Blair G. Paul
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Education

U.C. Santa Barbara	Marine Science	Ph.D 2013
Coastal Carolina University	Marine Science	B.Sc. 2008

Professional Appointments

2019 – present	*Assistant Scientist;* Josephine Bay Paul Center for Comparative Molecular Biology and Evolution, Marine Biological Laboratory, Woods Hole, MA
2018 – *2019*	*Assistant Researcher;* California NanoSystems Institute, UC Santa Barbara, Santa Barbara, CA
Fall 2017 & 2018	*Lecturer*; Department of Earth Science, UC Santa Barbara, Santa Barbara, CA
2016 – 2018	*C-DEBI Postdoctoral Fellow*; Marine Science Institute, UC Santa Barbara, Santa Barbara, CA
2013 – 2016	*Postdoctoral Scholar*; Marine Science Institute, UC Santa Barbara, Santa Barbara, CA
2008-2013	*Graduate Student Researcher*; Marine Science Institute, UC Santa Barbara, Santa Barbara, CA

Publications

V Kivenson, BG Paul, and DL Valentine. An ecological basis for dual genetic code expansion in marine deltaproteobacteria
bioRxiv 03.15.435355. Doi: https://doi.org/10.1101/2021.03.15.435355

S Roux, BG Paul, SC Bagby, MA Allen, G Attwood, R Cavicchioli, L Chistoserdova, S Hallam, ME Hernandez, M Hess, WT Liu, and EA Eloe-Fadrosh. Ecology and molecular targets of hypermutation in the global microbiome.
bioRxiv (2020 preprint)

A Vallota-Eastman EC Arrington, S Meeken, S Roux, K Dasari, S Rosen, JF Miller, DL Valentine, and BG Paul (2020) Role of diversity-generating retroelements for regulatory pathway tuning in cyanobacteria.
BMC genomics, 21: 1-13. Doi:10.1186/s12864-020-07052-5

CMK Sieber, BG Paul, C Castelle, P Hu, BC Thomas, S Tringe, DL Valentine, G Andersen, and JF Banfield (2019) Unusual metabolism and hypervariation in the genome of a Gracilibacteria (BD1-5) from an oil degrading community.
MBio, 10. Doi: 10.1128/mBio.02128-19

Z Cui, V Kivenson, N Liu, A Xu, X Luan, W Gao, B Paul, and DL Valentine, (2019) Complete Genome Sequence of Cycloclasticus sp. Strain PY97N, Which Includes Two Heavy Metal Resistance Genomic Islands.
Microbiology resource announcements, 8(40).

V Kivenson, KL Lemkau, O Pizarro, DR Yoerger, C Kaiser, RK Nelson, C Carmichael, BG Paul, CM Reddy, and DL Valentine (2019). Ocean dumping of containerized DDT waste was a sloppy process.
Environmental science & technology. 53. Doi:10.1021/acs.est.8b05859

BG Paul, D Burstein, CJ Castelle, S Handa, D Arambula, E Czornyj, BC Thomas, P Ghosh, JF Miller, JF Banfield, and DL Valentine (2017). Retroelement-guided protein diversification abounds in vast lineages of Bacteria and Archaea.
Nature Microbiology, 2,17045. Doi:10.1038/nmicrobiol.2017.45

BG Paul, H Ding, SC Bagby, MY Kellermann, MC Redmond, GL Andersen, and DL Valentine (2017) Methane-Oxidizing Bacteria Shunt Carbon to Microbial Mats at a Marine Hydrocarbon Seep.
Frontiers in Microbiology, 8. Doi:10.3389/fmicb.2017.00186

BJ Campbell, BJ, AL Sessions, DN Fox, BG Paul, Q Qin, MY Kellermann, and DL Valentine (2017) Minimal influence of [NiFe] hydrogenase on hydrogen isotope fractionation in H2-oxidizing Cupriavidus necator.
Frontiers in Microbiology. 8. Doi:10.3389/fmicb.2017.01886

S Handa, BG Paul, JF Miller, DL Valentine, and P Ghosh (2016) Conservation of the C-type lectin fold for accommodating massive sequence variation in archaeal diversity-generating retroelements.
BMC Structural Biology, 16,13. Doi:10.1186/s12900-016-0064-6

BG Paul, SC Bagby, E Czornyj, D Arambula, S Handa, A Sczyrba, P Ghosh, JF Miller and DL Valentine (2015) Targetted diversity generation by intraterrestrial archaea and archaeal viruses.
Nature Communications 6. Doi:10.1038/ncomms7585.

Teaching Experience
Fall 2018 – Lecturer, Introduction to Oceanography, Dept. of Earth Science, UCSB
Fall 2017 – Lecturer, Introduction to Oceanography, Dept. of Earth Science, UCSB
Winter 2017 – Group Lead, Informal workshop on Metagenomics, UCSB
2008-2012 – Teaching Assistant for Oceanography and Geological Catastrophes, Dept. of Earth Science, UCSB

Funding and Grants
- Gordon and Betty Moore Foundation Symbiosis Model Systems Initiative Grant
  BG Paul (Lead, MBL); P Ghosh (UCSD), JF Banfield (UCB), D Valentine (UCSB)
  2020 – 2023

- Gordon and Betty Moore Foundation Symbiosis Model Systems Initiative Grant
  ZG Cardon (Lead, MBL), SE Ruff (MBL), AE Giblin (MBL), BG Paul (MBL)
  2020 - 2023

- California NanoSystems Institute (CNSI) Challenge Grant
  DL Valentine (Lead, UCSB); BG Paul (UCSB); EG Wilbanks (UCSB); JF Miller (UCLA); P Ghosh (UCSD)
  2018 – 2020

- NSF XSEDE Supercomputing Research Allocation (Award: DEB170007)
  BG Paul; V Kivenson
  2017 – present

- Center for Dark Energy Biosphere Investigations (C-DEBI) Postdoctoral Fellowship
  2016 – 2018

Presentations

BG Paul *Genome Variation and Accelerated Evolution in Bacteria, Archaea, and Viruses* **Invited Talk**. 2019. Marine Biological Laboratory, Woods Hole, MA

BG Paul, O Nigro, V Kivenson, M Rappe, G Steward, DL Valentine. *Accelerated evolution by archaeal viruses: a fast race to keep in place?* **Invited Talk**. 2018. University of Hawaii, Oahu, HI

BG Paul, O Nigro, V Kivenson, M Rappe, G Steward, DL Valentine. *Rapid protein evolution in bacteria, archaea, and viruses from subsurface environments*. **Invited Talk**. 2018 Earth Science Seminar, UC Santa Barbara, CA.

BG Paul. *Localized genomic hypervariability in bacteriophage and subsurface archaeal viruses*. **Invited Talk**. 2017 **C-DEBI Annual Meeting**, Monterey, CA.

BG Paul D Burstein, CJ Castelle, S Handa, D Arambula, E Czornyj, BC Thomas, P Ghosh, JF Miller, JF Banfield, and DL Valentine. *Targeted mutation in members of candidate archaeal and bacterial phyla*. Oral Presentation. 2017 **SoCal Geobiology Symposium**, Los Angeles, CA.

BG Paul D Burstein, CJ Castelle, S Handa, D Arambula, E Czornyj, BC Thomas, P Ghosh, JF Miller, JF Banfield, and DL Valentine. *Subsurface metagenomes uncover a vast repertoire of hypervariable proteins encoded by genetic elements in uncultivated organisms and viruses*. Oral presenetation. 2016 **AGU General Meeting**, San Francisco, CA.

BG Paul. *Extraordinary genetic variation offers symbionts an adaptive response to biological and environmental stress*. Oral Presentation. 2016 Interdepartmental Graduate Program in **Marine Science Seminar** (Invited Speaker), UC Santa Barbara, CA.

BG Paul, SC Bagby, and DL Valentine. *Microbial metagenomes reveal that diversification via retrohoming is a globally distributed phenomenon*. Poster. 2015 **ASM General Meeting**, New Orleans, LA.

BG Paul, SC Bagby *Reverse transcriptase directs viral evolution in a deep ocean methane seep*. 2013 **AGU Fall Meeting**, San Francisco, CA.

BG Paul. (2013) *Carbon, Energy, and Genetic Exchange Among Cold Seep Microbiota*, UC Santa Barbara.

BG Paul, H Ding, SC Bagby, and DL Valentine. *Methane-oxidizing bacteria shunt carbon to microbial mats at a hydrocarbon seep*. Poster. 2012 **ASM General Meeting,** San Francisco, CA.

BG Paul, and DL Valentine. *Linking marine viruses to methane-oxidizing hosts with stable isotope probing and metagenomic analysis*. Poster. 2011 **ASM General Meeting**, New Orleans, LA.

BG Paul. *Comparative metagenomic analysis of marine phage from two methanotrophic communities*. Poster. 2010 **Genomic Standards Consortium Meeting**, Argonne National Laboratory, Chicago, IL.

Fellowships and Awards
Center for Dark Energy Biosphere Investigations (C-DEBI) Postdoctoral Fellow (2016 -)
ASM General Meeting Outstanding Student Poster Award (2012)
ASM General Meeting Outstanding Student Poster Award (2011)
Faculty's Distinguished Student Excellence Award, Coastal Carolina University (2008)
Origins of Life Undergraduate Research Fellow, Harvard University (2007)

Ad-Hoc Reviewer
Cell
Microbiome
Molecular Biology and Evolution
The ISME Journal
Environmental Microbiology
Nature Microbiology
Biogeosciences

Skills
For over 10 years, BGP has gained experience with laboratory techniques relevant to microbiome investigations. Specific work involved microbial enrichment experiments, virus purification, stable isotope probing, and various molecular assays. BGP is skilled in analysis of high throughput sequencing datasets using computational tools and is proficient in coding with R and Python with emphasis in bioinformatics, statistics, and visualization of scientific data. BGP has expertise in utilizing or adapting existing bioinformatic tools for genome reconstruction, identification of hypervariable elements, prediction of protein structure and function, and phylogenetic analysis. Moreover, BGP has provided training in these areas as a mentor to undergraduate and graduate students at UC Santa Barbara.

Field and Cruise Experience
BGP has been involved on two oceanographic research cruises aboard R/V Atlatntis – AT-15-53 and AT-26-06. As a certified AAUS Scientific Diver, BGP participated in research diving fieldwork for UC Santa Barbara in the Coal Oil Point hydrocarbon seep field.