

Taesik Lee

Department of Industrial & Systems Engineering
KAIST
291 Daehak-ro, Yuseong-gu
Daejeon, Korea 305-701
E-mail: taesik.lee@kaist.edu
Tel: (+82) 42-350-3126

(Last updated February 5, 2016)

Research Interests

Healthcare analytics
Disaster response system
Modeling & simulation of large-scale systems
Systems engineering
Decision making under uncertainty

Teaching Interests

Healthcare service delivery
Systems engineering
Project management
Simulation
Engineering design and communication

Education

B.S., Seoul National University, 1997 Seoul, Korea
Bachelor of Science in Mechanical Engineering

M.Sc., Massachusetts Institute of Technology, 1999 Cambridge, MA, USA
Master of Science in Mechanical Engineering. Thesis Title: *System Architecture concept in Axiomatic Design Theory: Hypotheses Generation & Case-study Validation*. Thesis Supervisor: Professor Nam P. Suh (Mechanical Engineering, MIT)

Ph.D., Massachusetts Institute of Technology, 2003 Cambridge, MA, USA
Doctor of Philosophy in Mechanical Engineering with concentration on systems design and engineering. Thesis Title: *Complexity Theory in Axiomatic Design*. Thesis Supervisor: Professor Nam P. Suh (Mechanical Engineering, MIT)

Honors & Award

Best Paper Award, The Korean Federation of Science and Technology Society, July, 2015 (Hwang, K., Lee, T. and Lee, H.R., “Simulation model for pandemic disease spreading by using census data,” published in *Journal of the Korean Institute of Industrial Engineers*, **40**(2):163–171, 2014.)

Pierskalla Award, INFORMS Health Applications Society, November, 2014. (Cho, S.H., Jang, H., Lee, T. and Turner, J.G., “Simultaneous location of trauma centers and helicopters for emergency medical service planning”)

Research Excellence Award, Dept. of Industrial & Systems Engineering, KAIST, December, 2014.

Best Paper Award at 2014 Korea Society for Simulation (KSS) Annual Conference, May, 2014. (Lee, H.J., Shin, K. and Lee, T., “Activity cancelling in P-ACD and its application to EMS system modeling”)

Academic Excellence Award, Dept. of Industrial & Systems Engineering, KAIST,

December, 2013.

Honorable mention in Best Paper Award at International Military Science and Technology Fair, 2013. (Nam, H., Shin, K. and Lee, T., “Communication and target acquisition modeling for a combat simulation in a network centric warfare environment”)

Best Session Paper Award at Korean Institute of Industrial Engineers (KIIE) Annual Conference, November, 2012. (Jang, H. and Lee, T., “Data aggregation method for capacitated covering problems with gradual coverage”)

Best Session Paper Award at KIIE Annual Conference, November, 2012. (Lee, Y.W. and Lee, T., “Metric to measure NCW effects by using Lanchester Model”)

Best Session Paper Award at KIIE Annual Conference, November, 2012. (Jang, H., Kim, Y. and Lee, T., “A framework for building a simulation model to study overcrowding in ED”)

Minister’s Recognition of Excellence, Ministry of Education, Science and Technology, February, December, 2011.

Research Excellence Award, Dept. of Industrial & Systems Engineering, KAIST, December, 2011.

Teaching Excellence Award, Dept. of Industrial & Systems Engineering, KAIST, December, 2010.

KAIST Grand Award for Creative Teaching, KAIST, February, 2009.

Professional Experience

Associate Professor September, 2012 – present
Department of Industrial & Systems Engineering, KAIST, Daejeon, Korea

Assistant Professor September, 2007 – August, 2012
Department of Industrial & Systems Engineering, KAIST, Daejeon, Korea

Assistant Director January, 2004 – September, 2007
Park Center for Complex Systems, MIT, Cambridge, MA, USA

Business Consultant June, 2004 – August, 2004
Boston Consulting Group, Seoul Office, Seoul, Korea

Postdoctoral Research Associate June, 2003 – December, 2003
Department of Mechanical Engineering, MIT, Cambridge, MA, USA

Research staff January, 1997 – June, 1997
Robotics and Hydraulics Division, KIST, Seoul, Korea

Journal Publication

1. “Optimal allocation of emergency medical resource under mass casualty incident: patient prioritization by column generation approach,” Sung, I. and Lee, T., *European Journal of Operations Research*, <http://dx.doi.org/10.1016/j.ejor.2016.01.028>, February 2016.
2. “Group decision procedure to model the dependency structure of complex systems: framework and case study for critical infrastructures,” Moon, J.R., Lee,

- D., Lee, T., and Ahn, J., *Systems Engineering*, to appear in *Systems Engineering*, <http://dx.doi.org/10.1002/sys.21306>, May 2015.
3. “Demand point aggregation method for covering problems with gradual coverage,” Jang, H. and Lee, T., *Computers and Operations Research*, **60**:1-13, 2015.
 4. “Combining syndromic surveillance and ILI data using particle filter for epidemic state estimation,” Lee, T. and Shin, H., to appear in *Flexible Services and Manufacturing Journal*, <http://dx.doi.org/10.1007/s10696-014-9204-0>, 2014.
 5. “Simultaneous location of trauma centers and helicopters for emergency medical service planning,” Cho, S.H., Jang, H., Lee, T. and Turner, J.G., *Operations Research*, **62**(4):751-771, 2014.
 6. “Priority assignment for emergency medical service provision in disaster by considering resource limitation,” Shin, K. and Lee, T., *Journal of the Korean Society of Hazard Mitigation*, **14**(2):159–168, 2014.
 7. “Simulation model for pandemic disease spreading by using census data,” Hwang, K., Lee, T. and Lee, H.R., *Journal of the Korean Institute of Industrial Engineers*, **40**(2):163–171, 2014.
 8. “Effectiveness of dispersed commute hours on infectious disease spread,” Lee, H-R. and Lee, T., *SCS M&S Magazine*, **4**(3), 2014.
 9. “Network-based metric for measuring combat effectiveness,” Lee, Y. and Lee, T., *Defence Science Journal*, **64**(2):115-122, 2014.
 10. “Axiomatic Design for eco-design: eAD+,” Morrison, J.R., Azhar, M., Lee, T. and Suh, H., *Journal of Engineering Design*, **24**(10), 2013.
 11. “Container loading and unloading scheduling for a Mobile Harbor system: a global and local search method,” Shin, K. and Lee, T., *Flexible Services and Manufacturing Journal*, **25**(4):557–575, 2013.
 12. “A scheduling problem for a novel container transport system: a case of Mobile Harbor operation schedule,” Nam, H. and Lee, T., *Flexible Services and Manufacturing Journal*, **25**(4):576–608, 2013.
 13. “Untangling the antecedents of initial trust in web-based health information: the roles of argument quality, source expertise, and user perceptions of information quality and risk,” Yi, M., Yoon, J.J., Lee, T., and Davis, J.M., *Decision Support Systems*, **55**(1):284–295, 2013.
 14. “Parameterized Activity Cycle Diagram and its application,” Choi, B.K., Kang, D., Lee, T., Jamjoom, A.A., and Abulkhair, M.F., *ACM Transactions on Modeling and Computer Simulation*, **23**(4):24:1–24:18, 2013.
 15. “Design of carrier-based offshore CCS system: plant location and fleet assignment,” Nam, H., Lee, T., Lee, J., Lee, J., and Chung, H., *International Journal of Greenhouse Gas Control*, **12**:220-230, 2013.
 16. “Scheduling algorithms for Mobile Harbor: an extended m-parallel machine problem,” Sung, I., Nam, H., and Lee, T., *International Journal of Industrial Engineering: Theory, Applications and Practice*, **20**(1-2):213-226, 2013.
 17. “Heuristics for locating two types of public healthcare facilities,” Kim, D-G., Kim, Y-D., and Lee, T., *Industrial Engineering & Management Systems*, **11**(2):202–214, 2012.
 18. “Review on modeling and simulation of large-scale and complex disaster scenarios,” Moon, I-C. and Lee, T., *SCS M&S Magazine*, **1**(9):11–17, 2012.
 19. “Product type and consumers’ perception of online consumer reviews,” Bae, S.Y. and Lee, T., *Electronic Markets*, **21**(4):255-266, 2011.

20. "Gender differences in consumers' perception of online consumer reviews," Bae, S.Y. and Lee, T., *Electronic Commerce Research*, **11**(2):201–214, 2011.
21. "Mathematical modeling and simulation to design two-tier ambulance system," Kim, T.H., Shin, S.D., Ahn, K.O., Lee, T., Jun, C.M., Cha, W.C., and Song, K.J., *Journal of the Korean Society of Emergency Medicine*, **22**(1):1–8, 2011.
22. "Managing system design process using Axiomatic Design: a case on KAIST Mobile Harbor project," Lee, T. and Park, G-J., *SAE International Journal of Materials and Manufacturing*, **3**(1):125–132, 2010.
23. "Design of an agent-based NCW modeling system," Park, S., Shin, H., Lee, T., and Choi, B., *Journal of the Korean Society for Simulation*, **19**(4):271-280, 2010.
24. "A model for the association of the call volume and unavailable for response interval on the delayed ambulance response for out-of-hospital cardiac arrest using a geographic information system," Ahn, K.O., Shin, S.D., Cha, W.C., Jun, C.M., Lee, T., and Pirrallo, R.G., *Prehospital Emergency Care*, **14**(4):469–476, 2010.
25. "A comprehensive study on patient flow improvement solutions and their implementation strategies in an outpatient system," Lee, Y. and Lee, T., *IE Interfaces*, **23**(1):1–11, 2010.
26. "Interactive system design using the complementarity of Axiomatic Design and fault tree analysis," Heo, G., Lee, T. and Do, S.-H., *Nuclear Engineering and Technology*, **39**(1):51–62, 2007.
27. "Optimal strategy for eliminating coupling terms from a design matrix," Lee, T., *Journal of Integrated Design & Process Science*, **10**(2):45–55, 2006.
28. "A function-based framework for understanding biological systems," Thomas, J.D., Lee, T., and Suh, N.P., *Annual Review of Biophysics and Biomolecular Structure*, **33**:75–93, 2003.

Journal Papers Under Review

1. "Finding Aximoatic Design," Lee, T. and Kim, S-G., *CIRP Annals Manufacturing Technology*, under review, 2016.
2. "Imperfect information in war-game simulation," Noh, H. and Lee, T., *Journal of KIMST*, under review, 2016.
3. "Study on the optimal deployment of the passive radar system for detecting small Unmanned Aerial Vehicles," Baek, I. and Lee, T., *Journal of KIMST*, under review, 2016.
4. "Measuring and Visualizing Combat Effectiveness in a Defensive Operation," Lee, Y. and Lee, T., *IEEE Transactions on SMC: Systems*, under review, 2016.

Working Paper

1. "Communication and target acquisition modeling for a combat simulation in network centric warfare environment," Shin, K., Nam, H., and Lee, T.
2. "Multi-period location problem – simulation iteration method," Jang, H. and Lee, T.
3. "Ambulance location problem with stochastic call arrivals under nearest-available dispatching policy," Sung, I. and Lee, T.
4. "Algorithm for patient admission decision at an emergency department in the event of disaster," Lee, H-R. and Lee, T., January 2015, manuscript in preparation.
5. "Monitoring cardiac condition using a wearable photoplethysmogram sensor device," Hwang, K., Bae, K., Jung Y., Choi, D., Shin, H., Moon, I-C., Lee, T., and Kim, H.

Conference Proceedings

1. “Axiomatic Design: 30 Years After,” Nordlund, M., Kim, S-G., Lee, T., *Proceedings of the 2015 International Mechanical Engineering Congress and Exposition*, Houston, TX, November 13-19, 2015.
2. “EMSSIM: Emergency Medical Service Simulator with Geographic and Medical Details,” Moon, I-C. et al., *Proceedings of the 2015 Winter Simulation Conference*, Huntington Beach, CA, December 2015.
3. “Markov Decision Process Model for Patient Admission Decision at an Emergency Department in Disasters,” Lee, H-R. and Lee, T., *Proceedings of the International Conference on Health Care Systems Engineering*, Lyon, France, May 27–29, 2015.
4. “Ambulance Location Problem with Stochastic Call Arrivals under Nearest Available Dispatching Policy,” Sung I. and Lee, T., *Proceedings of the International Conference on Health Care Systems Engineering*, Lyon, France, May 27–29, 2015.
5. “Epidemic state estimation with syndromic surveillance and ILI data using particle filter,” Lee, T. and Shin, H., *Proceedings of the International Conference on Health Care Systems Engineering*, Matta, A., Li, J., Sahin, E., Lanzarone, E., Fowler, J. (Eds.), Springer Proceedings in Mathematics & Statistics, **61**:227–241, 2014.
6. “Emergency Medical Service (EMS) system design evaluator,” Shin, K., Sung, I., and Lee, T., *Winter Simulation Conference*, Washington D.C., USA, December 8–11, 2013.
7. “Identifying superspreaders for epidemics using R0-adjusted network centrality,” Lee, T., Lee, H.R., and Hwang, K., *Winter Simulation Conference*, Washington D.C., USA, December 8–11, 2013.
8. “Communications modeling for a combat simulation in a network centric warfare environment,” Shin, K., Nam, H., and Lee, T., *Winter Simulation Conference*, Washington D.C., USA, December 8–11, 2013.
9. “A framework to model the interdependencies among critical infrastructure using the nominal group technique(NGT),” Moon, J., Lee, D., Lee, T., and Ahn, J., *Asia-Pacific Council on Systems Engineering Conference (APCOSEC)*, Yokohama, Japan, September 8–11, 2013.
10. “A measure to assess combat effectiveness using network representation,” Lee, Y. and Lee, T., *Summer Computer Simulation Conference*, Toronto, ON, Canada, July 7–10, 2013.
11. “Modeling requirement for an emergency medical service system design evaluator,” Sung, I. and Lee, T., *Winter Simulation Conference*, Berlin, Germany, December 9–12, 2012.
12. “A simulation-based iterative method for a trauma center – air ambulance location problem,” Lee, T., Jang, H., Cho, S-H., and Turner, J.G., *Winter Simulation Conference*, Berlin, Germany, December 9–12, 2012.
13. “Identifying critical infrastructure interdependencies for healthcare operations during extreme events,” Moon, J. and Lee, T., *2nd International Conference on Complex Sciences: Theory and Applications*, Santa Fe, NM, USA, December 5–7, 2012.
14. “Outpatients appointment scheduling with multi-doctor sharing resources,” Yun N., Jang, H. and Lee, T., *Winter Simulation Conference*, Baltimore, MD, USA, 2010.
15. “A study of scheduling algorithm for mobile harbor with an extended M-parallel machine problem,” Sung, I., Nam, H. and Lee, T., *International Conference on Logistics and Maritime Systems*, Busan, Korea, September 15–17, 2010.
16. “A GA-based approach for container unloading scheduling problem with mobile harbor’s stability constraint,” Shin, K. and Lee, T., *International Conference on Logistics and Maritime Systems*, Busan, Korea, September 15–17, 2010.

17. "A graph theory based method for functional decoupling of a design with complex interaction structure," Oh, H.L., Lee, T. and Lipowski, R., *ASME Conference*, Montreal, Canada, August 16–18, 2010.
18. "Capacitative deionization process with decoupled charging and discharging flow schemes," Barman, I., Lee, T., Heo, G. and Suh, N.P., *Proceedings of the Fifth International Conference on Axiomatic Design*, Lisbon, Portugal, March 25–27, 2009.
19. "Decoupling (un)loading operations from the land-sea interface in port service: the mobile floating port concept," Morrison, J.R. and Lee, T., *Proceedings of the Fifth International Conference on Axiomatic Design*, Lisbon, Portugal, March 25–27, 2009.
20. "Reducing emergency department overcrowding –five patient buffer concepts in comparison," Kolb, E., Peck, J.S., Schoening, S. and Lee, T., *Proceedings of the 40th Conference on Winter Simulation*, Orlando, FL, USA, December 7–10, 2008.
21. "Effect of coupling between emergency department and inpatient unit on the overcrowding in emergency department," Kolb, E., Lee, T. and Peck, J.S., *Proceedings of the 39th Conference on Winter Simulation*, Washington, D.C., December 9–12, 2007.
22. "Understanding the value of eliminating an off-diagonal term in a design matrix," Lee, T. and Jeziorek, P.N., *Proceedings of the Fourth International Conference on Axiomatic Design*, Florence, Italy, June 13–16, 2006.
23. "Evaluating functional commonality of system use-case scenarios – case study: planetary landing attenuation system," Bathurst, S., Jeziorek, P.N., Schrauth, A.J., Lee, T. and Suh, N.P., *Proceedings of the Fourth International Conference on Axiomatic Design*, Florence, Italy, June 13–16, 2006.
24. "A framework for evaluating high-level design alternatives," Jeziorek, P.N., Bjelkemyr, M., Deo, H.V., Peliks, B., Schrauth, A.J., Lee, T. and Suh, N.P., *Proceedings of PICMET'05*, Portland, OR, USA, August 1–4, 2005.
25. "A function-based approach to systems biology," Lee, T., Thomas, J.D. and Suh, N.P., *Proceedings of the Fifth International Conference on Complex Systems*, Boston, MA, June 25–30, 2004.
26. "An exploratory study of cost engineering in Axiomatic Design: creation of the cost model based on an FR-DP map," Lee, T. and Jeziorek, P., *Proceedings of the Third International Conference on Axiomatic Design*, Seoul, Korea, June 21–24, 2004.

Conference Presentations

1. "Measuring and Visualizing Combat Effectiveness," Lee, Y. and Lee, T., *2015 Winter Simulation Conference*, Huntington Beach, CA, December 6–9, 2015.
2. "Modeling and Simulation for Evaluating the C3 Structure for a NCW Mission Environment," Nam, H. and Lee, T., *2015 Winter Simulation Conference*, Huntington Beach, CA, December 6–9, 2015.
3. "Optimal resource allocation policy for emergency room under mass casualty incident," Lee, H-R. and Lee, T., *Korean Society for Industrial and Applied Mathematics (KSIAM) Annual Meeting*, November 21–22, 2014, Jeju, Korea.
4. "Framework to manipulate imperfect information for NCW simulation," Noh, H. and Lee, T., *ROK Army Conference on Modeling&Simulation*, November 18–19, 2014, Daejeon, Korea.
5. "Key issues in modeling NCW environment for combat simulation," Lee, T., *ROK Army Conference on Modeling&Simulation*, November 18–19, 2014, Daejeon, Korea.
6. "Cooperative MCLP for emergency department location problem, Lee, T. and Jang, H., *INFORMS Annual Meeting*, San Francisco, CA, Nov. 9-12, 2014.

7. "Simultaneous location of trauma centers and helicopters for emergency medical service planning, Cho, S-H., Jang, H., Lee, T., and Turner, J., *INFORMS Annual Meeting*, San Francisco, CA, Nov. 10, 2014.
8. "How modeling & simulation can enhance disaster response," Lee, T., *2014 Korean Operations Research and Management Science (KORMS) Annual Fall Conference*, November 1, 2014, Suwon, Korea.
9. "Study on NCW analysis M&S based on combat information process," Noh, H. and Lee, T., *2014 Korean Institute of Industrial Engineers(KIIE) Annual Spring Conference*, May 16–17, 2014, Busan, Korea.
10. "Markov Decision Process model for prioritizing and distributing patients to multiple-hospitals under mass casualty incident," Shin, K. and Lee, T., *2014 KIIE Annual Spring Conference*, May 16–17, 2014, Busan, Korea.
11. "Algorithm for ambulance scheduling under mass casualty incident," Sung, I. and Lee, T., *2014 KIIE Annual Spring Conference*, May 16–17, 2014, Busan, Korea.
12. "Optimal resource allocation policy for emergency room under mass casualty incident," Lee, H-R. and Lee, T., *2014 KIIE Annual Spring Conference*, May 16–17, 2014, Busan, Korea.
13. "Activity cancelling in P-ACD and its application to EMS system modeling," Lee, H-J. and Lee, T., *2014 Korea Society for Simulation (KSS) Annual Conference*, May 30, 2014, Daegu, Korea.
14. "A framework to identify interdependencies among infrastructures: capability-driven and demand-driven dependency," Moon, J. and Lee, T., *Health and Humanitarian Logistics Conference*, June 4–5, 2013, Kuala Lumpur, Malaysia.
15. "Communication modeling for war game simulation under Network Centric Warfare," Shin, K., Nam, H., Lee, Y. and Lee, T., *13th ADD Conference on Communications and Electronics*, November 2, 2012, Daejeon, Korea.
16. "Data aggregation method for capacitated covering problems with gradual coverage," Jang, H. and Lee, T., *2012 KIIE Annual Fall Conference*, November 2, 2012, Ansan, Korea.
17. "Metric to measure NCW effects by using Lanchester Model," Lee, Y. and Lee, T., *2012 KIIE Annual Fall Conference*, November 2, 2012, Ansan, Korea.
18. "A framework for building a simulation model to study overcrowding in ED," Jang, H., Lee, T., Kim, Y. and Cha, W.C., *2012 KIIE Annual Fall Conference*, November 2, 2012, Ansan, Korea.
19. "Identifying central nodes in pandemic disease spreading network," Hwang, K. and Lee, T., *2012 KIIE Annual Fall Conference*, November 2, 2012, Ansan, Korea.
20. "Design of ABMS-based simulation model for C4I in an NCW combat environment," Nam, H., Lee, Y., Baek, K., Shin, K. and Lee, T., *2012 KORMS Annual Fall Conference*, November 1, 2012, Seoul, Korea.
21. "A location problem for trauma centers and emergency medical service transportation resources," Turner, J.G., Cho, S.H., Lee, T. and Jang, H., *2012 INFORMS MSOM Conference*, June 17–19, 2012, New York, NY, USA.
22. "Simulation of Disaster Response System: A pilot study," Cha, W.C., Lee, T., Kim, G. and Kim, C.H., *NAEMSP Annual Meeting*, January 12–14, 2012, Tucson, AZ, USA.
23. "A location problem for trauma centers and EMS transportation resources," Lee, T., Jang, H., Cho, S-H. and Turner, J.G., *INFORMS Annual Meeting*, November 13–16, 2011, Charlotte, NC, USA.

24. "Ambulance relocation model design by optimization and simulation," Lee, T., Jang, H., Sung, I., Cha, W.C., and Shin, S.D., *NAEMSP Annual Meeting*, January 13–15, 2011, Bonita Spring, FL, USA.
25. "Understanding the determinants of trust in online health advice: a combinatory approach," Yoon, J., Yi, M., Lee, T. and Choi, J., *KMIS Fall Conference*, November 12, 2010, Seoul, Korea.
26. "Complex system design and axiomatic design," Lee, T., *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC&CIE)*, August 16–18, 2010, Montreal, Canada.
27. "How can online sellers use blogs as online consumer review sources?" Bae, S.Y., Hwang, S.H. and Lee, T., *KIIE/KORMS Annual Spring Joint Conference*, June 3–4, 2010, Jeju, Korea.
28. "Optimal container loading & unloading schedule with stability constraint: rule-based heuristic algorithm and local search method," Shin, K. and Lee, T., *KIIE/KORMS Annual Spring Joint Conference*, June 3–4, 2010, Jeju, Korea.
29. "An extended M-parallel machine problem with a limited machine capacity and interference between jobs," Sung, I., Nam, H. and Lee, T., *KIIE/KORMS Annual Spring Joint Conference*, June 3–4, 2010, Jeju, Korea.
30. "A study on the optimal number of emergency vehicles for development of pre-hospital emergency medical system," Lee, Y., Jang, H. and Lee, T., *KIIE/KORMS Annual Spring Joint Conference*, June 3–4, 2010, Jeju, Korea.
31. "A study on effectiveness of simulation optimization for outpatient appointment scheduling," Jang, H. and Lee, T., *KIIE/KORMS Annual Spring Joint Conference*, June 3–4, 2010, Jeju, Korea.
32. "Optimal planning for Mobile Harbor system operation," Lee, T., Sung I., Shin, K. and Nam, H., *Korea CAD/CAM Association Winter Conference*, January 27–28, 2010, Yongpyoung, Korea.
33. "Achieving design target in the presence of functional coupling," Lee, T. and Oh, H.L., *SAE World Congress*, April 16–20, 2007, Detroit, MI, USA.

Invited Seminars & Lectures

1. Seoul National University Medical School, "Modeling & Simulation for Disaster Response," Seoul, Korea, December 9, 2014.
2. Korea Air Force, "Overview on Modeling and Simulation," Gyeryong, Korea, November 7, 2014.
3. Korea University Medical School, "Role of computer simulation for designing disaster response system," Seoul, Korea, November 14, 2014.
4. Ewha Womans University Business School, "Business Analytics in healthcare service delivery," Seoul, Korea, May - June, 2013.
5. Samsung Corning Precision Materials, "What is good design?" Cheonan, Korea, July 19, 2012.
6. Seoul National University Emergency-Grand-Round (EGR) Seminar Series, "Role of Modeling & Simulation in EMS System Design," Seoul, Korea, December 20, 2011.
7. University of Bozen-Bolzano, Short Course on "Axiomatic Design for Complex Systems," Bolzano, Italy, May 25–28, 2011.
8. Ajou University Medical School, "Healthcare Delivery Engineering," Suwon, Korea, October 26, 2011.

9. Korea Armed Forces Nursing Academy, "Design Thinking," Nonsan, Korea, June 22, 2011.
10. 33rd Korean Medical Association(KMA) Conference, "Assessment on EMS system's disaster response using simulation, and proposal to improve its preparedness," Seoul, Korea, May 13, 2011.
11. Hanbat University, "Healthcare service delivery system," Daejeon, Korea, October 27, 2010.
12. Yonsei University Severance Hospital, "Design and operation of healthcare delivery system," Seoul, Korea, Oct 15, 2010.
13. Dankuk University Hospital, "Optimal System Design for Helicopter Ambulance System in Chung-cheong Province," Oct 6, 2010.
14. Korean Society of Emergency Medicine EMS Summer Symposium, "Optimization, Modeling & Simulation for Helicopter EMS system," Songdo, Kyungki, August 29, 2010.
15. MIT Professional Institute Summer Course, "Axiomatic Design for Complex Systems," Cambridge, MA, USA, June 2010.
16. Seoul National University Medical School, "Healthcare Delivery System: Current Problems & Perspective," Seoul, Korea, May 26, 2010.
17. MIT Laboratory for Manufacturing and Productivity Seminar Series, "A Missing Piece of Healthcare Puzzle: Healthcare Delivery Science/Engineering," Cambridge, MA, USA, April 12, 2010.
18. Gwangju Institute of Science and Technology, "Healthcare Delivery Science and Engineering," Gwangju, Korea, March 19, 2010.
19. KIIE CAD/CAM Annual Conference, "Fundamentals of Axiomatic Design," Pyungchang, Korea, January 27-28, 2010.
20. KAIST Graduate School of Science and Technology Policy, "IT-assisted Healthcare Service Delivery: Discussion on PHR and Health 2.0," Daejeon, Korea, November 16, 2009.
21. Gwangju Institute of Science and Technology, "Fundamentals and Principles of Axiomatic Design," Gwangju, Korea, October 20, 2009.
22. Korea Electronics and Telecommunication Research Institute (ETRI), "Tutorial on Axiomatic Design," Daejeon, Korea, August 17 - 18, 2009.
23. University of Bozen-Bolzano Design Innovation Workshop "Axiomatic Design for Complex Systems," Bolzano, Italy, June 22-24, 2009.
24. Pohang Science and Technology Institute (POSTECH), Department of Industrial & Management Engineering, "Healthcare Delivery Science: Breaking the Bottleneck in Healthcare," Pohang, Korea, March 20, 2009.
25. KIIE Service Science Forum, "Healthcare Delivery Science: Breaking the Bottleneck in Healthcare," Seoul, Korea, February 20, 2009.
26. Seoul National University Hospital Boondang, "Engineering Healthcare Delivery," Sungnam, January 4, 2008.
27. MIT Professional Institute Summer Course, "Axiomatic Design for Complex Systems," Cambridge, MA, USA, June 2008.
28. Texas Tech University, "Axiomatic Design and Complexity Theory," Lubbock, TX, USA, September, 2006.

29. Annual meeting of International Consortium for Complexity Research, "Functional periodicity in manufacturing systems and biological systems," Kananaskis, Canada, July 2006.
30. Annual meeting of Institute of Biological Engineering, "Periodicity in Cell Motility," Tucson, AZ, USA, March 2006.
31. Tutorial at the 3rd International Conference on Axiomatic Design, "Fundamentals of Axiomatic Design," Seoul, Korea, June 21–24, 2004.

Patents

1. System integration based on time-dependent complexity, US patent #US6,701,205 B2 (March 2, 2004)
2. Method and apparatus for permeating flow desalination, US patent #US20110247937 A1 (October 13, 2011)
3. Mobile portal crane and vessel with the crane, Korean patent #1011121580000 (January 27, 2012)
4. Hybrid mobile floating port, Korean patent #1011136930000 (February 1, 2012)
5. Method and apparatus for providing architectures formation in mobile harbor system, Korean patent #1010892780000 (November 28, 2011)
6. Method and apparatus for planning operation of mobile harbor crane, Korean patent #1010892850000 (November 28, 2011)
7. Hybrid mobile floating port, Korean patent #1010686630000 (September 22, 2011)
8. Hybrid mobile floating port, Korean patent #1010686620000 (September 22, 2011)
9. Method and apparatus for planning operation of mobile harbor system, Korean patent #1010623580000 (August 30, 2011)

Professional Service

1. Board member, Korean Institute of Industrial Engineers(KIIE), 2015 – present
2. Member recruiting&retention committee, INFORMS I-SIM, 2014 – present
3. Session Chair, 2014 INFORMS Annual Meeting, San Francisco, CA, USA
4. International Advisory Committee, 2014 International Conference on Axiomatic Design, Lisbon, Portugal
5. Program Committee, 2012 International Conference on Logistics and Maritime, Bremen, Germany
6. Editorial Board, Journal of Korea Society of Hospital Administration, 2008 - 2012
7. Session Organizing Committee, SAE World Congress 2007–2010, Detroit, USA
8. Co-chair, 2009 International Conference on Axiomatic Design, Lisbon, Portugal
9. Scientific Program Committee, 2006 International Conference on Axiomatic Design, Florence, Italy
10. Scientific Program Committee, 2004 International Conference on Axiomatic Design, Seoul, Korea