

## Dr. Jinyuan Liu, P.E., P.Eng.

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### 1. EDUCATION

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**Ph.D /Civil (Geotechnical) Engineering** **Jan. 2003**

Polytechnic University (<http://www.poly.edu>)

Dissertation: Visualization of 3D Deformations Using Transparent “Soil” Models

**Ph.D. /Civil (Geotechnical) Engineering** **Oct. 1999**

Tongji University (<http://www.tongji.edu.cn>)

Dissertation: Centrifugal Modeling of Excavation in Soft Clay

**M.S./Civil (Structural) Engineering** **July 1995**

Nanjing Hydraulic Research Inst. (<http://www.nhri.cn>)

Thesis: Spectrum & Time Series Method in Structural Health Evaluation

**B.S. / Civil (Structural) Engineering** **July 1992**

Hohai Univ. (<http://www.hhu.edu.cn>)

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### 2. WORK EXPERIENCE

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**July 2007- Now** **Ryerson University** **Toronto, ON**

***Associate Professor (Assistant Professor from July 2007 to February 2012)***

Working on geotechnical engineering teaching and research at Department of Civil Engineering.

- Establishing a geotechnical research team and a GeoOptical Research Lab
- Teaching graduate and undergraduate courses mainly in geotechnical engineering
- Conducting geotechnical engineering research, particularly industry-sponsored projects
- Secured over \$400,000 external research funding
- Trained over 15 graduate students at Master's and Ph.D. levels

**Oct. 2005- June 2007** **Jacobs Engineering Group** **Detroit, MI**

***Tunnel Engineer***

Worked on Upper Rouge Tunnel (URT) Project, a 12 km long 9 m diameter tunnel in Detroit.

- Performed lining design and analyses for all the tunnels, chambers, adits, and shafts
- Designed contract drawings for tunnel plan and profile and tunnel linings
- Involved in supplemental geotechnical investigation and SBOD report
- Coordinated design activities among design teams and subconsultants
- Supervised staff engineers

Worked on Stanford Linear Accelerator project, a drill-and-blast rock tunnel project in CA.

- Analyzed tunnel lining using GT-Strudl with tension cut-off springs
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**Nov. 2002 –Oct.2005**

**STV Inc.**

**New York, NY**

***Senior Geotechnical Engineer***

Worked on East Side Access (ESA) Project, a \$ 6.8b transit tunnel project in NYC.

- Led lining analysis and design for TBM tunnel in soft ground
- Designed the cut-and-cover tunnel and U-box structures by GT Strudl
- Designed and detailed the RC segmental liner using MicroStation
- Studied workable underpinning schemes for different structures
- Numerically analyzed of interaction between closely spaced tunnels

Worked on Chicago Transit Authority Block 37 project, a transit tunnel project in Chicago.

- Modeled soil-tunnel interaction using Plaxis and designed reinforced concrete frames

**1999 – 2002**

**Polytechnic University**

**Brooklyn, NY**

***Research Assistant and Teaching Assistant***

Research on NSF project (\$320,000) “Career: Modeling 3D Flow and Soil Structure Interaction Using Optical Tomography.” This project involves making two kinds of transparent materials to model sands and clays and obtaining flow and deformation pattern inside non-intrusively. Images of the laser speckle generated by the interaction of laser light and transparent soils are captured before and after deformation to obtain soil deformation field non-intrusively using digital image correlation method. A model consisting of a layer of transparent “sand” overlying a layer of soft “clay” is used in the study. Results showed that transparent soils and developed optical system are capable in modeling soil deformation and flow problems in natural soils. This research has attracted interests from researchers world-wide, including US, UK, Australia, Germany, and Israel.

Taught undergraduate laboratories in soil mechanics, foundation design, and surveying.

Supervised two high school interns during two summers.

**1996 - 1999**

**Tongji University**

**Shanghai, China**

***Research Assistant and Field Engineer***

Designed, performed, and analyzed four centrifugal tests to study multi-braced deep excavation with varying excavation parameters, including volume and time. Samples were retrieved from undisturbed soil blocks from a depth of 12m in the field to obtain similar geotechnical properties. Test results show that controlling construction can efficiently reduce the ground loss to protect surrounding properties in urban environment, which supports the widely implemented excavation technique in Shanghai.

In charge of following field research projects related to Shanghai subway construction:

- Supervised compensation grouting protection of 6 buildings (CN¥500k)
- Supervised dewatering protection of a 73-year-old six-storey building (CN¥600k)
- Supervised underpinning and grouting protection of a shopping mall (CN¥1M)
- Designed and analyzed soil properties change due to excavation (CN¥150,000)

**1992 - 1996**

**Nanjing Hydraulic Research Institute**

**Nanjing, China**

***Graduate Student (3 yrs) and Structural Engineer (1 yr)***

- Studied spectrum and time series method to assess structural safety of a concrete dam
  - Analyzed seepage force in Toulinkuo Dam using finite difference method
  - Preliminary study and design for Sino-American natural gas station in East China Sea
  - Programmed the database for safety monitoring of Fuchunjiang Dam
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### 3. RESEARCH CONTRIBUTION

#### 3.1 Research Publications

More than 90 publications, including 35 journal papers, 42 conference papers, 5 book chapters, 3 conference proceedings, 3 technical reports. An index of 13 in both *h-index* and *i10-index* for over 383 citations over the last five year. The most representative publications are listed below:

Liu J, Liu M, Zhu Z. 2012. Sand deformation around an uplifting plate anchor. ASCE, *Journal of Geotechnical & Geoenvironmental Engineering*, 138(6), 728–737.

Liu J, Gao H, Liu H. 2012. Finite element analyses of negative skin friction on a single pile. *Acta Geotechnica*, 7(1), 1-14.

Iskander M, Liu J, Sadek S. 2002. Transparent amorphous silica to model clay. ASCE, *Journal of Geotechnical & Geoenvironmental Engineering*, 128(3), 262-273.

Liu J, Iskander M. 2010. Modelling capacity of transparent soil. *Canadian Geotechnical Journal*. 47(4), 451-460.

Liu H, Li P, Liu J. 2011. Numerical investigation of underlying tunnel heave during a new tunnel construction. Elsevier, *Tunnelling and Underground Space Technology*. 26(2), 276-283.

Liu J, Mitchell S. 2008. Numerical settlement analyses and design of bridge pier underpinning due to tunnelling. *GeoEdmonton'08*, 76-82.

Liu J. 2003. Compensation grouting to reduce settlement of buildings during an adjacent deep excavation. *Grouting and Ground Treatment*, ASCE GSP. No. 120(2), 837-844.

#### 3.2 Research Projects

A total of more than \$750,000 external research funding secured from governmental agencies and open laboratories. Currently, there are five projects ongoing and listed below:

**Project 1:** Fundamental investigation of compensation grouting using transparent soil. Funded by NSERC, 2014-2019

**Project 2:** Numerical investigation of long-term settlement of Waba Dam. Funded by MITACS Accelerate PhD Program and OPG, 2014-2018

**Project 3:** Development of guidelines for soil nail walls. Funded by MTO, 2011-2015

**Project 4:** Optimized design of shaft foundations for noise walls in the GTA. Funded by NSERC and supported by Safe Roads Engineering, 2014-2015

**Project 5:** Statistical correlations between SPT-N values and soil parameters. Funded by NSERC and supported by SPL Consultants Ltd, 2014-2015

## 4. OTHER EVIDENCE OF IMPACT AND CONTRIBUTIONS

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### 4.1. Awards

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**1999 Shanghai Science & Tech. Development Award** Shanghai Bureau of Infrastructure.

**Guanghua Scholarship** Tongji University, China, 1997

**Liu Jianhang Scholarship** Shanghai Metro Company, China, 1998

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### 4.2. Professional Activities

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**Chairman** of CGS-SOS (Toronto Group), 2010/2011, **Past Chair**, 2011/2012, **Executive Committee Member**, 2008-10

**Chair** of CGS Education Committee, 2014-2016

**Session Chair & Co-Editor** of GeoHubei 2014 conference

**Session Chair & Co-Editor** of GeoHunan 2011 International Conferences

**Session Chair & Co-Editor** of GeoHunan 2009 International Conferences

**Committee Member** of IACGE 2013 conference

**Committee Member** of the *CGS Education Committee (2007-now)* and *DFI Technical Committees: Micropile (08-now), Helical Pile (08-now), Tieback & Soil Nailing (08-now), Marie Foundations (08-10); Ground Improvement (08-now)*

**Paper reviewer for Journals:** *J. of Geotechnical and Geoenvironmental Engineering, Canadian Geotechnical Journal, Tunnelling & Underground Space Technology; Geotechnical Testing J.; Environmental Earth Sciences; Automation in Construction; Journal of Performance of Constructed Facilities; J. of Testing and Evaluation; DFI Journal and*

**Paper reviewer for Conferences:** *DFI-EFFC 2014, GeoHubei 2014, IACGE 2013, Pan AM CGS 2011; CGS GeoEdmonton'08 ; ASCE GeoCongress'08 ; Geohunan'11; Geohunan'09 ; ASCE IFCEE'09 Conferences*

**Professional Engineer** in the state of CT, WA, & MI in the US

**Professional Engineer** in the province of Ontario in Canada

**Member** of following professional societies: CSCE, ASCE, DFI, ISSMGE, CGS

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### 4.3 Professional Training Courses

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CUMT: Urban Tunnelling: Planning, Design, and Construction, 65 professionals, August 3-4, 214, Xuzhou, China

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APEGBC: Applied Soil Mechanics and Shoring Design, 22 professionals, April 23 - 25, 2014, Vancouver, BC

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EPIC: Urban Tunnelling: Planning, Design, and Construction, 12 professionals, March 24 - 26, 214, Mississauga, ON

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EPIC: Trenching and Shoring Design, 7 professionals, April 18 - 19, 2013, Mississauga, ON

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