Lijun Zhu

Research Assistant · Signal/Data Analysis

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Summary

Ph.D. student majored in Electrical Engineering working on large-scale data processing and statistical model prediction challenges. Passionate about data science and machine learning algorithms. Co-author of FDTD simulation tool *S3I* and contributing to *Obspy*, the open-source seismic signal processing tools. Maintaining Linux HPC cluster and built computer server as a hobby.

Education

Georgia Institute of Technology — *Atlanta, GA*

Ph.D. student in Electrical Engineering — *Aug. 2014 - PRESENT*

- Research topic: detection and estimation through signal processing, statistical, and machine learning tools.
- Advisor: Professor James H. McClellan.
- Expected graduated in 2018 (GPA = 3.91/4.00).

Georgia Institute of Technology — *Atlanta, GA*

B.Sc. in Electrical Engineering — *Aug. 2009 - May. 2013*

- Developed and maintained online tutorial system for DSP undergraduate courses.
- Designed and tested keyword spotting algorithm for always-on voice recognition system.
- Built peripheral circuits and wrote programs on Texas Instruments MSP430 chip.
- Graduated with Highest Honor (GPA = 3.96/4.00).

Skills

Coding	Python, C/C++, MATLAB®, LaTeX, Bash, Assembly/VHDL, Verilog, Perl, PHP, HTML/CSS, SQL
Software	NumPy/SciPy, scikit-learn, PyTorch, TensorFlow, OpenCV, awk/sed, GNU Parallel, ssh/scp
Hardware	NI Labview/DAQ, acoustic measurement, soldering, oscilloscope, logic analyzer

Experience

Georgia Institute of Technology — *Atlanta, GA*

Research Assistant — *Sep. 2014 - PRESENT*

- Prepare and process large data using bash/awk script on Linux/Unix servers.
- Design, prototype, and test machine learning algorithms using *Python* on large-scale dataset with tools like PyTorch and Tensorflow.
- Maintain and upgrade Linux HPC cluster and storage system.
- Develop and support in-house numerical (FD) simulation tools for elastic wave propagation in complex medium.

Houston Research Center, Aramco Service Company — *Houston, TX*

Research Intern — *Aug. 2015 - Nov. 2015*

- Wrote *Python/MATLAB* tools for organizing and processing large-scale dataset (> 1TB).
- Processed land acquisition data searching for small events in the noisy environment.
- Tested machine learning algorithms for dimension reduction, image segmentation and object tracking on spectrogram domain.

Microsoft Research — *Redmond, WA*

Research Intern — *May. 2014 - Aug. 2014*

- Wrote numerical simulation tools for ultrasonic wave propagation in *C++* with a *MATLAB* interface.
- Conducted acoustic measurements in anechoic chamber testing prototype products.
- Documented progress and results in published research papers.

Bose Coporation — *Framingham, MA*

Research Co-op — *Jan. - May., Aug. - Dec. 2012*

- Worked with marketing team in identifying customer's requirements and make product definition.
- Led the product prototyping in early stage and make demonstration to executives.
- Updated *MATLAB* and *Perl* script to automate testing procedure.
- Assisted adaptive microphone array design for conference setup.

Services

SEG Student Chapter in Georgia Tech — *Atlanta, GA*

Vice President & President — *Jun. 2016 - PRESENT*

- Organized annual meeting and community services in 2016.
- Led the development of student chapter website redesign in 2017.

IEEE Student Chapter in Georgia Tech — *Atlanta, GA*

Secretary — *Feb. 2011 - Oct. 2011*

- Organized meetings and community services.
- Kept meeting minutes and updated chapter website.

Honors & Awards

2017	**Finalist**, Alibaba Cloud Aftershock Detection Contest	*Hangzhou, China*
2016	**Travel Grant**, SEG/Chevron Student Leadership Symposium	*Dallas, TX*
2012	**Faculty Honor**, Georgia Institute of Tehcnology	*Atlanta, GA*
2011	**Faculty Honor**, Georgia Institute of Tehcnology	*Atlanta, GA*
2010	**Faculty Honor**, Georgia Institute of Tehcnology	*Atlanta, GA*

Publication

Referenced Journals

[1] E. Liu, L. Zhu, A. Govinda Raj, J. H. McClellan, A. Al-Shuhail, S. I. Kaka, and N. Iqbal, "Microseismic events enhancement and detection in sensor arrays using autocorrelation-based filtering," *Geophysical Prospecting*, vol. 65, no. 6, pp. 1496–1509, 2017, ISSN: 1365-2478. DOI: 10.1111/1365-2478.12491. [Online]. Available: http://dx.doi.org/10.1111/1365-2478.12491.

[2] L. Zhu, E. Liu, and J. H. McClellan, "A multi-channel approach for automatic microseismic event localization using ransac-based arrival time event clustering (ratec)," *arXiv preprint arXiv:1702.01856*, 2017.

Conference Proceedings

[3] Z. Li, L. Zhu, Z. Peng, and J. McClellan, "High-resolution microseismic detection and location using large-n arrays," in *2017 Workshop: Microseismic Technologies and Applications, Hefei, China, 4-6 June 2017*, 2017, pp. 59–63. DOI: 10.1190/Microseismic2017-015. [Online]. Available: http://library.seg.org/doi/abs/10.1190/Microseismic2017-015.

[4] L. Zhu, Z. Li, Z. Peng, E. Liu, and J. H. McClellan, "Weighted random sampling in seismic event detection/location (wrased): Applications to local, regional, and global seismic networks," in *Seismological Research Letters*, vol. 88, GeoScienceWorld, Apr. 2017, pp. 463–723. DOI: 10.1785/0220170035. [Online]. Available: http://srl.geoscienceworld.org/content/88/2B/463.

[5] L. Zhu, E. Liu, J. H. McClellan, Z. Peng, and Z. Li, "Classification of arrival-time picks for microseismic event localization," in *79th EAGE Conference and Exhibition 2017*, Jun. 2017. DOI: 10.3997/2214-4609.201700728. [Online]. Available: http://earthdoc.eage.org/publication/download/?publication=88445.

[6] L. Zhu, E. Liu, J. McClellan, Y. Zhao, W. Li, Z. Li, and Z. Peng, "Estimation of passive microseismic event location using random sampling-based curve fitting," in *SEG Technical Program Expanded Abstracts 2017*, 2017, pp. 2791–2796. DOI: 10.1190/segam2017-17730445.1. [Online]. Available: http://library.seg.org/doi/abs/10.1190/segam2017-17730445.1.

[7] E. Liu, L. Zhu, and J. H. McClellan, "Microseismic events enhancement in sensor arrays using autocorrelation based filtering," in *78th EAGE Conference and Exhibition 2016*, EAGE, May 2016. DOI: 10.3997/2214-4609.201600722. [Online]. Available: http://earthdoc.eage.org/publication/publicationdetails/?publication=84967.

[8] L. Zhu, E. Liu, and J. H. McClellan, "An automatic arrival time picking method based on RANSAC curve fitting," in *78th EAGE Conference and Exhibition 2016*, EAGE, May 2016. DOI: 10.3997/2214-4609.201601481. [Online]. Available: http://www.earthdoc.org/publication/publicationdetails/?publication=85723.

[9] L. Zhu and D. Florencio, "3D numerical modeling of parametric speaker using finite-difference time-domain," in *2015 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Apr. 2015, pp. 5982–5986. DOI: 10.1109/ICASSP.2015.7179120. [Online]. Available: http://ieeexplore.ieee.org/document/7179120/.

[10] L. Zhu, E. Liu, and J. H. McClellan, "Full waveform microseismic inversion using differential evolution algorithm," in *2015 IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, Dec. 2015, pp. 591–595. DOI: 10.1109/GlobalSIP.2015.7418264. [Online]. Available: http://ieeexplore.ieee.org/document/7418264/.