

Masazumi Fujiwara, PhD

Research Professor / Associate Professor (PI)

Faculty of Natural Science and Technology
 (Department of Chemistry, Graduate School of Natural Science and Technology)
 Okayama University

3-1-1, Tsushimanaka, Kita-ku,
 Okayama 700-8530, Japan
 +81-(0)86-251-7834

Email: masazumi@okayama-u.ac.jpWeb: www.nanochem-okayama-u.net**Current Position**

2022- Research Professor
 2021- Associate Professor
 Faculty of Natural Science and Technology, Okayama University
 (Department of Chemistry, Graduate School of Natural Science and Technology)

Previous Position

2016-2021 Lecturer, Osaka City University, Sumiyoshi, Osaka, JAPAN
 2015-2016 Assistant Professor, Kwansei Gakuin University, Sanda, Hyogo, JAPAN
 2015 Project Assistant Professor, Osaka City University, Sumiyoshi, Osaka, JAPAN
 2013-2015 Humboldt Research Fellow, Humboldt University of Berlin, Berlin, GERMANY
 2009-2014 Assistant Professor, Hokkaido University, Sapporo, Hokkaido, JAPAN
 2006-2008 Teaching Assistant – to Prof. Hideki Hashimoto in “Computational Physics”, Osaka City University, Sumiyoshi, Osaka, JAPAN
 2004-2006 Teaching Assistant – to Department of Physics in “Experimental Physics”, Osaka City University, Sumiyoshi, Osaka, JAPAN

Education

December 2008 Doctor of Science (PhD), Osaka City University, Sumiyoshi, Osaka, JAPAN
 March 2006 Master of Science, Osaka City University, Sumiyoshi, Osaka, JAPAN
 March 2004 Bachelor of Science, Osaka City University, Sumiyoshi, Osaka, JAPAN

Awards & Fellowship

2022 Research Professorship (Okayama University)
 2021 2021 Osaka City University Young Researcher Award (Nambu Yoichiro Award)
 2016 Fellow of Leading Initiative for Excellent Young Researcher (LEADER) of MEXT
 2015 2015 Horiba Masao Award
 2013-2015 Postdoctoral Research Fellowship of Alexander von Humboldt Foundation
 2007-2008 Research Fellowships of the Japan Society for the Promotion of Science (JSPS) for Young Scientists, DC2

Selected Publications

1. Keisuke Oshimi, Yushi Nishimura, Tsutomu Matsubara, Masuaki Tanaka, Eiji Shikoh, Li Zhao, Yajuan Zou, Naoki Komatsu, Yuta Ikado, Yuka Takezawa, Eriko Kage-Nakadai, Yumi Izutsu, Katsutoshi Yoshizato, Saho Morita, Masato Tokunaga, Hiroshi Yukawa, Yoshinobu Baba, Yoshio Teki, and **Masazumi Fujiwara**, "Glass-patternable notch-shaped microwave architecture for on-chip spin detection in biological samples", [Lab Chip 22, 2519-2530 \(2022\)](#).
2. **Masazumi Fujiwara** and Yutaka Shikano, "Diamond quantum thermometry: From foundations to applications", [Nanotechnology 32, 482002 \(2021\)](#).
3. **Masazumi Fujiwara**, Alexander Dohms, Ken Suto, Yushi Nishimura, Keisuke Oshimi, Yoshio Teki, Kai Cai, Oliver Benson, and Yutaka Shikano, "Real-time estimation of the optically detected magnetic resonance shift in diamond quantum thermometry toward biological applications", [Phys. Rev. Research 2, 043415 \(2020\)](#).
4. **Masazumi Fujiwara**, Simo Sun, Alexander Dohms, Yushi Nishimura, Ken Suto, Yuka Takezawa, Keisuke Oshimi, Li Zhao, Nikola Sadzak, Yumi Umehara, Yoshio Teki, Naoki Komatsu, Oliver Benson, Yutaka Shikano, and Eriko Kage-Nakadai, "Real-time nanodiamond thermometry probing in-vivo thermogenic responses", [Sci. Adv. 6, eaba9636 \(2020\)](#).
5. Ryuta Tsukahara, **Masazumi Fujiwara**, Yoshihiko Sera, Yushi Nishimura, Yuko Sugai, Christian Jentgens, Yoshio Teki, Hideki Hashimoto, and Shinichi Shikata, "Removing Non-Size-Dependent Electron Spin Decoherence of Nanodiamond Quantum Sensors by Aerobic Oxidation", [ACS Appl. Nano Mat. 2, 3701-3710 \(2019\)](#).
6. **Masazumi Fujiwara**, Hong Quan Zhao, Tetsuya Noda, Kazuhiro Ikeda, Hitoshi Sumiya, and Shigeki Takeuchi, "Ultrathin fiber-taper coupling with nitrogen vacancy centers in nanodiamonds at cryogenic temperatures", [Opt. Lett. 40, 5702 \(2015\)](#).
7. **Masazumi Fujiwara**, Kiyota Toubaru, Tetsuya Noda, Hong-Quan Zhao, and Shigeki Takeuchi, "Highly Efficient Coupling of Photons from Nanoemitters into Single-Mode Optical Fibers" [Nano Lett. 11, 4362-4365 \(2011\)](#).
8. **Masazumi Fujiwara**, Kiyota Toubaru, and Shigeki Takeuchi, "Optical transmittance degradation in tapered fibers" [Opt. Express 19, 8596-8601 \(2011\)](#).
9. **Masazumi Fujiwara**, Kensei Yamauchi, Mitsuru Sugisaki, Andrew Gall, Bruno Robert, Richard J. Cogdell, and Hideki Hashimoto, "Energy dissipation in the ground-state vibrational manifolds of β -carotene homologues: a sub-20-fs time-resolved transient grating spectroscopic study" [Phys. Rev. B 77, 205118 \(2008\)](#).
10. **Masazumi Fujiwara**, Kazuhiro Yanagi, Minoru Maruyama, Mitsuru Sugisaki, Kazuyoshi Kuroyanagi, Hironori Takahashi, Shin-ichiro Aoshima, Yutaka Tsuchiya, Andrew Gall, and Hideki Hashimoto, "Second order nonlinear optical properties of the single crystal of N-benzyl 2-methyl-4-nitroaniline: anomalous enhancement of the d333 component and its possible origin" [Jpn. J. Appl. Phys. 45, 8676-8685 \(2006\)](#).

Invited Talks

Nov. 2022	Workshop on Quantum/Nano tech. for Biomedical Application, R031 Comitter of JSPS
Oct. 2022	62 nd Sensor/Actuator Tech Symp., Japan Society of Next Generation Sensor Technology
Sep. 2022	Lecture Seminar at Department of Physics, Strathclyde University, Glasgow, UK
Aug. 2022	Lecture Seminar at Institute of Physics, Humboldt University of Berlin, Berlin, Germany
May 2022	4 th Annual Meeting of Quantum Biology Society in Japan, Kobe, Japan
Feb. 2022	Optics, Applied Optics Special Workshop at The University of Tokyo, Online, Japan
Dec. 2021	Biothermology Workshop 2021, Online, Japan
Mar. 2021	JSAP Spring Meeting, Symposium, Virtual Meeting, Japan
Nov. 2020	MRS Spring/Fall Virtual Meeting, USA
Jan. 2020	Seminar at Institute for Frontier Life and Medical Sciences, Kyoto University, Kyoto, Japan
Nov 2019	The 13th Japanese-Russian Workshop, Awaji-Island, Japan
Apr. 2018	Seminar at Department of Hepatology, Osaka City University, Osaka, Japan
Mar. 2018	Life-science seminar at Graduate School of Medicine, Osaka City University, Osaka, Japan
Sep. 2017	Quantum Optics Seminar at Niels Bohr Institute, Copenhagen, Denmark
Apr. 2016	Young researcher seminar of light science, Kyoto, Japan
Oct. 2015	Award lecture of 2015 Horiba Masao Award, Kyoto, Japan
Dec. 2014	Seminar at Max-Planck Institute for The Science of Light, Erlangen, Germany
Sept. 2012	Photon 12, Durham, UK
May 2012	Seminar at University of Oregon, Prof. Hailin Wang's Group, Eugene, USA
Jul. 2011	20th International Laser Physics Workshop, Sarajevo, Bosnia & Herzegovina,

Patents (Japanese patent)

1. 特許出願 2019-124578, PCT/JP2020/024945
「リアルタイム生体内温度計測装置」大阪市立大学
出願日：2019年7月3日, 発明者：藤原正澄
2. 特許出願 2018-085225, 「容器、及び光学顕微鏡の温度調整装置」大阪市立大学・名古屋大学
出願日：2018年4月26日, 発明者：藤原正澄, 湯川博, 馬場嘉信
3. 特許出願 2017-073456, 「拡散反射スペクトル測定装置」花王株式会社
出願日：2017年4月3日, 発明者：宮里遼, 橋本秀樹, 藤原正澄
4. 特許出願 2017-073457, 「光触媒活性の評価方法」花王株式会社
出願日：2017年4月3日, 発明者：宮里遼, 橋本秀樹, 藤原正澄

Book Chapter

1. 藤原正澄, 中台(鹿毛)枝里子, 湯川博, 馬場嘉信, 『量子センシング技術最前線』(根来誠編): 「NV センタを用いた温度計測と生体応用」, 株式会社エヌ・ティー・エス, 東京, 2021年3月
2. 藤原正澄, Readout (HORIBA Technical Reports) 2015年増刊号: 「ナノ光ファイバを用いた蛍光性ナノ粒子の一粒子計測」, 堀場製作所, 京都, 2015年10月
3. 藤原正澄, 竹内繁樹, 化学工業: 「ナノテーパ光ファイバを駆使した光量子デバイス」, 化学工業社, 東京, 2012年9月号
4. 高橋宏典, 黒柳和良, 青島紳一郎, 藤原正澄, 橋本秀樹, 光アライアンス: 「極超短パルス光を利用したテラヘルツ波の発生・計測」日本工業出版, 東京, 2006年3月号

Social Activities

Committee

- 2019 International Workshop on Quantum Sensing and Biophotonics 2019 (IWQSB2019), Sept. 30, 2019, Osaka, Japan.
- 2013 The International Workshop on New Science and Technologies using Entangled Photons (NSTEP 2013), July 8-9, 2013, Osaka, Japan.

Academic Society

- 2020-present Member of S&T Experts Network of National Institute of Science and Technology Policy (NISTEP)
- 2017-2021 Committee for Gender Equality Promotion of Japan Physical Society

Peer-reviewing

Cryst.Grow.Des., Car.Sci., Jpn.J.Appl.Phys., Opt.Exp., J.Cryst.Grow., Appl.Opt., Opt.Mat.Exp., Appl.Phys.Exp., Mod.Phys.Lett.B, Opt.Lett., IEEE-Photon.Tech.Lett., Chem.Lett., Carbon, Photon.Rev., JOSA-B, Sci.Rep.

Outreach

- 2014 Scientific staff of "Die Lange Nacht der Wissenschaften am Berlin und Potsdam (The long night of science in Berlin and Potsdam)", May 10, 2014, Berlin, Germany
- 2012 Invited to the open campus of Osaka City University as distinguished alumni (2012. Aug.)

Teaching

- 2022-present Inorganic Chemistry 6, 3rd year undergrad. (Okayama University)
- 2021-present Inorganic Chemistry 4, 2nd year undergrad. (Okayama University)
- 2021-present Experiments in Chemistry for 3rd year undergrads (Okayama University)
- 2021-present Basic Experiments in Chemistry for 1st year undergrads (Okayama University)
- 2021-present Basic Modern Chemistry, 1st-2nd year undergraduates (Okayama University)
- 2019-2021 Quantum Chemistry 2 for 3rd year undergraduates (Osaka City University)
- 2019-2021 Advanced Experiments in Chemistry II for 3rd year undergraduates (Osaka City University)
- 2018-2021 Practice in Physical Chemistry for 3rd year undergraduates (Osaka City University)
- 2017-2021 Basic Experiments in Chemistry II for 2nd year undergraduates (Osaka City University)
- 2015-2016 Laboratory Work of General Chemistry, 1st year undergraduates (Kwansei Gakuin University)
- 2012-2013 Freshman's seminar, 1st year undergraduates (Hokkaido University)

Funding

The Japan Society for the Promotion of Science (JSPS)

- 2022-2025 **Grant-in-Aid for Challenging Research (Exploratory)**
PI: Prof. Eriko Kage-Nakadai
 Elucidation of anti-aging mechanism by spatio-temporal control and visualization of mitochondrial quality

RSK Sanyo Broadcasting Foundation

- 2022-2023 **Research Support**
 Creation of intracellular local temperature control technology using photofunctional nanoparticles
Budget: 500,000 JPY for 1 year.

The New Energy and Industrial Technology Development Organization (NEDO)

2022-2023 **Intensive Support for Young Promising Researchers Program**

Development of temperature measurement and thermal analysis technology using a nanodiamond quantum thermometer

Budget: 7,693,000 JPY for 1 year.

The Japan Agency for Medical Research and Development (AMED)

2021-2024 **Moonshot Research & Development Program**

PI: Prof. Hiroaki Murakami

Development of pre-symptomatic treatment by quantum technology neuromodulation medication targeting micro-inflammation around blood vessels leading to disease

The Japan Society for the Promotion of Science (JSPS)

2021-2024 **Fund for the Promotion of Joint International Research (Fostering Joint International Research (A))**

Multimodal quantum sensing thermometers for reliable nanoscale temperature measurements

Budget: 10,800,000 JPY for 3 years.

Mazda Foundation

2020-2021 **Research Budget**

Accurate temperature measurements of polymer nanostructures using fluorescent nanodiamonds

Budget: 1,000,000 JPY for 2 years

The Japan Society for the Promotion of Science (JSPS)

2020-2024 **Grant-in-Aid for Scientific Research (A)**

In-vivo sub-cellular thermometry toward quantitative thermal biology

Budget: 34,500,000 JPY for 4 years

The Japan Society for the Promotion of Science (JSPS)

2020-2023 **Grant-in-Aid for Scientific Research (B)**

PI: Prof. Yoshio Teki

Watanabe Foundation

2020- **Funding for Magnetism and Health**

3D mapping of neural magnetic field of thermosensory neurons in *C. elegans*

Budget: 1,000,000 JPY for 1 year

The Japan Society for the Promotion of Science (JSPS)

2019 - 2021 **Grant-in-Aid for Challenging Research (Exploratory),**

In-situ analysis of ultra-stable fluorescent nanoparticles confined in nanoscale structures

Budget: 5,000,000 JPY for 2 years

Osaka City University

2018 - 2020 **Strategic Research Project for Top-Priority Projects**

Spin-photonics Imaging for instrumentation and diagnosis

Budget: 14,000,000 JPY for 2 years

Osaka City University

2018 - 2019 **Strategic Research Project for Young Researchers**
Quantum nanosensor for nanofluidics measurements
Budget: 1,000,000 JPY for 1 year

Sumitomo Science Foundation

2018 - 2020 **Research Budget**
Ultra-precise temperature measurements of physiological activated state of stem-cell differentiation
Budget: 3,300,000 JPY for 2 years

Murata Science Foundation

2018 - 2020 **Research Budget**
Quantum-sensor-based in-vivo thermometry
Budget: 2,100,000 JPY for 2 years

Osaka City University

2017 - 2018 **Strategic Research Project for Young Researchers**
Photochemical analytic devices based on optical nanofibers
Budget: 1,000,000 JPY for 1 year

The Japan Society for the Promotion of Science (JSPS)

2017 - 2021 **Grant-in-Aid for Scientific Research (B)**
Efficient fluorescence detection of single molecules in liquid by using optical nanofibers
Budget: 14,100,000 JPY for 4 years

Ministry of Education, Culture, Sports, Science and Technology (MEXT)

2016 - 2021 **LEADER program**
Innovative nanoscale measurement and analytic tools based on quantum nanophotonics
Budget: 24,000,000 JPY for 5 years

The Japan Society for the Promotion of Science (JSPS)

2016 - 2018 **Grant-in-Aid for Challenging Exploratory Research**
The project is aimed for developing sensitive absorption-based spectroscopy by using nanophotonic structures for single non-fluorescent molecules
Budget: 2,900,000 JPY for 2 years

HORIBA Inc.

2015 - 2017 **2015 Horiba Masao Award Research Budget**
The project is aimed for supporting the researches on efficient detection of fluorescent nanoparticles.
Budget: 1,500,000- JPY for 3 years

The Japan Society for the Promotion of Science (JSPS)

2014- 2016 **Grant-in-Aid for Challenging Exploratory Research**
The project is aimed for developing sensitive absorption-based spectroscopy by using nanophotonic structures for single non-fluorescent molecules
Budget: 2,900,000- JPY for 2 years

The Japan Society for the Promotion of Science (JSPS)

2014- 2017 **Grant-in-Aid for Young Scientists (A)**

The project is aimed for developing sensitive absorption-based spectroscopy by using nanophotonic structures for single non-fluorescent molecules

Budget: 19,400,000- JPY for 3 years

Yamada Science Foundation

2013 - 2014 **Travel Grant for Overseas Research Stay**

The grant is to support the research stay in Humboldt University of Berlin, Germany.

Budget: 680,000- JPY for 1 year

The Japan Society for the Promotion of Science (JSPS)

2013- 2016 **Grant-in-Aid for Challenging Exploratory Research**

PI: Prof. Ryo Okamoto

The project is aimed for developing sensitive absorption-based spectroscopy by using nanophotonic structures for single non-fluorescent molecules

The Japan Society for the Promotion of Science (JSPS)

2011- 2013 **Grant-in-Aid for Young Scientists (B)**

The project is aimed for developing sensitive absorption-based spectroscopy by using nanophotonic structures for single non-fluorescent molecules.

Budget: 3,600,000- JPY for 2 years

The Japan Society for the Promotion of Science (JSPS)

2009-2011 **Grant-in-Aid for Young Scientists (Start-up)**

The project was aimed for applying efficient fluorescence detection technique using nanophotonic devices to single photosynthetic pigment-protein complexes.

Budget: 2,030,000- JPY for 2 years.