

Unit Name

Protein Engineering and Evolution Unit

Collaborations

Colin Jackson, ANU, Australia, The ultra-high affinity transport proteins of ubiquitous marine bacteria.

Lynn Kamerlin, Georgia Tech, USA, Redefining the Limits of Functional Continuity in the Early Evolution of P-Loop NTPases.

Shimon Bershtein, Ben Gurion University, Israel, Non-consecutive enzyme interactions within TCA cycle supramolecular assembly regulate carbon-nitrogen metabolism.

Research Personnel

Benjamin Clifton, Staff Scientist, A lecturer at University of Western Australia

Samuel Hauf, Staff Scientist, Working for the federal institute for risk assessment “Bundesinstitut für Risikobewertung (BfR)” in Berlin, Germany.

Dan Kehila, Postdoctoral Scholar

Prashant Jain, Postdoctoral Scholar

Yusran Abdillah Muthahari, Postdoctoral Scholar

Paul Matthay, Postdoctoral Scholar

Gen-ichiro Uechi, Research Unit Technician

Benjamin Clifton, Visiting Researcher

Paul Matthay, Benjamin Walter postdoctoral fellow

Elsie Dunkley, JSPS Postdoctoral Fellow

Karolina Honzejkova, JSPS Postdoctoral Fellow

Alessandro Bevilacqua, PhD Student

Yoshiki Ochiai, PhD Student

Dan Kozome, PhD Student

Erika Fukuhara, PhD Student

Lilian Magnus, PhD Student

Diana Nechepurenko, PhD Student

Amy Stanton Gooch, PhD Student

Maria Patricia Gorenflo, Special Research Student

Maria Grazia Mortaro, Research Intern

Milena Dobronos, Research Intern

Filippo Stocco, Research Intern

Mary Elizabeth Ludwig, Research Intern

Scholarly Contributions and Creative Productions (by Faculty)

Journal Article

1. Ochiai, Yoshiki, Ben E. Clifton, Madeleine Le Coz, Marco Terenzio, and Paola Laurino. 2024. "SUPREM: An Engineered Non-Site-Specific M6A RNA Methyltransferase with Highly Improved Efficiency." *Nucleic Acids Research* 52:12158–72.
2. Matthews, Melissa M., Tae Gyu G. Kim, Keon Youn Y. Kim, Vladimir Meshcheryakov, Higor Alve A. Iha, Miho Tamai, Daiki Sasaki, et al. 2024. "Engineered Protein Subunit COVID19 Vaccine Is as Immunogenic as Nanoparticles in Mouse and Hamster Models." *Scientific Reports* 14:25528.
3. Clifton, Ben E., Uria Alcolombri, Gen-Ichir I. Uechi, Colin J. Jackson, and Paola Laurino. 2024. "The Ultra-High Affinity Transport Proteins of Ubiquitous Marine Bacteria." *Nature* 634:721–28.
4. Jasinska, Weronika, Mirco Dindo, Sandra M C Cordoba, Adrian W R Serohijos, Paola Laurino, Yariv Brotman, and Shimon Bershtein. 2024. "Author Correction: Non-Consecutive Enzyme Interactions within TCA Cycle Supramolecular Assembly Regulate Carbon-Nitrogen Metabolism." *Nature Communications* 15:6196.
5. Jasinska, Weronika, Mirco Dindo, Sandra M C Cordoba, Adrian W R Serohijos, Paola Laurino, Yariv Brotman, and Shimon Bershtein. 2024. "Non-Consecutive Enzyme Interactions within TCA Cycle Supramolecular Assembly Regulate Carbon-Nitrogen Metabolism." *Nature Communications* 15:5285.
6. Kozome, Dan, Adnan Sljoka, and Paola Laurino. 2024. "Remote Loop Evolution Reveals a Complex Biological Function for Chitinase Enzymes beyond the Active Site." *Nature Communications* 15:3227.
7. Dindo, Mirco, Alessandro Bevilacqua, Giovanni Soligo, Vincenzo Calabrese, Alessandro Monti, Amy Q. Shen, Marco Edoard E. Rosti, and Paola Laurino. 2024. "Chemotactic Interactions Drive Migration of Membraneless Active Droplets." *Journal of the American Chemical Society* 146:15965–76.
8. Yusran Abdillah Muthahari, Lilian Magnus, Laurino, Paola. 2025. "From Duplication to Fusion: Expanding Dayhoff's Model of Protein Evolution." *Protein Science*.
<https://onlinelibrary.wiley.com/doi/10.1002/pro.70054>

Presentation at Conference

1. Laurino, Paola. 2025. "How Do Proteins Expand Functionality?" Plenary Lecture at the Institute for Protein Research International Conference 2025.
2. Laurino, Paola. 2024. "How Do Proteins Expand Functionality?" Keynote Lecture at Bio-Sakura Meeting, The Society for Biotechnology of Japan.
3. Laurino, Paola. 2024. "How Do Proteins Expand Functionality?" 4th Switzerland-Japan, Biomolecular Chemistry Symposium (SJBCS2024).
4. Laurino, Paola. 2024. "Indels: The Evolutionary Switches Bridging Protein Functions and Topologies." IUPAB 2024.
5. Laurino, Paola. 2024. "Indels: The Evolutionary Switches Bridging Protein Functions and Topologies." Pre-Symposium of ISBC2021.

Seminars

1. Laurino, Paola. 2025. "How Do Proteins Expand Functionality?"
2. Laurino, Paola. 2025. "How Do Proteins Switch Functionality? Diving into SAM Binding Proteins."
3. Laurino, Paola. 2024. "Expanding the Substrate Scope of Fluoroacetate Dehalogenase Enzymes."

Scholarly Contributions (by Unit Members)

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
Yusran Abdillah Muthahari	Journal Article	From duplication to fusion: Expanding Dayhoff's model of protein evolution	Protein Science	Wiley (Protein Science)	2025

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
Yoshiki Ochiai	Journal Article	SUPREM: an engineered non-site-specific m6A RNA methyltransferase with highly improved efficiency	Nucleic Acids Research	Oxford University Press	2024
Alessandro Bevilacqua	Journal Article	Enzyme Activity regulates Substrate Diffusion by modulating viscosity in Crowded Milieu	BioRxiv	BioRxiv	2024
Alessandro Bevilacqua	Journal Article	Chemotactic Interactions Drive Migration of Membraneless Active Droplets	Journal of the American Chemical Society	ACS	2024
Dan Kozome	Journal Article	Remote loop evolution reveals a complex biological function for chitinase enzymes beyond the active site	nature communications	Nature	2024
Ben Clifton	Journal Article	The ultra-high affinity transport proteins of ubiquitous marine bacteria	Nature	Springer Nature	2024
Paul Matthay	Other Scholarly Work	Pitch: Unlocking microbial PFAS-degradation with evolutionary approaches	OIST POC showcase	OIST	2025
Yoshiki Ochiai	Other Scholarly Work	Opinion - From the Field of Research: Lecture on 'How to Attend Conferences' for Graduate Students, No. 175	Experimental Medicine	Yodo-sha	2024
Amy Gooch	Poster Presentation at Conference	Breaking the Unbreakable: Engineering Enzymes to Crack the Fluorine Code	The 1st International SynBYSS Conference		2024
Dan Kozome	Poster Presentation at Conference	Protein Evolution and Enginering through remote loop regions	Japan Society for Bioscience, Biotechnology, and Agrochemistry		2025
Erika Fukuhara	Poster Presentation at Conference	Construction of highly efficient metabolic enzyme complexes by phase-separated droplets	GRC Conference: Enzymes, Coenzymes, and Metabolic Pathways		2024
Yoshiki Ochiai	Poster Presentation at Conference	Protein Engeneering by Ancestral Reconstruction: Overview and an Example	The 64th Biophysics Summer School for Young Scientists in Japan		2024
Dan Kozome	Poster Presentation at Conference	Protein Evolution and Enginering through remote loop regions	Protein Science Society of Japan		2024
Alessandro Bevilacqua	Poster Presentation at Conference	Chemotactic Interactions Drive Migration of Membraneless Active Droplets	FEBS2024		2024
Yoshiki Ochiai	Poster Presentation at Conference	SUPREM: An engineered non-site-specific m6A RNA methyltransferase with highly improved efficiency	Protein Science Society of Japan		2024
Dan Kozome	Poster Presentation at Conference	Protein Evolution and Enginering through remote loop regions	IPR International Conference		2025

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
Yoshiki Ochiai	Presentation at Conference	SUPREM: An engineered non-site-specific m6A RNA methyltransferase with highly improved efficiency	5th Protein Engineering Canada Conference		2024
Yoshiki Ochiai	Presentation at Conference	SUPREM: An engineered non-site-specific m6A RNA methyltransferase with highly improved efficiency	The Biophysical Society Annual Meeting 2025		2024
Elsie Dunkley	Presentation at Conference	Enzymatic responses to antibiotic stress	East Asia Joint Symposium		2024
Ben Clifton	Presentation at Conference	The ultrahigh affinity transport proteins of SAR11 marine bacteria	37th annual meeting of the Japanese Society of Microbial Ecology		2024

Honors, Awards & Fellowships

May 2023	Featured in ChemBioTalent, 2023, ChemBioTalent
2024 - Ongoing	Dr Karolina Honzejkova, Japan Society for the Promotion of Science (JSPS) postdoctoral fellowship # P24746, Dr Karolina Honzejkova, Japan Society for the Promotion of Science (JSPS) postdoctoral fellowship # P24746, 2024
2024 - Ongoing	Mr Dan Kozome, Japan Society for the Promotion of Science (JSPS), doctoral fellowship DC2 , Mr Dan Kozome, Japan Society for the Promotion of Science (JSPS), doctoral fellowship DC2 , 2024
2024 - Ongoing	Dr Elsie Dunkley, Japan Society for the Promotion of Science (JSPS) postdoctoral fellowship #P23754, Dr Elsie Dunkley, Japan Society for the Promotion of Science (JSPS) postdoctoral fellowship #P23754, 2023

Honors, Awards & Fellowships (only by unit members)

2024 - Ongoing	Yoshiki Ochiai, Travel Award, BPS2025 travel award for Graduate students, 2024, Biophysical Society, N/A
2024 - Ongoing	Ben Clifton, Excellent Presentation Award, Excellent Presentation Award, 2024, Japanese Society of Microbial Ecology, N/A
2024 - Ongoing	Karolina Honzejkova, JSPS Postdoctoral Fellowships for Research in Japan (Standard), JSPS Postdoctoral Fellowships for Research in Japan (Standard), 2024, JSPS, N/A
2024 - Ongoing	Amy Gooch, Poster Prize, Biotechnology for the Environment (Springer Nature), Bronze poster prize, 2024, J. Craig Venter Institute, N/A
2024 - Ongoing	Paul Matthay, Fellowship, Benjamin Walther Stipendium , 2024, Deutsche Forschungsgemeinschaft, N/A
2024 - Ongoing	Yoshiki Ochiai, Poster Prize, 優秀ポスター発表賞, 2024, The 64th Biophysics Summer School for Young Scientists in Japan, N/A
2024 - Ongoing	Dan Kozome, Fellowship, 特別研究員奨励金, 2024, JSPS, N/A

External Service

2024-09-01	Grant Review Committees, European science foundation , 1 application
2024-09-01	Reviewer for Journals, Nature Communications, 3 article
2024-09-01	Reviewer for Journals, Nucleic Acid Research, 1 article

2024-09-01	Reviewer for Journals, Protein Science, 3 article
2024-09-01	Reviewer for Journals, Nature Methods, 1 article
2024-09-01	Grant Review Committees, Keck Foundation, 1 application
2024-09-01	Reviewer for Journals, Nature, 1 article
2024-09-01	Grant Review Committees, Swiss National Science Foundation (SNSF), 1 application
2024-09-01	Grant Review Committees, U.S.-Israel Binational Science Foundation, 1 application
2024 - Ongoing	Member of Editorial Advisory Board of ACS Biochemistry, ACS Biochemistry
2024 - Ongoing	Co-founder of ROZ, Rosalind Franklin forum for female scientist, Open to all (www.rozforum.org) ROZ was awarded the Rita R. Colwell Impact Fund for the Advancement of Women in Science - ROZ initiative was highlighted in Nature Catalysis in July 2023 https://www.nature.com/articles/s41929-023-00991-8 - R-award for DEI initiative was promoted in the TransBio 2025 (Basel, CH)
2024 - Ongoing	Member of the Editorial Advisory Board of Protein Engineering Design and Selection, Protein Engineering Design and Selection

Outreach Activities (For Unit Members Only)

2024	Genichiro Uechi, OIST Science Festival 2025, OIST
2024	Paul Matthay, OIST Science Festival 2025, OIST
2024	Dan Kozone, OIST SEED program, OIST
2024	Ben Clifton, Onna x OIST School of Science, OIST