

MIN-WOOK KANG, Ph.D.

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EDUCATION

- May 2008 Ph.D. in Civil and Environmental Engineering (Transportation)
University of Maryland, College Park, Maryland USA
Dissertation Title: An Alignment Optimization Model for A Simple Highway Network
- Dec. 2007 M.S. in Civil and Environmental Engineering
University of Maryland, College Park, Maryland USA
Thesis Title: Highway Alignment Optimization through Feasible Gates
- Feb. 2003 M.S. in Transportation System Engineering with *first class honors*
Hanyang University, South Korea
Thesis Title: Development of Accident Prediction Models Based on Roadway Geometric Characteristics at Freeway Curve Sections
- Feb. 2001 B.S. in Transportation System Engineering with *top honors*
Hanyang University, South Korea

PROFESSIONAL EXPERIENCE

- Jan. 2010* Postdoctoral Research Associate
– Present Center of Advanced Transportation and Infrastructure Research
Morgan State University, Baltimore, Maryland USA
- Conduct research & development in a U.S. Federal Agency-funded research project, entitled “Software-Simulated Test and Evaluation of Military Missions Using Positioning and Routing Algorithm.”
 - Develop Artificial Intelligence (AI)-based military path finding algorithm
 - Develop simulation modules for military path optimization
 - Coordinate the development of computer-based programs
 - Propose, write, and submit research grant applications to Federal/State/Local agencies
 - Present and publish papers in international conferences
 - Publish work in relevant peer-reviewed journals
 - Teach graduate and undergraduate courses.
 - Supervise and train undergraduate and graduate students
- Oct. 2008* Senior Research Scientist, Technical Group Leader
– Present Amar Transportation Research & Consulting, Inc. at Severn, Maryland USA
- Conduct research & development in a U.S. National Science Foundation (NSF) - funded projects, entitled “A Multi-objective Bi-level Approach to Highway Alignment Optimization.”
 - Develop and improve effective highway alignment optimization approaches.
 - Supervise and manage the highway route optimization research team.
 - Communicate with management and user personnel to develop design standards.
 - Recommend methods of improving utilization of personnel, material and utilities.
 - Plan and establish sequence of operations to promote efficient utilization.
 - Propose, write, and submit research grant applications to Federal/State/Local agencies
 - Publish work in peer-reviewed journals and present in international conferences

- Jan. 2008*
– *Sep. 2008*
- Senior Transportation Engineer
Brudis & Associates Inc. at Columbia, Maryland USA
- Provided expert technical support services to the FHWA-Office of Safety
 - Conducted research on engineering countermeasure for reducing speeds
 - Investigated relations between speed and traffic accident in high-speed roads
 - Characterized aggressive driving, low speed drivers' impacts to the traffic stream
 - Evaluated existing speed limits by comparing operating speed, posted speed limit and design speed
 - Conducted a feasibility study for improving existing highways and traffic safety
 - Evaluated traffic and environmental impacts due to the improvement
 - Conduct a signal coordination for improving traffic operation of the corridors
 - Enhanced traffic safety by improving intersection control and geometric design
 - Developed effective traffic operation plans for enhancing safety in work-zones
 - Conducted detailed roadway designs
- Sep. 2007*
– *Jan. 2008*
- Graduate Research Assistant
National Center for Smart Growth Research and Education
University of Maryland, College Park, Maryland USA
- Developed a pedestrian demand model and crash analysis protocol
 - Modeled pedestrian travel activities and risk exposure using a GIS application
 - Published work in peer-reviewed journals and presented in international conferences
- Nov. 2003*
– *Jan. 2008*
- Graduate Research Assistant, pursuing M.S. and Ph.D. in
Department of Civil & Environmental Engineering
University of Maryland, College Park, Maryland USA
- Comprehensively researched on optimization methods of new highway selection and alternative evaluation for improving existing road systems, land-use, and environment.
 - Developed a bi-level model framework for optimizing highway alignments and impacts to the existing transportation and land-use systems.
 - Developed effective solution search methods for optimizing highway alignments
 - Developed a method for optimizing junction (intersection) points of new highways with existing roads
 - Tested and evaluated the capabilities of the highway alignment optimization through its application to real-highway projects
 - Developed a GIS-based model which automatically identifies road segments required for noise barrier installation
 - Analyzed seasonal variation of towboat operations in U.S. inland waterways for improving the U.S. navigation system simulation (NASS) model developed by the U.S. Army Corps of Engineers
 - Developed a hybrid methodology for freeway work-zone optimization with time constraints
 - Published work in peer-reviewed journals and presented in international conferences
- March 2001*
– *March 2003*
- Graduate Research Assistant, pursuing M.S. in
Department of Transportation System Engineering
Hanyang University, South Korea
- Developed accident estimation models based on roadway geometric characteristics for a safe road design
 - Developed a methodology which determines the length of highway horizontal curved sections for effective traffic accident estimation
 - Published work in peer-reviewed journals and presented in international conferences

PUBLICATIONS

1. Peer Reviewed Journal Articles

1. **Kang**, M.-W., M.K. Jha, and P. Schonfeld (under review), Applicability of Highway Alignment Optimization Models, Submitted for publication in the *Transportation Research Part C*.
2. **Kang**, M.-W., N. Yang, P. Schonfeld, and M.K. Jha (accepted for publication 2010), Bi-Level Highway Route Optimization, *Transportation Research Record: Journal of Transportation Research Board (forthcoming issue)*.
3. Jha, M.K. and M.-W. **Kang** (2009), GIS-Based Model for Highway Noise Analysis, *Journal of Infrastructure Systems-ASCE*, Vol. 15, No. 2, pp. 88-94
4. Yang, N., P. Schonfeld, and M.-W. **Kang** (2009), A Hybrid Methodology for Freeway Work Zone Optimization with Time Constraints, *Public Works Management & Policy*, Vol. 13, No. 3, pp. 253-264
5. **Kang**, M.-W., P. Schonfeld, and N. Yang (2009), Prescreening and Repairing in a Genetic Algorithm for Highway Alignment Optimization, *Computer-Aided Civil and Infrastructure Engineering*, Vol. 24, No. 2, pp. 109-119
6. **Kang**, M.-W., P. Schonfeld, and J-C. Jong (2007), Highway Alignment Optimization through Feasible Gates, *Journal of Advanced Transportation*, Vol. 41, No. 2, pp. 115-144
7. Jha, M.K., C. Davis, and M.-W. **Kang** (2007), State-of-the-art Intelligent Road Design Model with Genetic Algorithms, Geographic Information Systems, and CADD, *Advances in Transportation Studies-An International Journal, Section A&B*, 13, pp. 41-52
8. **Kang**, M.-W., B. Son, and T.W. Doh (2003), Development of A Dividing Method and Accident Estimation Models for Highway Horizontal Curve Sections Based on Geometric Characteristics, *Journal Eastern Asia Society for Transportation Studies*, Vol. 5, pp. 2695-2707
9. **Kang**, M.-W., T.W. Doh, and B. Son (2002), Fitting Distribution of Accident Frequency of Freeway Horizontal Curve Section & Development of Negative Binomial Regression Model, *Journal of Korean Society of Transportation*, Vol. 20, No. 7, pp. 197-204.
10. **Kang**, M.-W., B. Son, and T.W. Doh (2002), Development of Accident Prediction Models Based on Roadway Geometric Characteristics at Freeway Curve Sections, *Journal of The Korean Society of Civil Engineers*, Vol. 22, No. 6-D, pp.1077-1088.

2. Peer Reviewed Conference Proceedings

1. **Kang**, M.-W., M.K. Jha, N. Yang, and P. Schonfeld (under review), Bilevel Multiobjective Highway Alignment Optimization, Submitted for publication in *Proceedings of 19th International Symposium on Transportation and Traffic Theory (ISTTT'19)*
2. **Kang**, M.-W., M.K. Jha, and Karri, G., (2010) Determination of Robot Drop Locations for Military Path Planning Using GIS Application, In *Proceedings of the 4th WSEAS International Conference on Computer Engineering and Applications (CEA '10)*
3. Jha, M.K., G. Karri, and M.-W. **Kang**, (2010) A Military Path Planning Algorithm Using Visualization and Dynamic GIS, In *Proceedings of the 4th WSEAS International Conference on Computer Engineering and Applications (CEA '10)*
4. **Kang**, M.-W., N. Yang, P. Schonfeld, and M.K. Jha, (2010) Bi-Level Highway Route Optimization, In *Proceedings of the 89th Annual Meeting of Transportation Research Board of the National Academies*, Paper No. 10-1330 on CD-ROM.
5. Yang, N., M.-W. **Kang**, P. Schonfeld, and M.K. Jha, (2010) Multiple Objective Optimization of Highway Alignments Incorporating Preference Information, In *Proceedings of the 89th Annual Meeting of Transportation Research Board of the National Academies*, Paper No. 10-1128 on CD-ROM
6. Burnier, C., K.J. Clifton, S. Huang, M.-W. **Kang**, R. Schneider, (2008) A Meso-Scale Model of Pedestrian Demand, In *Proceedings of ACSP-AESOP 4th Joint Congress*

7. **Kang**, M.-W., M.K. Jha, and P. Schonfeld, (2006) 3D Highway Alignment Optimization for Brookeville Bypass, In *Proceedings of the 85th Annual Meeting of Transportation Research Board of the National Academies*, Paper No. 06-1023 on CD-ROM
8. **Kang**, M.-W., T. Kim, and T.W. Doh, (2005) A New Methodology to Determine Length of Highway Horizontal Curve Sections for Accident Estimation Model, In *Proceedings of the 84th Annual Meeting of Transportation Research Board of the National Academies*, Paper No. 05-2691 on CD-ROM
9. **Kang**, M.-W. and T.W. Doh, (2001) Optimization Strategy with External Metering on Urban Network: a Simulation Study, In *Proceedings of the 50th Korean Society of Civil Engineers Annual Conference*, pp. 131-134

3. Thesis, Dissertation, and Project Reports

1. **Kang**, M.-W., Yang, N., Schonfeld, P., and Jha, M.K. A MultiObjective Bilevel Approach to Highway Alignment Optimization. *Phase-IB Final Report NSF-STTR-074098*. Amar Transportation Research & Consulting, Prepared for U.S. National Science Foundation (NSF). July 2009.
2. **Kang**, M.-W., Yang, N., Schonfeld, P., and Jha, M.K. A MultiObjective Bilevel Approach to Highway Alignment Optimization. *Phase-I Final Report NSF-STTR-074098*. Amar Transportation Research & Consulting, Prepared for U.S. National Science Foundation (NSF). January 2009.
3. Giering, G., Xiao, Q., **Kang**, M.-W., and Warren, D. Engineering Countermeasures for Reducing Speeds. *A Desktop Reference of Potential Effectiveness*, Brudis & Associate, Inc (BAI), Prepared for FHWA Office of Safety, May 2009.
Available on-line at http://safety.fhwa.dot.gov/speedmgt/ref_mats/eng_count/
4. Giering, G. and **Kang**, M.-W. Feasibility Study for Widening of MD State Highway 272. *Final Report*, Brudis & Associate Inc (BAI), Prepared for Maryland State Highway Administration, Maryland Department of Transportation (MDOT), 2008
5. **Kang**, M.-W. An Alignment Optimization Model for A Simple Highway Network. *Ph.D. Dissertation, University of Maryland*, College Park, May 2009
6. Clifton, K.J., Burnier, C., Huang, S., **Kang**, M.-W., and Schneider, R. *Pedestrian Demand Model and Crash Analysis Protocol*. University of Maryland, Prepared for Office of Traffic and Safety, Maryland State Highway Administration, Maryland Department of Transportation, June 2008
7. Clifton, K.J., Burnier, C., Huang, S., **Kang**, M.-W., and Schneider, R. Pedestrian Demand Model for Evaluating Pedestrian Risk Exposure. *Final Report*, University of Maryland, Prepared for Office of Traffic and Safety, Maryland State Highway Administration, Maryland Department of Transportation, June 2008
8. **Kang**, M.-W., Schonfeld, P., Jha, M.K., and Karri, G. Improved Alignment Evaluation and Optimization Model. *Final Report MD-07-SP608B4P*, University of Maryland, Prepared for Maryland State Highway Administration, Maryland Department of Transportation, June 2007
9. **Kang**, M.-W. and P. Schonfeld, Prescreening and Repairing in Highway Alignment Optimization, TSC Report 2006-23, University of Maryland, College Park, August 2006
10. **Kang**, M.-W. and Schonfeld, P. Analysis of Towboat Operating Areas, *Final Report IWR Report 06-NETS-R-04*, University of Maryland, Prepared for the Institute for Water Resources (IWR), U.S. Army Corps of Engineers, March 2006.
Available at <http://www.nets.iwr.usace.army.mil/docs/TowboatOper/06-NETS-R-04.pdf>
11. **Kang**, M.-W., Jha, M.K., and Schonfeld, P. 3D Highway Alignment Optimization for Brookeville Bypass. *Final Report MD-04-XXX*, University of Maryland, Prepared for Maryland State Highway Administration, Maryland Department of Transportation, November 2004

12. **Kang**, M.-W. Development of Accident Prediction Models Based on Roadway Geometric Characteristics at Freeway Curve Sections. *Master's Thesis, Hanyang University*, Seoul Korea (South), February 2003.

4. Book Chapters

1. Jha, M.K., Djiki, B., **Kang**, M.-W., and Kim, E. (2009). Cost-Benefit Analysis in Applying Design Flexibility and Context Sensitive Solutions: A Case Study of Alternative Alignment of MD 43 Extension, in "*The Development of the Town and the Region: Past, Present and Future*," Dd Eleni Stamatiou (ed.).

5. News Report

1. **Kang**, M.-W. and Schonfeld, P. Towboat Analysis Finds Seasonality Is Prevalent and Important in the Upper Mississippi River and Affects Other Rivers. *Navigation Economic Technologies (NETS) News*, Vol. II, Issue 3, March 2006.
Available at http://www.nets.iwr.usace.army.mil/NETSnews/netsnews_v2_i3_0306.html

Conference Presentation

1. **Kang**, M.-W., M.K. Jha, and Karri, G. "Determination of Robot Drop Locations for Military Path Planning Using GIS Application." *4th WSEAS International Conference on Computer Engineering and Applications (CEA '10)*, Harvard University, Cambridge, Jan. 2010.
2. Jha, M.K., G. Karri, and M.-W. **Kang**. "A Military Path Planning Algorithm Using Visualization and Dynamic GIS." *4th WSEAS International Conference on Computer Engineering and Applications (CEA '10)*, Harvard University, Cambridge, Jan. 2010.
3. **Kang**, M.-W., N. Yang, P. Schonfeld, and M.K. Jha. "Bi-Level Highway Route Optimization." *89th Annual Meeting of Transportation Research Board of the National Academies*, January 2010, Washington DC.
4. Yang, N., M.-W. **Kang**, P. Schonfeld, and M.K. Jha "Multiple Objective Optimization of Highway Alignments Incorporating Preference Information." *89th Annual Meeting of Transportation Research Board of the National Academies*, January 2010, Washington DC.
5. Burnier, C., K.J. Clifton, S. Huang, M.-W. **Kang**, R. Schneider. "A Meso-Scale Model of Pedestrian Demand." *ACSP-AESOP 4th Joint Congress*, in Chicago, Illinois, 2008
6. Karri, G., M.K. Jha, M.-W. **Kang**, and P. Schonfeld. "Application of GIS in Highway Alignment Optimization." *TUgis07:20th Annual Geographic Information Science conference*, March 2007, Towson, Maryland
7. **Kang**, M.-W., M.K. Jha, and P. Schonfeld. "3D Highway Alignment Optimization for Brookeville Bypass." *85th Annual Meeting of Transportation Research Board of the National Academies*, January 2006, Washington DC.
8. **Kang**, M.-W., T. Kim, and T.W. Doh "A New Methodology to Determine Length of Highway Horizontal Curve Sections for Accident Estimation Model." *84th Annual Meeting of Transportation Research Board of the National Academies*, January 2005, Washington DC.
9. **Kang**, M.-W., B. Son, and T.W. Doh "Development of A Dividing Method and Accident Estimation Models for Highway Horizontal Curve Sections Based on Geometric Characteristics." *5th EASTS Conference*, November 2003, Fukuoka
10. **Kang**, M.-W. and T.W. Doh "Optimization Strategy with External Metering on Urban Network: a Simulation Study." *50th Korean Society of Civil Engineers Annual Conference*, 2001, Seoul South Korea

SCHOLARSHIPS, HONORS, & AWARDS

- 2005-2007 *Scholarship for Outstanding Graduate Students* at the Annual Meeting of Transportation Research Board of the National Academies, Korean Transportation Association in America (KOTAA)
- 2004 *2nd Place in Poster Competition* of University of Maryland section, 83th Annual Meeting of Transportation Research Board of the National Academies, Washington DC
- 2003-2005 *Korea Government Scholarship for Outstanding Graduate Students* studying at the top research institutes or graduate schools in the United States (\$60,000 for 2 years), National Research Foundation of Korea (NRF), South Korea
- 2001-2003 *Scholarships for Outstanding Graduate Students with Excellent GPA*, Hanyang University, South Korea
- 2 times of the 1st Prize with *top honors*, and
 - 2 times of the 2nd Prize with *first class honors*
- 2001 *3M Scholarship for Outstanding Students*, 3M Korea
- 1994-2000 *Scholarship for Outstanding Undergraduate Student with Excellent GPA*, Hanyang University, South Korea
- 4 times of the 1st Prize with *top honors*,
 - 2 times of the 2nd Prize with *first class honors*, and
 - 1 time of the 3rd Prize with *honors*

ACTIVITIES & VOLUNTEERING

- 2009 – Present Served as a reviewer of Artificial Intelligence and Advanced Computing Applications Committee (ABJ70) of *Transportation Research Board of the National Academies*
- 2003 – Present Active member of Korean Transportation Association in America (KOTAA)
- 2005 – Present Active member of Korean-American Scientists and Engineers Association (KSEA)
- Nov. 2009 Served as a conference coordinator for *WSEAS International Conferences on VIS'09, MACMESE'09, DNCOCO'09, SENSIG'09, NAHA'09, CGB '09, MATERIALS'09, and URES'09* at Baltimore, Maryland USA
- 2006 – 2008 Served as the secretary of Korean Transportation Association in America (KOTAA)
- 2003 – 2008 Was a student member of Institute of Transportation Engineers (ITE)

GRANTS (as PI or Co-PI)

- “*Experience-Based Advisory Systems for Ground Operations-Phase I & IB.*” Funding source: U.S. Department of Defense – Small Business Innovation Research (DoD-SBIR) FY2010. Total Project Cost: \$150,000 – Status: Pending
- “*Optimizing Locations for Rail Transit Routes and Stations-Phase I.*” Funding source: U.S. National Science Foundation – Small Business Technology Transfer (NSF-STTR). Total Project Cost: \$300,000 – Status: Pending

TECHNICAL SKILLS

- Computer Language: MATLAB, C, C++, Visual Basic and its Application
- GIS Software: ArcView GIS 3.X, ArcGIS 9.X (and other versions)
- CADD Software: Microstation, AutoCAD
- Transportation Software: CORSIM, Synchro, EMM/2, TRANSYT-7F
- Statistical Software: SPSS, STATA, LIMDEP
- Microsoft Office Tool: Excel, PowerPoint, Word, Access

LICENSE

- Engineer-in-Training (EIT), a professional engineering license issued by Maryland DLLR

ACADEMIC REFERENCES AND COLLABORATORS

- Paul Schonfeld (Professor at University of Maryland), pschon@eng.umd.edu
- Manoj Jha (Associate Professor at Morgan State University), mkjha@eng.morgan.edu
- Kelly Clifton (Associate Professor at Portland State University), kclifton@pdx.edu
- Greg L. Giering (Project Manager at BAI, Inc.), ggiering@brudis.com
- Jyh-Cherng Jong (Researcher at Sinotech Engineering, Taiwan), jcjong@sinotech.org.tw
- Tcheol-Woong Doh (Professor at Hanyang University, South Korea), tcheolung@hanyang.ac.kr
- Bongsoo Son (Associate Professor at Yonsei University, South Korea), sbs@yonsei.ac.kr
- Ning Yang (Ph.D. Candidate at University of Maryland), ningyang@umd.edu