

Zhigang Shen

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1. Education

- Ph.D. in Design, Construction and Planning, University of Florida, 2007
- M.S. in Computer Engineering, University of Florida, 2003
- Master of Architecture, Tongji University (China), 1997
- Bachelor of Engineering in Architecture, Zhengzhou University (China), 1992

2. Experience

- Associate Professor (2013-present), The Durham School, University of Nebraska–Lincoln
- Visiting Associate Professor (2013-2014), Civil and Urban Engineering, New York University
- Assistant Professor (2007-2013), The Durham School, University of Nebraska–Lincoln
- Assistant Professor (2005-2007), Construction Management, University of Wisconsin – Stout
- Project Engineer (2004-2005), Catalfumo Construction and Development, West Palm Beach, Florida
- Assistant Project Manager/Estimator (2003-2004), Ecclestone Homes, West Palm Beach, Florida
- Architect (1997-1998), John Portman & Associates, Shanghai, China
- Architect (1992-1994), Tianchen Chemical Engineering Co., Tianjin, China

3. Publications (¹supervised student; * corresponding author)

3.1. Refereed Journal Papers in Press or Accepted

1. Na, R.,¹ Lin, S., **Shen, Z.***, Gu, L. (accepted). “Case Study of Quantifying Energy Loss through Ceiling-Attic Recessed Lighting Fixtures through 3D Numerical Simulation”. *ASCE J. Archit. Eng.*
2. **Shen, Z.***, Hassani, A¹, Shi, Q. (in press) “Construction time-cost optimization using CobbDouglas production function and GA.” *J. of Civil Engineering and Management*.
3. Wang, E¹ *, **Shen, Z.**, Alpa, N., and Barry, N. (2015) “Benchmarking Energy Performance of Residential Buildings Using Two-stage Multifactor Data Envelopment Analysis with Degree-day Based Simple-normalization Approach”. *J. of Energy Conversion and Management*.
4. Wang, E¹., **Shen, Z.***, and Grosskopf, K. (2014) “Benchmarking energy performance of building envelopes through a selective residual-clustering approach using high dimensional dataset” *Journal of Energy and Buildings*. 75(), 10-22.
5. **Shen Z.*** and Wang, S.¹ (2014). “Investigating self-cooling effects of ventilated attics under different roof and ambient temperatures in summer.” *Journal of Civil Engineering and Management*. 20(5), 674-685
6. Erdogmus, E.*, **Shen, Z.**, and Schaap, B. (2013). ”Review of BIM in Small-Scale Sustainable Design by François Lévy.” *ASCE J. Archit. Eng.*, SPECIAL ISSUE: Emerging Trends of Sustainable Engineering, Design, and Construction, 217–218.

7. Wang, E.¹ and **Shen, Z.*** (2013) “A stochastic framework for estimating embodied energy in whole-building lifecycle assessments using a hybrid data quality indicator (DQI) and statistical approach.” *J. of Cleaner Production*. 43(), March 2013, 166-173
8. Wang, E.¹, and **Shen, Z.*** (2013). “Stochastic lifecycle residential energy consumption prediction considering longitudinal uncertainties.” *Journal of Civil Engineering and Management*
9. **Shen, Z.***, Jensen, W., Wentz, T., and Fischer, B. (2012). “Project-based sustainable building education utilizing 3D BIM models.” *Journal of Education Science*, 2(3), 136-149
10. Wang, S.¹, and **Shen, Z.*** (2012). “Impacts of ventilation ratio and vent balance on cooling load and airflow of naturally ventilated attics”, *Journal of Energies*, 5(9), 3218-3232.
11. Wang, E.¹ and **Shen, Z.***, Neal, J., Shi, J., Berryman, C., and Schwer, A. (2012). “An AHP-weighted Aggregated Data Quality Indicator (AWADQI) Approach for Estimating Embodied Energy of Building Materials”. *Journal of Life Cycle Assessment*. 17(6), 764-77.
12. Wang, S.¹, **Shen, Z.***, and Gu, L. (2012). “Numerical simulation of buoyancy-driven turbulent ventilation in attic space under winter conditions” *Journal of Energy and Buildings*. 47, 360–368.
13. Wang, S.¹, **Shen, Z.*** (2012) “Effects of roof pitch on airflow and heating load of sealed and vented attics for gable-roof residential buildings” *Journal of Sustainability*, 4(9), 1999-2021.
14. Wang, S.¹, **Shen, Z.***, Gu, L. (2012). “The Impact of Roof Pitch and Ceiling Insulation on Cooling Load of Naturally-Ventilated Attics.” *Journal of Energies*, 5(7), 2178-2196.
15. **Shen, Z.*** and Jensen, W. (2011). “Civil Engineers as Master Builders and the Professionalization of Construction.” *ASCE Leadership and Management in Engineering*, 11(2), 169-181. **2011 Best Feature Article Award** of the journal.
16. Jensen, W.*, Fischer, B. and **Shen, Z.** (2011). “Limited Scope Permitting for Time-Sensitive Project Delivery Systems.” *Journal of the American Professional Constructor*
17. **Shen, Z.***, Jensen, W., Berryman, C., and Zhu Y. (2011). “A Comparative Study of Activity-based Construction Labor Productivity in the US and China.” *ASCE Journal of Management in Engineering*, 27(2), 116-124.
18. **Shen, Z.***, Issa, R R A (2010) “Quantitative evaluation of the BIM-assisted construction detailed cost Estimates.” *Journal of Information Technology in Construction*, 15(), 234-257.
19. Jensen, W.*, **Shen, Z.**, and Kluver, C. (2009) “Measuring Performance of Innovative Pavement Features.” *Journal of the American Professional Constructor*
20. **Shen, Z.***, Issa, R.A., Gu, L. (2007). “Semantic 3D CAD and its applications in construction industry - An outlook of construction data visualization.” *Lecture Notes in Computer Science*, Vol. 4781(), 461-467.

3.2. Book Chapters

1. O'Brien, W., Issa R., **Shen, Z.**, and Xie, H. (2004), “Configurable environments: a vision for future project information technologies” in Kazi, S. (ed.) *Knowledge Management in the Construction Industry: A Socio-technical Perspective*, Idea Group Publishing, Hershey, PA 17033, USA, 339-358.

3.3. Refereed Papers in Conference Proceedings

1. Shang, Z.¹, Shen, Z (2016). “A Framework of Site Safety Assessment Model using Statistical 4D BIM-based Spatial-temporal Collision Detection” Construction Research Congress 2016. May 31- June 2, San Juan, Puerto Rico
2. Na, R.¹, Shang, Z.¹, Shen, Z. (2016). “Time-lapse of Cavity Brick Wall Temperature Profiles Using Infrared Thermography”. Associated Schools of Construction-Proceedings, April 13-16, Salt Lake City, UT
3. Luci, G.¹, and **Shen, Z.** (2015). “ A critical review of recent progress on construction workspace planning using BIM” The CIB W78 conference 2015, October 27th-29th 2015, Eindhoven, The Netherlands
4. Na¹ R., Lin¹, S., **Shen, Z.**, Gu, L. (2014). “Evaluating Energy Loss through Recessed Lighting Fixtures (RLF) in Residential Buildings through a Case Study”. Computing in Civil and Building Engineering, Orlando, FL
5. Shang¹ Z., **Shen, Z.** (2014). “Critical Success Factors (CSFs) of BIM Implementation for Collaboration based on System Analysis” Computing in Civil and Building Engineering, June 23-25, Orlando, FL
6. **Shen, Z.**, Grosskopf, K., Lin, S.¹ (2013). “Investigating the potential of self-cooling cavity wall system in reducing buildings’ summer peak cooling load.” Third Asian Conference on Sustainability, Energy & the Environment, June 6-9, Osaka, Japan.
7. Na, R.¹, Lin, S.¹, **Shen, Z.**, Gu, L. (2013). “Impact of air leakage through recessed lighting fixtures on the energy performance of residential buildings-a case study”. The 3rd International Conference Central Europe towards Sustainable Building (CESB13), June 26 – 28, Prague, Czech Republic.
8. Zhu, Y., **Shen, Z.** (2013). “Applying Structure, Behavior and Function (SBF) and Discrete Event Modeling to Construction Education: a Pilot Study” Associated Schools of Construction 49th Annual International Conference, April 10-13, 2013, San Luis Obispo, CA
9. Wang, E.¹, **Shen, Z.** (2012) “A Stochastic Markov Model for Projecting Life Cycle Building Energy”. 2012 International Conference on Construction and Real Estate Management, October 01- 02, Kansas City
10. **Shen, Z.**, Shamsi R.¹ and Hassani, A.¹ (2012). “A New Perspective for Construction Crashing Cost Analysis”. 2012 International Conference on Construction and Real Estate Management, October 01- 02, Kansas City
11. **Shen, Z.**, Jensen, W., Fischer, B. and Wentz, T. (2012). “Using project-based BIM to teach “what-if” scenarios in education of sustainable building design and construction” 2012 ASEE Annual Conference, June 9-13, San Antonio, TX
12. **Shen, Z.** and Jiang L.¹ (2012) “An augmented 3D mobile application for communication, collaboration and learning (CCL) of building systems”. 2012 ASCE International Workshop on Computing in Civil Engineering, June 17-20, Clearwater,
13. Wang, E.¹ and **Shen, Z.** (2012). “An Improved Uncertainty Estimating Model using Analytical Hierarchy Process (AHP) Weighting Process in Aggregating Data Quality Indicators (DQI) for Life Cycle Assessment (LCA) of Embodied-energy of Construction Materials”. Construction Research Congress 2012, May 22-24, Lafayette, IN, 1840-1849
14. Jiang, L.¹, **Shen, Z.**, Grosskopf, K., and Berryman, C. (2012). “A BIM based interactive 3D web environment for energy retrofit training”. Construction Research Congress 2012, May 22-24, Lafayette, IN, 1212-1221
15. M. Hu; T. Zhang; J. Stansbury; M. Dahab; J. Shi; J. Neal; M. Alahmad; C. Berryman; H. Li; A. Schwer; and **Shen, Z.** (2011). “Economic Input-Output Life Cycle Assessment of Water

- Reuse Strategies in Residential Buildings”. World Environmental and Water Resources Congress 2011, Palm Springs, California, United States, May 22-26, 1652-1662
16. Zhu, Y. and **Shen, Z.** (2011) “Learning Construction Complexity by Visualizing Cases”. Proceedings of the International Conference of Construction and Real Estate Management, Guangzhou, November
 17. **Shen, Z.** and Zhu Y. (2011). “Is visualization of engineering accidents or failure cases a good way to learn complex engineering systems?” the First World Engineering Education Flash Week, October, Lisbon, Portugal
 18. Derek Gardels, John Stansbury, Shannon Killion, Tian Zhang, Jill Neal, Mahmoud Alahmad, Charles Berryman, Siu Lau, Haorong Li, Avery Schwer, Jonathan Shi, **Shen, Z.** “Economic Input-Output Life Cycle Assessment of Water Reuse Strategies in Residential Buildings” ASCE World Environmental and Water Resources Congress 2011, Palm Springs, California, May 22-26, 1652-1662.
 19. **Shen, Z.**, and Zhu, Y. (2011). “Complex Engineering System Learning through Study of Engineering Cases using 3D Animations” ASEE 2011 Annual Conference and Exposition, June 26-29, 2011, Vancouver, Canada
 20. Wang, E.², and **Shen, Z.** (2011). “A Building LCA Case Study Using EcoTech and BIM Model.” Associated Schools of Construction 47th Annual International Conference, April 6-9, 2011, Omaha, NE
 21. Mahmoud Alahmad, Wisam Nader, Jill Neal, Jonathan Shi, Chuck Berryman, Y. Cho, Siu-Kit Lau, H. Li, Avery Schwer, **Shen, Z.**, John Stansbury, Tian Zhang, “Real Time Power Monitoring & integration with BIM,” in proceeding of 36th Annual conference of the IEEE Industrial Electronic Society, IECON’2010, 7-10 November, Phoenix, AZ, USA.
 22. M. A. Chaaban, M. Alahmad, J. Neal, J. Shi, C. Berryman, Y. Cho, S. Lau, H. Li, A. Schwer, **Shen, Z.**, J. Stansbury, T. Zhang (2010). “Adaptive Photovoltaic System,” in proceeding of 36th Annual conference of the IEEE Industrial Electronic Society, IECON’2010, 7-10 November, Phoenix, AZ, USA.
 23. Hsu, K., **Shen, Z.**, and Shi, J. (2009). “The idling cost rate of retaining equipment Proceedings”. 2009 Annual Conference - Canadian Society for Civil Engineering 3(0):1355-1363.
 24. **Shen, Z.**, Jensen, W., Berryman, C. and Shi, Q. (2009) “Activity-Based Construction Labor Productivity in China and the US.” Proceedings of the International Conference of Construction and Real Estate Management, Beijing, November 5-6
 25. **Shen Z.** and Issa R., (2006), "A Case Study of Construction Estimate Using IFCs Data Model", Proceedings of the 13th Rinker International Conference, Orlando, Florida, October.
 26. **Shen, Z.**, Issa, R., O'Brien, W., and Flood, I. (2005), “A Trade Construction Knowledge Module to Enable use of Design Component Data in Project Management”, Proceedings of ASCE the 2005 International Conference on Computing in Civil Engineering, Cancun, Mexico, July 12-15, 1-10
 27. **Shen, Z.**, Issa, R., O'Brien, W., and Flood, I. (2003). “A Model for Integrating Construction Design and Schedule Data”, ASCE Proceedings of the 4th Joint International Symposium on Information Technology In Civil Engineering, Nashville, Tennessee, November.
 28. **Shen, Z.**, Issa, R., O'Brien, W., and Flood, I. (2003). “A proposed design component and schedule data integration model for construction”, Proceedings of the 10th European Group for Intelligent Computing in Engineering Workshop, Delft, The Netherlands, July 3-4, 66-75.

4. Externally Funded Research Grants

	Project Title	Agency	Date	PI / Co-PI	Total	Contribution
1	3D Element-based Bridge Condition Rating System	NDOR	2013 - 2014	PI	46,091	41,482 90%
2	Case-based virtual simulation	NSF	2011 - 2014	PI	100,000	100,000 100%
3	IMPACT-Trade Adjustment Assistance	US DOL	2012-2014	Co-PI	725,844	208,876 28%
4	Building Energy Efficient Homes for America	US DOE -NREL	2011-2012	CO-PI	547,149	27,357 5%
5	Healthcare energy commissioning training	US DOE	2010 - 2013	PI	405,741	202,871 50%
6	Decentralized water/energy systems	US EPA	2009-2014	Co-PI	1,125,891	233,848 22%
7	Home Building Education Leadership Program	NAHB	2009 - 2012	Co-PI	294,106	29,411 10%
	Total				\$3,244,822	\$ 843,845

5. Teaching

5.1. Courses Taught

University of Nebraska-Lincoln (2007-present)

1. CNST 860 - Construction Visualization and Simulation
2. CNST 440 - Building Information Modeling II
3. CNST 378 - Construction Estimating I
4. CNST 379 - Construction Estimating II
5. CNST 225 - Introduction to Building Information Modeling

New York University (2014-2015)

1. CE 8313 - Engineering for Construction

2. CE 8303 - Information Systems in Construction
3. CE 8293 - Construction Operation Analysis using BIM
4. CE 2513 - Construction Materials and Methods

University of Wisconsin-Stout (2005-2007)

1. AEC 471 - Project Schedule and Construction Control
2. AEC 470 - Construction Estimating II
3. AEC 370 - Construction Estimating I
4. AEC 131 - Architectural Graphics

5.2. Undergraduate Independent Studies Supervised

1. "BIM modeling of the Church project", Andy Baruth, Spring 2011, 3 credit hours
2. "BIM application in hospital renovation schedule" Jonathan Garay, UCARE, Summer 2010
3. "The status of BIM application in JE Dunn projects", Joe Jelden, Summer 2008, 3 credit hours

5.3. Graduate Students Advised

PhD Students

1. Endong Wang, graduated in Fall 2012
2. Ri Na, expected graduation in Fall 2016
3. Zhexiong Shang, expected graduation in Fall 2017

Master of Science Students

1. Endong Wang, Fall 2010
2. Landu Jiang, Summer 2012
3. Vijay Kumar, graduated in Fall 2012
4. Ashkan Hassani, graduated Fall 2012
5. Na Ri, graduated in Spring 2013
6. Xiaoxiang Xue, graduated in Fall 2013
7. Lalitha Nandam, graduated in Summer 2015

6. Service

6.1. Journal Reviewer

1. Elsevier Journal of Energy and Buildings
2. Elsevier Journal of Cleaner Production
3. Elsevier Journal of Automation in Construction
4. Canadian Journal of Civil Engineering

5. Taylor & Francis Journal of Construction Management and Economics
6. Taylor & Francis International Journal of Sustainable Engineering
7. Taylor & Francis Journal of Building Performance Simulation
8. Taylor & Francis Journal of Sustainable Building Technology & Urban Development
9. Springer Journal of Visualization in Engineering
10. Springer Journal of Energy Efficiency
11. ASCE Journal of Computing in Civil Engineering
12. ASCE Journal of Construction Engineering and Management
13. ASCE Journal of Management in Engineering
14. ASCE Journal of Architectural Engineering
15. Wiley Journal of Computer Applications in Engineering Education

6.2. Invited Panelist/Reviewer for Research Grant Proposals

1. National Science Foundation CMMI panelist
2. National Science Foundation EEC ad-hoc reviewer
3. Maryland Industrial Partnerships Program proposal reviewer
4. Louisiana Board of Regents' Pilot Funding for New Research Program proposal reviewer

6.3. Invited Speaker/Presenter

1. "Building Information Modeling (BIM) – Research and Practice in the US", July 20th, 2015, Tongji University, Shanghai, China
2. "Impact of BIM (Building Information Modeling) on Construction Industry" CIE-USA/GNYC 2014 Annual Convention, December 6, 2014, New York City, NY
3. "Design-thinking, BIM-thinking, Lean-thinking". A Town and Gown Event - AIA New York Chapter, October 22, 2014, New York City, NY
4. "Construction Cost Trends & 3D Technology for Construction Estimates". 2009 TEA/TUG (Transportation Estimator Association) Conference and Workshop, September 23-25, Omaha, NE

6.4. International Conference Organizer

1. Co-Chair, TRB Workshop and Webinar: Information Standardization Practices for Digital Project Delivery, 2014
2. Technical Committee member of ASCE International Conference of Computing in Civil Engineering, Orlando, June 2014
3. Session Chair, International Conference on Construction and Real Estate Management (ICCREM), Kansas City, October 2012
4. Technical Committee member of ASCE International Conference of Computing in Civil Engineering, Clear Water, June 2012
5. Session Chair, ASCE International Conference of Computing in Civil Engineering, 2012
6. Technical Committee member, International Workshop of Computing in Civil Engineering, Miami, June 2011
7. Session Chair, International Conference on Construction and Real Estate Management (ICCREM), Beijing, November 2007

6.5. Professional Affiliations

1. Member of AIC (American Institute of Constructors) since 2005
2. Assoc. member of AIA (American Institute of Architects) since 2007
3. Member of ASCE TCCIT Visualization, Information Modeling, and Simulation (VIMS) Committee since 2011
4. Member of ASCE TCCIT Data Sensing and Analysis (DSA) Committee since 2011

6.6. Section 4.2 University Service

1. Member, The UNL Computational Service and Facilities Committee, 2010-2013
2. Member, The UNL Marshal Corps, 2011-2014
3. Member, The Chancellor's Commission on the Status of People of Color, 2009-2013
4. Member of the Graduate Committee (2009 - present)
5. Member of the Curriculum Committee (2007-present)
6. Department Chair/Faculty Search Committee (2008, 2009)

7. Awards

1. Recipient of UNL College of Engineering Faculty Service Award 2012
2. 2011 Best Feature Article Award of ASCE journal of Leadership and Management in Engineering
3. Alumni Pre-doctoral Fellow, the University of Florida, 1999-2003.

8. News and Media

1. "3-D Model Helps Manage Bridge Repairs", 2014-2015 Annual Report - University Of Nebraska-Lincoln, <http://research.unl.edu/annualreport/2015/3-d-model-helps-manage-bridge-repairs/>
2. "3-D model could help manage US bridge maintenance crisis", <http://phys.org/news/2015-02-d-bridge-maintenance-crisis.html>
3. "UNL professor develops big data tool for bridge inspections", http://journalstar.com/news/local/education/unl-professor-develops-big-data-tool-for-bridge-inspections/article_3eace6b7-d77e-5405-9791-2aa0a6a1ed54.html
4. "UNL professor develops 3-D tool to assess bridges". <https://www.youtube.com/watch?v=ZlGrLRHikq8>
6. "UNL Professor Develops 3-D Tool To Assess Bridges". <http://us.wow.com/video/518667598?ap=1>
7. "Tracking Bridge Health Using BIM". <https://sourceable.net/tracking-bridge-health-using-bim/#>
8. "BETTER DATA BUILDS BETTER BRIDGES". <http://engineering.nyu.edu/news/2014/10/09/better-data-builds-better-bridges>
9. "Making Headway on Bridge Repair and Maintenance". <http://www.artba.org/news/transportation-builder/making-headway-on-bridge-repair-and-maintenance/>

10. "Design-thinking, BIM-thinking, Lean-thinking". Dr. Shen was invited as a BIM panelist by New York City AIA.
<http://cfa.aiany.org/index.php?section=calendar&evtid=7566>