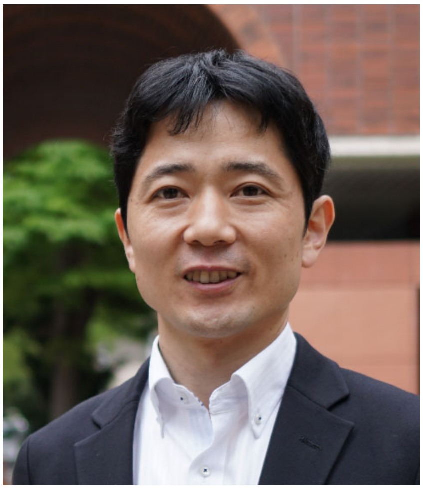
CURRICULUM VITAE



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ACADEMIC EDUCATION

BS The University of Tokyo, Tokyo, Japan
Civil Engineering, 2000

MS The University of Tokyo, Tokyo, Japan
Civil Engineering, 2002

Ph.D. University of Illinois at Urbana-Champaign, IL, USA
Civil and Environmental Engineering, 2007

AWARDS/FELLOWSHIPS

Fellowship Vodafone Graduate Fellowships, 2005/09-2006/07

Awards

2022 The Nishino Prize

2022 Best Teaching Award of Faculty of Engineering, the University of Tokyo

2021 Dean's award (Research) of Graduate School of Engineering, the University of Tokyo

2020 JSCE AI-Data-Science encouraging prize for the paper "Displacement estimation of nonlinear SDOF system under seismic excitation using Kalman filter for state-parameter estimation", Intelligence, Informatics and Infrastructure, 1(1), 2020.

2020 **ASCE Moisseiff Award** for the paper " "Reproduction of Cable-Stayed Bridge Seismic Responses Involving Tower–Girder Pounding and Damage Process Estimation for Large Earthquakes," Journal of Bridge Engineering, 2018

2019 **Prize for Science and Technology (Development Category), The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology** for "Development of a high accuracy road condition evaluation technique using a smartphone", Ministry of Education, Culture, Sports, Science and Technology, Japan.

2010 JSCE annual incentive award for the paper "Smart Sensor Middleware Development for Dense Structural Vibration Measurement," Journal of Japan Society of Civil Engineers, 2009.

2007 **ASCE Raymond C. Reese Research Prize** for the paper “Structural Identification of a Nonproportionally Damped System and Its Application to a Full-Scale Suspension Bridge,” Journal of Structural Engineering, October 2005

2003 **Tanaka Prize** for the paper, “Identification of Non-proportionally Damped System Using Ambient Vibration Measurement and its Application to a Suspension Bridge”, Journal of Structural Mechanics and Earthquake Engineering, Japan Society of Civil Engineers, 2002

EXPERIENCES

2002 **Research Assistant**, The University of Tokyo
2002-2005 **Research Assistant**, University of Illinois at Urbana-Champaign
2006-2009 **Junior Assistant Professor**, The University of Tokyo
2009-2014 **Senior Assistant Professor**, The University of Tokyo
2014-2022 **Associate Professor**, The University of Tokyo
2022-Present **Professor**, The University of Tokyo

2009- Committee on Data Informatics of the Asia-Pacific Network of Centers for Research in Smart Structures Technology

2010 National Organizing Committee and Conference Operations Committee, World Conference on Structural Control and Monitoring

2012- Program Committee , Sensors and Smart Structures Technologies for Civil, Mechanical,and Aerospace Systems, SPIE conference.

2015 Secretariat of the Scientific Committee, IABSE NARA 2015

2017 The 13th International Workshop on Advanced Smart Materials and Smart Structures Technology, Chair.

2015- Chairperson of Subcommittee for Performance-based Maintenance and Monitoring, Committee on Steel Structure, Japan Society of Civil Engineers.

2023- Secretary of the Organizing Committee and Scientific Committee of the IABSE Symposium Tokyo.

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https://www.scopus.com/authid/detail.uri?authorId=16402555500

PUBLICATION

Theses

Nagayama, T. (2007). "Structural Health Monitoring Using Smart Sensors," Doctoral dissertation, University of Illinois at Urbana-Champaign, 2007

Nagayama, T. (2002). "Development and performance evaluation of reflection free multi-directional wave generator," Master's thesis, Dept. of Civil Engineering, University of Tokyo, Japan (in Japanese).

Nagayama, T. (2000). "Structural identification of non-proportionally damped system and application to a long suspension bridge." Graduation thesis, Dept. of Civil Engineering, University of Tokyo, Japan (In Japanese).

Refereed Journal paper

Waqas, HA ., Su, D,. Nagayama ,T. (2024)"Identification of sliding plate bridge bearing malfunction and its effects on bridge structure under service conditions", *Journal of Civil Structural Health Monitoring,* 1-15.
https://link.springer.com/article/10.1007/s13349-024-00764-2

Kitahara,M., Kakiuchi,Y., Yang,Y., Nagayama ,T. (2024)"Adaptive Bayesian filter with data-driven sparse state space model for seismic response estimation", *Mechanical Systems and Signal Processing 208,* 111048.
https://www.sciencedirect.com/science/article/pii/S0888327023009561

Masuda,D.,Kitahara,M.,Inverse , Xue, K., Nagayama ,T., Su, D . (2024)"Inverse analysis of track profile using Half Car model and detection of unsupported sleepers considering the weight difference of train cars", *Journal of Japan Society of Civil Engineers,* 80 (15), 23-15012, (in Japanese).
https://doi.org/10.2208/jscejj.23-15012

Jirasek, R., Schauer, T., Su, D,. Nagayama ,T.(2023) "Experimental linear parameter-varying model identification of an elastic kinetic roof structure", *A Bleicher Engineering Structures* 297, 116986.
https://doi.org/10.1016/j.engstruct.2023.116986

Kawakatsu,., Aihara,., Takasu, A., Nagayama, T., Adachi, J.(2023) "Data-Driven Bridge Weigh-In-Motion", IEEE Sensors Journal, *Data-Driven Bridge Weigh-in-Motion | IEEE Journals & Magazine* | IEEE Xplore.
https://ieeexplore.ieee.org/abstract/document/10149192
Wang, H., Nagayama, T., Kawakatsu, T., Takasu A.(2023) "A data-driven approach for Bridge Weigh-In-Motion from impact acceleration responses at bridge joints, *Structural Control and Health Monitorin*.
https://doi.org/10.1155/2023/2287978

Kato,S.,Hisadumi,K.,Tominaga,T.,Yang,Y.,Nagayama,T.(2023) "Improvement of Thickness Estimation Model on a steel member using local vibration mode based

on data augmentation” , *Journal of Japan Society of Civil Engineers,*79 (11), 23-00112, (in Japanese).
https://doi.org/10.2208/jscejj.23-00112

Chen, J., Xue, K., Nagayama, T.(2023) “Vehicle trajectory estimation in GPS-blocked environments using inertial measurement units, estimated drive speed, and bidirectional Kalman filters”, *Structural Safety and Reliability: Proceedings of the Japan Conference on Structural Safety and Reliability (JCOSSAR) The 10th Japan Conference on Structural Safety and Reliability*,pp.23-30.
https://doi.org/10.60316/jcossar.10.0_23

Ogawa, D., Yang, Y., Nagayama, T., Kato, S., Hisazumi, K., Tominaga, T. (2023)“Load carrying capacity estimation of a belt conveyor support structure member based on cross-sectional vibration modes” , *Journal of Structural Engineering A*, *JSCE*，69，pp345-355.
https://doi.org/10.11532/structcivil.69A.345

Nakamura, T., Su, D., Nagayama, T.(2022) “Numerical investigation for uncertainty on seismic response of the pier considering material properties and curing conditions”, *Journal of Structural Engineering A, JSCE*，68，pp192-201, https://doi.org/10.11532/structcivil.68A.192

Ishihara, K., Yang, Y., Nagayama, T., Nakamura, T., Su, D.(2022) “Displacement response estimation based on measurement of acceleration response and nonlinear hysteresis model”, *Journal of Structural Engineering A,* JSCE，68，pp275-288, https://doi.org/10.11532/structcivil.68A.275

H Wang, T Nagayama.(2022) “ Response spectrum model of vehicle dynamic load for the prediction of bridge vibration level due to single vehicle-passage”, *Engineering Structures,* 260, 2022. https://doi.org/10.1016/j.engstruct. 114180

Yang, Y., Nagayama, T., Xue, K., Su, D.,(2021) “Displacement Estimation of a Nonlinear SDOF System under Seismic Excitation Using an Adaptive Kalman Filter”. *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering*, 8(1), 04021084. https://doi.org/10.1061/AJRUA6.0001213

Wang, H, Nagayama, T, Su, D.(2021) “Static and dynamic vehicle load identification with lane detection from measured bridge acceleration and inclination responses”, *Struct Control Health Monit*. 2021; 28(11):e2823.
https://doi.org/10.1002/stc.2823

Thiyagarajan, JS., Su, D., Tanaka, H., Zhao, B., Nagayama T.(2021) “Response based track profile estimation using observable train models with numerical and experimental validations”, *Smart Structures and Systems*, 27 (2), 267.

Yang, Y., Nagayama, T.,(2021) “Structural system identification under seismic excitation via Markov chain Monte Carlo method”. *Intelligence, Informatics and Infrastructure*, 2(2), 34–45. https://doi.org/10.11532/jsceiii.2.2_34.

Bao Y, Li J, Nagayama T, Xu Y, Spencer BF, Li H.(2021) “The 1st International Project Competition for Structural Health Monitoring (IPC-SHM, 2020): A summary and benchmark problem” *Structural Health Monitoring*. April 2021. doi:10.1177/14759217211006485

Kuno, H., Su, D., Nagayama, T. (2020) “Numerical investigation of unsupported sleeper detection method based on LSTM and Monte Carlo Dropout, *Intelligence, Informatics and Infrastructure,* 1(J1), pp.536-544 https://doi.org/10.11532/jsceiii.1.J1_536,

Yang, Y., NAGAYAMA, T., SU, D. (2020) “Displacement estimation of nonlinear SDOF system under seismic excitation using Kalman filter for state-parameter estimation, *Intelligence, Informatics and Infrastructure*, 1(1) pp.1-10, https://doi.org/10.11532/jsceiii.1.1_1,

Xue, K., Nagayama, T., Zhao, B. (2020) “Road profile estimation and half-car model identification through the automated processing of smartphone data”, *Mech. Syst. Signal Process*. 142, 106722. https://doi.org/10.1016/j.ymssp.2020.106722

Iida, Y., Nagayama, T., Xue, K., Su, D., Mizutani, T. (2020) “Numerical analysis on an active control of the train induced vibration of a railway bridge”, Journal of Structural Engineering A, JSCE, 66A, pp.376-387 (in Japanese).

Kato,S., Nagayama, T., Wang, H., Su, D., Nishio,M. (2020) “BWIM for ordinary road traffic on a continuous steel box girder bridge using wireless accelerometers” *Journal of Japan Society of Civil Engineers, Ser. A1, JSCE,*76 (2), pp. 356-375, (in Japanese).

Yang, Y., Nagayama, T., Xue, K. (2020) “Structure system estimation under seismic excitation with an adaptive extended Kalman filter”, *Journal of Sound and Vibration*, doi: https://doi.org/10.1016/j.jsv.2020.115690

Yamaguchi, T., Mizutani, T., Nagayama, T. (2020) “Mapping subsurface utility pipes by 3-D convolutional neural network and Kirchhoff migration using GPR images”, *IEEE Transactions on Geoscience and Remote Sensing*, doi: 10.1109/TGRS.2020.3030079

Wang, H., Nagayama, T., and Su, D. (2019) “Estimation of dynamic tire force by measurement of vehicle body responses with numerical and experimental validation”, *Mechanical Systems and Signal Processing*, 123, pp.369-385. https://doi.org/10.1016/j.ymssp.2019.01.017

Rana, S., Nagayama, T., Hisazumi, K., and Tominaga, T. (2019) "Damage identification of a belt conveyor support structure based on cross - sectional vibration characteristics" *Structural Control and Health Monitoring*; e2349. https://doi.org/10.1002/stc.2349

Yamaguchi, T., Nagayama, T., and Su, D. (2019) "Simple and accurate estimation of road profile by a Kalman filter using dynamic response of a bicycle" *Journal of Japan Society of Civil Engineers, Ser. E1,* pp. 17-26, (in Japanese).

Nagayama, T., Zhao, B.Y., and Xue, K. (2019) "Half car model identification and road profile estimation using vibration responses of a running vehicle" *Journal of Japan Society of Civil Engineers, Ser. E1,* pp. 1-16, (in Japanese).

Wang, H., Chen, J., Nagayama, T. (2019) "Parameter identification of spring-mass-damper model for bouncing people," *Journal of Sound and Vibration*, https://doi.org/10.1016/j.jsv.2019.05.034

Zhao, B., Nagayama, T., Xue, K. (2019) "Road profile estimation, and its numerical and experimental validation, by smartphone measurement of the dynamic responses of an ordinary vehicle," *Journal of Sound and Vibration*, https://doi.org/10.1016/j.jsv.2019.05.015

Fujino, Y., Siringoringo, D.M., Ikeda, Y., Nagayama, T., Mizutani, T. (2019) "Research and implementations of structural monitoring for bridges and buildings in Japan—a review", *Engineering*, https://doi.org/10.1016/j.eng.2019.09.006

Wang, H., Nagayama, T. (2019) "Two-step method for bridge modal mass identification using synchronously measured bridge and vehicle dynamic responses, " *International Journal of Lifecycle Performance Engineering,* Vol.3 No.3/4, pp.233 - 256, https://dx.doi.org/10.1504/IJLCPE.2019.103692

Kuleli M, Nagayama T. (2019) "A robust structural parameter estimation method using seismic response measurements", Struct Control Health Monit, 2019;e2475. https://doi.org/10.1002/stc.2475

Wang, H., Nagayama, T., Nakasuka, J., Zhao, B., and Su, D. (2018). "Extraction of bridge fundamental frequency from estimated vehicle excitation through a particle filter approach", *Journal of Sound and Vibration*, 428, pp.44–58. https://doi.org/10.1016/j.jsv.2018.04.030

Nakasuka, J., Wang, H., and Nagayama, T. (2018) "Extraction of the bridge natural frequency based on road profile estimation using vehicle response measurement", *Journal of Structural Engineering A, JSCE*, 64A, pp.325-332 (in Japanese).

Kato, S., Nagayama, T., Su, D. Hisazumi, K., and Tominaga, T. (2018) “Identification of a cross-sectional vibration mode of a belt conveyor support structure using acoustic loading”, *Journal of Structural Engineering A, JSCE*, 64A, pp.354-363 (in Japanese).

Takeda, T., Mizutani, T., Nagayama, T., and Fujino, Y. (2018) “Reproduction of Cable-Stayed Bridge Seismic Responses Involving Tower–Girder Pounding and Damage Process Estimation for Large Earthquakes”, *Journal of Bridge Engineering*, 24 (2), https://doi.org/10.1061/(ASCE)BE.1943-5592.0001336

Sun, Z. Nagayama, T., Nishio, M., and Fujino, Y. (2017). “Investigation on a curvature‐based damage detection method using displacement under moving vehicle.” *Structural Control and Health Monitoring,* e2044. https://doi.org/10.1002/stc.2044.

Zhao, B.Y., Nagayama, T., Toyoda, M., Makihata, N., Takahashi, M., and Ieiri, M. (2017) “Vehicle model calibration in the frequency domain and its application to large-scale IRI estimation”, *Journal of disaster research,* 12(3), pp. 446-455.

Nagayama, T, and Zhang C. (2017) “A numerical study on bridge deflection estimation using multi-channel acceleration measurement”, *Journal of Structural Engineering A, JSCE,* 63A, pp.209-215.

Nagayama, T., Reksowardojo, A.P., Su, D., and Mizutani, T. (2017) “Bridge natural frequency estimation by extracting the common vibration component from the responses of two vehicles”, *Engineering Structures*, 150, pp. 821-829. https://doi.org/10.1016/j.engstruct.2017.07.040

Wang, H., Nagayama, T., Zhao, B., and Su, D. (2017) “Identification of moving vehicle parameters using bridge responses and estimated bridge pavement roughness”, *Engineering Structures*, 153, pp.57-70. https://doi.org/10.1016/j.engstruct.2017.10.006

Suzuki, M., Nagayama, T., Ohara, S., and Morikawa, H. (2017) “Structural Monitoring Using Concurrent Transmission Flooding”, *the IEICE Transactions on Communications (Japanese Edition)*, J100-B,(12), pp952-960 (in Japanese).

Sugisaki, K., Ieiri, M., Kitahara, T., Nagayama, T., Kawamura, K., and Matsuda, H. (2017) “Monitoring Implementation Method for Infrastructure Management Innovation”, Journal of Japan Society of Civil Engineers, Ser. F3 (Civil Engineering Information Processing).

Zhao, B.Y., and Nagayama, T. (2017). “IRI estimation by the frequency domain analysis of vehicle dynamic responses.” *Procedia Engineering 188,* pp9-16. https://doi.org/10.1016/j.proeng.2017.04.451

Wang, H., Nagayama, T., and Su, D. (2017). "Vehicle parameter identification through particle filter using bridge responses and estimated profile." *Procedia Engineering 188,* pp64-71. https://doi.org/10.1016/j.proeng.2017.04.458

Kim, R. E., Li, J., Spencer, B.F. Jr., Nagayama, T., and Mechitov, K.A. (2016). "Synchronized sensing for wireless monitoring of large structures", *Smart Structures and Systems*, 18(5), pp 885-909

Sun, Z. Nagayama, T., Su, D., and Fujino, Y. (2016). "A damage detection algorithm utilizing dynamic displacement of bridge under moving vehicle." *Shock and Vibration*, 2016. https://doi.org/10.1155/2016/8454567.

Nakamura, N., Mizutani, T., and Nagayama, T. (2016). "Evaluation of Ultimate Strength of Railway Viaducts with Columns Reinforced with Spiral Rebars Using Nonlinear Dynamic Analysis." *Journal of Japan Society of Civil Engineers,* Ser. A1 (Structural Engineering & Earthquake Engineering (SE/EE)), *JSCE,*72 (4), I_213-I_223(in Japanese).

Sun, Z. Nagayama, T., and Fujino, Y. (2016). "Minimizing noise effect in curvature-based damage detection." *Journal of Civil Structural Health Monitoring*, 6(2), pp 255-264.

Narazaki,Y., Nagayama, T., and Su, D. (2016). "Development of a stiffness reduction evaluation method for RC columns during earthquakes based on acceleration measurements." *Journal of Structural Engineering. A, JSCE,* Vol. 62A, pp.212-225(in Japanese).

Nakasuka,J., Mizutani, T., Yamamoto,Y., Uchida,M., Su, D., Nagayama, T., and Fujino, Y. (2016). "Analysis of large amplitude vibration mechanism of Shinkansen PRC girder bridges and the long-term trend of their structural characteristics." *Journal of Structural Engineering. A, JSCE,* Vol. 62A, pp.42-49(in Japanese).

Su, D., Sano,S., Tanaka,H., Nagayama, T., and Mizutani, T. (2016). "Train localization by mutual correction of acceleration and interior sound." *Journal of Structural Engineering. A, JSCE,* Vol. 62A, pp.571-584(in Japanese).

Hornarbakhsh, A., Nagayama, T, Rana, S., Tominaga, T. Hisazumi, K., and Kanno, R. (2015). "Damage identification of belt conveyor support structure using periodic and isolated local vibration modes", *Smart Structures and Systems*, 15(3), pp.787-806.

Su, D., Shimada,Y., and Nagayama,T.(2015)."Stress evaluation and fatigue prediction of a steel girder bridge incorporating vehicle-bridge interaction analysis", *Journal of structural engineering.A,* 61A(0), pp.451-462(in Japanese).

Takeda,T., Nagayama,T., Mizutani,T.,. and Fujino,Y. (2015). "Seismic response characterization of a curved rigid-frame bridge using three dimensional nonlinear dynamic analysis, *Journal of Japan Society of Civil Engineers,* 71(4), I_641-I_649(in Japanese).

Mizutani,T., Inomata,K., Fujino,Y., and Nagayama,T.(2015). "Experimental Studies on Accurate Estimation of Rainfall Intensity from Electric Field Fluctuation of Surface Wave Mode around Leaky Coaxial Cable." *IEICE TRANSACTIONS on Communications,* B 98 (12), pp.1289-1297(in Japanese).

Sung, S., Park, J., Nagayama, T,. and Jung ,HJ. (2014). "A multi-scale sensing and diagnosis system combining accelerometers and gyroscopes for bridge health monitoring." *Smart Materials and Structures* 23 (1), 015005.

Zou, Z., Nagayama, T., and Fujino, Y. (2014). "Efficient multi-hop communication for static wireless sensor networks in the application to civil infrastructure monitoring." *Structural Control and Health Monitoring*, 21 (4), pp.603-619.

Mizutani,T., Inomata,K., Tsujita,W., Honda,R.,Fujino,Y., and Nagayama,T.(2014). "Real-Time Rainfall Detection by Analyzing Singularities of Communications Antenna Radiowave Fluctuations." *Journal of Japan Society Hydrology and Water Resources,* Vol. 27, No.5, pp.208-218(in Japanese).

Kuroiwa, T., Suzuki, M., Saruwatari, S., Nagayama, T., and Morikawa, H. (2013). "A multi-channel bulk data collection protocol for structural health monitoring using wireless sensor networks." *IEICE Transactions on Communications* (Japanese Edition), Vol.J96-B No.2 pp.114-123 (in Japanese).

Mizutani,T., Fujino,Y., Inomata,K., Tsujita,W., and Nagayama,T.(2013). "Trial of Rainfall Detection by Multi-fractal Analysis from Fluctuation of Electric Field around A Leaky Coaxial Cable", *Journal of Japan Society Hydrology and Water Resources,* 26(5), PP.258-268 (in Japanese).

Su, D., Miwa A., Fujino,Y., and Nagayama,T. (2013). "Measurement and analysis of traffic-induced response of viaducts in Tokyo Metropolitan Expressway." *Journal of Structural Engineering. A, JSCE* Vol. 59A, pp.281-289 (in Japanese).

Dinh, H.M., Nagayama, T., and Fujino, Y. (2012). "Structural parameter identification by use of additional known masses and its experimental application." *Structural Control and Health Monitoring,* 19(3), pp436-450.

Jo, H., Sim, S.-H., Nagayama, T., and Spencer, Jr., B. F. (2012). "Development and application of high sensitivity wireless smart sensors for decentralized stochastic modal identification." *Journal of Engineering Mechanics*, 138(6), pp.683–694.

Asakawa, H., Nagayama, T., Fujino, Y., Nishikawa, T., Akimoto, T., and Izumi, K. (2012). “Development of a simple pavement diagnostic system using dynamic responses of an ordinary vehicle.” *Journal of Japan Society of Civil Engineers, Ser. E1 (Pavement Engineering),* 68 (1) pp.20-31 (in Japanese).

Siringoringo, D., Fujino,Y., and Nagayama,T . (2011). “Dynamic characteristics of an overpass bridge in a full-scale destructive test.” *Journal of Engineering Mechanics*.https://ascelibrary.org/doi/10.1061/%28ASCE%29EM.1943-7889.0000280

Siringoringo, D., Fujino,Y., Nagayama,T., and Wenzel ,H. (2011). “Vibration Characteristics of an Overpass Bridge During Full-Scale Destructive Testing.” *Procedia Engineering 14,* pp.777-784.

Yun, G.J., Lee, S.-G., Carletta, J., and Nagayama, T. (2011). “Decentralized damage identification using wavelet signal analysis embedded on wireless smart sensors.” *Engineering Structures*, 33(7), pp.2162-2172.

Nagayama, T., Moinzadeh, P., Mechitov, K.A., Ushita, M., Makihata, N., Ieiri, M., Agha, G.A., Spencer Jr., B.F., Fujino, Y., and Seo, J. (2010). "Reliable multihop communication for structural health monitoring," *Special Issue of Smart Structures and Systems on Wireless Sensor Advances and Applications for Civil Infrastructure Monitoring*, 6(5).

Sim, S.-H., Spencer, Jr., B. F., and Nagayama, T. (2010). “ Multimetric sensing for structural damage detection.” *Journal of engineering mechanics* 137 (1), pp.22-30.

Rice, J., Mechitov, K., Sim, S.-H., Nagayama, T., Jang, S., Kim, R., Spencer, Jr., B. F., Agha, G., and Fujino, Y. (2010). “Flexible smart sensor framework for autonomous structural health monitoring.” *Special Issue of Smart Structures and Systems on Wireless Sensor Advances and Applications for Civil Infrastructure Monitoring*, 6(5).

Nagayama, T. Spencer, Jr., B. F., Mechitov, K. A., and Agha, G. A. (2009). “Middleware services for structural health monitoring using smart sensors.” *Smart Structures and Systems*, 5(2), pp.119-137.

Nagayama, T., Spencer, Jr., B. F., and Fujino, Y. (2009). “Smart sensor middleware development for dense structural vibration measurement.” *Journal of Structural Mechanics and Earthquake Engineering,* Japan Society of Civil Engineers, 65 (2) pp.523-535 (in Japanese).

.

Nagayama, T., Spencer, Jr., B. F., and Rice, J. A. (2009). “Autonomous decentralized structural health monitoring using smart sensors.” *Structural Control and Health Monitoring*, 16, pp.842-859.

Su, D., Fujino, Y., Nagayama, T., Hernandez, J., and Seki, M. (2009). “Vibration of reinforced concrete viaducts under high-speed train passage: measurement and prediction including train-viaduct interaction.” *Structure and Infrastructure Engineering*: *Maintenance, Management, Life-Cycle Design and Performance,* 1744-8980. https://doi.org/10.1080/15732470903068888

Cho, S., Yun, C.-B., Lynch, J. P., Zimmerman, A.T., Spencer, B. F., and Nagayama, T. (2008). “Smart wireless sensor technology for structural health monitoring of civil structures.” *International Journal of Steel Structures*, 8(3), pp.267-275.

Nagayama, T. Sim, S-H., Miyamori, Y., and Spencer, Jr., B. F. (2007). “Issues in structural health monitoring employing smart sensors.” Smart Structures and Systems, 3(3), pp. 299-320.

Ruiz-Sandoval, M. Nagayama, T., and Spencer, Jr., B. F. (2006). “Sensor development using Berkeley Mote platform.” *Journal of Earthquake Engineering*, 10(2), 289-309.

Nagayama, T., Abe, M., Fujino, Y., and Ikeda, K. (2005). “Structural identification of non-proportionally damped systems and its application to a full-scale suspension bridge.” *Journal of Structural Engineering*, 131(10), 1536-1545.

Nagayama, T., Abe, M., Fujino Y., and Ikeda, K. (2003). “Non-iterative identification of non-proportionally damped system from ambient vibration measurement and analysis of dynamic properties of a long span suspension bridge.” *Journal of Structural Mechanics and Earthquake Engineering, JSCE*, 745, 155-169 (in Japanese).

Abe, M., Fujino, Y., Nagayama, T., and Vu-Manh H. (2002). “A non-iterative approach in vibration-based damage detection for a damped mechanical system.” *Journal of Applied Mechanics, JSCE*, 5, 855-862 (in Japanese).

Nagayama, T., Sato, S., Isobe, M., and Tsuzuki, R. (2002). “Development and performance evaluation of reflection free multi-directional wave generator.” *Proc., 49th Coastal Engineering, JSCE*, 11-15 (in Japanese).

be, M., Fujino, Y., Nagayama, T., and Ikeda, K. (2001). “Identification of non-proportionally damped system using ambient vibration measurement and its application to a suspension bridge”, *Journal of Structural Mechanics and Earthquake Engineering, Japan Society of Civil Engineers*, 689, 261-274 (in Japanese).

Laboratory Report

Nagayama, T. and Spencer, Jr., B. F.(2007). “Structural health monitoring using smart sensors.” *Newmark Structural Engineering Laboratory Report Series 001* http://hdl.handle.net/2142/3521,

Conference paper

T. Kawakatsu, K. Aihara, A. Takasu, J. Adachi, H. Wang and T. Nagayama, "Fully-Neural Approach to Vehicle Weighing and Strain Prediction on Bridges Using Wireless Accelerometers," *ICASSP 2021 - 2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2021, pp. 8027-8031, doi: 10.1109/ICASSP39728.2021.9414433.

Nagayama, T., Kato, S., Wang, H., Su, D., and Nishio, M. (2019) “Automatic vehicle passage detection using wireless accelerometers toward Bridge Weigh-In-Motion”, *Proc. of ANCRiSST 2019*, Rome, Italy.

Xue, K., Nagayama, T., and Su, D. (2019) “Road condition evaluation using smartphone based sensing and data assimilation techniques”, *Proc. of 9th International Conference on Structural Health Monitoring of Intelligent Infrastructure, St. Loius, USA.*

Nagayama, T., Kato, S., Wang, H., Su, D., and Nishio, M. (2019) “Vehicle weight estimation using wireless accelerometers on a steel-box girder bridge,” *Proc. of 20th IABSE Congress,* pp.806-811.

Thiyagarajan,J.S., Su, D., Hirofumi Tanaka, H., Nagayama, T.(2018) “Track profile estimation using inverse analysis from multi body simulation approach”, *Proc. of 7th World Conference on Structural Control and Monitoring, Qingdao, China.*

Kuleli, M., and Nagayama, T. (2018). “Sensitivity of stiffness condition assessment results to unscented Kalman filter initial parameters”, *Proc. of 7th World Conference on Structural Control and Monitoring, Qingdao, China.*

Wang,H., and Nagayama, T. (2018). “Numerical study on dynamic tire force estimation from measurement of vehicle body responses”, *Proc. of 7th World Conference on Structural Control and Monitoring, Qingdao, China.*

Nagayama, T., Zhang, C., Su, D., and Lee, S. (2018) “Estimation of a continuous girder bridge’s deflection using acceleration and inclination measurement**”,** *Proc. of 7th World Conference on Structural Control and Monitoring, Qingdao, China.*

Waqas,H.A., Su, D., and Nagayama, T. (2018) “Feasibility of In Situ Displacement and Acceleration Measurements to identify Bridge Steel Bearing Malfunction” , *Proc. of 7th World Conference on Structural Control and Monitoring, Qingdao, China.*

Mizutani. T., Yamaguchi. T., Sakaguchi. A., Tarumi. M., and Nagayama, T. (2018) “Advancement and accuracy evaluation of automatic damage detection algorithm for concrete bridge deck by ground penetrating radar”, *Proc. of 7th World Conference on Structural Control and Monitoring, Qingdao, China.*

Zhao, B.Y., Nagayama, T., and Su, D. (2017). “Road Profile Evaluation Using Multiple Dynamic Responses from Ordinary Vehicles”, *Proc of ANCRiSST 2017,* Tokyo.

Takeda, T., Mizutani, T., Nagayama, T., and Fujino, Y. (2017). “Reproduction of Tower-girder Pounding Response and Local Damage Evaluation of Long-span Bridge Using Multi-scale Model”, *Proc of ANCRiSST 2017,* Tokyo.

Kato,S., Nagayama,., Su, D., Hisazumi, K., and Tominaga,T (2017). “Identification of a Cross-sectional Vibration Mode of a Belt Conveyor Structure Using Acoustic Loading”, *Proc of ANCRiSST 2017,* Tokyo.

Thiyagarajan,J.S., Su, D., Tanaka,H., Zhao, B.Y., and Nagayama,T. (2017). “Inverse Analysis for Rail Track Profile Estimation from In-service Railway Vehicle”, *Proc of ANCRiSST 2017,* Tokyo.

Wang,H., Nagayama, T., and Su. D. (2017). “A Bridge Weigh-in-Motion Method by Moving Force Identification Using Augmented Particle Filter from Measured Bridge Acceleration and Inclination Data”, *Proc of ANCRiSST 2017,* Tokyo.

Kuleli, M., and Nagayama, T. (2017). “Identification of the Rubber Bearing Characteristics Using Aftershock Response Measurement of the Kumamoto Earthquake”, *Proc of ANCRiSST 2017,* Tokyo.

Nagayama, T., Suzuki, M., Zhang, C., and Su. D. (2017). “High-accuracy Wireless Sensor Development and Its Application to Deflection Estimation of a Steel Box Girder Bridge”, *Proc of ANCRiSST 2017,* Tokyo.

Su, D., Nagayama, T., Nakazawa, J., and Wakisaka, D. (2017). “Vibration Characteristics of a Long Span Cable-Stayed Bridge Identified by Multipoint Wireless Sensors Measurement”, *Proc of ANCRiSST 2017,* Tokyo.

Su, D., E, Jonathan., and Nagayama, T. (2017). “Load Rating of a Steel Bridge by Inclination Measurement”, *IABSE Symposium Report 109(62),*pp. 639-646.

Nagayama, T. and Zhang, C. (2017). “Deflection estimation of a steel box girder bridge using multi-channel acceleration measurement”, *IABSE Symposium Report 109 (41),* pp.1656-1663.

Makihata, N. Zhao, B., Toyoda, M., Takahashi, M, Ieiri, M., and Nagayama, T. (2016). “Large-scale road surface evaluation using dynamic responses of commercial vehicles”, *Proceedings of the International Conference on Smart Infrastructure and Construction*, Cambridge, UK. 27–29 June 2016.

Suzuki, M., Jinno, K., Tashiro, Y., Katsumata, Y., Liao, C.H., Nagayama, T., Makihata, N., Takahashi, M., Ieiri, M., and Morikawa, H. (2016), “Development and field experiment of routing-free multi-hop wireless sensor networks for structural monitoring”, *Proceedings of the International Conference on Smart Infrastructure and Construction*, Cambridge, UK. 27–29 June 2016.

Thiyagarajan,J.S., Zhao, B.Y., Su, D., and Nagayama, T. (2016), “An observability analysis for profile estimation through vehicle response measurement”, *Proceedings of the International Conference on Smart Infrastructure and Construction*, Cambridge, UK. 27–29 June 2016.

Zhao, B., Nagayama, T., Makihata, N., Toyoda, M., Takahashi, M., and Ieiri, M.(2016). “IRI estimation by the frequency domain analysis of vehicle dynamic responses and its large-scale application.” *The 13th International Conference on Mobile and Ubiquitous Systems: Computing Networking and Services,* pp.41-46.

Faheem, M., Matsumoto, Y., Nohmi, H., Sakai, S., Su, D., and Nagayama, T. (2016). “Comparison of radar based displacement measurement systems with conventional systems in vibration measurements at a cable stayed bridge.” *11th German-Japan Bridge Symposium,* Osaka, Japan; 08/2016.

Nohmi, H., Shirai, I., Kujubu, O., Nohmi, A., Sakai, S., Matsumoto, Y., Su, D., Nagayama, T. (2016) “Development of microwave vibration imaging radar (VirA).” *11th German-Japan Bridge Symposium,* Osaka, Japan; 08/2016.

Su, D., Fujino, Y., Shimada, Y., and Nagayama, T. (2016). ”Stress evaluation and fatigue prediction in a steel girder bridge.” *IABSE Symposium Report 106 (11),* pp.256-263.

Sun, Z., Nagayama, T., and Fujino, Y. (2016). “Incorporating noise effect in damage detection with a curvature based method.” *IABSE Symposium Report 106 (8),* pp.506-513.

Kuleli, M., Nagayama, T., and Su. D. (2016). “Vibration monitoring of expressway viaducts and comparative analysis of their dynamic characteristics.” *Mechanics of Structures and Materials: Advancements and Challenges,* pp.1469-1476.

Nagayama, T., and Zhang, C. (2016). "Bridge deflection estimation using multi-channel acceleration measurement." *Mechanics of Structures and Materials: Advancements and Challenges,* pp.1463-1468.
Nakasuka, J., Mizutani, T., Yamamoto, Y., Uchida, M., Su, D., and Nagayama, T. (2015). "Analysis of large amplitude vibration mechanism of high-speed train prc girder bridges based on vibration measurement." in Proceedings of The Joint 6th International Conference on Advances in Experimental Structural Engineering (6AESE) and 11th International Workshop on Advanced Smart Materials and Smart Structures Technology (11ANCRiSST), Champaign, United States.

Takeda, T., Nagayama, T., Mizutani,T., and Fujino, Y. (2015). "Seismic Performance Evaluation of a Curved Rigid-frame Bridge Using Threedimensional Dynamic Analysis." *IABSE Symposium Report 104 (20),* pp.1-8.

Nagayama, T., Suzuki, M., Narazaki,Y., Morikawa, H. and Fujino, Y. (2015). "Vibration measurement with routing-free multihop wireless sensor networks and its application to a long-span bridge." *IABSE Symposium Report 104 (6),* pp.1-8.

Nagayama, T., Reksowardojo, AP., Su, D. and Zhang, C. (2015). "Bridge Natural Frequency Estimation by Extracting the Common Vibration Component from the Responses of Two Vehicles.", *Proc of ANCRiSST 2015*, Urbana, Illinois USA.

Su, D., Sano. S., Nagayama, T., Tanaka, H., and Mizutani,T.(2015) "Train Localization by Mutual Correction of Acceleration and Interior Sound", *Proc of ANCRiSST 2015*, Urbana, Illinois USA.

Nagayama, T., Kubota, Y., and Kurata, M. (2015). "IABSE Conference Nara, 2015-Report Elegance in Structures." *STRUCTURAL ENGINEERING INTERNATIONAL*, 25(3), pp.358-358.

Nagayama, T., Suzuki, M., Narazaki,Y., Morikawa, H. and Fujino, Y. (2014). "Long-span bridge vibration measurements using multihop wireless sensor networks." *Proc. of 6th World Conference on Structural Control and Monitoring,* Barcelona, Spain.

Nagayama, T., Miyajima, A., Kimura, S., Shimada, Y., and Fujino, Y. (2013). "Road condition evaluation using the vibration response of ordinary vehicles and synchronously recorded movies," *Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2013, Proc. of SPIE volume 8692*, San Diego, USA.

Nagayama, T., Honarbakhsh, A., Fujino, Y., Hisazumi, K., and Tominaga, T.(2013). "Damage identification of a belt-conveyor support structure using local vibration modes: numercal study" *Proc. of East Asia-Pacific Conference on Structural Engineering and Construction-13,* Sapporo, Japan.

Mizutani, T., Hida, T., Fujino,Y., and Nagayama, T . (2013). "Detection of State Changes of RC Columns in Shaking Table Tests by Singularity Analysis of Their Acceleration Responses." *Innovation, Communication and Engineering* 1, 377.

Takeda, T., Nagayama,T., Mizutani,T., and Fujino,Y. (2013). "Seismic Response Characterization of a Curved Rigid-frame Bridge Using Three Dimensional Nonlinear Dynamic Analysis." *Innovation, Communication and Engineering* 1, 289.

Su,D., Nagayama, T., Irie, M., and Fujino ,Y. (2013). "Development of a stereo camera system for road surface assessment." *SPIE Smart Structures and Materials+ Nondestructive Evaluation and Health Monitoring.*

Kuroiwa,T., Suzuki, M., Yamashita, Y., Saruwatari,S., Nagayama,T., and Morikawa,H (2012). "A multi-channel bulk data collection for structural health monitoring using wireless sensor networks." *Communications (APCC), 2012 18th Asia-Pacific Conference on,* pp.295-299.

Li, J., Nagayama, T., Mechitov, K. A., and Spencer, Jr., B. F. (2012). "Efficient campaign-type structural health monitoring system using wireless smart sensors." *Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2012, Proc. of SPIE volume 8345*, San Diego, USA.

Kim, R. E., Nagayama, T., Jo, H., and Spencer, Jr., B. F. (2012). "Preliminary study of low-cost GPS receivers for time synchronization of wireless sensors." *Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2012, Proc. of SPIE volume 8345*, San Diego, USA.

Su, D., Nagayama, T. Sun, Z, and Fujino, Y. (2012). "An interferometric radar for displacement measurement and its application in civil engineering structures." *Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2012, Proc. of SPIE volume 8345*, San Diego, USA.

Nagayama, T. Urushima, A., Fujino, Y., Miyashita, T., Yoshioka, T., and Ieiri, M. (2012). "Dense vibration measurement of an arch bridge before and after its seismic retrofit using wireless smart sensors." *Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2012, Proc. of SPIE volume 8345*, San Diego, USA.

Honarbakhsh, A., Nagayama, T., and Fujino, Y. (2012). "Damage identification of belt-conveyor support structure using global and local vibration modes." *Proc. of 5th European Conference on Structural Control*, Genoa, Italy.

Nagayama, T., Ushita, M., and Fujino, Y. (2011). "Suspension bridge vibration measurement using multihop wireless sensor networks." *Proc. of 12th East Asia-*

Pacific Conference on Structural Engineering and Construction, Hong Kong, Chaina.

Jo,H., Sim,S., Mechitov,K., Kim, R., Li,J., Moinzadeh,P., Spencer, Jr,BF., Park,J.W., Cho,S., Jung,H,J., Yun,C,B., Rice,J,A and Nagayama,T. (2011). "Hybrid wireless smart sensor network for full-scale structural health monitoring of a cable-stayed bridge." *SPIE Smart Structures and Materials+ Nondestructive Evaluation and Health Monitoring.*

Su, D,. Siringoringo,D., Nagayama,T., and Fujino,Y., (2011). "Monitoring and visual inspection of New Jersey reference bridges." *International Conference on Structural Health Monitoring of Intelligent Infrastructure,* SHMII-5.

Kuroiwa, T., Suzuki, M., Saruwatari, S., Nagayama, T., and Morikawa, H. (2011). "Scheduling for fast bulk data transfer in wireless sensor networks." *Technical report of IEICE, USN2011-16* (in Japanese).

Kuroiwa, T., Suzuki, M., Nagayama, T., and Morikawa, H. (2011). "Design of a MAC Protocol with Busy ACK for High Throughput Bulk Transfer in Wireless Sensor Networks." *IEICE Society Conference 2011*, B-19-3, (in Japanese).

Fujino, Y., Siringoringo, D. M., Nagayama, T., and Su, D. (2010). "Control, simulation and monitoring of bridge vibration – Japan's recent development and practice." *IABSE-JSCE Joint Conference on Advances in Bridge Engineering-II,* Bangladesh, pp.61-74.

Nagayama, T., Ushita, M., Fujino, Y., Ieiri, M. and Makihata, N. (2010). "The combined use of low-cost smart sensors and high accuracy sensors to apprehend structural dynamic behavior," *Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2010, Proc. of SPIE volume 7647*, San Diego, USA.

Jo, H., Rice, J.A. Spencer Jr., B.F., and Nagayama, T. (2010). "Development of a high-sensitivity accelerometer board for structural health monitoring," *Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2010, Proc. of SPIE volume 7647*, San Diego, USA.

Cho. S., Jang, S.A., Jo, H., Mechitov, K.A. Rice, J.A., Jung, H.-J., Yun, C.-B., Spencer Jr., B.F., Nagayama, T., and Seo, J. (2010). "Structural health monitoring system of a cable-stayed bridge using a dense array of scalable smart sensor network." *Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2010, Proc. of SPIE volume 7647*, San Diego, USA.

Jo, H., Sim, S., Nagayama, T., and Spencer, Jr. B.F. (2010). "Decentralized stochastic modal identification using high sensitivity wireless smart sensors."

Proc. of 5th World Conference on Structural Control and Monitoring, Tokyo, Japan.

Nagayama, T., Ushita, M., and Fujino, Y. (2010). "Efficient multihop data transport protocol for structural health monitoring and its evaluation at a full-scale bridge.", *Proc. of 5th World Conference on Structural Control and Monitoring*, Tokyo, Japan.

Yun, C.-B., Sohn, H., Jung, H.-J., Spencer, Jr., B. F., and Nagayama, T. (2010). "Wireless sensing technologies for bridge monitoring and assessment." *Bridge Maintenance, Safety, Management and Life-Cycle Optimization: Proceedings of the Fifth International IABMAS Conference,* Philadelphia, USA, 11-15 July 2010.

Siringoringo, D., Nagayama, T., Fujino, Y., Su D., and Tandian, C. (2010). "Observed dynamic characteristics of an overpass bridge during destructive testing." *Bridge Maintenance, Safety, Management and Life-Cycle Optimization: Proceedings of the Fifth International IABMAS Conference,* Philadelphia, USA, 11-15 July 2010.

Cho,S.,Park,J., Jung,H.-J.,Yun,C.-B.,Jang,S,. Jo, H., Spencer, Jr., B.F., Nagayama, T., and Seo, J.-W. (2010). "Structural health monitoring of a cable-stayed bridge using acceleration data via wireless smart sensor network." *Bridge Maintenance, Safety, Management and Life-Cycle Optimization: Proceedings of the Fifth International IABMAS Conference,* Philadelphia, USA, 11-15 July 2010.

Park, J.W., Cho, S., Jung, H.-J., Yun, C.-B., Jang, S. A., Jo, H., Spencer, Jr., B. F., Nagayama, T., and Seo, J.-W. (2010). "Long-term structural health monitoring system of a cable-stayed bridge based on wireless smart sensor networks and energy harvesting techniques.", *Proc. of 5th World Conference on Structural Control and Monitoring*, Tokyo, Japan.

Dinh, H.M., Nagayama, T., Fujino, Y., Sakurai, N., and Nakayama, H. (2010). "Boundary condition identification of a real-life bridge by use of additional known masses." *Proc. of 5th World Conference on Structural Control and Monitoring*, Tokyo, Japan.

Tandian, C.H., Fujino, Y., Nagayama, T., Siringoringo, D., and Su D. (2010). "Response variability among identical expressway bridges under moving vehicles." *Proc. of 5th World Conference on Structural Control and Monitoring*, Tokyo, Japan.

Mizutani, T., Fujino, Y., Inomata, K., Tsujita, W. Nagayama, T., Nishikawa, T., Shikai, M., and Sumi, K. (2010). "Leaky coaxial cable usage for monitoring real-time heavy rain." *Proc. of 5th World Conference on Structural Control and Monitoring*, Tokyo, Japan.

Su, D., Fujino, Y., Nagayama, T., and Yamazaki, S. (2010). "Identification of cable damping characteristics of a long-span cable-stayed bridge" *Proc. of 5th World Conference on Structural Control and Monitoring*, Tokyo, Japan.

Lin, T.H., Hung, S. L., Fujino, Y., and Nagayama, T. (2010). "Study of energy harvesting technology in structural health monitoring." *Proc. of 5th World Conference on Structural Control and Monitoring*, Tokyo, Japan.

Nagayama, T., Jung, H.-J., Spencer, Jr., B. F., Jang, S.A., Mechitov, K. A., Cho, S., Ushita, M., Yun, C.-B., Agha, G. A., and Fujino, Y. (2010). " International collaboration to develop a structural health monitoring system utilizing wireless smart sensor network and its development on a cable-stayed bridge." *Proc. of 5th World Conference on Structural Control and Monitoring*, Tokyo, Japan.

Jo, H., Sim, S., Nagayama, T., and Spencer Jr., BF, (2010). "Decentralized Stochastic Modal Identification using High-sensitivity Wireless Smart Sensors." *Proceedings of 5th World Conference on Structural Control and Monitoring 5WCSC M-10466.* pp. 12-14. Tokyo,Japan.

Nagayama, T., Ushita, M., and Fujino, Y. (2010). "High-throughput multihop wireless sensor network using multiple RF channels and its application to suspension bridge monitoring." *Proc. of 3rd Asia-Pacific Workshop on Structural Health Monitoring*, Tokyo, Japan.

Nagayama, T., Ushita, M., Dinh, H. M., Fujino, Y., Spencer, Jr. B. F., Rice, J. A., Jang, S.-A. Mechitov, K. A., and Agha, G. A. (2009). "Structural health monitoring system development and full-scale bridge vibration measurement using smart sensors," *Proc. 10th International Conference on Structural Safety and Reliability*, Osaka, Japan.

Su, D., Fujino, Y., Nagayama, T., and Miyashita, T. (2009). "Local train-induced vibration in high-speed train steel bridge." *IABSE Symposium Report 96 (16), pp.44-53*.

Yun, G.J., Lee, S.G., Carletta, J., and Nagayama, T. (2009). "Wavelet entropy based damage identification using wireless smart sensors."*SPIE Smart Structures and Materials+ Nondestructive Evaluation and Health Monitoring*.

Cho, S., Jang, S.A., Jo,H., Park,J., Jung,H.J., Yun,C.B., Spencer Jr, B.F., NAGAYAMA, T., and SEO.J.W. (2009). "Cable-stayed bridge test-bed for long-term structural health monitoring using smart wireless sensor network." *The Proceedings of the 1st International Conference on Computational Design in Engineering*.

Nagayama, T., Siringoringo, D. M., and Fujino, Y. (2008). “The importance of dense monitoring of long-span bridges for its performance re-evaluation.” *IABSE Congress Report 17 (16),* pp.246-247, 2008.

Mizuno, Y., Fujino, Y., Nagayama, T., and Nishikawa, T. (2008). “Networked Sensing Platform for Civil Structures and its Prototype.” *IABSE Symposium Report 94 (9),* pp.1-6, 2008.

Nagayama, T., Spencer, Jr., B. F., and Fujino, Y. (2008). “Structural health monitoring using smart sensors.” *Proc., 11th East Asia-Pacific Conference on Structural Engineering & Construction*, Taipei, Taiwan.

Asakawa, H., Fujino, Y., Nagayama, T., and Ohsumi, M. (2008). “Development and application of road monitoring system using dynamic response of vehicles.” *Proc., 11th East Asia-Pacific Conference on Structural Engineering & Construction*, Taipei, Taiwan.

Mizutani, T., Fuke, Y., Fujino, Y., Nagayama, T., and Mizuno, Y. (2008). “An experimental study on precipitation measurement using leaky coaxial cables.” *Proc., 11th East Asia-Pacific Conference on Structural Engineering & Construction*, Taipei, Taiwan.

Dinh, M.-H., Nagayama, T., and Fujino, Y. (2008). “Structural parameter identification by use of additional known masses and its application to damage detection.” *Proc., 11th East Asia-Pacific Conference on Structural Engineering & Construction*, Taipei, Taiwan.

Ushita, M., Nagayama, T., and Fujino, Y. (2008). “A distributed autonomous active-sensing approach for structural health monitoring using smart sensors.” *Proc., 11th East Asia-Pacific Conference on Structural Engineering & Construction*, Taipei, Taiwan.

Su, D., Fujino, Y., Nagayama, T., and Miyashita, T. (2008). “Local dynamic characteristics of train induced vibration of high-speed railway bridge.” *Proc., 11th East Asia-Pacific Conference on Structural Engineering & Construction*, Taipei, Taiwan.

Nagayama, T., Spencer, Jr., B. F. Ushita, M., and Fujino, Y. (2008). “Structural health monitoring systems using smart sensors, *Proc., 4th International Workshop on Advanced Smart Materials and Smart Structures Technologies*, Waseda University, Tokyo, Japan.

Castaneda, N.E., Sun, F., Dyke, S.J., Lu, C., Hope, A. and Nagayama. T. (2008). “Experimental validation of a correlation-based damage detection technique using iMote2 wireless sensors,” *5th International Workshop on Structural Control and Monitoring,* Dalian, China, June 5-6.

Castaneda, N.E., Sun, F. Dyke, S.J. Lu, C. Hope, A. and Nagayama, T. (2008). "Implementation of a correlation-based decentralized damage detection method using wireless sensors," *Proc., 4th International Conference on Advances in Structural Engineering and Mechanics (ASEM08)*, Jeju, Korea, May 26-28.

Spencer, Jr. B. F., Nagayama, T., and Rice, J. A. (2008). "Decentralized structural health monitoring using smart sensors," *Proc., Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2008, SPIE 6932*, pp693202, San Diego, CA, USA.

Moreu, F., and Nagayama, T. (2008). "Use of wireless sensors for timber trestle railroad bridges health monitoring assessment." *Proceedings of the 2008 Structures Congress (ASCE): Crossing Borders*.

Moreu, F., and Nagayama, T. (2007). "Possibilities of Using Sensing Technology for Railroad Bridges Repair and Maintenance." *IABSE REPORTS 93,* p.520.

Moreu, F., and Nagayama, T. (2007). "Possibilities of Using Sensing Technology For Railroad Bridges Maintenance and Repair." IABSE Symposium Report 93 (1), pp.335-340.

Nagayama, T., Spencer, Jr., B. F., and Fujino, Y. (2007). "Synchronized sensing toward structural health monitoring using smart sensors." *Proc., World Forum on Smart Materials and Smart Structures Technology (SMSST'07)*, Chongqing & Nanjing, China.

Nagayama, T., Spencer, Jr., B. F., and Rice, J. A. (2007). "Structural health monitoring utilizing Intel's Imote2 wireless sensor platform." *Proc., Sensor and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2007, SPIE 6529*, pp652943, San Diego, CA, USA.

Spencer, Jr. B. F., Nagayama, T., and Rice, J.A. (2007). "Structural health monitoring using smart sensors." *Proc., World Forum on Smart Materials and Smart Structures Technology (SMSST'07)*, Chongqing & Nanjing, China.

Spencer, Jr., B.F. and Nagayama, T. (2006). "Smart sensor technology: a new paradigm for structural health monitoring." *Proc., Asia-Pacific Workshop on Structural health Monitoring*, Yokohama, Japan.

Nagayama, T., Rice, J.A., and Spencer, Jr., B.F. (2006). "Efficacy of Intel's Imote2 wireless sensor platform for structural health monitoring applications." *Proc., Asia-Pacific Workshop on Structural health Monitoring*, Yokohama, Japan.

Nagayama, T. and Spencer, Jr., B. F. (2006). "Implementation of structural health monitoring algorithms on smart sensor networks. *4th World Conference on Structural Control and Monitoring*.

Nagayama, T., Spencer, Jr., B.F., Agha, G.A., and Mechitov, K.A. (2006), "Model-based data aggregation for structural monitoring employing smart sensors." *Proc. 3rd Int. Conference on Networked Sensing Systems (INSS 2006)*, Chicago, IL, 203-210.

Nitta, Y., Nagayama, T., Spencer, Jr., B. F., and Nishitani, A. (2005). "Rapid damage assessment for the structures utilizing smart sensor MICA2 Mote." *Proc., 5th International Workshop on Structural Health Monitoring*, 283-290.

Nagayama, T., Ruiz-Sandoval, M., Spencer, Jr., B. F., Mechitov, K. A., and Agha, G. A. (2004). "Wireless strain sensor development for civil infrastructure." *Proc., 1st International Workshop on Networked Sensing Systems*, Tokyo, Japan, 97-100.

Mechitov, K. A., Kim, W. Y., Agha, G. A., and Nagayama, T. (2004). "High-frequency distributed sensing for structure monitoring," *Proc., 1st International Workshop on Networked Sensing Systems*, Tokyo, Japan, 101-105.

Spencer, Jr., B. F., Lee, G. C., Yang, G., and Nagayama, T. (2003). "Seismic protection of non-structural components using semi-active devices." *Proc., Seminar on Seismic Design, Performance, and retrofit of Nonstructural Components in Critical Facilities*, 541-552

Others

Fujino, Y., Abe, M., Nagayama, T., and Ikeda, K. (2003). "Detection of unsteady aerodynamic forces in a suspension bridge from ambient vibration monitoring." *Wind Engineering, Japan Association for Wind Engineering*, 94, 37-49 (in Japanese).

Nagayama, T., Abe, M., and Fujino, Y. (2000). "Structural health monitoring of a long suspension bridge based on ambient vibration measurement." *Proc., 27th annual conference of JSCE, Kanto Division* (in Japanese), outstanding performance award.

Nagayama, T., Abe, M., and Fujino, Y. (2000). "Structural identification of a non-proportionally damped system and its application to a long suspension bridge." *Proc., 55th annual conference of JSCE* (in Japanese).

INVITED LECTURES

Asia-Pacific-Euro Summer School on Smart Structures Technology, University of Illinois at Urbana-Champaign, USA (2009, 2015), The University of Tokyo, Japan (2010), Tongji University, China (2011), University of Cambridge , UK (2016), Yokohama National University, Japan (2017), Qingdao University of Technology, China (2018), Sapienza University of Rome, Italy (2019).

2008 ANCRiSST short course on smart wireless sensor technology and applications, Korean Advanced Institute of Science and Technology, Daejeon, Korea, Sept. 2008.

Shantou University, "Structural health monitoring using smart sensors" Mar. 2007.

Monitoring-based evaluation of bridges, online workshop on assessment, repair & rehabilitation of bridges, Indian Association of Structural Engineers, 2022.3.18.

Monitoring-based evaluation of bridges, 1st international webinar series on recent advancements in Enviro-Structural confluence, ASCE Indo-Sri Lanka Section, 2022.3.5

Monitoring-based evaluation of bridge, international workshop on smart and resilient bridges, ASCE student chapter of IIT Dhanbad, 2021.12.5.

Monitoring Taking Advantage of and Materialising Digital Twins, IABSE online 2020, 2020.9.3.

Infrastructure assessment based on IoT and data assimilation techniques, 2nd International Conference on Health Monitoring of Civil & Maritime Structures, Glasgow, UK, 2019.5.23.

Infrastructure monitoring taking advantage of IoT technology - from proof-of-concept to engineering problem applications -, ZHITU Symposium, 2018.7.12

CURRENT RESEACH TOPICS

Research to evaluate road and railway track conditions efficiently using vehicle dynamic responses: A smartphone-based Dynamic Response Intelligent Monitoring System (DRIMS) has been developed to conduct road evaluations with high efficiency and reasonable accuracy. DRIMS estimates the International Roughness Index (IRI) based on vehicle responses measured with an iOS application, which obtains three-axis acceleration, angular velocity, and GPS with accurate sampling timing; resampling based on the sampling theory is implemented. Employing the half car vehicle model together with the data assimilation technique, this response-based profile estimation method can perform even better than expensive conventional profilers depending on conditions. This development is now being extended to implementation involving a large number of commercial vehicles. Furthermore, computer-vision techniques have been employed to analyze drive recorder images to extract road distress such as potholes and cracks. A variety of resources and techniques of inexpensive nature are studied to enable efficient road condition evaluations.

Furthermore, not only the current road condition, but also future deterioration risks of road is studied. The record of road condition evaluations and traffic volume and weight information are integrated to evaluate the deterioration risks.

In addition to vehicle road network, the total length of bicycle road network is increasing; the evaluation and maintenance of bicycle road is becoming important issues. The road condition evaluation techniques are being extended to the bicycle roads.

The same approach is applied to railroad track evaluation. In cooperation with railway-related companies, we are estimating track conditions by inverse analysis of train movements, evaluating track deformations by computer-vision techniques, and developing inverse analysis algorithms through multi-body simulation.
https://www.drims.online
https://doi.org/10.1016/j.ymssp.2020.106722
https://www.youtube.com/watch?v=8JswgBaFLn0
https://www.youtube.com/watch?v=09E7-P3KC2o

Research to efficiently evaluate the condition of industry infrastructure: Belt-conveyors at iron works are an important industrial infrastructure supporting our economy. The support structures of belt conveyors are, however, experiencing degradation. The failure of these structures can result in operation stop of the whole iron works. While the need for condition assessment is clear, the assessment is not easily performed; due to safety concerns, hands-on inspections on the support structures are allowed during operations. The condition needs to be efficiently evaluated without interrupting the operation. Using vibration based structural assessment techniques, together with LDV and other sensors to remotely measure the target, the condition of the support structures are investigated. Specific local vibration modes, which are sensitive to structural member damages, are identified and the load-carrying capacities of damaged members are assessed. We are developing remote diagnostic methods applicable to real structures by analyzing the vibration under non-contact excitation such as acoustic excitation and operational vibration.

We are also conducting research on the application of this technology to bridges and other structures, aiming at efficient maintenance and management of infrastructure.
https://doi.org/10.11532/structcivil.64A.354
https://doi.org/10.1002/stc.2349

Rapid post-earthquake assessment of structures: After large seismic events, quick assessment of critical transportation infrastructures is important. Numerical simulations and monitoring data analysis are studied to realize the quick assessment. Stiffness, hysteresis characteristics, and displacement are considered to be major structural characteristics to represent the structural conditions. These characteristics are evaluated using numerical models of structures and acceleration response monitoring data.
https://doi.org/10.1061/AJRUA6.0001213

Research to reveal the live load on road networks: Live load is one of major causes behind fatigues on the superstructures and pavement. However, the actual live load condition is not revealed in details. Weigh-In-Motion typically requires installation of sensors by burying sensors under the pavement; the traffic needs to be stopped. The installation is costly and time consuming, limiting the widespread use of WIM. A new Bridge Weigh-In-Motion using wireless accelerometers and camera based on only batteries, without the need of external power sources, are being studied to reveal the live load condition on large road networks.
https://doi.org/10.2208/jscejseee.76.2_356
https://doi.org/10.1002/stc.2823

Research to comprehend structural condition and states through flexible monitoring using ad-hoc wireless sensor networks: When new materials and new construction methods are employed, monitoring has been often adapted to comprehend the condition and states to compensate for our shortage of knowledge. For maintenance of existing structures, those showing behavior/conditions different from the original design assumption become problematic. Original assumptions and simulation based on the assumptions cannot therefore address the issues. Comprehending the structural condition and states through monitoring become important. However, traditional monitoring techniques are costly and time consuming prohibiting flexible monitoring; physical quantities of interests of target structures are not necessarily obtainable. Wireless sensor networks with the capability of synchronized sensing and battery operation can potentially enable such flexible monitoring.

The use of wireless sensors for such flexible monitoring were however not practical. Communication distance was too short. Synchronization accuracy was

too poor. The battery life was too short. The measurement accuracy was too poor. Academic research on wireless monitoring was not practical solutions toward addressing engineering problems. New wireless sensors addressing all of these problems have been developed in collaboration with Morikawa laboratory, the University of Tokyo. The sensors have been utilized in seismic response monitoring, detailed dynamic problem investigation on a cable-stay bridge, easy-to-install Bridge Weigh-In-Motion, and other applications. The wireless sensors enable monitoring of physical quantities when and where needed, in flexible and ad-hoc manners. The monitoring, together with data assimilation techniques which integrate numerical model and a large amount of data, aims to clarify the loading, structural system performance, characteristics of system output such as vibration and deflection, as well as to provide feedback to the design and maintenance.
https://doi.org/10.1002/stc.1588
DOI: 10.14923/transcomj.2017ASI0002
http://hdl.handle.net/2142/3521