

GEN ENOMOTO

POST-DOC BIOLOGIST JSPS OVERSEAS-RESEARCH FELLOW

Born on Jul. 7. 1988. Father of two children (6-yo son and 3-yo daughter).

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TRAINING/ EMPLOYMENT

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

2020-2022

Parental Leave (3 months)

2018

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

2018-2020

Academic Fellow
The University of Tokyo,
Graduate School of Arts and Sciences
Host Researcher: Prof. Masahiko Ikeuchi

2018-2019

Assistant Professor
The University of Tokyo,
Graduate School of Arts and Sciences
Lab Head: Prof. Masahiko Ikeuchi

2016-2018

EDUCATION

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

2013-2016

MS
The University of Tokyo,

2011-2013

Graduate School of Arts and Sciences
*Thesis: "Biochemical analysis of
cyanobacteriochromes from a thermophilic
cyanobacterium *Thermosynechococcus*"*
Advisor: Prof. Masahiko Ikeuchi

BS
The University of Tokyo,
College of Arts and Sciences
Major: Biology

2007-2011

**HONORS,
AWARDS AND
GRANTS**

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
Nibedita Priyadarshini, Niklas Steube, Dennis Wiens, Rei
Narikawa, Annegret Wilde, Georg K. A. Hochberg, and oGen
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, oGen 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, oGen 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**

o 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**

o 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 SPlI student and one master 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

¹equal 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>