CURRICULUM VITAE

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CURRENT STATUS
Associate Professor
University of Tokyo, Tokyo, Japan
Civil Engineering

ACADEMIC EDUCATION
BS University of Tokyo, Tokyo, Japan
Civil Engineering, 2000
MS 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
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 Engineering, 2002
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
2010 **JSCE annual incentive award f**or the paper "Smart Sensor Middleware Development for Dense Structural Vibration Measurement," Journal of Japan Society of Civil Engineering, 2009.

EXPERIENCES

2002 **Research Assistant**, 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-Present **Associate 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.

HP:
https://scholar.google.com/citations?user=g3FtWkIAAAAJ&hl=ja
https://www.researchgate.net/profile/Tomonori_Nagayama
https://www.scopus.com/authid/detail.uri?authorId=16402555500

PUBLICATION

Theses

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).

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

Refereed Journal paper

Abe, 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).

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).

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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).
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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).

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.

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. 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.

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. 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).

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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.

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prediction including train-viaduct interaction." *Structure and Infrastructure Engineering*: *Maintenance, Management, Life-Cycle Design and Performance,* 1744-8980.

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).

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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).

Siringoringo, D., Fujino,Y., and Nagayama,T . (2011). "Dynamic characteristics of an overpass bridge in a full-scale destructive test." *Journal of Engineering Mechanics*.

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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).

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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).

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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.

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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.

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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.

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validation", Mechanical Systems and Signal Processing, 123, pp.369-385. https://doi.org/10.1016/j.ymssp.2019.01.017

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

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

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.

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., 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.

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.

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

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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.

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.

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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.

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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.

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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.

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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*.

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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.

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INVITED LECTURES

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

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

CURRENT RESEACH PROJECT

Structural monitoring using wireless sensor networks: Wireless sensor nodes capable of communication, synchronization, and structural response measurement without the need of external power are expected to enable capturing structural behavior in detail. This research project develops the first wireless sensor nodes capable of capturing structural behavior such as micro-tremor responses, structural inclination, deflection, and others for months to years only using batteries. With the developed nodes, various civil structures have been monitored. The monitoring data have been used in various purposes including the identification of the cause of structural vibration, the estimation of structural properties, and the evaluation of vehicle loads. Data assimilation techniques have been employed to integrate the simulation and the dense measurement.

Road condition evaluation using vehicle dynamic responses: A smartphone-based Dynamic Response Intelligent Monitoring System (iDRIMS) has been developed to conduct road evaluations with high efficiency and reasonable accuracy. iDRIMS 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.
http://vims.sakura.ne.jp/
http://www.bridge.t.u-tokyo.ac.jp/nagayama/iDRIMSResampler.pdf