

Kuya Takami

Postdoctoral Research Fellow
Department of Mechanical Engineering
Virginia Polytechnic Institute and State University

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RESEARCH INTERESTS

Robot Audition, Human-Robot Interaction, Bayesian Robotics

EDUCATION

- 10/2015 – Present **Virginia Polytechnic Institute and State University**, Blacksburg, USA
Ph.D. Mechanical Engineering
Dissertation: *Non-Field-of-View Acoustic Target Estimation*
Advisor: Professor Tomonari Furukawa
- 05/2009 – 05/2011 **University of Wisconsin-Madison**, Madison, USA
M.S. Mechanical Engineering
Advisor: Professor Scott Sanders
- 10/2015-PRESENT **University of Wisconsin-Madison**, Madison, USA
B.S. Biomedical Engineering (Biomechanics)

AWARDS AND HONORS

- 2015 ASME:IDETC/CIE Best Student Paper Award
- 2014 Pratt Graduate Fellowship
‡: Awarded to students who are aggressively recruited by other top engineering colleges
- 2012 Pratt Graduate Fellowship
- 2011 Pratt Graduate Fellowship
- 2007 Most Outstanding Physics Award
‡: Scholarship to the best student in two semester physics courses at University of Wisconsin-M

PRIOR EMPLOYMENT

- 10/2015 - Present **Virginia Polytechnic Institute and State University** Blacksburg, VA
Postdoctoral Research Fellow
Computational Multiphysics and Systems Lab
Professor Tomonari Furuakawa

- Primary researcher on National Science Foundation EAGER project, non-line-of-sight (NLOS) target localization in an unknown environment.
 - Developed probabilistic approach to NLOS visual/ acoustical target estimation based on recursive Bayesian estimation framework, and conducting test on human/ mobile sensor platform for human-robot-interaction.
 - Collaboration with Daniel Kish, president of World Access for the Blind, for perception of acoustic diffraction and reflection signal processing for human echolocation experts.
 - Grant proposal writing for National Robotics Initiative (NRI) NSF16-517 with Dr. Furukawa.
- Leader of Mohamed Bin Zayed International Robotics Challenge 2017 mobile manipulator team for the Challenge 2. The project consists of perception, navigation, and manipulation based on actual mobile robots to operate the valve with tools.
- Developed and implemented an FPGA based high-resolution imaging system with the integration to tire testing machine.
- Developing an autonomous car and associative technologies including new sensors for a project sponsored by General Motors and Murata Manufacturing. Advising one MS student for the NSF EAGER project and mentoring a senior design project, Self-Driving Vehicle Team, consisting of nine senior students.

08/2011 - 09/2015 VT

Graduate Research Assistant/ *Graduate Teaching Assistant

- Developed NLOS hybrid optical/acoustical target localization scheme to model and predict the state of sound source in a complex environment (2011-2015).
- Modeled sound reflection/diffraction based NLOS target estimation for mobile robot localization (2011-2015).
- Assisted underwater autonomous navigation project on sonar localization simulation using simultaneous localization and mapping (SLAM) funded by Office of Naval Research (2011-2012).
- Worked on real-time autonomous driving using Grid-based SLAM in collaboration with ZMP and University of Technology, Sydney (2012-2014).
- Worked on tire noise prediction model entailing mathematical formulations, and fluid-solid interaction modeling funded by NSF Center for Tire Research (2012-2015).
- *Instructor (ME 2024-Engineering Design and Economics): Lectured mechanical engineering students on product development (Fall 2013).
- *Project Advisor (ME4015/4016): Supervised senior design project on autonomous driving, and automotive alternator design and experimental validation (2011-2012).

05/2014 – 08/2014 **Bridgestone Americas, Inc** Akron, OH

Advanced Tire Technology - Research intern

- Developed tire noise analysis procedure and designed and implemented tire noise experimental device based on an FPGA controller.

01/2013 - 07/2013 **ZMP, Inc** Tokyo, Japan

Research Engineer in Autonomous Vehicles

- Assisted programming and hardware development for an autonomous driving vehicle, including data acquisition, implementation of SLAM, and vehicle modeling/control.
- Designed and constructed a quadrupedal machine learning-based evolving robot by calculating kinematics and specifying components.

03/2009 - 08/2011 **University of Wisconsin-Madison** Madison, WI (03/2009 - 08/2011)

Graduate Research Assistant for Engine Research Center

- Conducted laser and fiber optics centered research optimizing optical element design in harsh environments.
- Developed a noninvasive laser grid tomography temperature measurement system for jet and IC engines.

05/2014 – 08/2014 **University of Wisconsin Hospital** Madison, WI (08/2007 - 12/2008)

MRI Research Assistant for Radiology Department

Studied MRI-based knee analysis, quantified quality of the image, and determined change of c

peer reviewed publications

teaching

TECHNICAL STRENGTH

Computer Languages: C/C++, Java

Software: ROS, MATLAB, Visual Studio

CAD & FEA: SolidWorks, PTC Creo, Abaqus

System: Windows, Linux, OS X

Languages: English, Japanese (native)

EXTRACURRICULAR EXPERIENCE

2013 – 2015 Mechanical Engineering Graduate Student Council

2013 – 2015 Mechanical Engineering Graduate Ambassador

President of VT Slackline Club (2011-2014)

President of Japanese Conversation Group (2012-2015)

President of Japanese Cultural Society in University of Wisconsin-EC (2005-2006)

Volunteer Graduate student mentor (2014-Present)

Society National Society of Leadership and Success, Biomedical Engineering Society

PUBLICATIONS

- **K. Takami**, T. Furukawa, M. Kumon, D. Kimoto, and G. Dissanayake. “Estimation of a nonvisible field-of-view mobile target incorporating optical and acoustic sensors,” *Autonomous Robots*, 2015.
- **K. Takami**, T. Furukawa, M. Kumon, and G. Dissanayake. “Non-Field-of-View Acoustic Target Estimation in Complex Indoor Environment,” *Springer Tracts in Advanced Robotics*, 2015.
- **K. Takami**, T. Furukawa, M. Kumon, and L. Mak, “Non-Field-of-View Indoor Sound Source Localization based on Reflection and Diffraction,” *Multi-sensor Integration and Fusion*, IEEE, 2015.
- **K. Takami**, T. Furukawa, M. Kumon, and G. Dissanayake. “Non-Field-of-View Acoustic Target Estimation in Complex Indoor Environment,” *Field and Service Robotics*, 2015.

- T. Furukawa, **K. Takami**, X. Tong, D. Watman, A. Hamed, R. Ranasinghe and G. Dis-
sayanake, “Map-based Navigation of an Autonomous Car Using Grid-based Scan-to-Map Match-
ing,” ASME IDETC, 2015.
- **K. Takami** and T. Furukawa, “High-Resolution Deformation Measurement System for Fast Ro-
tating Tire,” ASME IDETC/CIE, 2015.
- **K. Takami** and T. Furukawa, “High-Resolution Deformation Measurement System for Fast Ro-
tating Tires Towards Noise Prediction,” Euronoise., 2015.
- M. Kumon, D. Kimoto, **K. Takami** and T. Furukawa, “Acoustic recursive Bayesian estimation
for non-field-of-view targets,” In Image Analysis for Multimedia Interactive Services (WIAMIS),
IEEE, 2013.
- M. Kumon, D. Kimoto, **K. Takami** and T. Furukawa. “Bayesian non-field-of-view target esti-
mation incorporating an acoustic sensor,” In Intelligent Robots and Systems, IEEE/RSJ Inter-
national Conference, 2013.
- **K. Takami**, S. Taheri, M. Taheri and T. Furukawa, “Prediction of Railroad Track Foundation
Defects Using Wavelets,” Joint Rail Conference, ASME, 2013.
- J. M. Whitney, **K. Takami**, S. T. Sanders, and Y. Okura. “Design of system for rugged,
low-noise fiber-optic access to high-temperature, high-pressure environments,” Sensors Journal,
IEEE, 2011.
- A. Xinliang, T. Kraetschmer, **K. Takami**, S. T. Sanders, L. Ma, et al. “Validation of temper-
ature imaging by H₂O absorption spectroscopy using hyperspectral tomography in controlled
experiments,” Journal of Applied Optics, 2011.