GEN **ENOMOTO**

POST-DOC BIOLOGIST JSPS RESEARCH FELLOW
Born on Jul. 7. 1988. Father of two children (6-yo son and 4-yo daughter).
The University of Electro-Communications,
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TRAINING/ EMPLOYMENT

Post-doc Japan Society for the Promotion of Science (JSPS) Restart Postdoctoral Research Fellow — *2022–2025*
The University of Electro-Communications,
Graduate School of Informatics and Engineering
Lab Head: Prof. Daisuke Nakane

Post-doc Japan Society for the Promotion of Science (JSPS) Overseas Research Fellow — *2020–2022*
Albert-Ludwigs-Universität Freiburg,
Institut für Biologie III
Lab Head: Prof. Annegret Wilde

Parental Leave (3 months) — *2018*

Post-doc EMBO Long-Term Fellow — *2018–2020*
Albert-Ludwigs-Universität Freiburg,
Institut für Biologie III
Lab Head: Prof. Annegret Wilde

Academic Fellow — *2018–2019*
The University of Tokyo,
Graduate School of Arts and Sciences
Host Researcher: Prof. Masahiko Ikeuchi

Assistant Professor — *2016–2018*
The University of Tokyo,
Graduate School of Arts and Sciences
Lab Head: Prof. Masahiko Ikeuchi

EDUCATION

PhD — *2013–2016*

The University of Tokyo,
Graduate School of Arts and Sciences
Dissertation: "Molecular mechanisms of cyanobacteriochrome signaling via c-di-GMP"
Supervisor: Prof. Masahiko Ikeuchi

MS ***2011–2013***
The University of Tokyo,
Graduate School of Arts and Sciences
Thesis: "Biochemical analysis of cyanobacteriochromes from a thermophilic cyanobacterium *Thermosynechococcus*"
Advisor: Prof. Masahiko Ikeuchi

BS ***2007–2011***
The University of Tokyo,
College of Arts and Sciences
Major: Biology

HONORS, AWARDS AND GRANTS

JSPS Restart Postdoctoral Research Fellowship ***2022–2025***

Grants-in-Aid for JSPS Fellows, ***2022–2025***

JSPS Overseas Research Fellowship ***2020–2022***

Associate PI of DFG priority programme SPP 1879 ***2019–2022***

EMBO Long-Term Fellowship ***2018–2020***

Grant-in-aid for Young Scientists (B) (Japan Society for the Promotion of Science (JSPS) KAKENHI grant No. 17K15244) ***2017–2019***

The president of Japanese society of young photosynthesis researchers ***2017***

Research Fellowships for Young Scientists by JSPS for Doctoral Course Students (DC1) ***2013–2016***

Grants-in-Aid for JSPS Fellows, ***2013–2016***

CONFERENCE PRESENTATIONS (INTERNATIONAL)

Oral

○Gen Enomoto, Daisuke Nakane, and Annegret Wilde
"**Light-dependent induction of cell polarity and switching of moving direction in a rod-shaped cyanobacterium *Thermosynechococcus***"
17th International Symposium on Phototrophic Prokaryotes (ISPP) (Liverpool, UK), ***August 2022***

Nibedita Priyadarshini, Niklas Steube, Dennis Wiens, Rei

Narikawa, Annegret Wilde, Georg K. A. Hochberg, and ○Gen Enomoto

"**Green light perception paved the way for the diversification of GAF domain photoreceptors**"
Young Researchers Symposium on Plant Photobiology 2020, (Online), ***March 2022***

Daisuke Nakane, ○Gen Enomoto, Annegret Wilde and Takayuki Nishizaka

"***Thermosynechococcus* switches the direction of phototaxis by a c-di-GMP dependent process with high spatial resolution**"
Green Aquatic Biology, German-Japanese meeting, (Potsdam, Germany), ***March 2022***

Daisuke Nakane, ○Gen Enomoto, Annegret Wilde and Takayuki Nishizaka

"***Thermosynechococcus* switches the direction of phototaxis by a c-di-GMP dependent process with high spatial resolution**"
6th Early Career Researcher Symposium on Cyanobacteria (Cyano2021), (Online), ***November 2021***

○Gen Enomoto and Masahiko Ikeuchi

"**Cyanobacteriochrome-mediated blue/green light signaling is a population density-sensing system under photosynthesis-driving red light**"
10th European Workshop on the Molecular Biology of Cyanobacteria, (Cluj-Napoca, Romania), ***August 2017***

○Gen Enomoto, Rei Narikawa, and Masahiko Ikeuchi

"Cyanobacteriochrome trio as color-sensitive light input module for c-di-GMP signaling"
9th European Workshop on the Molecular Biology of Cyanobacteria, ORAL3-6, (Texel, The Netherlands), ***September 2014***

Poster

Nucleotide Second Messenger Signaling in Bacteria SPP 1879 International Symposium 2022, P09, (Berlin, Germany), ***May 2022***

Bacterial Locomotion and Signal Transduction (BLAST) XVI meeting, (Online), ***January 2021***

Photosensory Receptors and Signal Transduction (GRC) Gordon Research Conference, #8, (Lucca (Barga), Italy), ***March 2018***

Photosensory Receptors and Signal Transduction (GRS) Gordon Research Seminar, #22, (Lucca (Barga), Italy), ***March 2018***

Nucleotide Second Messenger Signaling in Bacteria SPP 1879 International Symposium, P13, (Berlin, Germany), ***September 2018***
3rd Early Career Researcher Symposium on Cyanobacteria, P11, (Freiburg, Germany), ***September 2018***
17th International Congress on Photosynthesis Research (ICPR), 3D.25, (Maastricht, The Netherlands), ***August 2016***
15th International Symposium on Phototrophic Prokaryotes (ISPP), ID:169, (Tübingen, Germany), ***August 2015***
11th Workshop on Cyanobacteria 2013, no.24, (St. Louis, MO, USA), ***August 2013***
Internacional Symposium on Phototrophic Prokaryotes (ISPP) 2012, P49, (Porto, Portugal), ***August 2012***
International Conference On Tetrapyrrole Photoreceptors Of Photosynthetic Organisms (ICTPPO) 2011, P-D3, (Berlin, Germany), ***July 2011***

Teaching Experience

Albert-Ludwigs-Universität Freiburg Germany, ***2018–***
Post-doc

- Supervised one Bachelor student, one SPII student and one master student. Half-supervised one PhD student.

The University of Tokyo, Japan, ***2016–2018***
Assistant Professor, Graduate School of Arts and Sciences,

- Taught *Experimental course of Basic biology,* an undergraduate course averaging 120 students per day in summer semester in cooperation with 7~8 assistant professors, covering the following topics: molecular biology, microbiology, plant biology, cell biology, etc.

LANGUAGES

Japanese: Native Language
English: (TOEFL result: 93, ***2016***)
German: Intermediate

PUBLICATIONS

*Corresponding Author

Nakane, D.[*1], **Enomoto, G.**[*1], Wilde, A., and Nishizaka, T. (2022)
Thermosynechococcus switches the direction of phototaxis by a c-di-GMP dependent process with high spatial resolution.
eLife, 11, e73405

[1]equal contribution

Maeda, K., Okuda, Y., **Enomoto, G.**, Watanabe, S., and Ikeuchi, M.* (2021)
Biosynthesis of a sulfated exopolysaccharide, synechan, and bloom formation in the model cyanobacterium *Synechocystis* sp. strain PCC 6803.
eLife, 10, e66538.

Fushimi, K., Hasegawa, M., Ito, T., Rockwell, N. C., **Enomoto, G.**, Lagarias, J. C., Ikeuchi, M., and Narikawa, R.* (2020)
Evolution-inspired design of multicolored photoswitches from a single cyanobacteriochrome scaffold.
Proc. Natl. Acad. Sci. USA 117(27), 15573-15580

Enomoto, G., Kamiya, A., Okuda, Y., Narikawa, R., and Ikeuchi, M.* (2020)
Tlr0485 is a cAMP-activated c-di-GMP phosphodiesterase in a cyanobacterium *Thermosynechococcus*.
The Journal of General and Applied Microbiology 66(2), 147–152

Enomoto, G.* and Ikeuchi, M. (2020)
Blue/green light-responsive cyanobacteriochromes are cell shade sensors in red-light replete niches.
iScience 100936

Enomoto, G., Wilde, A., and Ikeuchi, M*. (2020)
Light-Regulated Nucleotide Second Messenger Signaling in Cyanobacteria.
Microbial Cyclic Di-Nucleotide Signaling (book chapter) 311-327

Enomoto, G.*, Okuda, Y., and Ikeuchi, M. (2018)
Tlr1612 is the major repressor of cell aggregation in the light-color-dependent c-di-GMP signaling network of *Thermosynechococcus vulcanus*.
Scientific reports 8, 5338

Hasegawa, M., Fushimi, K., Miyake, K., Nakajima, T., Oikawa, Y., **Enomoto, G.**, Sato, M., Ikeuchi, M., and Narikawa, R.* (2018)
Molecular characterization of DXCF cyanobacteriochromes from the cyanobacterium *Acaryochloris marina* identifies a blue-light power sensor.
J. Biol. Chem. 293, 1713-1727

Fushimi, K., **Enomoto, G.**, Ikeuchi, M., and Narikawa, R.* (2017)

Distinctive properties of dark reversion kinetics between two red/green-type cyanobacteriochromes and their application in the photoregulation of cAMP synthesis.
Photochem. Photobiol. 93, 681-691

Fushimi, K., Rockwell, N. C., **Enomoto, G.**, Ni Ni, W., Martin, S. S., Gan, F., Bryant, D. A., Ikeuchi, M., Lagarias, J. C., and Narikawa, R.* (2016)
Cyanobacteriochrome photoreceptors lacking the canonical Cys residue.
Biochemistry 55, 6981-6995

Fortunato, A. E., Jaubert, M., **Enomoto, G.**, Bouly, J. P., Raniello, R., Thaler, M., Malviya, S., Bernardes, J. S., Rappaport, F., Gentili, B., Huysman, M. J., Carbone, A., Bowler, C., d'Alcala, M. R.*, Ikeuchi, M., and Falciatore, A.* (2016)
Diatom phytochromes reveal the existence of far-red-light-based sensing in the ocean.
Plant Cell 28, 616-628

Enomoto, G., Ni Ni, W., Narikawa, R., and Ikeuchi, M.* (2015)
Three cyanobacteriochromes work together to form a light color-sensitive input system for c-di-GMP signaling of cell aggregation.
Proc. Natl. Acad. Sci. USA 112, 8082-8087

Narikawa, R.*, Nakajima, T., Aono, Y., Fushimi, K., **Enomoto, G.**, Ni Ni, W., Itoh, S., Sato, M., and Ikeuchi, M. (2015)
A biliverdin-binding cyanobacteriochrome from the chlorophyll *d*-bearing cyanobacterium *Acaryochloris marina*.
Scientific reports 5, 7950

Enomoto, G., Nomura, R., Shimada, T., Ni Ni, W., Narikawa, R., and Ikeuchi, M.* (2014)
Cyanobacteriochrome SesA is a diguanylate cyclase that induces cell aggregation in *Thermosynechococcus*.
J. Biol. Chem. 289, 24801-24809

Narikawa, R.*, **Enomoto, G.**, Ni Ni, W., Fushimi, K., and Ikeuchi, M. (2014)
A new type of dual-Cys cyanobacteriochrome GAF domain found in cyanobacterium *Acaryochloris marina*, which has an unusual red/blue reversible photoconversion cycle.
Biochemistry 53, 5051-5059

Enomoto, G., Hirose, Y., Narikawa, R., and Ikeuchi, M.* (2012)
Thiol-based photocycle of the blue and teal light-sensing cyanobacteriochrome Tlr1999.

Biochemistry 51, 3050-3058

PREPRINTS

Priyadarshini, N., Steube, N., Wiens, D., Narikawa, R., Wilde, A., Hochberg, G.* , and **Enomoto, G.*** (2021)
Green light perception paved the way for the diversification of GAF domain photoreceptors.
BioRxiv doi: https://doi.org/10.1101/2021.09.27.462012