

David Talmy
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Education

- 2009-2013 **PhD Environmental Science**
School of Biological Sciences, University of Essex
- 2008-2009 **MRes Mathematics in the Living Environment (with Distinction)**
Departments of Biology and Mathematics, University of York
- 2004-2008 **MMath Mathematics**
School of Mathematical and Physical Sciences, University of Sussex

Professional Experience

- 2018-present **Assistant Professor**
Department of Microbiology and the National Institute of Mathematical and Biological Synthesis (NIMBioS), University of Tennessee
- 2016-2018 **Research Scientist**
Department of Earth, Atmosphere and Planetary Science, Massachusetts Institute of Technology
- 2013-2016 **Postdoctoral Associate**
Department of Earth, Atmosphere and Planetary Science, Massachusetts Institute of Technology
- 2010-2013 **Graduate Research Assistant**
Plymouth Marine Laboratory

Research Interests

Microbial physiology and metabolism, microbial ecosystem interactions, marine biogeochemistry, organic matter elemental composition

Peer Reviewed Publications

Omta, A.W., **Talmy, D.**, Sher, D., Finkel, Z.V., Irwin, A.J., Inomura, K., Follows, M.J. (2020). Quantifying nutrient throughput and DOM production by algae in continuous culture. *Journal of Theoretical Biology*.

Pound, H.L., Gann, E.R., Tang, X., Krausfeldt, L. E., Huff, M., Staton, M. E., **Talmy, D.**, Wilhelm, S.W. (2020) The “neglected viruses” of *Taihi*: Abundant transcripts for viruses infecting eukaryotes and their potential role in phytoplankton succession. *Frontiers in Microbiology*, 11, 1-11.

Inomura, K., Omta, A.W., **Talmy, D.**, Bragg, J., Deutsch, C., Follows, M.J. (2020). Elemental composition and growth rate of phytoplankton governed by macromolecular allocation. *Frontiers in Microbiology*, 11, 1-22.

Talmy, D., Beckett, S.J., Taniguchi, D.A.A., Weitz, J., Follows, M.J. (2019). An empirical model of carbon transfer through marine viruses and microzooplankton grazers. *Environmental Microbiology*, 21, 2171-2181.

Nissimov, J.I., **Talmy, D.**, Haramaty, L., Fredricks, H., Zelzion, U., Eren, M., Gardella, R., Laber, C., More, K.D., Bhattacharya, D., Follows, M.J., Coolen, M.J.L., Van Mooy, B.A.S., Bidle, K.D. (2019) Biochemical diversity of sphingolipid biosynthesis as a driver of algal-virus competitive ecology. *Environmental Microbiology*.

Talmy, D., Beckett, S.J., Taniguchi, D.A.A., Weitz, J., Follows, M.J. (2019). Contrasting controls on microzooplankton grazing and viral infection of microbial prey. *Frontiers in Marine Science*.

Thamatrakoln, K., **Talmy, D.**, Haramaty, L., Maniscalco, C., Latham, J., Natale, F., Coolen, M.J.L., Follows, M.J., Bidle, K.D. (2018). Light-dependent regulation of coccolithophore host-virus interactions. *New Phytologist*.

Omta, A.W., **Talmy, D.**, Sher, D., Finkel, Z.V., Irwin, A.J., Follows, M.J. (2017). Extracting phytoplankton physiological traits from batch and chemostat culture data. *Limnology and Oceanography: Methods*, 15, 453-466.

Record, N.R., **Talmy, D.**, Våge, S. (2016). Quantifying tradeoffs for marine viruses. *Frontiers in Marine Science*, 3, 251.

Li, G., **Talmy, D.**, Campbell, D.A. (2016) Diatom responses to photoperiod and light are predictable from diel reductant generation. *Journal of Phycology*, 10.1111/jpy.12483-16-032.

Lopez, J.S., Garcia, N.S., **Talmy, D.**, Martiny, A.C. (2016) Diel variability in the elemental composition of the marine cyanobacterium *Synechococcus*. *Journal of Plankton Research*, fbv120.

Talmy, D., Martiny, A.C., Hill, C.N., Hickman, A.E., Follows, M.J. (2016) Microzooplankton regulation of surface ocean POC:PON ratios. *Global Biogeochemical Cycles*, 30, 1-22.

Talmy, D., Blackford, J., Hardman-Mountford, N., Polimene, L., Follows, M.J., Geider, R.J., (2014) Flexible C:N ratio enhances metabolism of large phytoplankton when resource supply is intermittent. *Biogeosciences*, 11, 601-602.

Talmy, D., Blackford, J., Hardman-Mountford, N., Dumbrell, A.J., Geider, R.J., (2013) An optimality model of phytoplankton photoadaptation in contrasting aquatic light regimes. *Limnology and Oceanography*, 58, 1802-1818.

Invited talks

Talmy, D. Trade-offs modify ecosystem biomass structure along trophic gradients. SIMPLEX project kick-off meeting. University of Bergen, Norway, August 22nd, 2019 Host: *Dr. Selina Vage*.

Talmy, D. Inferring phytoplankton host-virus traits and trade-offs from laboratory population dynamics. Weizmann Institute of Science, Rehovot, Israel, August 14th, 2019. Host: *Prof. Assaf Vardi*.

Talmy, D. Understanding microbial ecosystem structure and function on large scales using mathematical models. American Society for Microbiology Annual Meeting, San Francisco, California, USA, June 21st 2019.

Talmy, D. Trait-based modeling of viruses in global ocean microbial ecosystems. Gordon Research Conference: Elucidating microbial processes across spatial and temporal scales. Lucca, Italy, July 5th, 2018.

Talmy, D. What controls virus dynamics in global ocean microbial ecosystems? University of Texas, Austin, USA, March 23rd, 2018. Host: *Prof. Patrick Heimbach*.

Talmy, D. What controls microbial predator-prey ratios in the global ocean? Lamont-Doherty Earth Observatory, Columbia University, New York, USA, October 2nd, 2017. Host: *Prof. Andrew Juhl*.

Talmy, D., Martiny, A.C., Hickman, A.E., Follows, M.J. Microzooplankton regulation of particulate organic matter elemental composition. Bigelow Laboratory for Ocean Sciences, Maine, USA, March 9th, 2016. Host: *Dr. Nicolas Record*.

Talmy, D., Martiny, A.C., Hickman, A.E., Hill, C.N., Follows, M.J. Microzooplankton regulation of surface ocean POC:PON ratios. Rutgers University, New Jersey, USA, December 15th, 2015. Host: *Dr. Jozef Nissimov*.

Talmy, D., Martiny, A.C., Hickman, A.E., Follows, M.J. Zooplankton regulation of particulate organic matter elemental composition. National Oceanography Center, Southampton, UK, November 10th, 2015. Host: *Dr. Anna Hickman*.

Selected Oral Presentations

Papoulis, S.E., Wilhelm, S.W., Talmy, D., Zinser, E.R. Environmental nutrients explain the distribution of restriction modification systems in prokaryotic genomes. 4th workshop on trait-based approaches to ocean life, Buckinghamshire, UK, Aug 20th, 2019.

McCullough, D.K., Calfee, B., Zinser, E.R., Talmy, D. Connecting hydrogen peroxide damage and nutrient limitation controls on marine cyanobacterial growth. 4th workshop on trait-based approaches to ocean life, Buckinghamshire, UK, Aug 19th, 2019.

Talmy, D., Vage, S., Cael, B.B., Follows, M.J. Trade-offs modify ecosystem biomass structure along trophic gradients. 4th workshop on trait-based approaches to ocean life, Buckinghamshire, UK, Aug 18th, 2019.

Hinson, A., Talmy, D. What controls algal-virus population dynamics in diverse systems? Aquatic Sciences Meeting, San Juan, Puerto Rico, Feb 26th, 2019.

Talmy, D., Bidle, K.D., Kranzler, C., Thamatrakoln, K. Inferring nutrient and light sensitivity of phytoplankton host-virus metabolism from laboratory population dynamics. 9th Aquatic Virus Workshop, Lincoln, Nebraska, USA, June 20th, 2018.

Talmy, D., Zakem, E., Follows, M.J. Modeling competitive interactions among viruses and microzooplankton grazers in the global ocean. Ocean Sciences Meeting, Portland, Oregon, USA, February 15th, 2018.

Talmy, D., Follett, C.L., Follows, M.J. Does viral lysis influence dissolved organic matter elemental composition? Aquatic Sciences Meeting, Honolulu, Hawaii, USA, February 28th, 2017.

Talmy, D., Thamatrakoln, K., Bidle, K.D., Follows, M.J. How does viral infection of *Emiliania huxleyi* depend on ambient irradiance? Monteiro group meeting, University of Bristol, Bristol, UK, July 26th, 2016.

Talmy, D., Hussain, F., Follows, M.J. The influence of lytic vs. lysogenic viral reproduction on host-virus populations. 8th Aquatic Virus Workshop, Plymouth, UK, July 11th, 2016.

Talmy, D., Martiny, A.C., Hickman, A.E., Hill, C.N., Follows, M.J. Microzooplankton regulation of surface ocean POC:PON ratios. Ocean Sciences Meeting, New Orleans, Louisiana, USA, February 25th, 2016.

Talmy, D., Hussain, F., Follows, M.J. The influence of viral reproduction strategies on marine microbial community dynamics. Trait-based approaches to ocean life workshop, New Hampshire, USA, October 5th, 2015.

Talmy, D., Hussain, F., Follows, M.J. The influence of viral reproductive strategies on marine microbial community dynamics. Aquatic Sciences Meeting, Granada, Spain, February 27th, 2015.

Talmy, D., Hardman-Mountford, N.J., Blackford, J.C., Geider, R.J. Phytoplankton photoadaptation in contrasting aquatic light regimes. Ocean Sciences Meeting, Honolulu, Hawaii, USA, February 27th, 2014.

Talmy, D., Hardman-Mountford, N.J., Blackford, J.C., Polimene, L., Hill, C.N., Follows, M.J., Geider, R.J. Phytoplankton photoadaptation in contrasting aquatic light regimes. Sack Lunch Seminar Series, Department of Earth, Atmosphere and Planetary Sciences, Massachusetts Institute of Technology, Massachusetts, USA, October 23rd, 2013.

Talmy, D., Blackford, J., Hardman-Mountford, Geider, R.J. Adaptation to variable light determines resource allocation in phytoplankton. Ocean Sciences Meeting, Salt Lake City, Utah, USA, February 23rd, 2012.

Talmy, D., Blackford, J., Hardman-Mountford, Geider, R.J. Modeling phytoplankton growth in non steady-state environments. Marine Sciences Seminar, Plymouth Marine Laboratory, Plymouth, UK, May 26th, 2011.

Talmy, D., Blackford, J., Hardman-Mountford, Geider, R.J. Modeling phytoplankton productivity in the open ocean: including the effects of adaptation to different light regimes. Marine Science and Environmental Microbiology Seminar, University of Essex, January 26th, 2011.

Talmy, D., Blackford, J., Hardman-Mountford, Geider, R.J. Optimality in phytoplankton growth models and the link with satellite data. NCEO Ocean Carbon Cycle Meeting, Plymouth, UK, July 15th, 2010.

Poster Presentations

Talmy, D., Follett, C.L., Follows, M.J. Viral regulation of dissolved organic matter elemental composition. Viruses of Microbes Meeting, Liverpool, UK, July 19th, 2016.

Talmy, D., Blackford, J., Hardman-Mountford, Geider, R.J. Phytoplankton optimal resource allocation in response to variable light intensity. Advances in Marine Ecosystem Modelling Research (AMEMR) Symposium, Plymouth, UK, June 28th, 2011.

Talmy, D., Blackford, J., Hardman-Mountford, Geider, R.J. Optimality in phytoplankton growth models and the link with satellite data. Advanced School on Complexity, Adaptation and Emergence in Marine Ecosystems, Trieste, Italy, October 21st, 2010.

Workshops and Summer Schools

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| 2019 | 4 th workshop on trait-based approaches to ocean life, Buckinghamshire, UK |
| 2018 | 9 th Aquatic Virus Workshop, Lincoln, Nebraska, USA |
| 2016 | 8 th Aquatic Virus Workshop, Plymouth, UK |
| 2015 | Trait-Based Approaches to Ocean Life Workshop, Waterville Valley, New Hampshire, USA |
| 2015 | Workshop for Development of macromolecular models of marine algae, Sackville, New Brunswick, Canada |
| 2014 | The Gordon and Betty Moore Foundation Research Associate and Postdoctoral Scholar Summit, Dorado, Puerto Rico |
| 2014 | North Atlantic Virus Infection of Coccolithophores Expedition (Na-VICE) post cruise meeting, Woods Hole Oceanographic Institution, Falmouth, Massachusetts, USA |
| 2013 | Trait and Resource Allocation Based Modeling of Microbial Communities, University of Exeter, UK |
| 2013 | Workshop for Understanding Microbial Macromolecular Composition, Haifa, Israel |
| 2010 | Advanced School on Complexity, Adaptation and Emergence in Marine Ecosystems, Trieste, Italy |
| 2010 | Earth System Science Spring School, Scarborough, UK |
| 2010 | Modeling Evolutionary and Ecological Processes in Biogeochemical Cycles, University of East Anglia, UK |

Teaching Experience

- 2018-2019 Graduate journal club in computational biology, University of Tennessee, Knoxville
- 2016 Invited lecturer, Hjort Summer school in Bergen, Norway: Complexity vs. simplicity in microbial ecology
- 2008 Associate Tutor, University of Sussex, UK. Courses taught: Linear algebra II and Introduction to Matlab
- 2007 High school classroom assistant as part of the Student Associate Scheme, Worthing High School, Worthing, East Sussex, UK

Mentorship

Undergraduates

- 2018 Brielle Shortreed, NSF Research Experiences for Undergraduates, 10-week summer research placement.
- 2018-2019 Maitraya Ghatak, 401R, Undergraduate Research in Microbiology.
- 2019 Lucas Fiet, Margie Knight, Priscilla Cho, NIMBioS Research Experiences for Undergraduates, 10-week summer group research project.
- 2019 Aaron Lin, NSF Research Experiences for Undergraduates, 10-week summer research placement

Graduate students

- 2019-present K.C. Pramir, Microbiology Graduate Student, Project TBD
- 2018-present Katie McCullough, Microbiology Graduate Student, Project TBD
- 2018-present Kyla Linn, Genome Science and Technology Graduate Student, Project TBD

Postdoctoral researchers

- 2018-present Audra Hinson

Professional Service and Outreach

- Ongoing Reviewer, *Nature Communications*, *Nature Ecology and Evolution*, *The ISME Journal*, *The American Naturalist*, *Limnology and Oceanography*, *Global Biogeochemical Cycles*, *New Biotechnology*, *Journal of Theoretical Biology*, *Marine Ecology Progress Series*, *PLOS ONE*, *Frontiers in Marine Science*, *Journal of Marine Systems*
- Ongoing Volunteer, development of an interactive web app for high school students to learn about scientific modeling, with Janice McDonnell and Carrie Ferraro in the Department of Marine and Coastal Sciences (DMCS) at Rutgers University
- 2019 NSF Biological Oceanography, mail-in reviewer
- 2017 NASA panelist, EXPORTS program
- 2015-2016 Interviewee for outreach movie for high school students to learn about scientific modeling, collaboration between Tilapia Film (Los Angeles) and scientists in the DMCS at Rutgers University

2016	Demonstrator, The 6 th Annual John Carlson Lecture, New England Aquarium
2016	Demonstrator, Oceans Alive! Display for MIT Open House
2014	Demonstrator, Nautical Night at the MIT Museum
2011-2012	STEMNET (Science, Technology and Engineering Network) Ambassador (various locations)
2011	Researcher in Residence, Ridgeway School (now Plympton Academy), Plympton, UK

Grants and Awards

2020-2023	Simons Early Career Investigator in Marine Microbial Ecology and Evolution Award (\$666,000). ID number: 690671
2018-2020	Burroughs Wellcome Fund (\$150,000): “ <i>Enhancing Quantitative and Data Science Education for Graduate Students in Biomedical Science at the University of Tennessee, Knoxville</i> ” ID number: 1018963
2015-2019	NSF Co-Principle Investigator award (\$326,864): “ <i>Elucidating algal host-virus dynamics in different nutrient regimes - mechanistic interactions and biogeochemical impact</i> ”. ID number: OCE-1536521.
2009-2013	National Centre for Earth Observation PhD studentship
2009	NERC subsidy to attend Earth System Science Spring School
2008-2009	NERC Masters studentship