

# Elaine Luo

Weston Howland Jr. Postdoctoral Scholar  
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## EDUCATION

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- 2020     **PhD** in Marine Biology  
“Viral diversity and dynamics in the open ocean”, mentor: Edward DeLong  
*University of Hawai‘i*, Honolulu, USA
- 2014     **Honors BSc** with High Distinction (eq. summa cum laude)  
Ecology and Evolutionary Biology Specialist (eq. to double major)  
*University of Toronto*, Toronto, Canada

## PEER-REVIEWED PUBLICATIONS

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\* co-first authors

*in review*

12. Hackl T, Trigodet F, Eren M, Biller S, Eppley J, **Luo E**, Burger A, DeLong E, Fischer M.  
proofframe: frameshift-correction for long-read (meta)genomics.

*in revision*

11. Hackl T, Laurenceau R, Ankenbrand M, Bliem C, Cariani Z, Thomas E, Dooley K, Arellano A,  
Hogle S, Berube P, Leventhal G, **Luo E**, et al. Novel integrative elements and genomic  
plasticity in ocean ecosystems.

*published*

10. **Luo E**, Leu A, Eppley J, Karl D, DeLong E. 2022. Diversity and origins of bacterial and archaeal  
viruses on sinking particles reaching the abyssal open ocean. *ISME Journal*
9. Linney M, Eppley J, Romano A, **Luo E**, DeLong E, Karl D. 2022. Microbial sources of extracellular  
DNA in the ocean. *Applied & Environmental Microbiology*
8. **Luo E**, Eppley J, Romano A, Mende D, DeLong E. 2020. Virioplankton population dynamics and  
reproductive strategies in the oligotrophic open ocean water column. *ISME Journal* 14: 1304-  
1315
7. Beaulaurier J,\* **Luo E\***, Eppley J\*, Den Uyl P, Dai X, Turner D, Pendelton M, Juul S, Harrington  
E, DeLong E. 2020. Assembly-free single-molecule sequencing recovers complete virus  
genomes from natural microbial communities. *Genome Research* 30(3): 437-446
6. Coenen A\*, Hu S\*, **Luo E\***, Muratore D\*, Weitz J. 2020. A primer for microbiome time-series  
analysis. *Frontiers in Genetics* 11: 310

5. McMullen A\*, **Luo E\***, Martinez-Hernandez F, Tominaga K, Ogata H, Yoshida T, DeLong E, Martinez-Garcia M. 2020. Diel cycling of the cosmopolitan abundant Pelagibacter virus 37-F6: one of the most abundant viruses on Earth. *Environmental Microbiology Reports* 12(2): 214-219
4. **Luo E**, Aylward F, Mende D, DeLong E. 2017. Bacteriophage distributions and temporal variability in the ocean's interior. *mBio* 8(6): 01903-17
3. Wheeler J, **Luo E**, Helfrich K, Anderson E, Starczak V, Mullineaux L. 2017. Light stimulates swimming behavior of larval eastern oysters (*Crassostrea virginica*) in turbulent flow. *Marine Ecology Progress Series* 571: 109-120
2. Dutton EM, **Luo E**, Cembrowski A, Shore J, Frederickson M. 2016. Three's a crowd: trade-offs between attracting pollinators and ant bodyguards with nectar rewards in *Turnera*. *The American Naturalist* 188(1): 38-51
1. **Luo E**, Ogilvie J, Thomson J. 2014. Stimulation of flower nectar replenishment by removal: A survey of eleven animal-pollinated plant species. *Journal of Pollination Ecology* 12(7): 52-62

#### SELECTED RESEARCH APPOINTMENTS

\* acquired independent research funding

2021-	<b>Weston Howland Jr. Postdoctoral Scholar*</b> Mentor: Julie Huber, <i>Woods Hole Oceanographic Institution</i> , Woods Hole, USA Virus-induced carbon cycling in the dark ocean using DNA stable isotope probing
2020-21	<b>Postdoctoral scholar</b> Mentor: Edward DeLong, <i>University of Hawai'i</i> , Honolulu, USA Molecular inventory of viral particles; diversity and prevalence of viral parasites
2015-20	<b>Graduate research assistant*</b> Mentor: Edward DeLong, <i>University of Hawai'i</i> , Honolulu, USA Viral diversity, spatiotemporal dynamics, and implications for biogeochemical cycling
2014	<b>Guest student research fellow</b> Mentor: Matt Johnson, <i>Woods Hole Oceanographic Institution</i> , Woods Hole, USA Effect of cell-cell interactions on heat-stressed coral symbiont <i>Symbiodinium</i>
2013-14	<b>Honors BSc independent project</b> Mentor: Megan Frederickson, <i>University of Toronto</i> , Toronto, Canada Trade-offs in multiple mutualistic interactions in ant-plant-pollinator systems
2013	<b>Summer Student Fellow*</b> Mentor: Lauren Mullineaux, <i>Woods Hole Oceanographic Institution</i> , Woods Hole, USA Bio-physical interactions: quantifying larval swimming using particle image velocimetry
2012	<b>NSERC-USRA scholar*</b> <i>Toronto and Region Conservation Authority</i> , Toronto, Canada Habitat connectivity in Toronto river systems

2011      **Independent student scholar\***  
Mentor: James Thomson, *University of Toronto*, Toronto, Canada  
& *Rocky Mountain Biological Laboratory*, Crested Butte, USA  
Removal-enhanced nectar replenishment in Colorado wildflowers

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**RESEARCH GRANTS AND SCHOLARSHIPS**    open to **(I)** institutional **(N)** national **(Int)** international  
total awarded ~\$398 285

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submitted	“Viral transformation of carbon in the dark ocean” <i>National Science Foundation</i>	
2021-23	<b>(Int) Weston Howland Jr. Postdoctoral Scholarship</b> <i>Woods Hole Oceanographic Institution</i>	\$105 875
2016-19	<b>(N) Postgraduate Scholarship</b> <i>Natural Sciences and Engineering Research Council of Canada</i> Canadian equivalent of US NSF-GRFP	\$63 000
2018	<b>(Int) Travel Award for Young Scientists</b> <i>International Society for Microbial Ecology</i>	\$910
2016-18	<b>(I) Sea Grant</b> , graduate student co-author <i>University of Hawai‘i</i>	\$168 000
2015	<b>(I) Exploration Fund Grant</b> <i>Explorer’s Club</i>	\$1500
2015	<b>(I) Edmondson Research Grant</b> <i>University of Hawai‘i</i>	\$2000
2014	<b>(N) Canadian Graduate Scholarship</b> \$17 500, declined, untenable internationally <i>Natural Sciences and Engineering Research Council of Canada</i> Canadian equivalent of one year of US NSF-GRFP	
2014	<b>(I) Margaret Addison Scholarship</b> <i>University of Toronto</i> Awarded biennially to one student to pursue graduate research internationally	\$5000
2013	<b>(Int) Travel Award</b> <i>Woods Hole Oceanographic Institution</i> 3/~30 Summer Student Fellows nominated to present work at conference of choice	~\$2500
2013	<b>(Int) Summer Student Fellowship</b> <i>Woods Hole Oceanographic Institution</i>	~\$9000
2012-13	2x <b>(N) Undergraduate Student Research Award</b> <i>Natural Sciences and Engineering Research Council of Canada</i> Canadian equivalent of US NSF-REU	\$9000

2012	<b>(I) Center for Global Change Sciences Research Award</b> \$8000, declined for above <i>University of Toronto</i>	
2012	<b>(I) Walter and Mary Tuohy Award for Field Research</b> <i>University of Toronto</i>	\$2000
2012	<b>(I) Milne Research Award</b> <i>University of Toronto</i>	\$2000
2011	<b>(I) International Research Experience Award</b> <i>University of Toronto</i>	\$2000

#### SELECTED AWARDS AND SCHOLARSHIPS

**(M)** merit **(F)** financial need **(L)** leadership

2015-20	4x <b>(M)</b> Graduate Student Organization Award, <i>University of Hawai'i</i>
2019	<b>(M)</b> Maile Mentorship Bridge Program Award, <i>University of Hawai'i</i>
2019	<b>(M)</b> Best Poster Award, <i>FEMS Microbiology, Gordon Research Conference</i>
2010-14	4x <b>(M)</b> Dean's List Scholar, <i>University of Toronto</i>
2014	<b>(MF)</b> Hosinec Family Scholarship, <i>University of Toronto</i>
2013	<b>(MF)</b> James Bruce Falls Scholarship in Ecology and Evolutionary Biology
2013-14	2x <b>(ML)</b> Regents Scholarship, <i>University of Toronto</i>
2012-13	2x <b>(M)</b> McCuaig Muriel Memorial Scholarship in French, <i>University of Toronto</i>
2012	<b>(MF)</b> J.R. Dymond Memorial Award, <i>University of Toronto</i>
2011	<b>(MF)</b> Tsui Jenny and Frank Award, <i>University of Toronto</i>
2010	<b>(M)</b> Ontario Scholar Award

#### TEACHING, MENTORING, AND OUTREACH

2021	<b>Science panelist</b> for high school students <i>BETA camp</i>
2015-19	<b>Mentor</b> for local Hawai'i students transferring from Kapi'olani Community College Maile mentoring bridge, Global and Environmental Sciences <i>University of Hawai'i</i>
2016	<b>Volunteer</b> for K-12 outreach on ocean microbes School of Oceanography, Earth Science, and Technology Open House <i>University of Hawai'i</i>
2015	<b>Mentor</b> in the Honolulu District Science Fair High school mentee won the agency's Junior Stockholm award and Best in Category
2014	<b>Instructor</b> for Genetics Laboratory BIOL 375 L Teaching laboratory techniques in genetics to upper-year undergraduates <i>University of Hawai'i</i>

- 2014      **Mentor** for undergraduate students in the Frederickson lab  
Training ~5 undergraduate students in experimental data collection  
*University of Toronto*
- 2013      **Science blog writer**, WHOI through the perspective of a Summer Student Fellow  
www.whoissf2013.wordpress.com  
*Woods Hole Oceanographic Institution*
- 2012-13      **Mentor** for undergraduate student researchers  
Research Opportunity Program, *University of Toronto*
- 2011-14      **Tutor** for undergraduate students in biology, mathematics, and statistics  
*University of Toronto*
- 2011-14      **Community outreach and reading mentor** for low-income communities  
Ideas for the World, *University of Toronto*

## LEADERSHIP AND SERVICE

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- 2021-      **President**  
Postdoctoral Association, *Woods Hole Oceanographic Institution*
- 2019      **Early Career Scientist inaugural meeting organizer**  
Simons Collaborations on Ocean Processes and Ecology, *Simons Foundation*
- 2017-19      **Graduate program representative** for reviewing grant funding proposals  
Graduate Student Organization, *University of Hawai'i*
- 2012-14      **Co-President** for departmental student organization  
Ecology and Evolutionary Biology, *University of Toronto*
- 2011-12      **Secretary** for departmental student organization  
Ecology and Evolutionary Biology, *University of Toronto*

*Ad hoc* peer-reviewer for journals: PeerJ, Frontiers in Virology, Water Research, Microbiome, mSystems

## SELECTED RESEARCH PRESENTATIONS

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\* award

**Luo E**, Leu A, Eppley J, Karl D, DeLong E. 2022. Diversity and origins of bacterial and archaeal viruses on sinking particles reaching the abyssal ocean. *Ocean Sciences Meeting*, online

**\*Luo E**, Eppley J, Romano A, Mende D, DeLong E. 2019. Viral population dynamics and reproductive strategy in the open oceans. *Applied and Environmental Microbiology Gordon Research Seminar and Conference*, South Hadley, USA

- Luo E**, Eppley J, Mende R, DeLong E. 2018. Spatiotemporal dynamics of bacteriophages and their hosts in the North Pacific Subtropical Gyre. *ISME Symposium*, Leipzig, Germany
- Luo E**, Aylward F, Eppley J, DeLong E. 2018. Bacteriophage distributions in the ocean's interior. *Ocean Sciences Meeting*, Portland, USA
- Luo E**, Aylward F, Eppley J, Romano A, DeLong E. 2017. Depth structure and function of marine bacteriophage in the North Pacific Subtropical Gyre. *ASLO Meeting*, Honolulu, USA
- Luo E**, Dutton E, Cembrowski A, Frederickson M. 2014. Multiple mutualistic interactions: regulation of two mutualistic rewards. *Ecology and Evolutionary Biology Symposium*, Toronto, Canada
- Luo E**, Wheeler J, Helfrich K, Anderson E, Mullineaux L. 2014. Effects of light and turbulence on swimming behavior of larval eastern oysters (*Crassostrea virginica*). *Ocean Sciences Meeting*, Honolulu, USA
- Luo E**, Ogilvie J, Thomson J. 2013. Nectar replenishment in wildflowers of Colorado. *Ontario Ecology, Ethology, and Evolution Colloquium*, London, Canada

## ACADEMIC SOCIETIES

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|-------|---|
| 2022- | American Society of Microbiology (ASM)                            |
| 2021- | Society for Women in Marine Sciences (SWMS)                       |
| 2018- | International Society for Microbial Ecology (ISME)                |
| 2013- | Association for the Sciences of Limnology and Oceanography (ASLO) |

## PROFESSIONAL SKILLS

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| Computing      | Linux bash, Slurm, Python, R, Matlab, HTML, SAS, ArcGIS, ImageJ  |
| Laboratory     | DNA/RNA: collection, extraction, sequencing<br>PCR: standard, quantitative, digital drop<br>microscopy: epifluorescence, electron  |
| Sea            | 2019 R/V Kilo Moana, HOT312: viruses and viral parasites at Station ALOHA<br>2016 R/V KOK, SCOPE-dipole: cellular and viral diversity in two mesoscale eddies<br>2016 R/V Kilo Moana, HOT282: viruses at Station ALOHA |
| Culturing      | Plants, fish, marine invertebrates, microbes   |
| Certifications | AAUS scientific diver, NAUI master diver, nitrox, rescue diver, CPR, first aid   |
| Languages      | English (fluent)<br>Chinese (native, intermediate)<br>French (elementary)  |