

Liam M. Longo, Ph.D.

CONTACT INFORMATION

Tokyo Institute of Technology
Earth-Life Science Institute
Tokyo, Japan

email: llongo@elsi.jp
phone:
webpage: liamlongo.org

PROFESSIONAL EXPERIENCE

Postdoctoral Fellow (Mar. 2020 – present)

Tokyo Institute of Technology, Earth-Life Science Institute, Tokyo, Japan
Blue Marble Space Institute of Science
Advisor: Shawn E. McGlynn

Koshland Postdoctoral Fellow (Mar. 2019 – Feb. 2020)

Weizmann Institute of Science, Department of Biomolecular Sciences, Rehovot, Israel
Advisor: Dan S. Tawfik

Senior Postdoctoral Fellow (Mar. 2018 – Feb. 2019)

Weizmann Institute of Science, Department of Biomolecular Sciences, Rehovot, Israel
Advisor: Dan S. Tawfik

Postdoctoral Fellow (Mar. 2015 – Feb. 2018)

Weizmann Institute of Science, Department of Biomolecular Sciences, Rehovot, Israel
Advisors: Dan S. Tawfik and Sarel J. Fleishman

EDUCATION

Florida State University

Ph.D., Molecular Biophysics (2014)
Dissertation: Symmetry and simplicity in protein evolution and design.

Florida State University

B.A., Biochemistry (2009)

TEACHING EXPERIENCE

Frontiers in Medicine, Protein Design Unit. (2014). Florida State University
Introductory Biology Lab for Majors. (2012). Florida State University
Introductory Chemistry Lab for Majors. (2009). Florida State University

GRANTS, AWARDS and FELLOWSHIPS

Innovation in Systems Biology Award (2017)

Department of Systems Biology, Weizmann Institute of Science

Koshland Prize (2015)

Feinberg Graduate School, Weizmann Institute of Science

Dean of Faculty Fellowship (2015)

Feinberg Graduate School, Weizmann Institute of Science

Dissertation Research Grant (2013)

The Graduate School, Florida State University

Kasha Award (2013)

Institute of Molecular Biophysics, Florida State University

Protein Science Best Paper Award (2012)

The Protein Society

Fisher Undergraduate Research Fellowship (2008)

American Cancer Society

Undergraduate Research and Creativity Award (2008)

The Office of Research, Florida State University

PROFESSIONAL ASSOCIATIONS

The Protein Society

The Protein Science Society of Japan (PSSJ)

PROFESSIONAL DEVELOPMENT

EMBO Laboratory Management Course (2017). Rehovot, Israel

Rosetta Boot Camp, Rosetta Academy (2015). Chapel Hill, USA

INVITED TALKS

Longo, L.M. (2019). Resolving the basic amino acid problem. 19th Annual Symposium of the Protein Science Society of Japan. Kobe, Japan

Longo, L.M. (2013). Experimental support for the foldability-function tradeoff hypothesis. 27th Annual Symposium of the Protein Society. Boston, USA

INTELLECTUAL PROPERTY

Blaber, M. and **Longo, L.M.** (2017). Synthetic foldable proteins generated from peptide segments of folding nuclei of reference proteins. U.S. Patent 9,783,587

PREPRINTS***Equal contribution**

Vyas, P., Trofimyuk, O., **Longo, L.M.**, Kumar-Deshmukh, F., Sharon, M., and Tawfik, D.S. (2020). Helicase-like functions in phosphate loop containing beta-alpha polypeptides. bioRxiv.

Longo, L.M., Jabłońska, J., Vyas, P., Kolodny, R., Ben-Tal, N., Tawfik, D.S. (2020). On the emergence of P-loop NTPase and Rossmann enzymes from a beta-alpha-beta ancestral fragment. bioRxiv.

PEER-REVIEWED PUBLICATIONS***Equal contributions**

Despotović, D.*, **Longo, L.M.***, Aharon, E., Kahana, A., Scherf, T., Gruic-Sovulj, I., Tawfik, D.S. (2020). Polyamines mediate folding of primordial hyper-acidic helical proteins. Biochemistry. (Accepted)

Longo, L.M.*, Despotović, D.*, Weil-Ktorza, O.*, Walker, M.J., Jabłońska, J., Fridmann-Sirkis, Y., Varani, G., Metanis, N., Tawfik, D.S. (2020). Primordial emergence of a nucleic acid-binding protein via phase separation and statistical ornithine-to-arginine conversion. *Proceedings of the National Academy of Sciences USA*. 117:15731-15739

- Faculty Opinions Recommendation

Longo, L.M., Petrović, D., Kamerlin, S.C.L. and Tawfik, D.S. (2020). Short and simple sequences favored the emergence of N-helix phospho-ligand binding sites in the first enzymes. *Proceedings of the National Academy of Sciences USA*. 117:5310-5318

Tenorio, C.A., **Longo, L.M.**, Parker, J.B., Lee, J., Blaber, M. (2020). Ab initio folding of a trefoil-fold motif reveals structural similarity with a β -propeller blade motif. *Protein Science*. 29:1172-1185

Davidi D, **Longo, L.M.**, Jabłońska, J., Milo, R., and Tawfik D.S. (2018). A bird's-eye view of enzyme evolution: chemical, physicochemical, and physiological considerations. *Chemical Reviews*. 118:8786-8797

Longo, L.M.*, Gao, Y.*, Tenorio, C.A., Wang, G., Paravastu, A.K. and Blaber, M. (2018). The folding nucleus structure persists in thermally-aggregated FGF-1. *Protein Science*. 27:431-440

Noda-Garcia, L., Romero-Romero, M.L., **Longo, L.M.**, Kolodkin-Gal, I. and Tawfik, D.S. (2017). *Bacilli* glutamate dehydrogenases diverged via coevolution of transcription and enzyme regulation. *EMBO Reports*. 7:1139-1149

Xia, X.*, **Longo, L.M.***, Sutherland, M.A. and Blaber, M. (2016). Evolution of a protein folding nucleus. *Protein Science*. 25:1227-1240

Longo, L.M., Tenorio, C.A., Kumru, O.S., Middaugh, C.R. and Blaber, M. (2015). Emergence of aromatic amino acid biosynthesis enables halophile to mesophile protein adaptation. *Protein Science*. 24:27-37

Xia, X., **Longo, L.M.** and Blaber, M. (2015). Mutation choice to eliminate buried free cysteines in protein therapeutics. *Journal of Pharmaceutical Science*. 104:566-576

Longo, L.M. and Blaber, M. (2015). Proteins: folding, misfolding, disordered proteins, and related diseases. *Encyclopedia of Cell Biology*. Academic Press, Oxford. 108-114

Longo, L.M., Kumru, O.S., Middaugh, C.R. and Blaber, M. (2014). Evolution and Design of Protein Structure by Folding Nucleus Symmetric Expansion. *Structure*. 22:1377-1384

Longo, L.M. and Blaber, M. (2014). Symmetric protein architecture in protein design: top-down symmetric deconstruction. *Methods in Molecular Biology*. 1216:161-182

- Cover Article

Longo, L.M. and Blaber, M. (2014). Prebiotic protein design supports a halophile origin of foldable proteins. *Frontiers in Microbiology*. 4:418-419

Stefanovic, L., **Longo, L.M.**, Zhang, Y., and Stefanovic, B. (2014). Characterization of binding of LARP6 to the 5' stem-loop of collagen mRNAs: implications for synthesis of type I collagen. *RNA Biology*. 11:1386-1401

Longo, L.M., Lee, J. and Blaber, M. (2013). Simplified protein design biased for prebiotic amino acids yields a foldable, halophilic protein. *Proceedings of the National Academy of Sciences USA*. 110:2135-2139

- 2013 Kasha Award
- Faculty Opinions Recommendation

Longo, L.M.*, Lee, J.*, Tenorio, C.A. and Blaber, M. (2013). Alternative folding nuclei definitions facilitate the evolution of a symmetric protein fold from a smaller peptide motif. *Structure* 21:2042-2050

- Longo, L.M.**, Şanlı-Mohamed, G. and Blaber, M. (2013). Biophysical characterization of a thermoalkalophilic esterase from *Geobacillus* sp. *Journal of Proteins and Proteomics*. 4:123-128
- Phipps, H., **Longo, L.M.**, Blaber, S.I., Blaber, M. and VanLandingham, J. (2013). Kallikrein-related peptidase 6: a biomarker for traumatic brain injury in rat. *Journal of Brain Injury*. 27:1698-1706
- Longo, L.M.**, Lee, J. and Blaber, M. (2012). Experimental support for the foldability-function tradeoff hypothesis: segregation of the folding nucleus and functional regions in FGF-1. *Protein Science*. 21:1911-1920
- 2012 Protein Science Best Paper Award
- Longo, L.M.** and Blaber, M. (2012). Protein design at the interface of the prebiotic and biotic worlds. *Archives of Biochemistry and Biophysics*. 526:16-21
- Blaber, M., Lee, J. and **Longo, L.M.** (2012). Emergence of symmetric protein architecture from a simple peptide motif: evolutionary models. *Cellular and Molecular Life Sciences*. 69:3999-4006
- Longo, L.M.** and Blaber, M. (2012). Protein design—a vast unexploited resource. *Journal of Proteins and Proteomics*. 3:78-83
- Lee, J., Dubey, V.K., **Longo, L.M.** and Blaber, M. (2008). A logical OR redundancy within the Asx-Pro-Asx-Gly type I β -turn motif, *Journal of Molecular Biology*. 377:1251-1264
- Hacisalihoglu, G., Ji, P., **Longo, L.M.**, Olson, S., and Momol, T.M. (2007). Bacterial wilt induced changes in nutrient distribution and biomass and the effect of acibenzolar-S-methyl on bacterial wilt in tomato. *Crop Protection*. 26:978-982
- Hacisalihoglu, G., Duke, E. and **Longo, L.M.** (2005). Differential response of common bean genotypes to mycorrhizal colonization. *Proceedings of the Florida State Horticultural Society*. 118:150-152

REFERENCES

Dan S. Tawfik, Ph.D.

Professor
Department of Biomolecular Sciences
Weizmann Institute of Science
Rehovot, Israel
dan.tawfik@weizmann.ac.il

Michael Blaber, Ph.D.

Professor
Department of Biomedical Sciences
Florida State University
Tallahassee, USA
michael.blaber@med.fsu.edu

Shawn E. McGlynn, Ph.D.

Associate Professor
Earth-Life Science Institute
Tokyo Institute of Technology
Tokyo, Japan
mcglynn@elsi.jp

Shina Caroline Lynn Kamerlin, Ph.D.

Professor
Department of Chemistry-BMC
Uppsala University
Uppsala, Sweden
lynn.kamerlin@kemi.uu.se