

# 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,  
1-5-1 Chofugaoka, Chofu, Tokyo 182-8585, Japan

Email: [genenomoto@gmail.com](mailto:genenomoto@gmail.com)

Website: <https://genenomoto.github.io>

## 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**  
**Albert-Ludwigs-Universität Freiburg,**

2018-2020

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**  
o 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 SPlI 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.\*<sup>1</sup>, **Enomoto, G.\*<sup>1</sup>**, Bähre, H., Hirose, H., 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

<sup>1</sup>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.

## **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>