

Last Updated: Dec 2019

**Curriculum Vita**  
**TAEK M. KWON, Ph.D.**



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**EDUCATION**

- Ph.D. in Electrical Engineering, June 1988, Department of Electrical and Computer Engineering, Florida Institute of Technology, Melbourne, FL  
Dissertation: An Elementary Processor for a Digital Neural Computer.
- M.S. in Electrical Engineering, June 1985, Department of Electrical and Computer Engineering, Florida Institute of Technology, Melbourne, FL.  
Thesis: Consonant Recognition Using Linear Predictive Coding.

**PROFESSIONAL EXPERIENCE**

- September 2002 to present: **Professor**, Department of Electrical and Computer Engineering, University of Minnesota, Duluth.
- September 1995 to August 2002: **Associate Professor**, Department of Electrical and Computer Engineering, University of Minnesota, Duluth.
- 1997 to 2000: **Associate Editor** of the International Journal on Intelligent Automation and Soft Computing.
- September 1988 to August 1995: **Assistant Professor**, Department of Electrical and Computer Engineering, University of Minnesota, Duluth.
- March 1984 to August 1988: Teaching Assistant and Research Associate, Department of Electrical and Computer Engineering, Florida Institute of Technology.

## **RESEARCH INTERESTS**

Large scale transportation data archival/retrieval/analytics systems, intelligent sensor diagnostic algorithms, new optical/magnetometer based vehicle sensors, new technologies in weigh-in-motion (WIM) systems, remote renewable power stations, digital vehicle photography database and classification, wireless sensor networks.

## **PROFESSIONAL AFFILIATIONS AND ACTIVITIES**

Member of IEEE Computer Society  
Member of IEEE Intelligent Transportation Systems Society  
Member of IEEE Computational Intelligence Society  
Reviewer of IEEE Transactions on Signal Processing  
Reviewer of IEEE Transactions on Image Processing  
Reviewer of IEEE Transactions on Neural Networks  
Reviewer of IEEE Transactions on Circuits and Systems  
Reviewer of IEEE Transactions on Fuzzy Systems  
Reviewer of Transportation Research Board papers

## **AWARDS**

- Received a Special Recognition Award in the the Research Partnership Award 2013 for the impact of research in “Development of a Weigh-Pad-Based Portable Weigh-In-Motion System” Mn/DOT Partners involved in this research project include: Ben Timerson, Josh Kuhn, Mark Novak, Bruce Moir, MnDOT, April, 2013.
- Received a Research Partnership Award 2012 for research in “Advanced LED Warning Signs.” from the Center for Transportation Studies, University of Minnesota, Twin Cities, April 6, 2012. Mn/DOT Partners involved in this award include Brian Boder, St. Louis County, Rob Ege, MnDOT, Taek Kwon, University of Minnesota-Duluth, Victor Lund, St. Louis County, Alan Rindels, MnDOT, Mike Weiss, MnDOT, April 18, 2012.
- Received “Research Partnership Award” from the Center for Transportation Studies, University of Minnesota, Twin Cities, April 24, 2001. Mn/DOT Partners awarded include Ed Fleege, Curt Pepe, and Roberta Dwyer. The award plaque reads “To recognize research projects within the CTS program that result in significant impacts on transportation, and to reward teams of individuals who draw on the strengths of their diverse partnerships to achieve those results.”

- Received the Distinguished Achievement in Scientific Research Award from KSEA Florida Chapter, 1984.

## **US PATENTS**

- “Video Camera-Based Visibility Measurement system,” US Patent #7,016,0456, United States Patent and Trademark Office. March. 21, 2006. Continuation of prior patent and includes “Relative visibility measurement system”
- “Video Camera-Based Visibility Measurement system,” US Patent #6,853,453, United States Patent and Trademark Office. Feb. 8, 2005.

## **TEACHING**

### Courses regularly taught in recent years

EE 4321: Computer Networks  
 EE 4301: Computer Architecture  
 EE 5315: Multiprocessor-Based System Design  
 EE 5801: Introduction to Artificial Neural Networks

## **RESEARCH GRANTS**

- T.M. Kwon (PI), “Integrate RTMC Vehicle Length Classification to the Current Detector Volume Database,” MnDOT R&D Project, Contract 1003325, Work Order No. 125, 7/25/2019 – 1/31/2021. (\$26,641.00)
- T.M. Kwon (PI), “Improve Traffic Volume Estimates from MnDOT’s Regional Traffic Management Center,” MnDOT R&D Project, Contract No. 99008, Work Order No. 251, 6/22/2016 – 4/30/2020. (\$97,484.00)
- T.M. Kwon (PI), “Enhanced Capabilities of BullReporter and BullConverter,” MnDOT R&D Project, Contract No. 99008, Work Order No. 202, 5/14/2015 – 12/31/2017. (\$42,351.00)

- T.M. Kwon (PI), “Enhanced Capabilities for the Portable Weigh-in-Motion Systems,” MnDOT R&D Project, Contract No. 99008, Work Order No. 117, 4/22/2013 – 9/30/2015. (\$75,667)
- T.M. Kwon (PI), “Implementation of a Low-Cost Weigh-in-Motion System,” MnDOT R&D Project, Contract No. 99008, Work Order No. 124, Federal Project No. MPR-4(003), 6/14/2013 – 8/31/2015. (\$35,909)
- T.M. Kwon (PI), “New Export and Data Quality Functions in ATR-TDA and SC-TDA Software Applications for Use with Regional Transportation Management Center Sensor Data,” MnDOT, MnDOT Contract No. 99008, Work Order No. 77, 10/26/2012 – 12/31/2013. (\$7,220)
- T.M. Kwon (PI), “Advanced LED Warning Signs for Rural Intersections Powered By Renewable Energy, Phase II” Local Road Research Board (LRRB), MnDOT Contract No. 99008, Work Order No. 25, Dec. 14, 2011- Jun 30, 2014. (\$106,192)
- T.M. Kwon (PI), “New Reporting Capabilities for Continuous Vehicle Class and WIM Data,” Minnesota Department of Transportation, Contract No. 89261, Work Order No. 227, Federal Project No. MPR-0(003), 11/18/2010 – 6/30/2012. (\$35,268)
- T.M. Kwon (PI), “Migration of Automated Traffic Recorder and Short-Duration Traffic Data Warehouse at the University of Minnesota - Duluth Data Center,” MnDOT R&D Project, Contract No. 89261, Word Order No. 138, CFMS Contract # B25944, March 25, 2009 – May 15 2010. (\$15,869)
- T.M. Kwon (coPI) and Brent Auvermann (PI), “Visibility-Based Measurement of Fugitive Dust from Open-Lot Livestock Operations” National Research Initiative Competitive Grant Program (NRICGP), Awarded from Air Quality Program. With the Texas A&M University, Jan 2009-2011. (\$507,244)
- T.M. Kwon (PI), “Development of a Weigh-Pad Based Portable WIM System,” Minnesota Department of Transportation, Mn/DOT Contract No. 89261, Work Order No. 114, CFMS Contract No: B23013, Jan 2009 – Jan 2012. (\$160,000)
- T.M. Kwon (PI), “Advanced Dynamic LED Warning Signals for Rural Intersections Powered By Renewable Energy,” Local Road Research Board (LRRB), Contract No. 89261, Work Order No. 91, CFMS No. B11201, Feb. 14, 2008 - Feb 28, 2011. (\$125,476)
- T.M. Kwon (PI), “Development and Field Evaluation of Renewable Electric Power Station for Rural ITS Applications,” ENTERPRISE Multi-State Pool Fund, Fund-Area-Org 1677-173-6037, EGMSi Award # 20102255-A01, 2006-2008. (\$65,000)

- T.M. Kwon (PI), “Cellular Wireless Mesh Sensor Network for Comprehensive Spatial Traffic Movement Detection and Data Fusion,” Northland Advanced Transportation Systems Research Laboratories, 2006-2007. (\$104,000)
- T.M. Kwon (PI), “TDRL Projects: Data Support for Access to Destinations Project and Mn/DOT Wigh-in-Motion Archive Design,” Northland Advanced Transportation Systems Research Laboratories, 2006-2007. (\$73,135)
- T.M. Kwon (PI), “Development of Data Warehouse and Applications for Continuous Vehicle Class and Weigh-in-Motion (WIM) Data,” Minnesota Department of Transportation, Contract No. 89261, Work Order No. 41, CFMS Contract No. A95335, Nov 13 2006 – Jan. 31, 2008. (\$91,388)
- T.M. Kwon (PI), “Integrated TDRL Projects, DLL Traffic Software Development Package, Gravel-Road Traffic Counter, Intersection Movement Counter, and Hybrid Renewable Light Pole,” Northland Advanced Transportation Systems Research Laboratories, 2005-2006. (\$101,900)
- T.M. Kwon (PI), “Development of Eight-Channel WIM Analysis System Based on Analog WIM Signals,” Minnesota Department of Transportation, Contract No. 81655, Work Order no. 180, Dec 2005 – Dec 2007. (\$89,611)
- T.M. Kwon (PI), “Development of Transportation Data Center at TDRL: Archival of Large-Scaled Transportation Data, Analysis Tool Developments, and On-Line Data Support,” Northland Advanced Transportation Systems Research Laboratories, 2004-2005. (\$89,908)
- T.M. Kwon (PI), “Development of Transportation Data Center at TDRL: Archival of Large-Scaled Transportation Data, Analysis Tool Developments, and On-Line Data Support,” Northland Advanced Transportation Systems Research Laboratories, 2003-2004. (\$101,900)
- T.M. Kwon (PI), “Development of Transportation Data Center at TDRL: Archival of Large-Scaled Transportation Data, Analysis Tool Developments, and On-Line Data Support,” NATSRL, 2002-2003. (\$141,660)
- T.M. Kwon (PI), “Section Travel-Time Measurement Using Inductance Signatures of Loop Detectors,” Minnesota Department of Transportation, Contract No. 81655, Work Order No. 40, Nov 2003- Dec 2004. (\$51,000)
- T.M. Kwon, S. Burns, D.B. Crouch, D.A. Wyrick, J.P. Riehl, “Development of Northland Advanced Transportation Systems Research Lab,” 2001, USDOT TEA-21. (\$3,691,200)

- T.M. Kwon (PI), “TMC Traffic Data Automation for Mn/DOT’s Traffic Monitoring Program,” Guide Star Fund, Minnesota Department of Transportation, Contract No. 74708, Work Order No.150, Jan 2001 – Dec 2002. (\$79,819)
- T.M. Kwon (coPI), Max Donath (PI), Craig Shankwitz (coPI), “Intelligent Vehicle Initiative (IVI) - Specialty Vehicle Field Operational Test Program: Visibility Evaluation," FHWA, Mn/DOT (Funded by FHWA: \$3.89mil, Mn/DOT: \$0.97mil, Partners: \$1.69mil), Oct. 1, 1999 - Sep 2002. (\$6,550,000)
- T. M. Kwon (PI), “World Wide Web Based Pavement Condition Reporting System,” Minnesota Department of Transportation, Agreement No. 74708, Work Order No. 143, Sep. 1, 1999 – 2000. (\$44,094)
- T. M. Kwon (PI), “An Automatic Visibility Measurement System Based on Video Cameras: Phase II,” Center for Transportation Studies (USDOT), USDOT/DTR93-G-0017, Nov. 1999-Oct 30 2001. (\$95,550)
- T. M. Kwon (PI), “Development of Event-dialing/Auto-logging/Auto-paging System for Aitkinson Bridge Automated Deicing Spray,” *Instrumentation Grant*, Minnesota Department of Transportation, Summer, 1988, (\$3,460).
- T. M. Kwon (PI), “Integration of RTMS and SQL to Mn/DOT Next Generation R/WIS,” Minnesota Department of Transportation, Mn/DOT Agreement No., 74708, Work Order No. 101, (renewed contract: award # 81655, W.O. # 142), Dec. 20, 1998 -2000. (\$66,359)
- T. M. Kwon (PI), “Design and Construction of Testing Equipment for Load Dump, Inductive Load Switching, Alternator Field Decay, Mutual Coupling,” *Development Grant*, Hibbing Electronics, July 1996 – July 1997. (\$8,600)
- T. M. Kwon (PI), “Next Generation R/WIS: Video Clip Based Integrated Visual R/WIS,” Minnesota Department of Transportation, Mn/DOT Agreement No. 74708, Work Order No. 47 and Supplement No. 1, July 1997-1999. (\$54,000)
- T. M. Kwon (PI), “Automatic Low-Visibility Warning System Based on Video Cameras,” *Research Grant*, Mn/DOT Contract # 74708, Work Order No. 10, Minnesota Department of Transportation, Aug. 1996 - 1998. (\$28,191)
- T. M. Kwon (PI) and W. Marko, “WAN and LAN design and installation for Schott Power Corporation,” *Development Grant*, Schott Corporation, Dec. 95 - Mar. 96. (\$7,600)

- T. M. Kwon (PI) and M. G. Kang, "High Resolution Image Reconstruction for Honeywell," *Development Grant*, Honeywell Inc., Summer 1995. (\$6,854)
- T. M. Kwon (PI), "Intelligent Image Compression Based on Human Priority," *Grant-in-Aid of Research, Artistry, and Scholarship*, Graduate School, University of Minnesota, TC, submitted Mar. 6, 1995. (\$14,600)
- T. M. Kwon (co-PI), M. Zervakis, N. Shehadeh, "Design of a RWIS Measurement System for Mn/DOT," *Development Grant*, Minnesota Department of Transportation, June 1994 - Dec. 1995. (\$24,872)
- T. M. Kwon (co-PI), M. Zervakis, N. Shehadeh, M. Patyra, and P. Cheung, Jiann-Shiou Yang, "Characterization of Contaminants in Wastepaper Bales Based on Physical Characteristics of Contaminants," *Development Grant*, Superior Recycled Fiber Industries, June 1994-September 1994. (\$35,794)
- T. M. Kwon (PI), "Image Restoration Using a Complementary Neural Network," *Faculty Summer Research Fellowship*, under the research proposal No. 16038, Graduate School, University of Minnesota, TC, Summer-II, 1994. (\$4,800)
- T. M. Kwon (PI), "Professional Development Fund for UNIX Administration," *Faculty and Academic Staff Professional Development Fund*, Academic Administration, UMD, Dec. 1993. (\$1,300)
- T. Kwon (co-PI), C. Carroll, P. Cheung, L. Garber, M. Patyra, J. Yang, K. Yin, and M. Zervakis, "Wastepaper Classification and Processing," *Development Grant*, Superior Recycled Fiber Industries, May 25, 1993-Sep. 30, 1993. (\$71,000)
- T. M. Kwon (PI), "Development of a Self-Organizing and Trainable Fuzzy Logic Controller," *Grant-in-Aid of Research, Artistry, and Scholarship*, Graduate School, University of Minnesota, TC, under the research proposal #15463, Dec. 1, 1992 - June. 1, 1994. (\$11,197)
- T. M. Kwon (PI), "An Efficient Learning Algorithm for Gaussian Neural Networks," *Faculty Summer Research Fellowship*, Graduate School, University of Minnesota, TC, under the research proposal #15065, Summer 1992. (\$4,500)
- T. M. Kwon (PI), "Synthesis of Threshold Networks Using Convexity and Decomposition," *Grant-in-Aid of Research, Artistry, and Scholarship*, Graduate School, University of Minnesota, TC, under the research proposal #14305, Feb. 20, 1991 - Jun. 1992. (\$7,985)

- T. M. Kwon (PI), “A Stable Learning Algorithm in Feedforward Network for Binary Logic,” *Faculty Summer Research Fellowship*, Graduate School, University of Minnesota, TC, Summer 1990. (\$4,300)
- T. M. Kwon (PI), “Development of General Purpose Network Memory,” *Faculty Summer Research Fellowship*, College of Science and Engineering, University of Minnesota, Duluth, Summer 1989. (\$3,555)
- T. M. Kwon (PI), *Research Set-up Fund*, College of Science and Engineering, University of Minnesota, Duluth, Sep. 1989. (\$30,000)
- T. M. Kwon (PI) and C. R. Carroll, “Development and Construction of Monitoring and Control Instruments for Minnesota Power Co.,” *Development Grant*, Minnesota Power Co., Sep. 1989 - Sep. 1990. (\$12,500)

## PUBLICATIONS

### A. Research Reports, Books, Chapters

- T.M. Kwon, *Improve Traffic Volume Estimates from MnDOT’s Regional Traffic Management Center*, Final Report MnDOT 2020-02, Research Services and Library, Minnesota Department of Transportation, St. Paul, MN, February 2020. (102 pages)
- T.M. Kwon, *Implementation and Evaluation of a Low-Cost Weigh-In-Motion System*, Final Report MnDOT 2016-10, Research Services and Library, Minnesota Department of Transportation, St. Paul, MN, March 2016. (47 pages)
- T.M. Kwon, *Weigh-Pad-Based Portable Weigh-In-Motion System: User Manual*, Final Report MnDOT 2016-07, Research Services and Library, Minnesota Department of Transportation, St. Paul, MN, February 2016. (38 pages)
- T.M. Kwon, *Advanced LED Warning System For Rural Intersections: Phase 2 (ALERT-2)*, Final Report MnDOT 2014-10, Minnesota Department of Transportation, St. Paul, MN, February 2014. (96 pages)
- T.M. Kwon, *Development of a Weigh-Pad-Based Portable Weigh-In-Motion System*, Final Report Mn/DOT 2012-38, Minnesota Department of Transportation, St. Paul, MN, Dec 2012. (87 pages)



- T.M. Kwon, *Advanced LED Warning Signs for Rural Intersections Powered by Renewable Energy*, Minnesota Department of Transportation, Final Report Mn/DOT 2011-04, Dec 2010. (98 pages)
- T.M. Kwon, *Development of Data Warehouse and Applications for Continuous Vehicle Class and Weigh-in-Motion Data*, Minnesota Department of Transportation, Mn/DOT 2009-33, Oct 2009.
- T.M. Kwon and R. Weidemann, *Solar/Wind Hybrid Renewable Power Generator for a Dynamic Message Sign*, Multi-state ENTERPRISE Pooled Study. March 2009.
- T.M. Kwon, *Transportation Data Research Laboratory: Data Acquisition and Archiving of Large Scaled Transportation Data, Analysis Tool Developments, and On-Line Data Support*, CTS 09-07, ITS Institute, Center for Transportation Studies, Minneapolis, MN, March 9, 2009.
- T.M. Kwon and R. Weidemann, *Portable Cellular Wireless Mesh Sensor Network for Vehicle Tracking in an Intersection*, CTS 08-29, ITS Institute, Center for Transportation Studies, Minneapolis, MN, Dec 2008. (CTS Project # 2007039)
- T.M. Kwon, R. Weidemann, and D. Cinnamon, *TDRL Projects: Solar/Wind Hybrid Renewable Light Pole, Gravel-Road Traffic Counter, DLL-Based Traffic Software Development Kit*, CTS 08-21, ITS Institute, Center for Transportation Studies, Minneapolis, MN, Dec 2008. (CTS Project # 2007026)
- T.M. Kwon and S. Klar, *Access to Destinations: Computation of Travel Time Data for Access to Destination Studies*, Report # 2008-38 (Report #8 in the series), ITS Institute, Center for Transportation Studies, Minneapolis, MN, Nov 2008. (CTS Project # 2007037)
- T.M. Kwon and Bibhu Aryal, *Development of a PC-Based Eight-Channel WIM System*, Final Report, Mn/DOT 2007-45, Minnesota Department of Transportation, St. Paul, MN, Oct 2007
- T.M. Kwon, *Development of Efficient Data Archival/Retrieval Model for R/WIS, RTMS, and Loop Traffic Data*, Minnesota Department of Transportation, MN/RC-2006-22, 59 pages, June 2006. (C#:81655, WO#:142)
- T.M. Kwon, *Annual Report: Transportation Data Research Laboratory 2004*, CTS 06-03, 80 pages, April 2006. (CTS P# 2004023)
- T.M. Kwon, *Blind Deconvolution of Vehicle Inductance Signatures for Travel-Time Estimation*, Minnesota Department of Transportation, MN/RC-2006-06, 63 pages, Feb, 2006, (C# 81665, W.O. #40).

- T.M. Kwon, *Atmospheric Visibility Measurements Using Video Cameras: Relative Visibility*, Minnesota Department of Transportation and Center for Transportation, Report No. CTS 04-03, July, 2004.
- T.M. Kwon, *TMC Traffic Data Automation for Mn/DOT's Traffic Monitoring Program*, Minnesota Department of Transportation, Report No. MN-RC-02004-29, July, 2004.
- T.M. Kwon, *An Automatic Visibility Measurement System Based on Video Cameras*, Minnesota Department of Transportation, MN/RC-1998-25, Sep. 1998

## B. Journal Papers

- T.M. Kwon (Edited by Max Glaskin), "Danger Ahead," Rural ITS, *Traffic Technology International Magazine*, pp 46-47, [www.traffictechnologytoday.com](http://www.traffictechnologytoday.com), Oct/Nov, 2015.
- V. Lund, T.M. Kwon, and H. Ismail, "Development and evaluation of the ALERT system," *Institute of Transportation Engineering (ITE) Newsletter*, pp. 10-13, Vol 25, No. 1, September, 2014.
- V. Lund, T.M. Kwon, and H. Ismail, "Intersection Safety: High on ALERT system helps rural drivers make the right choices," *Roads & Bridges*, pp. S10-S12, June 2014. (web: <http://www.roadsbridges.com/june-2014>)
- V. Lund, T.M. Kwon, and H. Ismail, "Development and evaluation of the ALERT system," *Local Technical Assistance Program in Washington State (LTAP) Newsletter*, pp. 13-16, Issue 117, Quarter-2, 2014.
- T.M. Kwon, R. Weidemann and V. Lund, "Intersection Safety: All the stops," *Roads & Bridges*, pp. 48-53, Jan 2012.
- R. Weidemann, T.M. Kwon, V. Lund, and B. Boder, "Determining the effectiveness of an advanced LED warning system for rural intersections," *Transportation Research Record (TRR): Journal of the Transportation Research Board*, Vol. 2250/2011, pp. 25-31, ISSN: 0361-1981, DOT: 10.3141/2250-04, Dec 15, 2011.
- T.M. Kwon, "Beyond the loop: Researchers develop the next generation of vehicle detectors," *Sensor, Publication of the ITS Institute: Sensor*, University of Minnesota, Vol. 10, Issue 1, 2009.
- T.M. Kwon, N. Dhruv, S. Patwardhan, E. Kwon "Common Data Format Archiving of Large-Scale Intelligent Transportation Systems Data for Efficient Storage, Retrieval,

- and Portability,” *Journal of the Transportation Research Board: Transportation Research Record 1836*, pp. 111-117, National Academy of Science, 2003.
- T.M. Kwon and E. Fleege, “R/WIS Architecture for Integration and Expansion,” *Journal of the Transportation Research Board: Transportation Research Record 1700*, pp. 1-4, The National Research Council, The National Academies, 2000.
  - E.H. Feroz, T.M. Kwon, V.S. Pastena, and K. Park, “The Efficacy of Red Flags in Predicting the SEC's Targets: An Artificial Neural Network Approach,” *International Journal of Intelligent Systems in Accounting, Finance and Management*, vol. 9, No 3, pp. 145-157, July 2000.
  - T.M. Kwon and E. H. Feroz, “Self-Organizing Fuzzy and MLP Approaches to Detecting Fraudulent Financial Reporting,” *Soft Computing in Financial Engineering*, Springer-Verlag Co. Feb. 1999, pp. 499-506, (edited by R. Ribeiro, R.R. Yarger, H-J Zimmermann and J. Kacprzyk.).
  - T.M. Kwon, P. Agrawal, and D. Crouch, “A ROI Search Method for Still Images Based on Set Descriptions,” *International Journal on Multidimensional Systems and Signal Processing*, vol. 9, pp 93-106, 1998.
  - T. M. Kwon and E. Feroz, “A Multi-layered Perceptron Approach to Prediction of the SEC's Investigation Targets,” *IEEE Trans. on Neural Networks*, vol. 7, no. 5, pp. 1286 - 1290, Sep. 1996
  - T. M. Kwon and Hui Cheng, “Contrast Enhancement for Back-Propagation Network,” *IEEE Trans. on Neural Networks*, vol. 7, no. 2, pp. 515 - 524, Mar. 1996.
  - M. J. Patyra and T. M. Kwon, “A Degenerated Fuzzy-Number Processing System Based on Artificial Neural Networks,” *Information Science*, vol. 86, pp. 211-226, 1995.
  - M. E. Zervakis, T. M. Kwon, and J. Yang “Multiresolution Image Restoration in the Wavelet Domain,” *IEEE Trans. on Circuits and Systems II: Analog and Digital Signal Processing*, vol. 42, No. 9, pp. 578-591, Sep. 1995.
  - M. E. Zervakis, A. K. Katsaggelos, and T. M. Kwon, “A Class of Robust Entropic Functionals for the Enhancement of Images,” *IEEE Trans. on Image Processing*, vol. 4, No 6, pp. 752-773, June, 1995.
  - T. M. Kwon and M. E. Zervakis, “KWTN Networks and Their Applications,” *International Journal on Multidimensional Systems and Signal Processing*, vol. 6, pp. 331-344, 1995.

- T. M. Kwon, M. E. Zervakis, and A. N. Venetsanopoulos, “Design and Analysis of a Class of Self-Organizing and Trainable Fuzzy Controllers,” *Journal of Intelligent and Robotic Systems*, vol. 12, pp. 1-15, 1995.

### C. Conference Papers

- T.M. Kwon, “Thermal sensitivity of weigh-in-motion sensors and weight compensation,” *Transportation Research Board 96<sup>th</sup> Annual Meeting*, Paper #17-05310, Washington, D.C., submitted Aug. 1, 2016.
- T.M. Kwon, “Portable Weigh-in-Motion Systems Provides Low-Cost Screening,” in *Research Highlights, Accelerator*, MnDOT Research Services and Library, March-April 2015
- T.M. Kwon, “Building weigh-in-motion systems cheap,” in Session: Maximizing Resources in Your Program, *2015 National Rural ITS Conference*, Snowbird, Utah, Aug 9-12, 2015.
- Scott Petersen and T.M. Kwon, “Portable weigh-in-motion evaluation,” *26<sup>th</sup> Annual Transportation Research Conference*, St. Paul, River Center, MN, May 20-21, 2015.
- V. Lund, T.M. Kwon and H. Ismail, “Evaluation of the ALERT system, a rural intersection conflict warning system,” *Transportation Research Board 94<sup>th</sup> Annual Meeting*, Paper #15-1599, Session 593: Traffic Control Device Research, Washington, D.C., Jan 11-15, 2015.
- T.M. Kwon, “Weigh-pad-based portable weigh-in-motion system,” *Transportation Research Board 94<sup>th</sup> Annual Meeting*, Paper #15-4636, Session 376: Highway Traffic Monitoring Innovative and Advanced Methods and Technologies, Washington, D.C., Jan 11-15, 2015.
- T.M. Kwon, “Evaluation results of rural intersection conflict warning system, ALERT-2,” *25th Annual Transportation Research Conference*, St. Paul, River Center, MN, May 21-22, 2014.
- T.M. Kwon, “Development of a new rural intersection conflict warning system: ALERT project,” *2014 National Rural ITS Conference*, Branson, MO, Aug 24-27, 2014.
- T.M. Kwon and Scott Petersen, “Recent development of portable weigh-in-motion system studies at MnDOT,” *NATMEC 2014*, Chicago, IL, June 29- July 2, 2014.

- T.M. Kwon, “Warning system aims to alert drivers to potential crashes,” *Center for Transportation Studies, Catalyst*, p. 3, July 2013. [Research news]
- T.M. Kwon, “Development and evaluation of an advanced LED warning system for rural intersections: Phase-2 (ALERT-2),” 24th Annual Transportation Research Conference, St. Paul, River Center, May 22-23, 2013.
- S.L.M. Preece, B.W. Auvermann, T.M. Kwon, K.J. Bush, G.W. Marek, and K. Heflin, “Photometric prediction of ground-level PM10 concentrations measured by TEOMs downwind of a commercial cattle feedyard,” National Conference on Livestock and Poultry Environment Quality, Denver, CO, April 1-5, 2013.
- T.M. Kwon, “Development of a portable weigh-in-motion (WIM) system for rural highways,” Session: Pavement Tools, 23<sup>rd</sup> Annual Transportation Research Conference, St. Paul, River Center, May 23-24, 2012.
- T.M. Kwon, “Development of weigh-pad-based portable WIM system at Minnesota DOT,” *TRB Conference: North American Travel Monitoring Exposition and Conference (NATMEC 2012)*, June 4-7 2012, Dallas, TX.
- T.M. Kwon, “Signs use solar power to make rural intersections safer,” *Sensor*, ITS Institute, Vol 13, Issue 2, Summer 2011. (news)
- T.M. Kwon and V. Lund, “Minnesota research program uses solar-powered signs to make rural intersection safer,” Traffic Technology Today, News (on line <http://www.traffictotechnologytoday.com/news.php>), Aug. 3. 2011.
- T.M. Kwon, R. Weidemann, V. Lund, and B. Border, “Development and evaluation of an advanced LED warning system for rural intersections,” The 22<sup>nd</sup> Annual Transportation Research Conference, Minneapolis, MN, May 24-25, 2011, Sponsored by CTS.
- R. Weidemann, T.M. Kwon, V. Lund, and B. Border, “Determining the effectiveness of an advanced LED warning system for rural intersections,” *Transportation Research Board 90<sup>th</sup> Annual Meeting*, Washington D.C., Jan 23-27, 2011.
- Sakirkin, S. L. P., B. W. Auvermann, T.M. Kwon, G. W. Marek, K. Heflin, and K. J. Bush, “Photometric measurement of ground-level fugitive dust emissions from concentrated animal feeding operations,” *International Symposium on Air Quality and Manure Management for Agriculture*, September 13-16, 2010 in Dallas, Texas.
- Scott Klar, Taek Kwon, Brent Auvermann, “Development of low-cost dust generator, wireless test chamber, and wireless nephelometers for a feedlot dust study,”

*International Symposium on Air Quality and Manure Management for Agriculture*, September 13-16, 2010 in Dallas, Texas.

- T.M. Kwon, “Data warehouse integration of WIM and vehicle class data and application developments of MEPDG, adjustment factors, and reporting,” TRB Conference: *North American Travel Monitoring Exposition and Conference (NATMEC 2010)*, June 21-24 2010, Seattle, WA.
- T.M. Kwon, “Wireless mesh sensor network for vehicle turning movement counting in an intersection,” *National Rural ITS Conference*, Seaside, Oregon, August 23-27, 2009.
- T.M. Kwon and R. Weidemann, “Wireless mesh sensor network for vehicle tracking in an intersection,” 20<sup>th</sup> Annual Transportation Research Conference, Minneapolis, MN, May 19-20, 2009.
- T.M. Kwon, “Embedded Systems Design: V10.1 EDK with MicroBlaze,” Professor Seminar, Xilinx University Program, University of Wisconsin Madison, WI, Aug 14-15, 2008.
- T.M. Kwon, R. Weidemann, R. Sowder, K. Schmidt, R. Starr, “Solar/Wind Hybrid Renewable Energy Generator for Powering Rural Dynamic Message Signs,” 2008 *National Rural ITS Conference (NRITS08)*, Anchorage, Alaska, Sep 1-5, 2008.
- T.M. Kwon, Matthew Oman, Oscar Martinson, and Mark Novak, “Development of a PC-based weigh-in-motion system using off-the-shelf components,” *NATMEC 2008*, Washington D.C., June 2008, Aug 5-8, 2008.
- T.M. Kwon and R. Weidemann, “Experiments with solar/wind integrated renewable light pole,” 2007 National Rural ITS Conference (NRITS07), Traverse City, Michigan, Oct. 7-10, 2007.
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## **INVITED SEMINARS**

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- “A New Histogram Equalization Technique for a Back-Propagation Network,” 5th KSEA Midwest Region Meeting, University of Minnesota Twin Cities, May 21, 1994.
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- “Neural Networks and Pattern Classification,” Natural Resources Research Institute, April 20, 1993.