

J. Cesar Ignacio Espinoza Ph.D.

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Research Interests: Understanding the ecological and evolutionary mechanisms that structure microbial communities with special emphasis in virus-host interactions via 'omics technologies and bioinformatics approaches.

Keywords: Bioinformatics, Microbial Ecology, Marine Microbes, Genomics, Metagenomics, Metatranscriptomics, Metaproteomics, Virus-Host interactions.

Education:

- University of Arizona, Tucson, AZ. Ph.D. Molecular and Cellular Biology, January 2015.
- University of Arizona, Tucson, AZ. M.Sc. Ecology and Evolutionary Biology, August 2010.
- Tecnológico del Valle de Oaxaca, México. B.Sc. Biology, emphasis: Botany, June 2007.

Positions/Appointments:

Jan 2018-Present	Research Laboratory Specialist. Marine Environmental Biology, University of Southern California, PI: Jed A. Fuhrman
Sep 2015-Dec 2017	Postdoctoral Research Fellow. Marine Environmental Biology, University of Southern California, PI: Jed A. Fuhrman
Feb 2015-Sep 2015	Postdoctoral Research Associate I. Department of soil water and environmental science, University of Arizona, PI: Virginia I. Rich
2010-2015	Graduate Research Assistant. Department of molecular and cellular biology, University of Arizona, PI: Matthew B. Sullivan
2008-2010	Fulbright Fellow. Department of ecology and evolutionary biology, University of Arizona, PI: Matthew B. Sullivan

Awards and Scholarships:

- **Young Scientist Award**, International Conference on Genomics – Ocean, Qingdao, China, October 2018. 120,000 RMB (16,800 USD)
- **ISME17 Travel Award**, ISME17 Leipzig Germany, August 2018. 800 EUR (910 USD)
- **USC-CONACyT Provost Postdoctoral Fellowship**, Los Angeles CA, 2015-2017 136,000 USD
- **Galileo Circle Scholarship**, University of Arizona College of Science, April 2014. 1,000 USD
- **Complemento Scholarship**, Ministry of Public Education, Mexico, 2013-2014. 5,000 USD
- **IRES-SBR**, International Research Experience for Students, Station Biologique de Roscoff (SBR). 2009
- **Fulbright Scholarship**, University of Arizona. Ecology and evolutionary biology, 2008-2010. 43,000 USD
- **CONACyT Scholarship**, National Council for Science and Technology, Mexico, 2002-2007 60,000 MXN (~6,000) USD

Published Manuscripts:

1. 2020. A.M. Long, S. Hou, **J.C. Ignacio-Espinoza** and J.A. Fuhrman. [Benchmarking microbial growth rate predictions from metagenomes](#). In Press ISME

2. 2020. Wang, W., J. Ren, K. Tang, E. Dart, **J.C. Ignacio-Espinoza**, J.A. Fuhrman, J. Braun, F. Sun & N. Ahlgren [A network-based integrated framework for predicting virus-host interactions](#). *In Press NAR Genomics and Bioinformatics*
3. 2020. **Ignacio-Espinoza J.C.**, N. Ahlgren & J.A. Fuhrman (2019) [Long-term stability and Red Queen-like strain dynamics in marine viruses](#). *Nature Microbiology* 5:265–271
4. 2019 Martinez, M.A, B.J. Woodcroft, **J.C. Ignacio-Espinoza**, A.A .Zayed, C.M. Singleton, J.A. Boyd, Y.F Li, S. Purvine, H. Maughan, S.B. Hodgkins, D. Anderson, M. Sederholm, B. Temperton, B. Bolduc, S.R. Saleska, G.W. Tyson, V.I. Rich, IsoGenie Project Coordinators. [Discovery and ecogenomic context of a global Caldiseica-related phylum active in thawing permafrost, *Candidatus Cryoserica* phylum nov., *Ca. Cryoserica* class nov., *Ca. Cryosericales* ord. nov., *Ca. Cryosericeae* fam. nov., comprising the four species *Cryosericum septentrionale* gen. nov. sp. nov., *Ca. C. hinesii* sp. nov., *Ca. C. odellii* sp. nov., *Ca. C. terrychapinii* sp. nov.](#) *Systematic and applied microbiology* 42:54-66
5. 2019 Sieradzki E.T., **J.C. Ignacio-Espinoza**, D.M. Needham, E. Fichot & J.A. Fuhrman. [Dynamic marine viral infections and major contribution to photosynthetic processes shown by spatiotemporal picoplankton metatranscriptomes](#) *Nature Communications* 10:1169
6. 2018 **Ignacio-Espinoza, J.C.** & J.A. Fuhrman. [A non-tailed twist in the viral tale](#). *Nature* 554:38
7. 2016 Gregory A.C., S.A. Solonenko, **J.C. Ignacio-Espinoza**, K. LaButti, A. Copeland, S. Sudek, A. Maitland, L. Chittick, F. dos Santos, J.S. Weitz, A.Z. Worden, T. Woyke and M.B. Sullivan. [Genomic differentiation among wild cyanophages despite widespread horizontal gene transfer](#). *BMC genomics* 17:930
8. 2016 Guidi L, S. Chaffron, L. Bittner, and other 36 authors including **J.C. Ignacio-Espinoza**. [Plankton networks driving carbon export in the oligotrophic ocean](#). *Nature* doi:10.1038/nature16942
9. 2016 Brum*, J.R., **Ignacio-Espinoza***, **J.C.**, Kim*, EH, G. Trubl, R.M. Jones, S. Roux, N.C. VerBerkmoes, V.I. Rich, M.B. Sullivan. [Illuminating structural proteins in viral “dark matter” with metaproteomics](#). *PNAS* 113: 2436-2441
10. 2015 Roitman S., J. Flores-Urbe, A. Filosof, B. Knowles, F. Rohwer, **J.C. Ignacio-Espinoza**, M.B. Sullivan, F.M. Cornejo - Castillo, P. Sánchez, S.G. Acinas, C.L. Dupont, O. Béjà. [Closing the gaps on the viral photosystem - I psaDCAB gene organization](#). *Environmental Microbiology* 17: 5100-5108
11. 2015 Lima-Mendez G, K. Faust, N. Henry, J. Decelle, S. Colin, F. Carcilli, S. Chaffron, **J.C. Ignacio-Espinoza**, and other 34 authors. [Top-Down determinants of community structure in the global plankton interactome](#). *Science* 348:e1262073 doi:10.1126/science.1262073.
12. 2015 Brum, J.R.* , **Ignacio-Espinoza***, **J.C.**, Roux* S., G. Doulcier, S. Acinas, A. Alberti, S. Chaffron, L. Coppola, C. Cruaud, C. de Vargas, P. Gasol, G. Gorsky, A.C. Gregory, L. Guidi, P. Hingamp, F. Not, H. Ogata, S. Pesant, B.T. Poulos, S.M., Schwenck1, S. Speich, C. Dimier, M. Pichera, S. Searson, S. Kandels-Lewis, Tara Oceans Coordinators, P. Bork, C. Bowler, E. Karsenti, S. Sunagawa, P. Wincker, & M.B. Sullivan. [Global patterns and ecological drivers of ocean viral communities](#). *Science* 348:e1261498 doi:10.1126/science.1261498.
13. 2015 Lara E., K. Holmfeldt, N. Solonenko, E. Laia-Sà, **J.C. Ignacio-Espinoza**, F.M. Cornejo-Castillo, N.C. Verberkmoes, D. Vaqué, M.B. Sullivan & S.G. Acinas. [Life-style and genome structure of marine *Pseudalteromonas siphovirus* B8b isolated from the Northwestern Mediterranean Sea](#). *PLoS One* 10:e0114829.

14. 2014 Deng, L.^{*}, **Ignacio-Espinoza^{*}, J.C.**, A. Gregory, B.T. Poulos, P. Hugenholtz & M.B. Sullivan. [Viral tagging reveals discrete populations in *Synechococcus* viral genome sequence space](#). *Nature* 513: 242–245.
15. 2013 **Ignacio-Espinoza J.C.**, S.A. Solonenko & M.B. Sullivan. [The global virome: not as big as we thought?](#) *Current Opinion Virology*, 3:566–571.
16. 2013 Solonenko S., **J.C. Ignacio-Espinoza**, A. Alberti, C. Cruaud, S. Hallam, K. Kostantinidis, G. Tyson, P. Wincker & MB Sullivan. [Impact of sequencing platform and library preparation choices on viral metagenomes](#). *BMC Genomics* 14:320.
17. 2012 **Ignacio-Espinoza J.C.** & M.B. Sullivan. [Phylogenomics of T4 cyanophages: lateral gene transfer in the 'core' and origins of host genes](#). *Environmental Microbiology* 14:2113-26.
18. 2010 Sullivan, M.B., K.H. Huang, **J.C. Ignacio-Espinoza**, A. Berlin, L. Kelly, P.R. Weigele, A.S. DeFrancesco, S.E. Kern, L.R. Thompson, S. Young, S.Yandava, R. Fu, B. Krastins, M. Chase, D. Sarracino, M.S. Osburne, M.R. Henn & S.W. Chisholm. [Genomic analysis of oceanic cyanobacterial myoviruses compared to T4-like myoviruses from diverse hosts and environments](#). *Environmental Microbiology* 12:3035-56.

**Equal contribution, strict alphabetical order*

Manuscripts in preparation

19. **Ignacio-Espinoza, J.C.**, Y. Zou[&], S. Hou, A.M. Long, D.M. Needham, E. Fichot & J.A. Fuhrman. [In situ bacterioplankton growth distribution by high-resolution metatranscriptomics](#). *In preparation for Environ. Microbiol.*
20. **Ignacio-Espinoza, J.C.**, Y. Zou[&], D.M. Needham, E. Fichot and J.A. Fuhrman. [Metagenomic and metatranscriptomic time series reveals a highly dynamic virus-host interaction landscape](#). *In preparation for Environ. Microbiol.*

[&]*Mentored student*

Oral and Poster Presentations:

1. 2019 Long term virus community stability facilitated by ‘red queen’ dynamics. ASLO 2019, talk. San Juan, Puerto Rico. USA,
2. 2018 Metagenomic and metatranscriptomic time series reveals a highly dynamic virus-host interaction landscape. ISME17, Leipzig Germany.
3. 2016 Functional and Population-based viral Ecology. **University of California Irvine**, departmental seminar, *invited talk*.
4. 2014 The first 43 Tara Oceans Viromes: towards a global ocean viral gene catalog. Poster presentation. Gordon Research Conference, Marine Microbes. Bentley University, Waltham MA.
5. 2013 Population based viral ecology and community structure in 43 Tara ocean viromes. Station Biologique de Roscoff, Tara Oceans Retreat, talk. Roscoff France.
6. 2013 Learning how to count complex viral communities. University of Arizona, Department of

Molecular and Cellular Biology Colloquium series.

7. 2013 Host-targeted viral metagenomics. International Environmental Virology Workshop. Talk. Biosphere2. Oracle AZ.
8. 2012 Diversity and structure of a simplified marine viral community. Grad Blitz, University of Arizona. Tucson AZ.
9. 2009 Comparative genomics of T4-like marine cyanophages. University of Arizona, Department of Ecology and Evolutionary Biology Colloquium series.
10. 2009 Viral metagenomics in marine microbial samples. Poster presentation. International Society for computational Biology. Rocky 09. Aspen CO.

Languages:

Spanish, native speaker.

English, full professional proficiency.

Professional Memberships:

- American Society for Microbiology
- International Society for Computational Biology
- Society for the Study of Evolution
- International Society for Microbial Ecology
- Association for the Sciences of Limnology and Oceanography

Teaching and Mentoring Experience:

- Teaching assistant, Molecular Genetics MCB304 U of Az. Held office hours and graded homework.
- Mentor to **Yuxuan Zou**. Exchange Student, Beijing Normal University, China. 2017-2018
- Mentor to **Lisa Duong**, East Los Angeles College, MESA Internship, 2018-Present.
- Mentor to **Yanpui Chan**, Undergraduate Student at USC, May 2019-Present
- Teaching assistant, Recombinant DNA Methods and Applications, MCB473.

Relevant Skills:

- Fully proficient with Perl and Shell scripting.
- Working proficiency in Python, R and Matlab.
- Comfortable managing large datasets, often involving more than one type of data.
- 3+ years of experience as a systems administrator managing and maintaining an Ubuntu/Linux cluster, providing technical support, training, and mentorship to 14 researchers.
- 6+ years of experience working with metagenomics, proteomics and metatranscriptomics datasets.
- Extensive experience developing bioinformatics pipelines, with emphasis in genomics and metagenomics.
- Well trained in molecular biology and microbiology techniques: PCR, DNA extraction, Cloning, RNA extraction, retro transcription, protein extraction, DNA-RNA-Protein quantification, agarose gels, western blots, sterile technique, library preparation (all steps).
- Multivariate statistics.
- Familiar with the API workflows for most common bioinformatics public databases.
- Experience in writing grants and scientific communication, involving preparing manuscripts and giving invited talks.

Other Relevant Experience:

- Sampling cruise, R.V. Urania, September 2009, Italy. 16 days of sea time.
- Fieldwork, R.V. Yellowfin, monthly sampling 2015-2019.

Outreach, Service and Social media presence:

- Finalist, top 10, in the Oceans180 video competition: “Innocence by viral tagging”, seen by more than 30 thousand students worldwide. <http://vimeo.com/80800870>.
- Featured on the **Ocean Portal by the Smithsonian** <https://ocean.si.edu/ocean-life/microbes/working-dark>
- Secretary and webmaster of GaIA, U of Arizona Graduate International Association, 2013.
- Twitter handle: @phagenomics.

Service to the profession:

- *Ad hoc* reviewer for: Environmental Microbiology; Environmental Microbiology Reports; Microbial Genomics, Communications Biology; Nature Communications; The ISME Journal.
- *Ad hoc* reviewer for: The Chilean National Science Foundation (CONICYT) and the NSF.

Press (short list):

Tiniest Catch: UA Scientists' Fishing Expedition Reveals Viral Diversity in the Sea http://uanews.org/story/tiniest-catch-ua-scientists-fishing-expedition-reveals-viral-diversity-in-the-sea?utm_source=uanow&utm_medium=email&utm_campaign=biweekly-uanow

Featured also in: EurekAlert! & Phys.org

Microbial Murder Mystery Lands Two UA Students in Top 10 of Ocean Science Video Challenge
<http://uanews.org/story/microbial-murder-mystery-lands-two-ua-students-in-top-10-of-ocean-science-video-challenge>

Featured also in: mbioblog.asm.org & <http://www.moore.org/newsroom>

New insights into global ocean microbe-virus interactions, drivers of Earth's ecosystems http://phys.org/news/2015-05-insights-global-ocean-microbe-virus-interactions.html?fb_action_ids=10152992531437815&fb_action_types=og.shares

Major project also featured in: NPR, El Pais, NY Times, Time, Le Figaro, Business Insider, Reuters.

References:

Dr. Jed A. Fuhrman (Postdoctoral adviser and mentor)

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Dr. Matthew B. Sullivan (PhD adviser and mentor)

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Professor, Ohio State University

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Dr. Jennifer R. Brum (Collaborator and mentor)

jbrum1[at]lsu.edu

Assistant Professor, Louisiana State University

Department of Oceanography and Coastal Sciences

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