

Tatsunori Hayashi, Ph.D.

Postdoctoral Research Associate

Department of Aerospace and Mechanical Engineering

University of Notre Dame

100 White Field Research Laboratory, Notre Dame, IN 46556, USA

thayashi@nd.edu

574-250-0760

Education

- Mar.2019 to March 2020 Doctor of Philosophy, Aerospace Engineering
Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, US
Supervisor: Prof. Hirotaka Sakaue
- Jan.2016 to Mar. 2019 Master of Science, Aerospace Engineering
Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, US
Supervisor: Prof. Hirotaka Sakaue
- Apr. 2011 to Mar. 2013 Master of Science, Mechanical Engineering
Department of Mechanical Engineering, Tokyo University of Science (TUS), Tokyo, Japan
Supervisor: Prof. Hitoshi Ishikawa (TUS), Dr. Hirotaka Sakaue (JAXA)
- Apr. 2008 to Mar. 2011 Bachelor of Science, Mechanical Engineering
Department of Mechanical Engineering, Tokyo University of Science (TUS), Tokyo, Japan
Supervisor: Prof. Hitoshi Ishikawa (TUS), Dr. Hirotaka Sakaue (JAXA)

Research Experience Summary

Six years of experience in experimental fluid dynamics.

- developed chemical sensors (pressure-sensitive paint, temperature-sensitive paint)
- developed experimental measurement system and fluid dynamic devices (Differential luminescent measurement system, Hartmann oscillator, shock tube, resonance tube, rotating blade)
- experienced in sensor characterizations using fluorescent analysis and luminescent imaging
- experienced in flow visualizations and wind tunnel measurements

Two years of experience in mechanical engineering design for gas turbine power plants

- simulated performance of gas turbine combined cycle power plant
- designed piping model and equipment specification

Professional Experience

- June.2020 to current Postdoctoral Research Associate
Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, US
Supervisor: Prof. Hirotaka Sakaue
- Jan.2016 to May. 2020 Graduate Research Assistant
Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, US
Supervisor: Prof. Hirotaka Sakaue
- Jun. 2017 to Aug. 2017 Internship
German Aerospace Center, Institute of Aerodynamics and Flow Technology, Bunsenstr a e 10, 37073 G ottingen, Germany,
Supervisor: Dr. Christian Klein
- Apr. 2013 to Oct. 2014 Industrial Designer
Power Systems Project Department Project Center, Energy & Plant Operations, IHI Corporation, Tokyo, Japan

➤ May.2010 to Mar. 2013 Degree-Seeking Student

Aerodynamics Research Group, Japan Aerospace Exploration Agency (JAXA), Tokyo, Japan

Supervisor: Dr. Hiroataka Sakaue

Publications

Journal Paper

1. Sakaue, H., Hayashi, T., Ishikawa, H., “Luminophore Application Study of Polymer-Ceramic Pressure-Sensitive Paint,” *Sensors*, Vol. 13, No. 6, pp. 7053 – 7064, 2013.
2. Hayashi, T., and Sakaue, H., “Dynamic and Steady Characteristics of Polymer-Ceramic Pressure-Sensitive Paint with Variation in Layer Thickness,” *Sensors*, Vol. 17, No.1125, 2017.
3. Hayashi, T., Houpt, W. A., Leonov, B. S. and Sakaue, H., “Motion-capturing pressure-sensitive paint method under transient illumination by plasma source,” *Journal of Physics D: Applied Physics*, 52, 324005, 2019.
4. Hayashi, T., and Sakaue, H., “Differential Luminescent Imaging Method.,” *Journal of Applied Physics*, 127, 074502, 2020
5. T. Hayashi, H. Sakaue, Temperature effects on polymer-ceramic pressure-sensitive paint as a luminescent pressure sensor, *Aerospace*, 7(6), 80, 2020.

Book Chapter

1. Hayashi, T., Ishikawa, H., Sakaue, H., “Part VIII: Flow Visualization, Development of Polymer-Ceramic Pressure-Sensitive Paint and Its Application to Supersonic Flow Field,” *28th International Symposium on Shock Waves, Vol 1*, Editor: Kontis, K., Springer Berlin Heidelberg, ISBN 978-3-642-25687-5, pp. 607 – 613, 2012.

Refereed Conference Proceeding

1. Hayashi, T., Ishikawa, H., Sakaue, H., “Development of Polymer-Ceramic Pressure-Sensitive Paint and its Application to Supersonic Flow Field,” *Proceedings of the 28th International Symposium on Shock Waves*, ISSW28 Paper ID 2615, Manchester, UK, July 17 – 22, 2011.

Abstract-Refereed Conference Proceedings

1. Hayashi, T., Ishikawa, H., Sakaue, H., “Frequency Response Characterization of Sprayable Pressure-Sensitive Paint,” Annual Meeting of Visualization Society of Japan, Journal of the Visualization Society of Japan, suppl. 31, No. 2, B205 p 177, Sep. 26 – 27, 2011.
2. Hayashi, T., Ishikawa, H., Sakaue, H., “Frequency Response Characterization of Anodized Aluminum Pressure Sensitive Paint”, Annual Meeting of Visualization Society of Japan, Journal of the Visualization Society of Japan, D108, Himeji, Japan, October 4 – 5, 2012.
3. Hayashi, T., Houpt, A.W., Hedlund, B.E. Leonov, S.B. and Sakaue, H., “Pressure-Sensitive Paint Measurement under Transient Plasma in M=2 Airflow,” 55th AIAA Aerospace Sciences Meeting, AIAA SciTech Forum, (AIAA 2017-0704).
4. Chin, D.Y., Sealy, W., Granlund, K.O., Hayashi, T., and Sakaue, H., “Unsteady PSP measurements on a cylinder translating out from a supersonic cavity,” 47th AIAA Fluid Dynamics Conference, AIAA AVIATION Forum, (AIAA 2017-3468).
5. Hayashi, T., Houpt, A.W., Hedlund, B.E. Leonov, S.B. and Sakaue, H., “Two-Color Polymer-Ceramic Pressure-Sensitive Paint for Transient Plasma in M=2 Airflow”, 2018 AIAA Aerospace Sciences Meeting, AIAA SciTech Forum, (AIAA 2018-1028).
6. Hayashi, T., Hase, S., and Sakaue, H., “Differential Pressure-Sensitive Paint Method,” 2020 AIAA Aerospace Sciences Meeting, AIAA SciTech Forum, (AIAA 2020-0291).
7. Kurihara, D., Hayashi, T., and Sakaue, H., “Surface Pressure Measurement over Rotating Blade using Motion-Capturing PSP Method,” 2020 AIAA Aerospace Sciences Meeting, AIAA SciTech Forum, (AIAA 2020-0515).
8. Hayashi, T., Farahani, F. H., Rangwala, S. A., and Sakaue, H., “Simultaneous Temperature and Velocity Field Measurements of

Liquid Hydrocarbons by Dual-luminescent Imaging and Particle Tracking Velocimetry in a Side Cooled Cavity,” APS DFD 2020, Chicago

9. Kurihara, D., Hayashi, T., and Sakaue, H., “Temperature Dependency Reduction in Pressure-Sensitive Paint Measurement by Motion-Capturing Method,” 2021 AIAA SciTech Forum, (AIAA 2021-0328)
10. Gonzales, J., Hayashi, T., and Sakaue, H., “Luminescent Ice Sensor for Internal Property Measurement During Impact,” 2021 AIAA SciTech Forum, (AIAA 2021-1511)

Non-Refereed Conference Proceedings

1. Hayashi, T., Ishikawa, H., Sakaue, H., “Development and Frequency Analysis of Sprayable PSP,” Proceedings of the 6th Interdisciplinary Forum on Molecular Imaging, Japan Aerospace Exploration Agency, JAXA-SP-11-001, P07, Chofu, Japan, Nov. 2011
2. Hayashi, T., Ishikawa, H., Sakaue, H., “Frequency Analysis of Pressure-Sensitive Paint using Hartmann Oscillator,” Proceedings of the 7th Interdisciplinary Forum on Molecular Imaging, Japan Aerospace Exploration Agency, JAXA-SP-12-001, P09, Chofu, Japan, Nov. 2012
3. Hayashi, T., Ishikawa, H., Sakaue, H., “Frequency Response of Pressure-Sensitive Paint using Hartmann Oscillator,” Proceedings of the 8th Interdisciplinary Forum on Molecular Imaging, JAXA-SP-13-002, P15, Chofu, Japan, Nov. 2013
4. Hayashi, T., and Sakaue, H., “Pressure Measurement by Plasma and Injection including Shock Wave with PSP Method,” 14th FLUCOME, #505, Notre Dame, IN, Oct. 2017

Invited Talk

1. Hayashi, T., and Sakaue, H., “Luminescent imaging technique by interdisciplinary study,” July 2019, Center for Socio-Robotic Synthesis, Kyusyu Institute of Technology, Japan
2. Hayashi, T., “Luminescent imaging technique in aerodynamics”, December 21th, 2020, Kanagawa Institute of Technology, Japan

Fellowship, Grants, and Awards

University of Notre Dame Department of AME Travel Grant Award [\$400]	January 2020
University of Notre Dame Graduate Student Union Conference Presentation Grant (CPG) Award [\$380]	January 2020
University of Notre Dame Graduate School Professional Development Award (GAPDA) [\$1,000]	April 2020

Research grant submission

June 2020, JSPS research grant for two years research.	Rejected.
September 2020, Takahashi industrial and economics research foundation.	Under review
November 2020, Nakanishi scholarship foundation.	Under review