

Shrey Kumar Shahi

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EDUCATION

- 2013* **Stanford University**, California, USA
Doctor of Philosophy, *Civil Engineering*, GPA: 4.11/4.00
Thesis : A Probabilistic Framework to Include the Effects of Near-Fault Directivity in Seismic Hazard Assessment.
Advisor : Prof. Jack W. Baker
- 2010* **Stanford University**, California, USA
Master of Science, *Statistics*, GPA: 4.10/4.00
- 2007* **Indian Institute of Technology Kanpur (IITK)**, India
Bachelor of Technology, *Civil Engineering*, Ranked 1st in the graduating class.

AWARDS & HONORS

- Stanford graduate fellowship, Stanford University, *2009-2012*.
- Shah graduate research assistantship, Stanford University, *2008-2009*.
- General proficiency medal, IITK, *2007*.
- Prof. A.S.R. Sai memorial medal for outstanding all round achievement, IITK, *2007*.
- Academic excellence award, IITK, *2007*.

RESEARCH INTERESTS

- Developing tools to quantify and communicate risks posed by natural hazards.
- Applications of probability, statistics, and machine learning in Civil Engineering.

RESEARCH EXPERIENCE

- 2013-14* **Postdoctoral Associate, Virginia Tech**
Advisor : Prof. Adrian Rodriguez-Marek
- Compiled a database of earthquake ground-motions recorded in Pacific Northwest, Japan, Taiwan, South and Central America.
 - Studied the uncertainty in ground-motion intensity predictions across different regions due to source, site, and path effects.
- 2008-13* **Graduate Research Assistant, Stanford University**
Advisor : Prof. Jack W. Baker
- Developed and published a comprehensive probabilistic framework to account for directivity effects in seismic hazard assessment.
 - Used machine learning techniques to model properties of directivity effects in ground motion such as probability of observing pulse-like ground motion, pulse period etc.
 - Developed an efficient algorithm to classify strong velocity pulses in multi-component ground motions.
 - Developed and published statistical models for ground motion directionality.
 - Worked with the directivity and directionality groups of PEER NGA-West2 project.

TEACHING EXPERIENCE

- Fall 2013* **Guest Lecturer, graduate course on Geotechnical Aspects of Earthquake Engineering (CEE 5584), Virginia Tech**
- Developed lecture material, and gave two lectures on near-fault ground motions.
- Spring 2013* **Guest Lecturer, graduate course on Risk Analysis (CEE 5984), Virginia Tech**
- Developed lecture material, homework problems, and gave two lectures.
- Fall 2011* **Instructor, graduate course on Probabilistic Models in Civil Engineering (CEE 203), Stanford University**
- Developed lecture material and gave two 2-hour lectures every week.
 - Developed several new homework and exam problems for the course.
 - Received median evaluation score of 4.0/5.0 for course and instructor quality.
- Spring 2008* **Teaching Assistant, graduate course on Structural Reliability (CEE 204), Stanford University**
- Graded weekly problem sets.
- Winter 2008* **Teaching Assistant, undergraduate course on Mechanics of Materials (CEE 101A), Stanford University**
- Held regular office hours and graded homework problem sets.
 - Explained, prepared and supervised lab sessions.

WORK EXPERIENCE

- 2013-2014* **Postdoctoral Associate, Virginia Tech**
Responsibilities include conducting research, helping write grant proposals, and holding regular office hours to help students with questions related to the applications of probability and statistics.
- Fall 2011* **Instructor, Stanford University**
Taught a full graduate level course on Probabilistic Models in Civil Engineering.
- Summ 2011* **Summer Intern, Chronos Research**
Analyzed market order-flow data to develop high-frequency trading strategies. Developed a fully featured stock market simulator and profit and loss computation engine to augment the backtesting framework for trading algorithms.
- Fall 2009* **Consultant, Statistics Consulting, Stanford University**
Worked as a consultant in Statistics department's consulting service. Provided assistance in areas such as data analysis and interpretation, model fitting, time-series analysis etc.
- Summ 2006* **Summer Intern, Span Consultants, Bangalore, India**
Worked on projects with experienced engineers and helped design structures such as reinforced-concrete beams, retaining walls and storm water drains.

1. **Shahi, S.K.** and J.W. Baker (2011), “An Empirically Calibrated Framework for Including the Effects of Near-Fault Directivity in Probabilistic Seismic Hazard Analysis.” *Bulletin of the Seismological Society of America*, 101(2), 742-755.
2. **Shahi, S.K.** and J.W. Baker (2013), “NGA-West2 Models for Ground-Motion Directionality.” *Earthquake Spectra*, (accepted for publication).
3. **Shahi, S.K.** and J.W. Baker (2013), “An Efficient Algorithm to Identify Strong Velocity Pulses in Multi-Component Ground-Motions.” *Bulletin of the Seismological Society of America*, (under review).
4. Spudich, P., B. Rowshandel, **S.K. Shahi**, and J.W. Baker (2013), “Overview and Comparison of the NGA-West2 Directivity Models.” *Earthquake Spectra*, (under review).
5. Bozorgnia, Y., N.A. Abrahamson, L.A. Atik, T.D. Ancheta, G.M. Atkinson, J.W. Baker, A. Baltay, D.M. Boore, K.W. Campbell, B.S.J. Chiou, R. Darragh, S. Day, J. Donahue, R.W. Graves, N. Gregor, T. Hanks, I.M. Idriss, R. Kamai, T. Kishida, A. Kottke, S.A. Mahin, S. Rezaeian, B. Rowshandel, E. Seyhan, **S.K. Shahi**, T. Shantz, W. Silva, P. Spudich, J.P. Stewart, J. Watson-Lamprey, K. Wooddell, and R. Youngs (2013), “NGA-West2 Research Project.” *Earthquake Spectra*, (under review).
6. **Shahi, S.K.** and J.W. Baker (2013), “Explicit Inclusion of Directivity Effects in Ground-Motion Models.” (under preparation, anticipated submission December 2013).

OTHER REVIEWED PUBLICATIONS

1. **Shahi, S.K.**, and J.W. Baker (2013), “NGA-West2 Models for Ground-Motion Directionality.” PEER Technical Report 2013/10, Berkeley, CA, 46p.
2. Spudich, P., J.R. Bayless, J.W. Baker, B. Chiou, B. Rowshandel, **S.K. Shahi** and P. Somerville (2013), “Final Report of the NGA-West2 Directivity Working Group.” PEER Technical Report 2013/09, Berkeley, CA, 131p.
3. **Shahi, S.K.**, “A Probabilistic Framework to Include the Effects of Near-Fault Directivity in Seismic Hazard Assessment.” Ph.D. Thesis, Stanford University, Stanford, CA, 226p (co-published as PEER Technical Report 2013/15).
4. **Shahi S.K.** and J.W. Baker (2012), “Preliminary NGA-West2 Models for Ground-Motion Directionality.” *15th World Conference on Earthquake Engineering*, Lisbon, Portugal, 10p.
5. Spudich P., J. Watson-Lamprey, P. Somerville, J. Bayless, **S.K. Shahi**, J.W. Baker, B. Rowshandel and B. Chiou(2012), “Directivity Models Produced for the Next Generation Attenuation West 2 (NGA-West 2) Project.” *15th World Conference on Earthquake Engineering*, Lisbon, Portugal, 9p.
6. **Shahi S.K.** and J.W. Baker (2011), “Regression Models for Predicting the Probability of Near-Fault Earthquake Ground Motion Pulses, and their Period.” *11th International Conference on Applications of Statistics and Probability in Civil Engineering*, Zurich, Switzerland, 8p.

7. Baker, J. W., T. Lin, **S.K. Shahi**, and N. Jayaram (2011), “New Ground Motion Selection Procedures and Selected Motions for the PEER Transportation Research Program.” PEER Technical Report 2011/03, Berkeley, CA, 106p.
8. **Shahi, S. K.**, and J.W. Baker (2010), “Signal Processing and Probabilistic Seismic Hazard Analysis Tools for Characterizing the Impact of Near-Fault Directivity.” *Proceedings, 7th International Conference on Urban Earthquake Engineering (7CUEE) & 5th International Conference on Earthquake Engineering (5ICEE)*, Tokyo, Japan, 6p.

INVITED TALKS

1. **Shahi, S.K.**, “NGA-West2 Models for Ground-Motion Directionality.” *Structural engineering seminar, Virginia Tech*, Blacksburg, VA. October 9, 2013.
2. **Shahi, S.K.**, “A Probabilistic Framework to Include the Effects of Near-Fault Directivity in Seismic Risk Assessment.” *Geotechnical seminar, Virginia Tech*, Blacksburg, VA. October 10, 2012.
3. **Shahi, S.K.**, and J.W. Baker, “Preliminary NGA-West2 Models for Ground Motion Directionality (e-poster presentation).” *15th World Conference on Earthquake Engineering*, Lisbon, Portugal. September 25, 2012.
4. **Shahi, S.K.**, “Pulse-Like Ground-Motions.” *NEES REU Symposium*, Stanford, CA. August 16, 2012.
5. **Shahi, S.K.**, and J.W. Baker, “Directionality Models for Ground Motions in the NGA-West2 Database.” *PEER NGA-West2 Working Group Meeting*, Berkeley, CA. May 3, 2012.
6. **Shahi, S.K.**, and J.W. Baker, “Pulse-Like Ground motions: Models for Predicting Probability of Occurrence and Period.” *11th International Conference on Applications of Statistics and Probability in Civil Engineering*, Zurich, Switzerland. August 3, 2011.
7. **Shahi, S.K.**, and J.W. Baker, “Incorporating Near-Fault Directivity Effects into Design Criteria.” *PEER Ground Motion Selection and Modification working group meeting*, Berkeley, CA. July 7, 2010.

ACADEMIC SERVICE

Reviewer for the following journals:

- Bulletin of the Seismological Society of America
- Earthquake Engineering and Structural Dynamics
- Earthquake Spectra
- Nuclear Engineering and Design
- Acta Geophysica

TECHNICAL SKILLS

Programming Languages

- MATLAB
- R
- Python
- C/C++

Distributed/Parallel Comfortable with parallel and distributed programming frameworks like:

- Hadoop (MapReduce)
- CUDA (GPU computation)

Statistics Extensive experience of analyzing large datasets from various fields

- Earthquake engineering
- Finance
- Social network / web data

Expert in both classical (regression, hypothesis testing etc.) and modern (support vector machines, neural networks etc.) statistics.

Web Developed websites using technologies like HTML, CSS, Javascript, Ruby on Rails, PHP, Python, etc.

Other Developed software on Windows and Unix platforms (OS X, Linux etc.) in both industry and academic settings. Expert user of typesetting systems like L^AT_EX, and office productivity suits.

REFERENCES

- **Prof. Jack W. Baker**
Associate Professor
Department of Civil and Environmental Engineering,
Stanford University, Stanford, CA.
email : bakerjw@stanford.edu , Phone : 650-725-2573
- **Prof. Adrian Rodriguez-Marek**
Associate Professor
Department of Civil and Environmental Engineering,
Virginia Tech, Blacksburg, VA.
email : adrianrm@vt.edu , Phone : 540-231-5778
- **Prof. Gregory Deierlein**
Professor
Department of Civil and Environmental Engineering,
Stanford University, Stanford, CA.
email : ggd@stanford.edu , Phone : 650-723-0453
- **Prof. Eduardo Miranda**
Associate Professor
Department of Civil and Environmental Engineering,
Stanford University, Stanford, CA.
email : emiranda@stanford.edu , Phone : 650-723-4450