

Pengcheng Shangguan
University of Illinois at Urbana-Champaign
1611 Titan Drive, Rantoul, IL 61866, USA

Email: shanggu1@illinois.edu Phone: (217) 898-0139 Fax: (217) 893-0601

EDUCATION

- University of Illinois at Urbana-Champaign (UIUC)**, Urbana, IL GPA: 3.90/4.0
PhD Candidate in Civil Engineering Jan. 2011-Aug. 2014 (expected)
Advisor: Professor Imad Al-Qadi
Dissertation Topic: Asphalt Pavement Compaction Monitoring Using Ground Penetrating Radar (GPR)
- Master of Science** in Civil Engineering Jan. 2010-Dec. 2010
Advisor: Professor Imad Al-Qadi
Developed algorithms and guidelines for GPR applications on railroad ballast contamination quantification
- Southeast University (SEU)**, Nanjing, China Aug. 2004-Jun. 2008
Bachelor of Science in Transportation Engineering Ranking: 1/180, GPA: 4.0/4.0

RESEARCH EXPERIENCE

- Illinois Center for Transportation, UIUC** Rantoul, IL
● **Research Assistant** Jan. 2010-present
- Project:** Asphalt Pavement Compaction Monitoring Using Ground Penetrating Radar
Sponsor: Illinois Center for Transportation
- Developed a tool to achieve “intelligent compaction” of asphalt pavement;
 - Developed numerical simulation model, advanced signal processing algorithms, feature extraction techniques, and artificial neural network model;
 - Collected and processed large amount of data and field test results validated the effectiveness of the developed algorithm.
- Project:** Railroad Ballast Condition Assessment Using Ground Penetrating Radar
Sponsor: Association of American Railroads
- A texture retrieval system was developed to quantify railroad ballast conditions;
 - Inspired by “Google Images” system, the system developed in this study was able to find the similar “images” based on their similarities to the “query image”;
 - The system utilized data filtering, wavelet technique, feature extraction and pattern recognition, statistical modeling and image processing technique;
 - The system was highly computational efficient which could process large amount of data within short amount of time.
- Project:** In-Place Hot Mix Asphalt Density Estimation Using Ground Penetrating Radar
Sponsor: Federal Aviation Administration
- Developed a model enabling effectively extracting useful information (density) from raw data.

HONORS AND AWARDS

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| 1 st Place in the Poster Competition at 4 th Annual Workshop for IACIP | 2014 |
| Certificate in Business Administration by University of Illinois | 2013 |
| Runner-up of the Best Posters in the 2 nd International Transportation Doctoral Symposium | 2013 |
| Illinois Association of Highway Engineers (IAHE) Grant Shaw Memorial Scholarship | 2013 |
| 1 st Place in the Poster Competition at 3 rd Annual Workshop for IACIP | 2013 |
| The Annual Innovative Research Award in the 52 nd Illinois Bituminous Conference | 2011 |
| First Level Master Student Fellowship, SEU | 2008 |
| Honored Graduate of Transportation College, SEU | 2008 |
| Honorable Mention in the Mathematical Contest in Modeling (MCM), USA | 2008 |
| Mao Yisheng Civil Engineering Education Student Award | 2007 |

Outstanding Student Leadership Award of Jiangsu Province, China	2007
Prominent Student of SEU in Studying	2006
SEU President Award	2006
T.Y. Lin Award	2006
Honorable Student of SEU	2006
Outstanding Student Leadership Award of SEU	2005
Changzhou City Government Scholarship	2005
1 st Prize in C++ Programming Designing Competition, SEU	2005
2 nd Prize in National Physics Competition, China	2003

PUBLICATIONS IN REFEREED JOURNALS

Pengcheng Shangguan and Imad Al-Qadi (2014). Assessing the Quality of Steel Fiber Reinforced Concrete Using Ground Penetrating Radar (working paper).

Pengcheng Shangguan, Imad Al-Qadi and Shan Zhao (2014). An Innovative Common Midpoint Method for Accurate Pavement Thickness Measurement Using 3D-Radar System (working paper).

Pengcheng Shangguan and Imad Al-Qadi (2014). Demonstration of Asphalt Pavement Compaction Monitoring during Field Construction Using Ground Penetrating Radar (working paper).

Pengcheng Shangguan and Imad Al-Qadi (2014). Monitoring Density of Asphalt Pavement during Compaction with Surface Moisture Presence Using Ground Penetrating Radar (working paper).

Pengcheng Shangguan and Imad Al-Qadi (2014). Calibration of FDTD Simulation of GPR Signal for Asphalt Pavement Compaction Monitoring, *IEEE Transactions on Geoscience and Remote Sensing* in press.

Pengcheng Shangguan and Imad Al-Qadi (2014). Texture Retrieval of Ground Penetrating Radar Images Collected from Fouled Railroad Ballast, *Construction and Building Materials*, Vol. 69, pp. 10-17.

Pengcheng Shangguan, Samer Lahouar, and Imad Al-Qadi (2014). Pattern Recognition Algorithms for Density Estimation of Asphalt Pavement during Compaction: A Simulation Study, *Journal of Applied Geophysics*, Vol. 107, pp. 8-15.

Pengcheng Shangguan, Imad Al-Qadi, Zhen Leng, Robert L. Schmitt and Ahmed Faheem (2013). Innovative Approach for Asphalt Pavement Compaction Monitoring with Ground-Penetrating Radar, *Journal of the Transportation Research Board*, Vol. 2347, pp. 79-87.

Pengcheng Shangguan, Imad Al-Qadi and Zhen Leng (2012). Development of Wavelet Technique to Interpret Ground-Penetrating Radar Data for Quantifying Railroad Ballast Conditions, *Journal of the Transportation Research Board*, Vol. 2289, pp. 95-102.

Zhen Leng, Imad Al-Qadi and **Pengcheng Shangguan**, Songsu Son (2012). Field Application of Ground-Penetrating Radar for Measurement of Asphalt Mixture Density: Case Study of Illinois Route 72 Overlay, *Journal of the Transportation Research Board*, Vol. 2304, pp. 133-141.

Yuhong Jiang, Tao Ma, **Pengcheng Shangguan** (2009). Study on Extraction and Recovery Experiments of Stone Matrix Asphalt, *Journal of Hefei University of Technology (Chinese)*, Vol. 32, Iss. 2, pp. 252-255.

Min Yang, Wei Wang, Xuewu Chen, Tao Wan and **Pengcheng Shangguan** (2009). Activity Pattern Choice of Work Commuting Trip by Workers, *Journal of Southwest Jiaotong University (Chinese)*, Vol. 44, Iss. 2, pp. 274-279.

Tao Ma, **Pengcheng Shangguan**, Xiaoming Huang and Guoqiang Xue (2008). Research on the Equivalent Axle-number Coefficients on Asphalt Pavement with Rigid Base, *Journal of Transportation Engineering and Information (Chinese)*, Vol. 6, Iss. 3, pp. 36-40.

PRESENTATIONS AND PUBLICATIONS IN CONFERENCE PROCEEDINGS

Pengcheng Shangguan (2014). Implementation of Ground Penetrating Radar on Asphalt Pavement and Railroad Ballast, Presentation at Kent Seminar Series, Rantoul, IL.

Pengcheng Shangguan (2014). Applications of Ground Penetrating Radar on Assessment of Transportation Infrastructure. Invited talk to the Illinois Association of Highway Engineers, Schaumburg, IL.

Pengcheng Shangguan, Imad Al-Qadi, and Shan Zhao (2014). Simulation of Asphalt Pavement Compaction Monitoring Using Ground Penetrating Radar. Poster at 4th Annual Workshop for the International Association of Chinese Infrastructure Professionals (IACIP).

Pengcheng Shangguan and Imad Al-Qadi (2014). Development of Texture Retrieval Approach for Quantifying Railroad Ballast Fouling from Ground-Penetrating Radar Data. Poster at 2014 Transportation Research Board (TRB) 93rd Annual Meeting, Washington, D.C.

Pengcheng Shangguan and Imad Al-Qadi (2014). Finite-Difference Time-Domain Simulation of Ground-Penetrating Radar Signals and Its Applications on Asphalt Pavement Compaction Monitoring Using Ground-Penetrating Radar. Presentation at 2014 Transportation Research Board (TRB) 93rd Annual Meeting, Washington, D.C.

Imad Al-Qadi and **Pengcheng Shangguan** (2013). Texture Retrieval Approach for Interpreting GPR Data to Quantify Railroad Ballast Fouling. Presented at European Geosciences Union General Assembly. Vienna, Austria.

Pengcheng Shangguan and Imad Al-Qadi (2013). Asphalt Pavement Density Prediction during Compaction from GPR Data Simulation Using Artificial Neural Network. Poster at the 2nd International Transportation Doctoral Symposium, Champaign, IL.

Pengcheng Shangguan, Imad Al-Qadi, and Aaron Coenen (2013). Non-destructive Monitoring of Asphalt Pavement Density Change during Compaction. Poster at 3rd Annual Workshop for The International Association of Chinese Infrastructure Professionals (IACIP) (1st prize).

Pengcheng Shangguan, Imad Al-Qadi, Zhen Leng, Robert L. Schmitt and Ahmed Faheem (2013). An Innovative Approach for Asphalt Pavement Compaction Monitoring Using Ground Penetrating Radar. Presentation at 2012 Transportation Research Board (TRB) 92nd Annual Meeting, Washington, D.C. and 2013 Kent Seminar Series, Rantoul, IL.

Pengcheng Shangguan, Imad Al-Qadi and Zhen Leng (2012). Development of Wavelet Technique for Railroad Ballast Fouling Condition Quantification Using Ground-Penetrating Radar Data. Presentation at 2012 Transportation Research Board (TRB) 91st Annual Meeting, Washington, D.C.

Zhen Leng, Imad Al-Qadi and **Pengcheng Shangguan** (2011). Monitoring of Asphalt Pavement Compaction Using Ground Penetrating Radar. Presentation at 2011 Annual FWD User's Group Meeting, Champaign, IL.

Fenglan Bian, Xiaoming Huang, **Pengcheng Shangguan** and Xiaofeng Yu (2009). Warning Model for Debt Risk of Toll Highway Based on Efficacy Coefficient Method, *Proceedings of the Second International Conference on Transportation Engineering*, Vol. 2, pp. 1182-1189.

Min Yang, Wei Wang, Xuewu Chen, Xianyao Hou, and **Pengcheng Shangguan** (2009). Simulation of Individual's Representative Activity-Travel Pattern Based on Cluster Analysis and Monte Carlo Method, *Proceeding of the International Conference on Engineering Computation*, pp. 139-142.

TEACHING EXPERIENCE

UIUC-CEE 504 Infrastructure NDE Methods (Prof. John Popovics) *Spring, 2014*
Introduce the GPR system and guide students to collect GPR data in the lab sessions.

UIUC-CEE 498 SAM Sensor and Measurements (Prof. Joshua Peschel) *Spring, 2014*
Guest lecturer on implementation of GPR on asphalt pavement and railroad ballast.

UIUC-CEE 508 Pavement Evaluation and Rehabilitation (Prof. Imad Al-Qadi) *Fall, 2011 and Fall, 2013*
Demonstrate the GPR system and explain the principles of GPR system to the whole class.

SEU-Pavement Engineering (Prof. Xiaoming Huang) *Fall, 2008*
Teaching assistant of the class. In addition, I led a student team to develop an online open course website based on the course contents. It was awarded “National Excellent Online Open Course in China” in 2008.

INTERNSHIPS

Jiangsu Province Transportation Planning and Designing Consulting Inc. Changzhou, China
● **Assistant Engineer** *Dec.2006-Feb. 2007*
Analyzed large amount of historical traffic data and predicted the future traffic demand for two major highway projects in the city of Changzhou, China.

Changzhou Municipal Engineering Consulting Inc. Changzhou, China
● **Assistant Engineer** *May 2006-Aug. 2006*
Utilized traffic simulation software to simulate the traffic in downtown Changzhou and analyzed the traffic congestion conditions before and after the construction of a major city road.

LEADERSHIP

Founder and President of JOIN Performing Art Troupe in SEU *Apr. 2005-Apr. 2007*
● Founded the Troupe with 4 groups: chorus, dancing group, instrumental group and drama group
● 300 members joined the troupe which became one of the largest student group in SEU
● The troupe delivered over thirty musical and theatrical performances
● The troupe won more than 10 awards in and out of the university and won great recognition