorus in Calcite, 117 p.

China University of Geosciences, School of Earth Sciences, Wuhan, China Jul 2010

B. Sc. Geochemistry Advisor: Dr. Shucheng Xie & Dr. Junhua Huang

Thesis: Study on 3-hydroxy Acids Distribution in Stalagmite as a Record of Microbial Response to Paleoclimate Variation, 51 p.

Research Experience

Louisiana State University, Department of Geology & Geophysics, LA Sep 2014 – Present

Research Assistant:

1) Study the degradation of nuclear waste form materials in aqueous environments

U.S. Department of Energy, EFRC WastePD & NEUP (Nuclear Energy University Program)

- Adopt the standard leach test method ASTM C1308-08 to evaluate the long-term leaching behavior of iodine in the nuclear waste form lead vanadate iodoapatite $\text{Pb}_5(\text{VO}_4)_3\text{I}$
- Characterize the chemical and physical alterations with SEM, Raman, IR, XRD, ICP-MS, etc.
- Investigate the gel formation of wollastonite CaSiO_3 during acid leaching
- Compute the energetics of sodium ion exchange in albite $\text{NaAlSi}_3\text{O}_8$ using ReaxFF MD
- Study the ion-exchange of apatite and silicate minerals by leaching experiments

2) Investigate the geochemistry of fluid/rock interfacial interactions in shale

- Simulate oil interactions with calcite and kerogen by Molecular Dynamics modeling
- Calculate the energetics of oil desorption from shale surface by Umbrella Sampling

- Evaluate the temperature effect on the desorption of oil from calcite and kerogen surfaces

Lawrence Berkeley National Lab, Deep Learning for Science School, Berkeley, CA Jul 2019

- Gained hands-on experience using TensorFlow 2.0 on Kera at NERSC HPC

Stony Brook University, Department of Geosciences, Stony Brook, NY Jul 2011 – May 2014

Research Assistant: Developed methodology with NMR to study organophosphates in calcite matrix
U.S. National Science Foundation, EAR, Division of Earth Sciences

- Managed laboratory such as categorizing inventory (SOP, SDS) and coordinating experiments
- Incorporated organic phosphate into calcite CaCO_3 using seeded constant-addition method
- Independently performed solid-state NMR experiments and data analysis

Stony Brook University, Department of Geosciences, Stony Brook, NY Mar 2011 – Jun 2011

Research Assistant: Reconstructed magnetic record from core logging data in Flathead Lake, MT

State Key Lab of Geological Processes and Mineral Resources, Hubei, China Jun 2008 – Jul 2010

Research Assistant: Provided geobiological evaluation of hydrocarbon rocks by biomarkers

China University of Geosciences, School of Earth Sciences, Wuhan, China Jan 2008 – Jun 2010

Research Co-leader: Invented an experimental apparatus to physically simulate geology structures

Wuhan Polytechnic University, School of Chemistry, Hubei, China Jan 2009 – Oct 2009

Research Assistant: Developed methodology to test the viscosity of liquid crystal

Teaching Experience

Louisiana State University, Geology & Geophysics, Baton Rouge, LA Jan 2020 – Present

Teaching Assistant: Teach historical geology lab for non-major college students

Louisiana State University, Geology & Geophysics, Baton Rouge, LA Aug 2017 – Dec 2017

Student mentor: Supervised research of undergraduate student

Stony Brook University, Department of Geosciences, NY Sep 2010 – Jul 2011

Teaching Assistant: Assisted in three undergraduate courses

Professional Experience

Lawrence Berkeley National Laboratory, Berkeley, CA July 2019

[Deep Learning for Science School](#) (Summer School)

Goldschmidt 2018, Boston, MA Aug 2018

Data Science in Geochemistry (Workshop)

Louisiana State University, Geology & Geophysics, Baton Rouge, LA 2015-2016

Boresight Geosteering (BHL)

LWD Technologies & Capabilities (Baker Hughes)

Volumetric Calculation and Risk Analysis of Hydrocarbon Reservoir (Talisman)

Shell Exploration and Production Co. and AAPG, New Orleans, LA Oct 2013

Imperial Barrel Award Training – Integrated Basin and Play Analysis

Field Experience

Louisiana State University , Geology & Geophysics, Baton Rouge, LA	Apr 2015
AAPG Spring Break Field Trip, Big Bend National Park, TX (1 week)	
China University of Geosciences (Wuhan) , School of Earth Sciences, Hubei, China	2007-2009
On-site practicum in SINOPEC Jiangnan Oilfield, Hubei, China (2 weeks)	
Geochemical survey in Three Gorges Dam area, China (3 weeks)	
Geological survey in Zhoukoudian District, Beijing, China (6 weeks)	
Geology field practicum in Beidaihe District, Hebei, China (2 weeks)	

Certificate and Award

Certificate

Logging for Oil and Gas Evaluation (issued by Total S.A.)	2019
Petrel Fundamentals; Petrel Geology; Petrel Property Modeling (issued by Schlumberger)	2016

Award

People's Choice Award, Best Writing Award , US D.O.E. Video Contest II	Jul 2019
The New Orleans Geological Society Memorial Foundation Scholarship	May 2019
Laura Cordell & John P "Jay" Moffitt Scholarship	Jan 2018
Goldschmidt 2016 Travel Grant	May 2016
LSU Graduate School Dean's Travel Awards	May 2016
Leadership LSU 2015	Apr 2015
Excellence Award of National Undergraduate Innovation Experimental Project	Sep 2010

Professional Communication (Talk, Video, and Poster)

EFRC WastePD Meeting at University of North Texas , Denton, TX	Oct 2019
Poster: Iodine Release from Apatite Ceramic Waste Form in Aqueous Environments	
Life at the Frontiers of Energy Research Video Contest II , US D.O.E.	July 2019
Video: Nuclear Energy Waste and WastePD (on behalf of WastePD)	
Deep Learning for Science School , Lawrence Berkeley National Lab, Berkeley, CA	July 2019
Poster: An integrated approach to study the iodine immobilization in apatite ceramic waste forms - from Artificial Neural Network to First Principle Calculation	
EFRC WastePD Meeting at University of Virginia , Charlottesville, VA	Sep 2018
Poster: Long Term Chemical Durability of Iodine-bearing Apatite	
Goldschmidt Conference , Boston, MA	Aug 2018
Workshop: Data Science in Geochemistry	
Poster: Energetics of the Oil Interaction with Calcite and Kerogen – Implication for Hydrocarbon Transport and Storage in Shale	

D.O.E. EFRC Mid-term Review Meeting , Gaithersburg, MD	Apr 2018
Poster: Long-term Chemical Duration of Iodine-bearing Apatite in Aqueous Environments	
MRS Spring , Phoenix, AZ	Mar 2018
Poster: Release Mechanism of Iodine Retained by Apatite Structure Waste Form in Aqueous Environments	
WastePD Monthly Research Highlight Webinar	Dec 2017
Talk: Mechanisms of Iodine Release from Iodoapatite in Aqueous Solution	
AGU Fall , New Orleans, LA	Dec 2017
Talk: Mechanisms of Iodine Release from Iodoapatite in Aqueous Solution	
Poster: The interfacial energetics of the oil molecules interactions with shale media using molecular dynamics simulation	
EFRC WastePD Meeting at Pacific Northwest National Lab , Richland, WA	Sep 2017
Poster: Mechanisms of Iodine Release from Iodoapatite in Aqueous Solution	
WastePD Design Workshop at QuesTek Innovations, LLC , Evanston, IL	April 2017
EFRC WastePD Kick-off Meeting , OSU, Columbus, OH	Dec 2016
4th Annual LONI HPC Parallel Programming Workshop , LSU, Baton Rouge, LA	Jun 2015
Gordon Research Conferences, Biomineralization , New London, NH	Aug 2014
Poster: NMR Investigation of Organic Phosphoesters Coprecipitated with Calcite	
Gordon Research Conferences, Organic Geochemistry , Holderness, NH	Aug 2014
Poster: Biomarker Phospholipids in Calcite – NMR evidence	
Goldschmidt Conference , Sacramento, CA	Jun 2014
16th Annual Chemistry Event Symposium , Boston, MA	May 2014
Poster: Organic Phosphorus Speciation in Carbonate Mineral – NMR Study	
AAPG Eastern Section , Morgantown, WV	Nov 2013
Student Chapter Leadership Workshop	
SPE ATCE international , New Orleans, LA	Sep2013– Oct 2013
SEG International Exposition and Annual Meeting , Houston, TX	Sep 2013
IEEE 23rd Magnet Technology Conference , Boston, MA	Jul 2013

Review

ACS journal <i>Energy & Fuel</i>	Jul 2020
NeurIPS 2019 workshop on Machine Learning and the Physical Sciences , Canada	Sep 2019

volunteer Experience

Fundraising

Science & Sprints, College of Science, LSU, Baton Rouge, LA

Oct 2019

Science Education

EarthArXiv

since Mar 2020

GSA, South Central Section 50th Annual Meeting, Baton Rouge, LA

Mar 2016

Louisiana Children's Museum, 15th Super Saurus Saturday, New Orleans, LA

Apr 2015

Louisiana State University, Baton Rouge, LA

Live Gold Leadership Conference

Nov 2014

Super Science Saturday

Oct 2014

New York City FIRST Mega Celebration of Science and Technology, NY

Mar 2013

Conference on the Geology of Long Island and Metropolitan New York (Annual)

2011-2012

Social Welfare

Louisiana State University, Baton Rouge, LA

6th Annual Spring Greening Day

Apr 2015

"Geaux BIG Baton Rouge" LSU 3rd Annual Day of Service

Mar 2015

Habitat for Humanity, Baton Rouge, LA

Mar 2015

International Thanksgiving Banquet, Baton Rouge, LA

Nov 2014

Animal Welfare

Cat Haven, Baton Rouge, LA

May 2019 - Present

Companion Animal Alliance, Baton Rouge, LA

Jul 2018 – May 2019

Patent and Publication

Zhang, Z., **Zhang, Z.**, Deng, M., Dai, Z., & Zhan, Z. [The Preparation and use of low viscosity liquid crystal materials at low-temperature](#), China Patent 200910273196.0, issued Dec 2009.

Zhang, Z.* Stephens, A., & Wang, J. (2020). Temperature Effect on Interactions of Oil Droplet with Water-wetted Shale Kerogen at Reservoir Temperatures: Linear Relationships between Temperature, Free Energy, and Contact Angle. arXiv:2007.09741

Lu, J., **Zhang, Z.***, Li, S., Yan, D., Zhang, Z.*, Guan, J., Qiao, J. (2020). Synthesis of 4-Chloro-1,3-Diazobenzene Bent-Cores Liquid Crystal and Characterizations of Its Mesogenic Behaviors and Photosensitivity. chemRxiv.12115878

Zhang, Z.*, Liu, H., & Wang, J. (2020). [Energetics of Interfacial Interactions of Hydrocarbon Fluids with Kerogen and Calcite using Molecular Modeling](#). *Energy & Fuels*. 34 (4), 4251-4259

Zhang, Z.*, Gustin, L., Xie, W., Lian, J., Valsaraj, K. T., & Wang, J. (2019). [Effect of solution chemistry on the iodine release from iodoapatite in aqueous environments](#). *Journal of Nuclear Materials*, 525, 161-

Zhang, Z., Ebert, W. L., Yao, T., Lian, J., Valsaraj, K. T., & Wang, J. (2019). [Chemical durability and dissolution kinetics of iodoapatite in aqueous solutions](#). *ACS Earth and Space Chemistry*, 3 (3), 452-462

Zhang, Z., Heath, A., Valsaraj, K. T., Ebert, W. L., Yao, T., Lian, J., & Wang, J.(2018). [Mechanism of iodine release from iodoapatite in aqueous solution](#). *RSC advances*, 8(8), 3951-3957.

Yao, G., **Zhang, Z.**, & Wang, J. (2017). [Beta transmutations in apatites with ferric iron as an electron acceptor—implication for nuclear waste form development](#). *Physical Chemistry Chemical Physics*, 19(37), 25487-25497.

Phillips, B. L., **Zhang, Z.**, Kubista, L., Frisia, S., & Borsato, A. (2016). [NMR spectroscopic study of organic phosphate esters coprecipitated with calcite](#). *Geochimica et Cosmochimica Acta*, 183, 46-62.

Zhang, Z., Deng, M., Zhang, Z., Wei, B., & Xuan, L. [Study on the synthesis of difluorooxymethylene alkybenzene and the properties of low temperature viscosity](#) *Digest of Technical Paper, ASID' 09*, (2009)190-1

References

Jianwei Wang, Ph.D.

Associate Professor
Department of Geology & Geophysics
Louisiana State University
E235 Howe-Russell-Kniffen
Baton Rouge LA 70803
Tel: (225) 578-5532
E-mail: jianwei@lsu.edu

Gerald Frankel, Ph.D.

Distinguished Professor of Engineering
Department of Materials Science Engineering
Ohio State University
Watts Hall Room 484
Columbus, OH 43210
Tel: (614) 688-4128
E-mail: frankel.10@osu.edu

Kalliat T Valsaraj, Ph.D.

Charles & Hilda Roddey Distinguished Professor of Chemical Engineering
Ike East Professor of Chemical Engineering
Cain Department of Chemical Engineering
Louisiana State University
3314R Patrick F Taylor Hall
Baton Rouge, LA 70803
Tel: (225) 578-6522
Email: valsaraj@lsu.edu