

1. Joseph J. Vallino, Ph.D.

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2. Education

University of California, Berkeley, CA

B.S. Chemical Engineering, June 1983.

California Institute of Technology, Pasadena, CA

M.S. Chemical Engineering, June 1985. Advisor: Prof. Gregory Stephanopoulos.

Thesis: On-Line Estimation of the Oxygen-Mass-Tr

- Ingram, K., C. S. Hopkinson, K. Bowman, H. Garritt and **J. Vallino**. (1994). From watershed to estuary: assessment of nutrient loading, retention and export from the Ipswich River Basin. *Biol. Bull.* **187**, 277-278.
- Vallino, J.J.** and Stephanopoulos, G. (1994). Carbon Flux Distributions at the Glucose 6-Phosphate Branch Point in *Corynebacterium glutamicum* during Lysine Overproduction. *Biotech. Prog.* **10**, 327-334
- Vallino, J.J.** and Stephanopoulos, G. (1994). Carbon Flux Distributions at the Pyruvate Branch Point in *Corynebacterium glutamicum* during Lysine Overproduction. *Biotech. Prog.* **10**, 320-326.
- Hopkinson, C.S. and **Vallino, J.J.** (1994). Toward the Development of Generally Applicable Models of the Microbial Loop in Aquatic Ecosystems. *Microb. Ecol.* **28**, 321-326.
- Alderman, D., B. Balsis, I. Buffam, R. Garritt, C. Hopkinson and **J. Vallino**. (1995). Pelagic metabolism in the Parker River/Plum Island Sound Estuarine System. *Biol. Bull.* **189**, 250-251.
- Balsis, B., D. Alderman, I. Buffam, R. Garritt, C. Hopkinson and **J. Vallino**. (1995). Total system metabolism in the Plum Island Sound estuary. *Biol. Bull.* **189**, 252-254.
- Hopkinson, C.S. and **Vallino, J.J.** (1995). The Relationship between Man Watersheds and Rivers and Patterns of Estuarine Community Metabolism. *Estuaries* **18**, 598-621.
- Uhlenhopp, A. G., J. Hobbie and **J. Vallino**

- Vallino, J.J.** (2000). Improving marine ecosystem models: use of data assimilation and mesocosm experiments. *J. Mar. Res.* **58**, 117-164.
- Hopkinson, C.S., **Vallino, J.J.** and Nolin, A. (2002). Decomposition of dissolved organic matter from the continental margin. *Deep-Sea Res. II*, **49**, 4461-4478.
- Vallino, J.J.** (2003). Modeling microbial consortiums as distributed metabolic networks. *Biol. Bull.*, **204**, 174-179.
- Tobias, C.R., Cieri, M., Peterson, B.J. Deegan, L.A., **Vallino, J.**

Pontius Jr, R.G., L. Claessens, C. Hopkinson Jr, A. Marzouk, E.B. Rastetter, L.C. Schneider, **J.J. Vallino**. (2000). Scenarios of land-use change and nitrogen release in the Ipswich watershed, Massachusetts, USA. in Parks, B.O., K.M. Clarke, M.P. Crane, editors. 2000. Proceedings of the 4th international conference on integrating geographic information systems and environmental modeling: problems, prospects, and needs for research; 2000 Sep 2-8; Boulder, CO. Boulder: University of Colorado, Cooperative Institute for Research in Environmental Science. (www and CD ROM).

d. *Books/monographs*

e. *Chapters in books*

Vallino, J.J. and Stephanopoulos, G. (1990). Flux determinations in cellular bioreaction networks: applications to lysine fermentations. In: *Frontiers in Bioprocessing*. Sikdar, S. K., Todd, P. W., and Bier, M. (Eds.), CRC Press, Florida, 205-219.

Vallino, J.J. and Stephanopoulos, G. (1990). Intracellular flux analysis as means of identifying limiting nodes in amino acid fermentations. In: *Proc. - Eur. Congr. Biotechnol.*, 5th, Vol. 2., Christiansen, C., Munck, L., Villadsen, J. (Eds.), Munksgaard, Copenhagen, Den. 1063-1066.

Bowden, W. B., B. J. Peterson, L. A. Deegan, A. D. Huryn, J. P. Benstead, H. Golden, M. Kendrick, S. M. Parker, E. Schuett, **J. J. Vallino**, and J. E. Hobbie. (2014) Ecology of Streams of the Toolik Region. In J. E. Hobbie and G. W. Kling, editors. *Alaska's Changing Arctic: Ecological Consequences for Tundra, Streams, and Lakes*. Oxford University Press, New York, pp. 173-237.

Vallino, J.J., Algar, C.K., Fernandez Gonzalez, N., Huber, J.A. (2014) Use of receding horizon optimal control to solve MaxEP-based biogeochemistry problems. In *Beyond the Second Law: Entropy Production and Non-Equilibrium Systems*, Dewar, R.C., Lineweaver, C., Niven, R. and Regenauer-Lieb, K., (eds), Springer, pp 337-359, doi: 10.1007/978-3-642-40154-1_18.

f. *Book reviews*

g. *Abstracts (1st Authored only)*

Francisco, CA, November 1989.

d with Metabolic Rigidity in Lysine

November 1990.

Society of Limnology and Oceanography, Reno, NV, June 1995.

Estuarine Research Federation, Corpus Christi, TX, November 1995.

Model to Assess

NM, February 1997.

"Seasonal patterns in estuarine metabolism from whole system measurements of oxygen: A pseudo-inverse technique", Estuarine Research Federation, Providence, RI, October 1997.

"Do terrestrial organic matter inputs stabilize aquatic food webs?", American Society of Limnology and Oceanography, St. Louis, MO, June 1998.

- "Improving Marine Ecosystem Models: Use of Data Assimilation and Mesocosm Experiments", American Society of Limnology and Oceanography, Santa Fe, NM, February 1999.
- "A non-linear inverse technique to estimate estuarine ecosystem metabolism from whole system oxygen measurements", 3rd International Symposium on Ecohydraulics, Salt Lake City, UT, July 1999.
- "Use of a ¹⁵N Enrichment Experiment for the Development and Calibration of an Estuarine Biogeochemistry Model", Estuarine Research Federation, New Orleans, LO, September 1999.
- "A Thermodynamically Constrained Metabolic Ecosystem Model", American Society of Limnology and Oceanography, Copenhagen, Demark, June 2000.
- "Model Evaluation Of Land-Use Transformations On Nutrient Dynamics In The Ipswich River, Ma", American Society of Limnology and Oceanography, Albuquerque, NM, February 2001.
- System 15N-Tracer Experiments To Improve Estuarine Biogeochemistry
- 2001.
- metabolic models to
- examine structure-
- 2012.
- Using metagenomic and metatranscriptomic observations to test a thermodynamic-based model of community metabolic expression over time as space , Ocean Sciences Meeting, New Orleans, LA, Feb 2016.
- omparing metagenomic and metatranscriptomic observations over time and space in a meromictic pond to predictions from a thermodynamic-based model of community metabolic expression Meeting, Portland, OR, Feb 2018.
- The Importance of Incorporating Planktonic Temporal Strategies in Marine Ecosystem Models Ocean Science Meeting, San Diego, CA, Feb 2020.

h. Invited lectures

- Conference, Boulder, CO, June 1987.
- Modeling for the Black Sea, Sofia, Bulgaria, March 1994.
- "A Bioenergetic Approach to Modeling Microbial Food Webs", Marine Chemistry Seminar Series, Woods Hole Oceanographic Institute, Woods Hole, MA, May 1995. This seminar was also given at Tufts, Yale, and Harvard Universities.
- Research Conference: Estuarine and Coastal Processes, Plymouth, NH, June 1995.
- Nitrogen in Coastal Ecosystems (Sea Grant workshop), MIT, Cambridge, MA, January 1996.
- "Developing estuarine ecosystem models." Seminar course on Estuarine Ecosystem Dynamics, University of New Hampshire, NH, April 1998.
- "Ecosystem biogeochemistry viewed as an optimized metabolic network", Boston University, Boston MA, April 2001.
- "Viewing Ecosystem Biogeochemistry as an Optimized Metabolic Network", Institute of Ecosystem Studies, Millbrook, NY, November 2001.
- Island, Narragansett, RI, April 2002.

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Genome-Genome Interactions, Woods Hole, MA, May 2002.

American Society of

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NSF-OCE-9726921. LTER: Plum Island Sound Comparative Ecosystem Study (Pisces) Effects of Changing land Cover, Climate and Sea Level on Estuarine Trophic Dynamics, Jul 1998-Jun 2004, **Co-PI**, \$4,646,609.

NSF-EAR-9807632, (EGB) Predictions of Bioavailability of Riverine Dissolved Organic Matter

J.J. Vallino

NSF JGOFS-Southern Ocean Modeling panel member, 1995.
Editorial Board, *Mangroves and Salt Marshes*, 1998 - 1999.
EPA Water and Watersheds Program panel member, 1999.
Editorial Board, *Wetlands Ecology and Management*. 1999 - 2001.
NSF Biocomplexity Math/Theory/Computation panel member, 2000.
NOAA Coastal Hypoxia Research Program panel member, 2005.
NSF Ecosystems Cluster panel member, 2006.
LTER Site Review Committee, Dry Valleys, Antarctica. Jan 2008.
Nature Reader Panel. 2008 - 2009.
Review Editor, *Aquatic Microbial Ecology*. 2007 - Present.

8. Teaching

a. *Marine Biological Laboratory, Woods Hole, MA*

Semester in Environmental Science Program (see <http://www.mbl.edu/SES>)

Course Instructor, Microbial Methods in Ecology (fall 1999-present): Undergraduate course combines lectures on microbial biogeochemistry and ecology with laboratory methods.

Lectures and labs on bacterial counts, leucine-¹⁴C bacterial productivity, hydrogen sulfide and methane production in Winogradsky columns, extracellular enzyme assays, bacterial grazers, bacteria-phytoplankton competition, and PCR (see <http://ecosystems.mbl.edu/SES/MicrobialMethods>).

SES Undergraduate Research Projects and REU's, Advisor to (last 5 years only):

Ruby An (2015) A2M: Experimental and modeling approaches to optimize an algae-to-methane coupled bioreactor system. (U. of Chicago, Metcalf).

Petra Byl (2015) Assessing Microbial Coordination over Space and Time in Siders Pond. (U. of Chicago, Metcalf).

Jessie Yang (2015) Effect of microbial fuel cells on nitrogen removal processes in wastewater organic matter.

Gabriela Atsepoi (2015) Comparison of microbial respiration between heated and control plots in the Harvard Forest soil warming experiment.

Emily Geoghegan (2015) Understanding decomposition of organic matter in anaerobic environments: improving breakdown of algal mass in A2M methanogenic bioreactor.

Emily Okikawa (2015) The importance of microbial mats versus "pink berries" in altering nutrient cycles between sediments and the water column in Little Sippewissett marsh.

Petra Byl (2016) Assessing microbial metabolic function and circadian rhythms over time and space in Siders Pond (U. of Chicago, Metcalf).

Catherine Ballali, Earlham College (2016) Can a microbial fuel cell be used to harness electricity from algal biomass?

Olivia Bispos, Earlham College (2016) Ocean Acidification and its effect on Phytoplankton

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Ashley Bulseco-McKim (2018-Present)
Ioannis Tsakalakis (2019-Present)
Amy Smith (2021-Present)

b. Brown University, Providence, RI

Co-instructor, Geomicrobiology (GEOL1950F), fall 2011. Course examined the influence of microbes in geological and environmental processes by integrating molecular, microbiological, and modeling approaches.