GUAN YIZHAO

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**EDUCATION**

**The University of Tokyo** *October 2021 - September 2024 (expected)*

* + - Doctor degree in Precision Engineering. (In Japanese)

**The University of Tokyo** *October 2019 - September 2021*

* + - Master degree in Precision Engineering. (In Japanese)

**Tohoku University**  *October 2015 - September 2019*

* + - Undergraduate degree in Mechanical and Aerospace Engineering (IMAC Program, an international course taught in English).

**High School Afflicted to China Fudan University** *September 2012 - August 2015*

**RESEARCH EXPERIENCE**

(Work with professors and doctors as several international groups from Japan, British, India, Indonesia, Thai, etc.)

Fluid Dynamic (Ohnish Lab) *Fall Semester 2016*

* + - Simulation of the airflow around the wing under applied laser beam and analyses lift improvement.

Fine Nano- Mechanics (Miura／Suzuki lab)Academic year 2017

* + - Ab initio simulation for Graphene

Optical super-resolution (Takahashi / Michihata lab) *Academic year 2019-2024*

* + - FDTD and RCWA simulation for super-resolution microscopy
    - Study of super-resolution optical depth measurement
    - Development of ultra-sensitive surface particle detection method with phase-contrast microscopy
    - Development of super-resolution microscopy aims at 10 nm resolution.

Participate in a research project on JST Research program CREST (Satoru Takahashi Team)

**RESEARCH ACHIEVEMENTS**

**FIRST AUTHOR PAPER**

1. Yizhao Guan, Shuzo Masui, Shotaro Kadoya, Masaki Michihata and Satoru Takahashi, “Super-resolution Imaging of Sub-diffraction-limited Pattern with Superlens based on Deep Learning”, International Journal of Precision Engineering and Manufacturing (IJPEM), (Accepted)
2. Yizhao Guan, Shuzo Masui, Shotaro Kadoya, Masaki Michihata and Satoru Takahashi, “Super-resolution by Localized Plasmonic Structured Illumination Microscopy using Self-Assembled Nanoparticle Substrates”, Nanomanufacturing and Metrology, (Accepted)
3. Yizhao Guan, Shuzo Masui, Shotaro Kadoya, Masaki Michihata and Satoru Takahashi, “Smart optical measurement probe for autonomously detecting nano-defects on bare semiconductor wafer surface: highly sensitive observation system using phase-contrast microscopy with a spatial light modulator”, 2022 J. Phys.: Conf. Ser. 2368 012014.
4. Yizhao Guan, Shotaro Kadoya, Masaki Michihata, Satoru Takahashi, “The FDTD analysis for dark field in-process depth measurements of fine microgrooves”, Measurement: sensors, Volume 18, 2021, 100257.
5. Yizhao Guan, Hiromasa Kume, Shotaro Kadoya, Masaki Michihata and Satoru Takahashi, “The FDTD analysis of near-field response for microgroove structure with standing wave illumination for the realization of coherent structured illumination microscopy”, Journal of Manufacturing Science and Engineering, Vol. 144, Issue 3 (2022) 031004.

**FIRST AUTHOR INTERNATIONAL CONFERENCES**

1. Manufacturing Science and Engineering Conference (MSEC 2021) *March 2021*

The FDTD Analysis of near-field response for microgroove structure with standing-wave illumination for the realization of coherent structured illumination microscopy (Selected and Published in Journal of Manufacturing Science and Engineering)

1. OPTICS & PHOTONICS International Congress (OPIC 2021) *April 2021*

The FDTD Analysis for Diffraction Limited Microgroove Structure with standing-wave illumination for the realization of coherent structured illumination microscopy

1. International Measurement Confederation (IMEKO 2021) *August 2021*

The FDTD Analysis for Dark Field In-process Depth Measurements of Fine Microgrooves (Selected and Published in Measurement: Sensors)

1. The 11th Global Conference on Materials Science and Engineering (CMSE 2022) *September 2022*

Smart optical measurement probe for autonomously detecting nano-defects on bare semiconductor wafer surface: highly sensitive observation system using phase-contrast microscopy with a spatial light modulator (Selected and Published in Journal of Physics: Conference Series)

1. Asian Society for Precision Engineering and Nanotechnology (ASPEN 2022) *November 2022*

Optical Depth Measurement for Microgrooves: A Self-interferometry Method based on Near-field Polarization Analysis (Best Paper Award)

1. Leading Edge Manufacturing/Material and Processing (LEM&P) *June 2023*

Numerical simulation of self-assembled nanoparticles substrate for plasmonic structured illumination microscopy

1. International Symposium on Measurement Technology and Intelligent Instruments (ISMTII) *September 2023*

Super-resolution Imaging of Sub-diffraction-limited Pattern with Superlens based on Deep Learning (Best Paper Award)

**FIRST AUTHOR CONFERENCES IN JAPAN**

1. Japan Society of Mechanical Engineers (JSME) Tohoku *September 2018*

First Principle Calculation on the Electrical Conductivity of Dumbbell-shape Graphene Nano-Ribbon.

1. Japan Society of Mechanical Engineers Computational Mechanics Division (CMD) *September 2019*

Effect of Strain on the Gas Adsorption of Graphene: A First Principle Study

1. The Japan Society for Precision Engineering (JSPE) *September 2020*

The FDTD Analysis of Near-field Response for Microgroove Structure with Standing Wave Illumination

1. The Japan Society for Precision Engineering (JSPE) *March 2021*

The FDTD Analysis of Near-field Response for Microgroove Structure with Standing Wave Illumination (2nd) -The Relationship of Microgroove Depth and Near-field Phase Response

1. Optics & Photonics Japan (OPJ) *September 2020*

Optical FDTD Analysis of Surface Microstructure for Coherent Structured Illumination Microscopy

1. The Japan Society for Precision Engineering (JSPE) *March 2022*

Near-field Phase Analysis of Periodic Microgroove Structure for Metasurface Design based on FDTD Simulation

1. The Japan Society for Precision Engineering (JSPE) *March 2022*

Study on the Detection of Nanoscale Foreign Objects by Autonomous Defect Exploration and Split-Type Multi-Probe (Report 11) - High Sensitivity Detection of Liquid Phase Probes by Spatial Optical Phase Modulation (In Japanese)

**TEAM WORKS**

**Team-based Research** *Fall semester 2016*

* + - We proposed a line navigation robot and realized this idea using Robolab. I participated in the assembling and programming.

**Professional development Consortium for**

**Computational Materials Scientists (PCoMS)** *September 2018*

* + - In this seminar, the topic "Computer-based DFT (Density functional theory) simulation for corrosion resistance of aluminum" was proposed by our team. I did the final presentation while team members (an assistant professor and a doctoral student) combined their ideas.

**JST Research program Core Research for Evolutionary Science and Technology** *Since 2022*

* + - This research target is to develop outstanding evolution of advanced precision measurement using measurement standards and information science: Development of 10nm super-resolution optical loupe. Three teams from Tokyo University and AIST co-work together.

**PART-TIME JOBS**

Convenient store (Ministop Co., Ltd.) staff *September 2017 - October 2018*

* + - Be promoted from C level to A level staff in 3 months.

Freshman tutor *October 2017 - August 2018*

* + - Support a new international student from Singapore in his study and daily life.

**Internship**

Sony Group *February 2023*

* + - R&D department, Tokyo, Optimization of grating coupler using FDTD

Mazda Motor Corporation *September 2019*

* + - R&D department, Hiroshima, Learning the jointing technology development of different metals

**SKILLS & INTERESTS**

* + - Experiments Optical microscopy, Interferometry, Ellipsometry, Scanning-electron microscopy, Atomic force microscopy,

Sputter deposition, Electron beam lithography, Dry etching.

* + - Software Microsoft Office, C Language, Python, Matlab, Solid works (Design software), Blender.
    - Language Native Chinese, Fluent in English (GRE 324) and Japanese (JLPT N1 level).
    - Interests Running, Simulation Games, Taichi (Martial Arts), Badminton

**Academic Achievements & Honors**

* + - MSEC 2021 selected for publication
    - IMEKO 2021 selected for publication
    - CMSE 2022 selected for publication
    - Best Paper Award for ASPEN 2022
    - Best Paper Award for ISMTII 2023

**Personal Achievements & Honors**

* + - JSPS DC1 (2022-2024)
    - Letter of thanks for attendance of EUSPEN Talent Program 2022
    - Outstanding graduation thesis award (修士論文優秀賞)
    - Graduation GPA: 2.7/3
    - Scholarship from Sumitomo Electric Industries Social Contribution Foundation
    - Finish undergraduate graduation courses in the 6th semester (normally 8th semester), and start taking graduate school lectures.
    - Undergraduation GPA: 3.34/4 Core courses: Obtain AA (GPA=4) in lectures below:

Heat Transfer (I,II)，Control Engineering (I,II), Quantum Mechanics, Computer seminar.

* + - Tohoku University Honor President Fellowship.
    - The Monbukagakusho Honors Scholarship (JASSO).
    - Membership of The Japan Society of Mechanical Engineers.
    - Enrolled in "elite training program" a study tour in Zhangye High school, Gansu, China.
    - Participated in voluntary support education in Xiji, Ningxia, China.