

## David M. Fields

### Education

1981 - 1986	<b>B.S. Biology. University of Utah</b>
1985 - 1986	<b>Boston University Marine Program (BUMP)</b> - Undergraduate Semester Woods Hole, MA
1988 - 1989	<b>University of Washington</b> - Department of Oceanography
1989 - 1991	<b>M.S. State University of New York - Stony Brook.</b> Thesis title: "Outer limits and inner structure: the 3 - dimensional flow field of <i>Pleuromamma xiphias</i> ."
1990	<b>University of Hawaii</b> - Institute of Marine Biology. Behavioral Ecology and Ethology of Coral Reef Animals.
1992 - 1996	<b>Ph.D. Coastal Oceanography. State University of New York - Stony Brook.</b> Dissertation title: "Implication of a moving fluid on predator-prey interactions among copepods".

### Academic\Professional Appointments

1997 - 1998	<b>Postdoctoral Fellow</b> - WATER Institute - University of Wisconsin.
1998 - 2001	<b>Postdoctoral Fellow</b> - Georgia Institute of Technology
2000-2004	<b>Consultant</b> - Kona Blue Water Farms. Kailua Kona, HI
2001-2004	<b>Research Scientist</b> - Georgia Institute of Technology - Atlanta, GA 30332
2004-Present	<b>Senior Research Scientist</b> – Bigelow Laboratory for Ocean Sciences – ME 04575
2005-Present	<b>Faculty of the Graduate School</b> – University of Maine - Orono
2009-Present	<b>REU Site Coordinator</b> – Bigelow Laboratory for Ocean Sciences
2011-Present	Adjunct <b>Research Scientist</b> - Colby College Maine
2015 – Present	ICES – <b>Review Editor</b>
2017 – Present	<b>ASLO Fellow</b>
2019	<b>ASLO Ramon Margelef Award for excellence in Education.</b>

### Publications

#### < 2014

- Yen, J. and D.M. Fields. 1992. Escape responses of *Acartia hudsonica* (Copepoda) nauplii from the flow field of *Temora longicornis* (Copepoda). *Erg. der Limnol.*: 36:123-134.
- Fields, D.M. and J. Yen. 1993. Outer limits and inner structure: the 3 - dimensional flow field of *Pleuromamma xiphias* (Copepoda). *Bull. Mar. Sci.* 53: 84-95.
- Jonasdottir, S. H., D.M. Fields, and S. Pantaja. 1995. Copepod egg production in Long Island Sound as a function of the chemical composition of seston. *Mar. Ecol. Prog. Ser.* 119: 87-98.
- Fields, D.M. and J. Yen. 1996. The escape behavior of *Pleuromamma xiphias* from a quantifiable fluid mechanical disturbance. In Lenz, P.H. D.K. Hartline, J.E. Purcell, and D.L. Macmillan. (eds.), *Zooplankton: Sensory Ecology and Physiology*. Vol. 1, pp. 323-340. Gordon and Breach Publ., Amsterdam.
- Fields, D.M. 1996. The Interaction of Calanoid Copepods with a Moving Fluid Environment: Implications for the Role of Feeding Current Morphology in Predator - Prey Interactions. Ph.D. State University of New York. p. 353.
- Fields, D.M. and J. Yen. 1997. Implication of copepod feeding currents on the spatial orientation of their prey. *J. Plankton Res.* 19: 79-85.
- Fields, D.M. and J. Yen. 1997. The escape behavior of marine copepods in response to a quantifiable fluid mechanical disturbance. *J. Plankton Res.* 19: 1289-1304.
- Fields, D.M., J.R. Strickler, S. Wroczynski and D. Vande Slute. 1998. The creation of laboratory generated turbulence. Technical Report #48 to the WATER Institute.
- Fields, D.M. 1998. The implications of biologically and physically created fluid motion on the sensory horizon of copepods. *Oceanography*. 11(2): 26.
- Moore, P.A., D.M. Fields, and J. Yen. 1999. The physical constraints of chemoreception in foraging copepods. *Limnol. Oceanogr.* 44(1): 166-177.

- Gries, T. K Johnk, D.M. Fields and J.R. Strickler. 1999. Size and structure of 'footprints' produced by *Daphnia*: impact of animal size and density gradients. J. Plankton Res. 21:509-523.
- Fields, D.M. 2000.Characteristics of the high frequency escape reactions of *Oithona sp.* Marine and Freshwater Behaviour and Physiology 34: 21-35.
- Preston, BL, Snell, TW, Fields, DM, Weissburg, MJ. 2001. The effects of fluid motion on toxicant sensitivity of the rotifer *Brachionus calyciflorus*. Aquatic Toxicology 52(2), 117-131.
- Doall, MH, JR Strickler, DM Fields, J Yen. 2002. Mapping the attack volume of a free-swimming planktonic copepod, *Euchaeta rimana*. Marine Biology. 140: 871-879.
- Fields, D.M., D. S. Shaeffer, M.J. Weissburg. 2002. Mechanical and neural responses from the mechanosensory hairs on the antennule of *Gaussia princeps*. Mar. Ecol. Prog. Ser. 227:173-186.
- Fields, D.M and J. Yen, 2002. Fluid mechanosensory stimulation of behavior from a planktonic marine copepod *Euchaeta rimana* Bradford. J. Plankton. Res. 24(8): 747-755.
- Lapensa, S. T.W. Snell, D.M. Fields, M. Serra. 2002 Predatory interactions between a cyclopoid copepod and rotifer sibling species. Freshwater Biology 47: 1685-1695
- Thompson, C, D.M. Fields, Zhang, Z-R, N McCarty. 2004. Inhibition of ClC-2 by a peptide component of scorpion venom J. Gen. Physiol. 122: 29A
- Lapensa, S. T.W. Snell, D.M. Fields, M. Serra. 2004 Selective feeding of *Artodiaptomus salinus* (Copepoda, Calanoida) on co-occurring sibling rotifer species. Freshwater Biology 49: 1053-1061
- Fields, D.M. and M.J. Weissburg. 2004 Rapid depolarization rates from the antennules of copepods. J.Comp. Phys A 190(11): 877-882
- Thompson CH, Fields DM, Olivetti PR, Fuller MD, Zhang ZR, Kubanek J, McCarty NA. 2005. Inhibition of ClC-2 by a peptide component of scorpion venom J. Membrane Biol. 208: 65-76.
- Fields, D.M. and M.J. Weissburg. 2005. Evolutionary and ecological significance of mechanosensory morphology: Copepods as a model system. Mar. Ecol. Prog. Ser. 287: 269-274
- Fields, D.M. Weissburg, M.J. and Browman, HI. 2007. Chemoreception in the salmon louse (*Lepeophtheirus salmonis*): an electrophysiological approach. Dis. Aquat. Org. 78:161-168.
- Fields, D.M. 2010. Orientation affects the sensitivity of *Acartia tonsa* to fluid mechanical signals. Mar. Biol. 157:505–514 DOI 10.1007/s00227-009-1336-5
- Abrahamsen M.B, Browman H.I, Fields D.M, ·Skiftesvik A.B. 2010. The three-dimensional prey field of the northern krill, *Meganyctiphanes norvegica*, and the escape responses of their copepod prey. Mar. Biol. DOI 10.1007/s00227-010-1405-9.
- Browman H.I, Yen J, Fields D.M, St-Pierre JF, Skiftesvik A.B. 2011. Fine-scale observations of the predatory behaviour of the carnivorous copepod *Paraeuchaeta norvegica* and the escape responses of their ichthyoplankton prey, Atlantic cod (*Gadus morhua*). Marine Biology 158: 2653-2660 DOI 10.1007/s00227-011-1763-y.
- Fields DM, Durif CMF, Bjelland RM, Shema SD, Skiftesvik AB, Browman HI. 2011. Grazing rates of copepods on algae exposed to different levels of UV radiation. PLoS ONE 6 (10) e26333 <http://dx.plos.org/10.1371/journal.pone.0026333>
- Fields D.M., Shema S.D., Skiftesvik A.B., Browman HI. 2012. Light primes the escape response of the Calanoid copepod, *Calanus finmarchicus*. PLoS ONE 7(6): e39594. doi:10.1371/journal.pone.0039594.
- Fukunishi Y, Browman HI, Durif CMF, Bjelland RM, Shema SD, Fields DM, Skiftesvik AB. 2013. Sub-Lethal Exposure to Ultraviolet Radiation Reduces Prey Consumption by Atlantic Cod Larvae (*Gadus morhua*). Mar Biol DOI 10.1007/s00227-013-2253-1

## 2014

- Fields, D.M. 2014. The sensory horizon of marine copepods, pp: 157-179, In, Seuront, L. (Ed.), Copepods: Diversity, Habitat and Behavior. Nova Science Publishers, Inc.
- Nuester J, Shema SD, Vermont A, Fields DM and Twining BS. 2014. The regeneration of highly bioavailable iron by meso- and microzooplankton Limnol. Oceanogr. 59: 1399-1409

## 2015

- Fields DM, Runge JA, Thompson C, Shema SD, \*Bjelland RM, Durif CMF, Skiftesvik AB, Browman HI. 2015. Infection of the planktonic copepod *Calanus finmarchicus* by the parasitic dinoflagellate, *Blastodinium* spp.: effects on grazing, respiration, fecundity, and fecal pellet production JPR. doi:10.1093/plankt/fbu084

Durif CMF, Fields DM, Browman HI Shema SD, Enoae JR, Skiftesvik AB, Bjelland RM, Sommaruga R, Arts MT. 2015. UV radiation changes algal stoichiometry, but does not have cascading effects on a marine food chain. JPR 37 DOI: 10.1093/plankt/fbv082

## 2016

- Zarubin M, Lindemann Y, Brunner O, Fields DM, Browman HI, Genin A. 2016 The effect of hydrostatic pressure on grazing in three calanoid copepods JPR DOI: 10.1093/plankt/fbv110
- Runge JA, Fields DM, Thompson CRS, Shema DS, Bjelland RM, Durif CMF, Skiftesvik AB, Browman HI. 2016. End of the century CO<sub>2</sub> concentrations do not have a negative effect on vital rates of *Calanus finmarchicus*, an ecologically critical planktonic species in North Atlantic ecosystems ICES Journal of Marine Sciences doi:10.1093/icesjms/fsv258
- Bailey A, Thor P, Browman HI, Fields DM, Runge J, Vermont A, Bjelland RJ, Thompson C, Shema SD, Durif C, Hop H. 2016. Early development of the Arctic copepod *Calanus glacialis* shows limited response to increased seawater pCO<sub>2</sub>. ICES Journal of Marine Sciences doi:10.1093/icesjms/fsw066
- Gilg IC, Archer SD, Floge SA, Fields DM, Vermont AI, Leavitt AH, Wilson WH, Martínez Martínez J (2016) Differential gene expression is tied to photo chemical efficiency reduction in virally infected *Emiliana huxleyi*. MEPS 55:13-27
- Vermont AI, Martínez Martínez J, Waller J, Gilg IC, Leavitt AH, Floge SA, Archer SD, Wilson WH, Fields DM. 2016. Virus infection of *Emiliana huxleyi* deters grazing by the copepod *Acartia tonsa* J. Plankton Res. 00(00): 1–12. doi:10.1093/plankt/fbw064

## 2017

- Waller J, Wahle R, McVeigh H, Fields DM 2016. Linking rising CO<sub>2</sub> and temperature to the larval development and physiology of the American lobster (*Homarus americanus*) ICES doi:10.1093/icesjms/fsw154
- Bailey A, De Wit P, Thor P, Browman HI, Bjelland R, Shema S, Fields DM, Runge JA, Thompson C, Haakon Hop H. 2017. Regulation of gene expression underlies tolerance of the Arctic copepod *Calanus glacialis* to CO<sub>2</sub>-acidified seawater. Ecol Evol 7(18):7145-7160
- Bailey A, P Thor, HI Browman, DM Fields, J Runge, A Vermont, R Bjelland 2017. Early life stages of the Arctic copepod *Calanus glacialis*: Towards a Broader Perspective on Ocean Acidification Research Part 2 A special issue of the Ices Journal of Marine Science: Ices Journal of Marine Science: Journal du Conseil 74 (4), 996-1004

## 2018

- Fields DM, Skiftesvik AB, Browman HI. 2017. Behavioural responses of infective-stage copepodids of the salmon louse (*Lepeophtheirus salmonis*, Copepoda:Caligidae) to host related sensory cues Journal of Fish Diseases 41:875-884 DOI: 10.1111/jfd.12690.
- White, Meredith M., Jessica D. Waller, Laura C. Lubelczyk, David T. Drapeau, Bruce C. Bowler, William M. Balch & David M. Fields. 2018. Coccolith dissolution within copepod guts affects fecal pellet density and sinking rate. Scientific Reports 8:9758, DOI:10.1038/s41598-018-28073-x.
- Núñez-Acuña G, Gallardo-Escárate C, Fields DM, Shema S, Skiftesvik AB, Ormazábal I, Browman HI. 2018. The Atlantic salmon (*Salmo salar*) antimicrobial peptide cathelicidin-2 is a molecular host recognition cue for the salmon louse (*Lepeophtheirus salmonis*). Scientific Reports 8:13738
- Woods MN, ME Stack, DM Fields, SD Shaw, PA Matrai 2018. Microplastic fiber uptake, ingestion, and egestion rates in the blue mussel (*Mytilus edulis*) - Marine pollution bulletin 37:638-645
- Elmi D, S Soumya, DR Webster, DM Fields Examining behavior of a cruise swimming copepod in a Burgers' vortex - Bulletin of the American Physical Society, 2018.

## 2019

- Weissburg MJ, J Yen, DM Fields 2019- Phytoplankton odor modifies the response of *Euphausia superba* to flow. Polar Biology doi.org/10.1007/s00300-018-02440-w
- Núñez-Acuña, G., C. Gallardo-Escárate, A.B. Skiftesvik, D.M. Fields & H.I. Browman. 2019. Silencing of ionotropic receptor 25a decreases chemosensory activity of the salmon louse *Lepeophtheirus salmonis* during the infective stage. Gene doi.org/10.1016/j.gene.2019.02.012
- Fields, D. M., Handegard, N. O., Dalen, J., Eichner, C., Malde, K., Karlsen, Ø., Skiftesvik, A. B., Durif, C. M. F., and Browman, H. I. Airgun blasts used in marine seismic surveys have limited effects on mortality, and no

sublethal effects on behaviour or gene expression, in the copepod *Calanus finmarchicus*. – ICES Journal of Marine Science, doi:10.1093/icesjms/fsz126.

Goode A, Fields DM, Archer SD, Martinez Martinez J. 2019. Physiological responses of *Oxyrrhis marina* to a diet of virally infected *Emiliana huxleyi*. PeerJ 6:e26851v1

\* Thompson CRS, Fields DM, Bjelland RM, Chan VBS, Durif CMF, Mount A, Runge JA, Shema SD, Skiftesvik AB, Browman HI. 2019. The planktonic stages of the salmon louse (*Lepeophtheirus salmonis*) are tolerant of end-of-century pCO<sub>2</sub> concentrations. PeerJ 7:e7810  
<http://doi.org/10.7717/peerj.7810>

\* Escobar, R.H., **D.M. Fields**, H.I. Browman, S.D. Shema, R.M. Bjelland, A.-L. Agnalt, A.B. Skiftesvik, O.B. Samuelsen, C.M.F. Durif. 2019. The effects of hydrogen peroxide on mortality, escape response and oxygen consumption of *Calanus* spp. FACETS 4: 626–637. doi:10.1139/facets-2019-0011

## 2020

\*Madelyn N. Woods, Theresa Hong, Donaven Baughman, Grace Andrews, David M. Fields, Patricia A. Matrai. 2020. Accumulation of microplastic fibers presence and ingestion in American lobster larvae (*Homarus americanus*) Mar. Poll. Bul. 157: 111280

Tyrell A, Fisher N, Fields DM 2020 Separating thermal and viscous effects of temperature on copepod respiration and energy budget. Biol. Bull. doi.org/10.1086/709646

Niemisto M, Fields DM, Clark KF, Waller JD, Greenwood SJ, Wahle RA. American lobster postlarvae alter gene regulation in response to ocean warming and acidification. *Ecol Evol.* 2020;00:1–14. doi.org/10.1002/ece3.7083

## 2021

Aluru, N., Fields, D. M., Shema, S., Skiftesvik, A. B., & Browman, H. I. (2021). Gene expression and epigenetic responses of the marine Cladoceran, *Evadne nordmanni*, and the copepod, *Acartia clausi*, to elevated CO<sub>2</sub>. *Ecology and Evolution*, 11, 16776–16785.  
<https://doi.org/10.1002/ece3.8309>

Dorsa Elmi, Donald R. Webster, David M. Fields. 2020. The response of the copepod *Acartia tonsa* to the hydrodynamic cues of small-scale, dissipative eddies in turbulence. *Journal of Experimental Biology*: jeb.237297 doi: 10.1242/jeb.237297 Published 21 December 2020

## 2022

SD Katz, H Chen, DM Fields, EC Beirne, P Keyes, GT Drozd, C Aeppli 2022. Changes in Chemical Composition and Copepod Toxicity during Petroleum Photo-oxidation. *Environmental Science & Technology* 56 (9), 5552-5562

D Elmi, DR Webster, DM Fields 2022 Copepod interaction with small-scale, dissipative eddies in turbulence: Comparison among three marine species *Limnology and Oceanography* 67 (8), 1820-1835

## 2023

NA Robinson, D Robledo, L Sveen, RR Daniels, A Krasnov, A Coates, ...DM Fields.. Applying genetic technologies to combat infectious diseases in aquaculture *Reviews in Aquaculture*. DOI: 10.1111/raq.12733

DM Fields, JA Runge, CRS Thompson, CMF Durif, SD Shema, ... HI Browman. 2022 A positive temperature-dependent effect of elevated CO<sub>2</sub> on growth and lipid accumulation in the planktonic copepod, *Calanus finmarchicus*. *Limnology and Oceanography*. doi: 10.1002/lno.12261

EH Vereide, M Mihaljevic, HI Browman, DM Fields, MD Agersted, ...2023. Effects of airgun discharges used in seismic surveys on development and mortality in nauplii of the copepod *Acartia tonsa*. *Environmental Pollution* 327, 121469

## 2024

JT Carloni, RA Wahle, DM Fields, P Geoghegan, B Shank 2024. Diverging phenology of American lobster (*Homarus americanus*) larvae and their zooplankton prey in a warming ocean. *ICES Journal of Marine Science*, fsae051

A Ascher, M Niemisto, D Baughman, G Andrews, C Morris, E Patrick, RA Wahle, DM Fields. 2024  
Climate induced declines in maternal size may come at a cost to embryonic investment and larval performance in the American lobster Fisheries Research 276, 107059

B Shank, JT Carloni, P Geoghegan, DM Fields, AG Goode, HJ Walsh, RA Wahle. 2024 . Bridging the  
spawner-recruit disconnect II: Revealing basin-scale correlations between zooplankton and lobster  
settlement dynamics in the Gulf of Maine. Fisheries Research 278, 107082

### Professional Workshops Publications

2005 Proceedings from a Workshop on Right Whale Foraging in the Nearshore Waters of the Northern  
Gulf of Maine 2005 Saco, Maine.  
2011 Pices 5<sup>th</sup> Annual Zooplankton Workshop Pucon Chile  
2012,14,16,18 OCE REU Workshop  
2014 PAN-National REU Workshop  
2016 ICES Zooplankton Workshop Bergen Norway  
2018/19 Lobster Larvae Collaborative BB Harbor Maine  
2022 – Salmon Lice workshop – Oslo Norway  
2023 Pices Annual Zooplankton Workshop

### Collaborator

J. Yen (GIT); M. Weisburg (GIT); Houshuo Jiang (WHOI); R Wahle (BLOS); H Browman (IMR-Norway);  
Skiftesvik AB (IMR-Norway); Mukul Sharma Dartmouth; Josh Carloni (NH Fish and wildlife); Jes Waller (DMR)

### Grants and Awards

\* Pending; \*\*Planned submission

\_\_\_\_\_ - Institutional Grants

1990	Graduate Student Travel Award		
1991	Graduate Student Travel Award		
1991	Nominated for best Masters Thesis - SUNY Stony Brook		
1992 - 1993	Natural History Museum of NY - Learner Gray Award		
1993	Graduate Student Travel Award		
1999 - 2002	P.I. Marc Weissburg – J. Yen	<b>NSF - Sensory Systems</b>	
	3 Yr Post Doctoral Salary		
	“Signal Recognition by Zooplankton”		
2000-2002	<b>Co P.I.</b> – P.I. Browman, H.	<b>Research Council of Norway</b>	
	“Sensory biology and behaviour studies of salmon lice nauplii and copepodids.”		
2002-2004	<b>Co P.I.</b> P.I. Kona Blue Water Farms.	<b>NSF – ATP</b>	
	Consultant – David Fields		
2003-2008	<b>P.I.</b> David Fields	<b>NSF -IOS</b>	<b>\$351,163</b>
	“Mechanoreception in marine copepods: detecting complex fluid signals”		
2003-2005	<b>Co P.I.</b> – P.I. Browman, H.	<b>Research Council of Norway</b>	
	“The sensory biology of host detection in the parasitic salmon louse, <i>Lepeophtheirus salmonis</i> : electrophysiological and behavioural investigations”		
<u>2005-2006</u>	<b>Co P.I.</b> – PI Annette Sharone	<b>NSF</b>	<b>\$1.6 Mil</b>
	Centers for Ocean Sciences Education Excellence - Oceans in the Earth-Sun System		
2004-2006	<b>Co P.I.</b> – P.I. Browman, H.		(1m / 3 years)
	Research Council of Norway+ Bergen Teknologioverføring AS		
	+ Institute of Marine Research		
	“Proof of Concept for an inexpensive salmon lice trap”		
2007-2009	<b>PI</b> -David Fields	<b>NSF-Biological OCE</b>	<b>\$462,847</b>
	The role of phytoplankton ballast material in deterring copepod grazing		
2007-2008	REU Supplement. Mechanoreception in Marine Copepods:		
	Detecting Complex Fluid Signals		

2007-2010	<b>Co PI</b> – PI Incze L.	<b>ONR-Marine Mammal S&amp;T</b>	<b>\$620,968</b>
	Energy transfer to upper trophic levels on a small offshore bank.		
2007-2011	<b>P.I</b> – David Fields	<b>NSF-IOB</b>	<b>\$322,532</b>
	Collaborative Research: From structure to information in mechanosensory systems. The role of sensor morphology in detecting fluid signals.		
2007-2009	<b>P.I</b> – David Fields	<b>NSF-IOB</b>	<b>\$ 6000</b>
	REU Supplementary Award		
2008-2010	<b>PI</b> -David Fields	<b>NSF-Bio OCE</b>	<b>\$ 6000</b>
	REU Supplementary Award		
<u>2008-2011</u>	<b>Co PI</b> – Co PI R Wahle	<b>NSF-Bio OCE</b>	<b>\$420,076</b>
	REU Site Proposal - Bigelow lab REU Site		
<u>2009-2011</u>	<b>Co PI</b> –PI D. Emerson	<b>NSF-DBI</b>	<b>\$341,265</b>
	Acquisition of a Confocal Laser Scanning Microscope at the Bigelow Laboratory for Ocean Sciences		
2011-2014	<b>Co PI</b> –PI B. Twining	<b>NSF-Chem-Oce</b>	<b>\$519,331</b>
	Assessing the chemical speciation and bioavailability of iron regenerated by marine zooplankton		
2011-2014	<b>PI</b> Fields – Co PI W. Balch	<b>NOAA</b>	<b>\$524,794</b>
	Implications of ocean acidification on carbon export in a simplified planktonic food chain: Experiments using <i>Acartia</i> and <i>Pleurochrysis</i> .		
<u>2012-2014</u>	<b>PI</b> -Fields	<b>NSF-Bio OCE</b>	<b>\$285,899</b>
	REU Site: Bigelow Laboratory for Ocean Sciences - Undergraduate Research Experience in the Gulf of Maine and the World Ocean		
2012-2014	<b>Co-PI</b> ; PI –Wilson	<b>Moore Foundation</b>	<b>\$1,048,000</b>
	Carbon and gene flow mediated by virus life.		
2012-2015	<b>CoPI</b> – PI W. Balch	<b>NSF-Bio OCE</b>	<b>\$ 999,948</b>
	Ocean Acidification-Category 1: Implications of Ocean Acidification on Predator Prey Interactions that Drive the Biological Pump		
<u>2014-2014</u>	<b>PI</b> – <b>Fields</b>	<b>NSF – Bio OCE</b>	<b>\$ 48,500</b>
	REU Supplement – Engaging community college students in REU Programs		
2014-2016	<b>PI</b> – <b>Jes Waller</b>	Canadian-American Center Fellowship	<b>~\$ 80,000</b>
	The impact of climate change of the American Lobster larvae		
<u>2015-2019</u>	<b>PI</b> – <b>Fields</b>	<b>NSF – Bio OCE</b>	<b>\$ 650,000</b>
	REU Site: Bigelow Laboratory for Ocean Sciences - Undergraduate Research Experience in the Gulf of Maine and the World Ocean		
2015-2018	<b>CoPI</b> –( <b>GIT</b> )	<b>Bio-OCE</b>	<b>\$ 339,669</b>
	Response of copepods to laboratory generated turbulence Burger Vortex		
2015-2016	<b>PI</b> – <b>Fields</b>	<b>Island Foundation</b>	<b>\$ 10,500</b>
	Bibliography – Using sensory ecology to limit fishing bycatch		
2016 -2018	<b>PI-Fields</b> – <b>Sub-award</b>	<b>NOAA S-K</b>	<b>\$25,000</b>
	Impact of OA-Temperature on lobster development/physiology in Midcoast ME		
2017	<b>PI-Fields</b>	<b>NOAA Seagrant</b>	<b>\$4300</b>
	Impact of OA-Temperature on lobster development/physiology in NE USA		
2018	<b>PI-Fields</b>	<b>NOAA Seagrant</b>	<b>\$4500</b>
	Impact of OA-Temperature on lobster development/physiology in NE USA		
<u>2018</u>	<b>PI</b> <b>Fields</b>	<b>REU Supplement</b>	<b>\$1500</b>
	Supplement to recover housing losses		
2018-2020	<b>Co-PI</b>	<b>Maine Lobster Research Collaborative (DMR)</b>	<b>\$40,000</b>
	<i>The Maine Lobster Collaborative: Bridging the great disconnect</i> - Linking the Gulf of Maine pelagic food web to larval dynamics		
2018-2020	<b>PI-Fields</b>	<b>NOAA S-K</b>	<b>\$284,528</b>
	Do Small lobsters produce lower quality eggs?		
2019-2020	<b>Co-PI</b>	<b>Arctic Domain Awareness Center *ADAC)</b>	<b>\$295,486</b>
	Bioaccumulation and depuration rates of oil and its weathering products by lipid-rich calanoid copepods		

2019	<b>PI-Fields</b>	<b>NOAA Seagrant</b>	<b>\$5000</b>
	Impact of microplastics on lobster development/physiology in NE USA		
2019-2021	<b>CoPI Fields</b>	<b>Maine DMR</b>	<b>\$40,000</b>
	Bridging the great disconnect: revealing trophic links between lobster larvae and the pelagic food web		
2019-2024	<b>PI – Fields</b>	<b>NSF-Polar Programs</b>	<b>\$551,480</b>
	Swarming behavior of Krill		
2019	<b>PI Fields</b>	<b>Spencer Funds (610450)</b>	<b>\$25,230</b>
	Microalgae Nutrition		
2019	<b>PI Fields</b>	<b>Spencer Funds (610420)</b>	<b>\$25,080</b>
	Salmon Lice Treatments		
2019-2021	<b>CoPI – Fields</b>	<b>NOAA Seagrant</b>	<b>\$404,193</b>
	Disconnect between egg production and settlement in a key benthic species: the American Lobster.		
2020-2023	<b>PI – Fields</b>	<b>NSF – Bio OCE</b>	<b>\$550,000</b>
	REU Site: Bigelow Laboratory for Ocean Sciences - Undergraduate Research Experience in the Gulf of Maine and the World Ocean		
2021-2022	<b>PI – Fields</b>	<b>Conoco Oil funding</b>	<b>\$20,000</b>
	Effects of Brunt Oil and herders on Lipid rich copepods		
2021-2024	<b>PI – Fields</b>	<b>NSF-Polar Programs</b>	<b>\$777,480</b>
	Euchaeta – Viscosity		
2022	<b>PI – Fields</b>	<b>NSF-Polar Programs</b>	<b>\$58,540</b>
	Supplement to Swarming behavior of Krill		
2022	<b>PI – Fields</b>	<b>NSF OCE-Polar Programs</b>	<b>\$101,964</b>
	Supplement to Euchaeta Viscosity		
2022	<b>PI – Fields</b>	<b>NSF-OCE</b>	<b>\$88,190</b>
	Supplement to REU Program		
2023	<b>PI – Fields</b>	<b>Maine DMR</b>	<b>\$346,198</b>
	Plankton Wind Energy		
2023	<b>PI – Fields</b>	<b>AKRF</b>	<b>\$10,492</b>
	White Paper – Wind Energy		
2024-2026	<b>PI – Fields</b>	<b>NSF – Bio OCE</b>	<b>\$480,000</b>
	REU Site: Bigelow Laboratory for Ocean Sciences - Undergraduate Research Experience in the Gulf of Maine and the World Ocean		
2024	<b>PI – Fields</b>	<b>Maine DMR</b>	<b>\$180,398</b>
	Plankton Wind Energy 2024		
*2024	<b>PI – Fields</b>	<b>NSF – Bio</b>	<b>\$3M</b>
	RaMP Post-Bacc Site: Bigelow Laboratory for Ocean Sciences – Oceans of Opportunity.		

## Invited Seminars

- 1996 - University of Wisconsin Milwaukee - “The interactions of copepods with a moving fluid environment”.
- 1997 - University of Wisconsin Milwaukee - “The role of kinematic viscosity in the ecology of plankton”
- 1997 - Stazione Marina di Napoli, Naples Italy – “Mechanoreception in marine organisms”
- 1998 - The Oceanographic Society, Paris France - “The role of biologically and physically forced fluid motion on the sensory horizon of copepods”.
- 1999 – Georgia Institute of Technology - “The detection of biologically and physically forced fluid motion by the mechanoreceptors of copepods”.
- 1999 – University of Minnesota – “The distribution of copepods in an active fluid environment”.
- 2000 – United Engineering Foundation Tuscany, Italy – “Decoding complex fluid mechanical signals: Neural responses from the mechanosensory hairs on the antennule of *Gaussia princeps*”.
- 2001 – University of Alabama - Dauphin Island Marine Laboratory.
- 2002 – University of Northern Colorado.
- 2003 – Austevoll Aquaculture Research Station, Norway
- 2003 – Bigelow Oceanographic Institute, ME

2004 – University of Texas – Austin  
 2006 – University of Maine – Orono  
 2006 – ASLO Victoria Canada  
 2008 – Carpenter's Boat Shop Bristol Maine  
 2011 – 5th annual Zooplankton Symposium (session chair)  
 2011 – University of Bergen Norway  
 2012 – Colby College Physics Dept  
 2013 – IMR Austevoll Norway  
 2014 – Maine OA Commission  
 2015 – IMR Austevoll Norway  
 2018 – MOCA (Maine Ocean and Coastal Acidification Partnership)  
 2019 – ASLO PR Ramon Magalef Award  
 2020 – University of Bergen-Norway Impact of seismic blasting on marine invertebrates.

### Published Abstracts - Reports

- Fields, D.M 1990. Early to bed early to rise: proximate cues for crepuscular activities in the cleaning wrasse, *Labroides phthiophagus*. *First international Coconut Island conference on the behavioral ecology and ethology of coral reef animals*. August 10, University of Hawaii, Oahu HI, USA.
- Fields, D.M and J. Yen. 1991. Outer limits and inner structure: the 3 - dimensional flow field of *Pleuromamma xiphias* (Copepoda). *Proceedings of Zooplankton Ecology Symposium* 21-25 August 1991, Lawrence University, Appleton, WI, USA.
- Fields, D.M. and J. Yen. 1992. The feeding ecology of *Pleuromamma xiphias*: a vertically migrating copepod. Abstr. *Aquatic Science Meeting Amer. Soc. Limnol. Oceanogr.*, - Santa Fe, NM, 9-14 February 1992.
- Yen, J. and D.M Fields. 1992. Escape responses of *Acartia hudsonica* (Copepoda) nauplii from the flow field of *Temora longicornis*. Abstr. *Aquatic Science Meeting Amer. Soc. Limnol. Oceanogr.*, Santa Fe, NM, 9-14 February 1992.
- Fields, D.M. and J. Yen. 1994. The escape of *Pleuromamma xiphias* in response to a quantifiable fluid dynamic disturbance. *EOS, Trans. Am. Geophys. Union* 75:184.
- Moore, P.A., D.M. Fields, and J. Yen. 1994. The fine scale structure of chemical signals within the feeding current of a calanoid copepod. *EOS, Trans. Am. Geophys. Union* 75:163.
- Yen, J. and D.M Fields. 1994. Behavioral responses of *Euchaeta rimana* to a controlled fluid mechanical disturbance. *EOS, Trans. Am. Geophys. Union* 75:184.
- Fields, D.M. and J. Yen. 1995. The escape behavior of marine copepods in response to a quantifiable fluid mechanical disturbance. *Symp. The sensory ecology and physiology of zooplankton*. Oahu, Hawaii.
- Fields, D.M. and J. Yen. 1996. Implication of copepod feeding currents on the spatial orientation of their prey. *1996 Ocean Sciences Meeting, AGU, San Diego, CA, 12-16 February 1996*.
- Fields, D.M. and J. Yen. 1997. The escape response of marine copepods to shear, a quantified fluid mechanical disturbance. Abstr. *Aquatic Science Meeting Amer. Soc. Limnol. Oceanogr.*, Santa Fe, NM, 9-14 February 1997.
- Fields, D.M. 1998. The implications of biologically and physically created fluid motion on the sensory horizon of copepods. *Oceanography*. 11(2) :26
- Fields, D.M., J. Yen, D.S. Shaeffer, M.W. Miller and M.W. Weissburg. 1999. Behavioral thresholds for *Euchaeta rimana* in response to fluid mechanical signals. Abstr. *Aquatic Science Meeting Amer. Soc. Limnol. Oceanogr.*, Santa Fe, NM, 1-5 February.
- Fields, D.M., D.S. Shaeffer, M.W. Miller and M.W. Weissburg. 2000. Physiological thresholds of *Gaussia princeps* to controlled mechanical stimuli. Abstr. *Aquatic Science Meeting Amer. Soc. Limnol. Oceanogr.*, Copenhagen, DK, June.
- Fields, D.M., D.S. Shaeffer, M.J. Weissburg. 2000. Living in the dark: The role of mechanoreception in the ecology of marine copepods. Abstr. *Second International Symposium on -The Mechanics of Plants, Animals and their Environments: Sensors and Sensing in the Natural and Fabricated World*. Tuscany Italy, June.
- Yen J. and D.M. Fields. 2000. Hydrodynamic prey mimic elicits capture from an aquatic microcrustacean



- copepod. Abstr. Second International Symposium on -The Mechanics of Plants, Animals and their Environments: Sensors and Sensing in the Natural and Fabricated World. Tuscany Italy, June.
- Fields. D.M., A. Reed, and M.W. Weissburg. 2001. The rapid behavioral response of *Calanus finmarchicus* to controlled mechanical stimuli. Abstr. *Aquatic Science Meeting Amer. Soc. Limnol. Oceanogr.*, Albuquerque, NM, Feb.
- Fields. D.M., D.S. Shaeffer, M.W. Miller and M.W. Weissburg. 2002. Decoding Complex Fluid Mechanical Signals: Neural Responses From the Mechanosensory Hairs on the Antennule of *Gaussia princeps*... Abstr. *Aquatic Science Meeting Amer. Soc. Limnol. Oceanogr.*, Honolulu, HI, Feb.
- Chang Y., D.M. Fields, J. Brown, J. Yen, and D. Webster. 2002. Pleopod kinematics of the krill, *Euphausia pacifica* Abstr. *Aquatic Science Meeting Amer. Soc. Limnol. Oceanogr.*, Victoria, Canada, June.
- A.I. Liatis\*, D.M. Fields and M.J. Weissburg 2002 Neural Recordings from *Euphausia pacifica* in response to mechanical stimulation. *Howard Hughes Presentations* Georgia Institute of Technology.
- Fields, D.M. 2003 Copepod mechanoreceptors as a model system for mechanosensory orientation. Georgia Tech Robotic Initiative.
- Mellard, J P ; Fields, D M ; Brown, J ; Weissburg, M J ; Yen, J. 2004 Behavioral Adaptation of a polar copepod. ASLO, Savannah GA July.
- Mellard, J.P.\*; Fields, D.M.; Brown, J.; Weissburg, M.J.; Yen, J. 2005 Effects of Viscosity on Copepod Signal Detection. Society for Integrative and Comparative Biology. San Diego, CA January.
- Proceedings from a Workshop on Right Whale Foraging in the Nearshore Waters of the Northern Gulf of Maine Edited by Laura Taylor Singer\* and Laura Ludwig. April 15, 2005 Saco, Maine*
- Fields, D.M. 2006. The Orientation of Copepods: Does it matter? ASLO – Victoria BC Canada
- deCharon A. Fields DM et al. 2006. Education and public outreach outside of traditional academic settings: Lessons from a small independent research institutions. ASLO 2006
- Incze, L.S., Wolff, N., Rosen, S., Baukus, A., Stevick, P., Hebridean Kraus, S. Fields, DM., Advection, internal waves and trophic funneling on a small offshore bank. ASLO – 2007 Santa Fe
- Fields, DM and H. Jiang. Sensory morphology and fluid structure: determining the form function relationship in mechanosensory hairs. ASLO – 2007 Santa Fe
- Lewis Incze, Scott Kraus, David Fields, Nicholas Wolff, Adam Baukus, Andone Lavery, Peter Stevick and James Lerczak. Internal Waves, Topographic Highs and Upper Trophic Level Feeding in the Gulf of Maine Globec 2009-Victoria BC
- David M. Fields, Steve D. Shema, Lewis Incze, Scott Kraus, Nicholas Wolff, Adam Baukus Are surface swarms of *Meganyctiphanes norvegica* a response to passing internal waves? Globec 2009-Victoria BC
- Howard I. Browman, Jeannette Yen, David M. Fields, Jean-François St-Pierre, Anne Berit Skiftesvik. Predatory behaviour of the carnivorous copepod *Euchaeta norvegica* and escape responses of their ichthyoplankton prey (Atlantic cod, *Gadus morhua*) WKMOR 2010, Aberdeen Scotland.
- Fields DM, Shema SD, Woll CI, Milligan AJ. 2011 Do algal hard parts confer protection against copepod grazing? ASLO – Puerto Rico
- Fields DM, Shema SD, Browne, TQ. Sensory morphology and fluid structure: determining the form function relationship in mechanosensory hairs. Session Chair - Pices – 5<sup>th</sup> annual zooplankton conf. 2011 Pucon Chile
- Fields DM, Shema SD, Milligan AJ. 2012. Do algal hard parts confer protection against copepod grazing? ASLO – SLC
- Poehls, Ashley, David Fields, W.M. Balch, Steven Shema. 2013. Effects of Ocean Acidification on the Growth Rate, Maximum Culture Density, and Cell Size of Coccolithophores. (Poster) ASLO Aquatic Sciences Meeting, New Orleans, LA. 18-21 February, 2013.
- Fields DM Browman HI, Twining BS. 2013 ASLO Hawaii copepod intestines: 10<sup>21</sup> microbioreactors of global ocean processes
- Fields DM, Vermont A, Waller J. Direct and indirect effects of ocean acidification on an estuarine copepod. NSF Ocean Acidification Principle Investigators' Meeting, Washington, DC. Poster presentation. Sep 2013.

Francisco CA, Fields DM. The respiration rates of *Acartia tonsa* in response to changing temperature and salinity. Ocean Sciences Meeting, Honolulu, HI. Poster presentation. Feb 2014 .

2015

SESSION CHAIR

\*Fields, DM – ROM, EL. Session Chair: Undergraduate Research in Aquatic Sciences Oral Session.

Vermont AI<sup>1</sup>, Waller JD<sup>1,4</sup>, Martínez Martínez J<sup>1</sup>, Gilg IC<sup>1</sup>, Leavitt AH<sup>1</sup>, Fløge SA<sup>1,3</sup>, Archer SD<sup>1</sup>, Wilson WH<sup>1,2</sup>, Fields DM<sup>1</sup> 2015. Virus infected algae deters grazing by marine copepods . Ocean Sciences Meeting, Honolulu, HI. Poster presentation. Feb 2014

Gilg IC, Archer SD, Martínez Martínez J, Fløge SA, Fields DM, Vermont AI, Waller J, Wilson WH. 2015. NEW INSIGHTS INTO THE MECHANISM DRIVING THE REDUCTION OF PHOTOCHEMICAL EFFICIENCY IN *EMILIANA HUXLEYI* DURING VIRAL INFECTION Ocean Sciences Meeting, Honolulu, HI. Poster presentation. Feb 2014

White MM, Lubelczyk L, Waller JD, Drapeau DT, Bowler BC, Vermont A, Fields DM, Balch WM. Dissolution of *Pleurochrysis carterae* coccoliths in *Acartia tonsa* guts: Testing the Tums hypothesis. Aquatic Sciences Meeting, Granada, Spain. Oral presentation. Feb. 2015.

White MM, Lubelczyk L, Waller JD, Drapeau DT, Bowler BC, Vermont A, **Fields DM**, Balch WM. Dissolution of *Pleurochrysis carterae* coccoliths in *Acartia tonsa* guts: Testing the Tums hypothesis. Aquatic Sciences Meeting, Granada, Spain. Oral presentation. Feb. 2015.

White, M., **Fields, DM.**, Drapeau, D., Lubelczyk, L, Balch, W. Ocean acidification and its impacts on a simple predator prey system. NSF-sponsored OA meeting, Woods Hole, MA. June, 2015

Webb A, Lasley R, Fields DM Pheromones effect grazing and respiration rates of marine copepods. ASLO Feb. 2015

2016

SESSION CHAIR

\*Fields, DM – ROM, EL. Session Chair: Undergraduate Research in Aquatic Sciences Oral Session.

White, M., Waller, J., Lubelczyk, L., Drapeau, D., Bowler, B., Wyeth, A., **Fields, DM.**, and Balch, W. 2016. Calcium Carbonate Dissolution Above the Lysocline: Implications of Copepod Grazing on Coccolithophores. Talk. 2016 Ocean Sciences Meeting, New Orleans, LA Feb. 21-26, 2016.

Waller JD, McVeigh H, Fields DM, Wahle R. Impact of climate change on Lobster development and physiology. Aquatic Sciences Meeting, NOLA. Oral presentation. Feb. 2016.

Kim, B. Fields DM. Impact of microplastic on the flux of organic matter in the ocean. Aquatic Sciences Meeting, SantaFe. Poster presentation. June. 2016.

Sloan, V. and DM. Fields. 2016. The History of the GEO REU Network. Abstract at the 2016 NSF Pan REU PI Workshop in Arlington, VA.

Browman HI, Fields DM, Skiftesvik AB. 2016 The sensory ecology of host finding in the free-living life history stages of the salmon louse, *Lepeophtheirus salmonis*. <http://www.sealice2016.com/>

2017

SESSION CHAIR

\*Fields, DM – ROM, EL. Session Chair: Undergraduate Research in Aquatic Sciences Oral Session.

Bragdon BL, Layman JJ, Fløge SA, Fields DM, Sullivan MB. Effect of Myovirus Infection on *Synechococcus* Photosynthesis. ALSO Hawaii – 2017

Fløge SA, Fields DM, Waller JD., Sullivan MB. EVALUATING THE ‘VIRAL SHUNT’: DO VIRUSES ENHANCE OR REDUCE NUTRIENT FLOW TO HIGHER TROPHIC ALSO Hawaii – 2017

Herzog, AN. Fields DM, Aeppli, C.: LINKING CHEMICAL COMPOSITION TO TOXICITY OF FRESH AND WEATHERED OIL SAMPLES COLLECTED FROM THE 2010 GULF OF MEXICO OIL SPILL ASLO Feb. 2017

Ross ML and Fields DM Swimming under the influence: signal detection in a changing world. ALSO Hawaii – 2017

Elmi D, Webster DR, **Fields DM** Copepod behavior response to Burgers' vortex treatments mimicking turbulent eddies ,American Physical Society 2017  
 Madelyn Woods Margaret Stack, David Fields, Patricia Matrai . Microplastic fiber uptake, ingestion, and egestion rates in the blue mussel (*Mytilus edulis*) .Rargom Portland Maine 2017

## REPORT

Kunstig lys og rensefisk. Sluttrapport FHF prosjekt 901146 DOI: 10.13140/RG.2.2.24310.40002

2018

### SESSION CHAIR

\*Fields, DM – ROM, EL. Session Chair: Undergraduate Research in Aquatic Sciences Oral Session.

Madelyn Woods Margaret Stack, David Fields, Patricia Matrai . Microplastic fiber uptake, ingestion, and egestion rates in the blue mussel (*Mytilus edulis*) Sixth International Marine Debris Conference San Diego 2018

Núñez-Acuña G, Gallardo-Escárate C, Fields DM, Shema S, Skiftesvik AB, Ormazábal I. Browman HI. HOST RECOGNITION MECHANISMS IN THE SEA LICE: GENOMIC AND FUNCTIONAL APPROACHES TO IDENTIFY NOVEL CHEMOATTRACTANTS DERIVED FROM SALMON SKIN. European Aquaculture Society 2018

Núñez-Acuña G, Gallardo-Escárate C, Fields DM, Skiftesvik AB, Ormazábal I. Browman HI. Key receptors and kairomones involved in host-recognition mechanisms in sea lice *Lepeophtheirus salmonis* inferred by RNAi experiments International Conference of Biotechnology in La Habana, Cuba. 2018

Dorsa Elmi, David Fields, Donald R Webster, EP44A-0873 Deconstructing turbulence-copepod interactions – Calanus response to mimics of turbulent vortices. AGU/ASLO Portland OR

Nelson H, Woods M, Lorenz C, Gerdt G, Fields DM, Matrai P. IS34B-2638 USE OF IMAGING FLOW CYTOMETRY (FlowCam) IN THE STUDY OF MICROPLASTICS. Sixth International Marine Debris Conference San Diego 2018

Nelson H, Woods M, Lorenz C, Gerdt G, Fields DM, Matrai P. IS34B-2638 USE OF IMAGING FLOW CYTOMETRY (FlowCam) IN THE STUDY OF MICROPLASTICS. AGU/ASLO Portland OR. 2018

Maura Niemisto, Richard A. Wahle, , Jessica Waller, Spencer Greenwood, David Fields E11A-07 Interactive Effects of High CO<sub>2</sub> and Temperature on the Physiology, Behavior and Development of American Lobster Larvae: Comparing Subpopulations across New England's Steep Thermal Gradient AGU/ASLO Portland OR. 2018

Nelson H, Woods M, Lorenz C, Gerdt G, Fields DM, Matrai P. IS34B-2638 USE OF IMAGING FLOW CYTOMETRY (FlowCam) IN THE STUDY OF MICROPLASTICS. AGU/ASLO Portland OR

Domeyer D, Waller J, Fields DM. ED34C-2450 Comparing the growth and physiology of American lobsters to European green crabs under elevated seawater temperature. AGU/ASLO Portland OR

Fields DM Mechanoreception in Marine Copepods: Measuring the Force Required to Move a Mechanoreceptive Setae AGU/ASLO Portland OR 2018

2019

### SESSION CHAIR

\*Fields, DM – ROM, EL. Session Chair: Undergraduate Research in Aquatic Sciences Oral Session.

Niemisto, M.; Wahle, R.; Waller, J.; Clark, F.; Greenwood, S.; Fields, D.: GENE REGULATORY RESPONSE TO END-CENTURY TEMPERATURE AND PCO<sub>2</sub> IN POSTLARVAL AMERICAN LOBSTER Ocean Sciences Meeting 2019

Goode, A.; Fields, D.; Archer, S.; Martinez, J.: PHYSIOLOGICAL RESPONSES OF OXYRRHIS MARINA TO A DIET OF VIRALLY INFECTED EMILIANIA HUXLEYI Ocean Sciences Meeting 2019

Webster, D.; Elmi, D.; Soumya, S.; Fields, D.: BEHAVIOR OF A CRUISE-SWIMMING COPEPOD IN MIMICS OF TURBULENT EDDIES Ocean Sciences Meeting 2019

Risley, S.; Niemisto, M.; Fields, D.: FEEDING RATES OF HOMARUS AMERICANUS (AMERICAN LOBSTER) LARVAE AT DIFFERENT FOOD CONCENTRATIONS. Ocean Sciences Meeting 2019

## 2020

### SESSION CHAIR

\*Fields, DM – ROM, EL. Session Chair: Undergraduate Research in Aquatic Sciences Oral Session.

D Elmi, S Soumya, DR Webster, D Fields. Hop and escape behavior of Acartia tonsa in response to turbulent-like eddies Ocean Sciences Meeting 2020

J Capista, AJ Contreras, A Ascher, M Niemisto, D Fields, R Wahle. Consequences of food limitation on the performance of early stage American lobster larvae Ocean Sciences Meeting 2020

EL Rom, D Fields. Undergraduate Student Research: A Multidisciplinary Session III Posters Ocean Sciences Meeting 2020

T Hong, MN Woods, D Fields, P Matrai. Effects of Microplastic Fibers on American Lobster Larvae (Homarus americanus) Ocean Sciences Meeting 2020

A Ascher, G Andrews, D Baughman, M Niemisto, D Fields, R Wahle. Do Climate-Mediated Effects on Adult Size Affect Larval Lobster Performance? Ocean Sciences Meeting 2020

D. ELMI, D.R. WEBSTER, D.M. FIELDS. Swimming response of marine copepod species to small-scale turbulent-like eddies. American Physical Society 2020

## 2021

Bridging the great disconnect: The conundrum of low larval settlement despite record egg production in Gulf of Maine lobster. Asher A, Wahle R. and DM Fields RARGOM 2021

Ontogeny of pursuit, handling, and ingestion of planktonic prey by early stage American lobster Homarus americanus. Laylan E, Spencer M, Lasley-Rasher R, Wahle R, Fields DM RARGOM 2021

## 2022

### ASLO SESSION CHAIR (6 sessions)

\*Fields, DM – ROM, EL. Session Chair: ED12: Undergraduate Research in Aquatic Sciences Oral Session. ASLO Honolulu HI

1. Deconstructing turbulence-copepod interactions – Response of three marine species to small-scale, dissipative eddies in turbulence  
*D.R. Webster, D. Elmi, and D.M. Fields*
2. Hunger Games: Effects of elevated temperature and acidification on the metabolomics and lipid stores of starved American lobster larvae  
*Maura Niemisto<sup>1</sup>, Adrián Contreras<sup>2</sup>, Richard A. Wahle<sup>3</sup>, David M. Fields<sup>1</sup>*
3. ANTARCTIC KRILL (*EUPHAUSIA SUPERBA*) KINEMATICS IN RELATION TO CHEMICAL, PHYSICAL AND PHOTIC STIMULI: FROM VIDEO ANALYSIS TO AN INDIVIDUAL-BASED-MODEL  
*Nicole Hellessey<sup>1</sup>, David Fields<sup>2</sup>, Nicholas Record<sup>2</sup> and Marc Weissburg<sup>1</sup>*

4. LARVAL AMERICAN LOBSTER FEEDING RATES AND PREFERENCE FOR NATURALLY OCCURRING COPEPOD PREY IN THE GULF OF MAINE  
*Molly Spencer, Emily Patrick, Maura Niemisto, Rachel Lasley-Rasher, Richard A. Wahle, David M. Fields*
5. COPEPOD INGESTION RATE AT SUBLETHAL OIL CONCENTRATIONS  
*Sam McNeely<sup>1,2</sup>, Maura Niemisto<sup>2</sup>, Christoph Aepli<sup>2</sup>, & David M Fields<sup>2</sup>*
6. FOOD LIMITATION IN LOBSTER LARVAE MEDIATED BY A CHANGING NORTH ATLANTIC FOODWEB  
*Alex Asher<sup>1,2</sup>, Maura Niemisto<sup>1</sup>, Richard A. Wahle<sup>2</sup>, David M. Fields<sup>1</sup>*
7. Ontogeny of pursuit, handling, and ingestion of planktonic prey by larval American lobster *Homarus americanus*  
*Evelyn Layland<sup>1</sup>, Molly Spencer<sup>2</sup>, Rachel Lasley-Rasher<sup>2</sup>, Richard A. Wahle<sup>1</sup>, David M. Fields<sup>3</sup>*
8. Microplastics as carriers of PAHs released from oil spills: Measuring ingestion rates and bioaccumulation of PAHs in copepods  
*Manasi Desai<sup>1,2</sup>, Maura Niemisto<sup>2</sup>, Christoph Aepli<sup>2</sup>, David Fields<sup>2</sup>*
9. Investigating the Effects of Dissolved Organic Matter on the Bioaccumulation of Short Chained Chlorinated Paraffins in the Copepod Species *Calanus finmarchicus*  
*Elizabeth Westbrook<sup>1,2</sup>, Brian DiMento<sup>1</sup>, Christoph Aepli<sup>1</sup>, David Fields<sup>1</sup>*
10. Feeding fleas: INGESTION RATES OF MARINE CLADOCERANS  
*Allegra Rocha<sup>1</sup>, Maura Niemisto<sup>2</sup>, David Fields<sup>2</sup>*
11. Swimming response of marine copepod species to small-scale turbulent-like eddies. D. ELMI, D.R. WEBSTER, D.M. FIELDS. Microscale Ocean Biophysics meeting – Mallorca Spain

## 2023

### ASLO SESSION CHAIR (3 sessions)

\*Fields, DM – SS122 Vulnerability and Adaptation of Meroplankton Larvae in a Changing .Oral Session. ASLO LaPalma SP

1. BRIDGING THE SPAWNER-RECRUIT DISCONNECT: LINKING GULF OF MAINE LOBSTER RECRUITMENT DYNAMICS TO REGIME SHIFTS IN THE PELAGIC FOOD WEB. Wahle RA, Burton Shank, David Fields, Rachel Lasley-Rasher, Joshua Carloni, Peter Countway, Alex Ascher, Evie Layland, Maura Niemisto,
2. IMPLICATIONS OF A WARMING CLIMATE FOR LARVAL PRODUCTION AND TROPHIC INTERACTIONS OF THE AMERICAN LOBSTER. Alexander Ascher, David Fields, Peter Countway Wahle RA
3. DIVERGING PHENOLOGY OF LOBSTER LARVAE AND THEIR POTENTIAL ZOOPLANKTON PREY IN A WARMING OCEAN  
Submitted by: Joshua T Carloni, David Fields, Wahle RA
4. OUTGROWING THE RISKS OF PLANKTONIC LIFE: ONTOGENY OF PREY PURSUIT, HANDLING AND INGESTION BY THE LARVAL AMERICAN LOBSTER Submitted by: Evelyn Layland, David Fields, Wahle RA
5. THE INFLUENCE OF FECULENCE: SWIMMING BEHAVIOUR AND GRAZING RATE CHANGES OF ANTARCTIC KRILL (*Euphausia superba*) IN THE PRESENCE OF PENGUIN GUANO Nicole G Hellessey, Wiessburg M, Fields DM.
6. UP, DOWN, AND SIDEWAYS: KRILL (*Euphausia superba*) SWIMMING AND SCHOOLING BEHAVIOR IN DIFFERING FLOW, LIGHT AND CHEMICAL CUE CONDITIONS Marc Weissburg Nicole G Hellessey, Fields DM

ASLO SESSION CHAIR (3 sessions)

\*Fields, DM – ROM, EL. Session Chair: ED12: Undergraduate Research in Aquatic Sciences Oral Session.  
ASLO LaPalma SP

7. ENVIRONMENTAL DRIVERS ON THE ABUNDANCE AND REPRODUCTIVE RATE OF MARINE CLADOCERA IN THE DAMARISCOTTA ESTUARY ME, USA Submitted by: Alexandra C Ouimet, Fields DM, Niemisto M.

**2024**

AGU – OSM SESSION CHAIR (3 sessions)

\*Fields, DM – ROM, EL. Session Chair: ED12: Undergraduate Research in Aquatic Sciences Oral Session.  
OSM-NOLA - 2024 Ocean Sciences Meeting

- 1) Clay Minerals Enhance Sinking Rates of Zooplankton Fecal Pellets  
M Desai, M Niemisto, D Fields, M Sharma
- 2) Vertical Distribution of Larval *Homarus americanus* and Zooplankton Community Structure  
M Niemisto, E Layland, M Spencer, B Kellogg, A Ascher, DM Fields
- 3) Getting Jacked Copepod Style - A Comparative Study Of The Viscosity Effects On Morphological Differences Between Tropical, Temperate And Polar Euchaeta Sp.  
I Orrantia, M Niemisto, DM Fields
- 4) Sticky water: the effects of viscosity on the kinematics of marine, carnivorous copepods  
C DeBlois, M Niemisto, M Ford, Z Wagner, A Santhanakrishnan, J Yen, DM Fields
- 5) The Effects of Flow, Light, Algae, and Aggregation Density on Antarctic Krill School Organization and Behavior.  
DW Murphy, K Garayev, C Scott, D Andriani, R Duckett, H Holmes, DM Fields, M Weisburg
- 6) Temperature and Viscosity Effects on the Hydrodynamically Conspicuous 3D Cruising Wake of Euchaeta rimana  
M Ford, M Niemisto, Z Wagner, G Wagner, J Yen, D Fields...
- 7) An Individual-Based Model (IBM) of Antarctic krill (*Euphausia superba*) swimming behaviour: From experimental observations to a working model  
N Hellessey, N Record, D Fields, MJ Weissburg

**REPORT**

- 8) Maine Department of Marine Resources Lobster Research Collaborative Final Project Report BRIDGING THE SPAWNER-RECRUIT DISCONNECT II: REVEALING BASIN-SCALE CORRELATIONS AND PHENOLOGY SHIFTS BETWEEN ZOOPLANKTON AND LOBSTER SETTLEMENT DYNAMICS IN THE GULF OF MAINE

**Academic Service**

2005-2008	Facilities Chair
2007-2008	Safety Chair
2007 – 2014	Search Committee - Bigelow Laboratory
2007 - Present	Education Committee - Bigelow Laboratory
2008 - Present	REU Site Coordinator - Bigelow Laboratory – 3 grant cycles
2009 – 2016	Budget Committee - Bigelow Laboratory
2010 – 2014	Education Committee Chair - Bigelow Laboratory
2016- 2020	Personnel Committee
2020-2021	SRS Rep Board
2022+	ASLO Margalef Award Selection Committee

**Courses Taught**

1986 - 1987	<b>High school science teacher.</b> Steamboat Springs CO. Grades 9-12. Taught all levels of biology and math including calculus.
1993	<b>Co-Taught advanced undergraduate marine zooplankton.</b> State University of New York - Stony Brook, NY with Dr. Jeannette Yen. Organized lectures and labs for 3 weeks (3 classes, 1 lab per week).
1997	<b>Lecturer for Animal Behavior Course.</b> University of Wisconsin - Milwaukee, WI. - Dr. J.R. Strickler Animal Behavior - Course # 204 - 530 – 3 lectures.
1998	<b>Lecturer for Ecology Course.</b> Georgia Institute of Technology. Atlanta GA. - Dr. M. Weissburg Ecology
1999	<b>Lecturer for Ecology Field Course.</b> Georgia Institute of Technology. Atlanta GA. - Dr. T. Snell Ecology – Use of optical tools in the field.
2000	<b>Lecturer for Biological Oceanography.</b> Georgia Institute of Technology. Atlanta GA. - Dr. J. Montoya Oceanography - Two lectures (Global Warming).
2000	<b>Lecturer for Ecology Field Course.</b> Georgia Institute of Technology. Atlanta GA. - Dr. T. Snell Ecology – Use of optical tools in the field. Predation – Fish and zooplankton
2002	<b>Senior Seminar Course.</b> Georgia Institute of Technology. Atlanta GA. (8 lectures).
2004- Present	<b>BLOOM – Bigelow Laboratory High school Program</b>
2005	<b>Ecology “Down Under”. 6 Week Block Course</b> Georgia Institute of Technology. Atlanta GA. (24 lectures)
2005	<b>Small-Scale Physical-Biological Interactions in the Plankton</b> Bigelow Laboratory for Ocean Sciences. West Boothbay Harbor. ME Intensive 7 day Workshop
2006	<b>Ecology “Down Under”. 6 Week Block Course</b> Georgia Institute of Technology. Atlanta GA. (24 lectures)
2007	<b>Ecology “Down Under”. 6 Week Block Course</b> Georgia Institute of Technology. Atlanta GA. (24 lectures)
2007	<b>Small-Scale Physical-Biological Interactions in the Plankton</b> Bigelow Laboratory for Ocean Sciences. West Boothbay Harbor. ME Intensive 7 day Workshop
2010-Present	<b>BLOOM Maine High School Teacher training</b>
2012-14,16-22	Colby Sea-Mester – Field Component (6 cruises)

**Technicians**

2005-2008	Christine Wall
2007-2011	Steve Shema
2013-2015	Alex Vermont
2014 – 2017	Jesica Waller
2016-present	Maura Niemisto
2022-present	Manasi Desai

**Students Supervised****Graduate Students**

2001	<b>Ph.D. Committee</b> – Ben Preston - Georgia Institute of Technology.
2010	<b>Ms Committee</b> – Yin Chang - Georgia Institute of Technology.
2011	<b>Ph.D. Committee</b> - Sara Lapensa Universidad de Valencia, Spain
2012	<b>Ph.D. Committee</b> – Soren Hansen University of Maine Orono
2012	<b>Ph.D. Committee</b> – Rachael Lasley - Georgia Institute of Technology.
2016	<b>MS student</b> – Jesica Waller - University of Maine Orono.

2019 **MS student** –Maura Niemisto - University of Maine Orono.  
 2020 **PhD Student** – Dorsa Elmi – - Georgia Institute of Technology.  
 2022 **Ph.D. Committee** –Robert Moorefield - University of Maine Orono  
 2023 **PhD Student** – Alex Ascher – University of Maine Orono  
 2023 **MS student** –Eveland Layland - University of Maine Orono.  
 Current **Ph.D. Committee** –Madelyn Wood - University of Maine Orono  
 Current **Ph.D. Student** – Zach Wagner- Georgia Institute of Technology

### Post-Baccalaureate Students

2023 Cassandra DuBlois – 1 Yr Internship

### Undergraduate Students

1993 **Supervised Undergraduate Project.**  
 State University of New York - Stony Brook, NY. Peter Esser  
 1997 **Supervised Undergraduate Project.**  
 University of Wisconsin - Milwaukee, WI. Michelle Taylor  
 1997 **Supervised Undergraduate Research Education (REU) Student.**  
 University of Wisconsin - Milwaukee, WI. Dinora Carolina Penalva  
 1998-99 **Supervised Undergraduate Project.**  
 Georgia Institute of Technology - Atlanta, GA. David Schaeffer - Project title  
 “Neurological response of copepods to controlled fluid mechanical signals”.  
 1998 **Supervised Undergraduate Project.**  
 Georgia Institute of Technology - Atlanta, GA. Matt Miller - Project title “Effects of  
 Fluid viscosity on the swimming behavior of *Daphnia pulicharia*”.  
 1999 **Supervised Undergraduate Project.**  
 Instituto Cavanilles de Biodiversidad y Biología Evolutiva.  
 Universidad de Valencia - Atlanta, GA. Sara Lapensa  
 2000 **Supervised Undergraduate Project.**  
 Georgia Institute of Technology - Atlanta, GA. Alana Reed -  
 2000 **Supervised Undergraduate Project.**  
 Georgia Institute of Technology - Atlanta, GA. Catherine Lee –  
 2001 **Supervised Undergraduate Project.**  
 Georgia Institute of Technology - Atlanta, GA. Ayo Afejuku – The role of chemical  
 signals in mediating the fluid mechanical threshold of copepods.  
 2002-03 **Supervised Undergraduate Project.**  
 Georgia Institute of Technology - Atlanta, GA. A.I. Liatis – Neural recordings from the  
 antennules of *Euphasia pacificus*.  
 2004-05 **Supervised Undergraduate Project.**  
 University of New England – Maine. Sarah Weissman. Behavior of marine copepods  
 2009 **Supervised Undergraduate REU Project.**  
 1. University of Arizona – Arizona. Alexis Gillmore.  
 2010 **Supervised Intern Project.**  
 1. Tuff University. Thomas Quincy Browne.  
 2. FIT - Whitney Westman . Voted best student project  
 3. Umaine Orono – Brandon Walus  
 2011 **Supervised Undergraduate REU Project.**  
 UNM – Alex Vermont- **DMSP Production during grazing by copepods**  
 2012 **Supervised Undergraduate REU Project.**  
 1. Colby College – Melanie Ross.  
 2. Michigan State – Ashley Poehls.  
 2013 **Supervised Undergraduate REU Project.**  
 1. Lewis and Clark – Charlotte Francisco.  
 2. UNE – Jessica Waller. Effects of ocean acidification on *Acartia tonsa*.  
 2014 **Supervised Undergraduate REU Project.**  
 1. Umaine – Amy Webb.



	2 Colby College – Alexa Williams.
2015	<b>Supervised Undergraduate REU Project.</b> 1. Warren Wilson College – Halley McVeigh 2. Colby College – Madison Marra 3. Rochester NY Community College – Aleem
2016	<b>Supervised Undergraduate REU Project.</b> 1. Colby College – Brian Kim 2. Colby College – Melanie Ross 3. UNE – Briar Bragdon 4. Devin Domeyer 5. College – Sarah Caron 6. College – Darcia Gonzalez
2017	<b>Supervised Undergraduate REU Project.</b> 1. Colby College – Yu Jin 2. South Carolina State University – Deja Best 3. UMaine - Devin Domeyer
2018	<b>Supervised Undergraduate REU Project.</b> 1. USC - Adrian Contraras 2. UMaineSarah Risley SMCC 3. Colby College - Mara McDonough
2019	<b>Supervised Undergraduate REU Project.</b> 1. Kansas State University - Donavan Baughman 2. Colby College - Grace Andrews 3. University of Puerto Rico - Jose 4. Penn State – Theresa Hong
2020	<b>Supervised Undergraduate REU Project.</b> 1. Molly Spencer – Umaine 2. Manasi Desai – Wooster College 3. Sam McNeeley
2021	<b>Supervised Undergraduate REU Project.</b> 1. Allegra Roche 2. Manasi Desai 3. Sam McNelley 4. Molly Spencer
2022	<b>Supervised Undergraduate REU Project.</b> 1. Alexandra Ouimet 2. UMass Ruben Pagani 3. SMCC - Brendan Kellogg
2023	<b>Supervised Undergraduate REU Project.</b> 1. Isabella Orrantia Marmol 2. Rachel
2024	<b>Supervised Undergraduate JanPlan.</b> 1. Colby College Elias Porter

### High School Students

2008	Eric Dolan- Deck house School Edgecome Maine
2008	Thomas Balch - Lincoln Academy High School Maine
2014	Essie Martin - Lincoln Academy High School Maine
2016	Sam Paul – Deck House School
2019	William Cullina - Lincoln Academy High School Maine
2021	Planktoscope – 4 students Lincoln Academy High School Maine

### Professional Services

NSF Panels – 2008, 2009, 2010, 2012, 2014, 2015  
Grant reviewer:

National Science Foundation (NSF)  
 Biological Oceanography  
 Sensory Systems (IOS)  
 Education and Human Resources  
 Polar Programs  
 National Oceanic and Atmospheric Association (NOAA) - Florida Bay Foundation.  
 Internal Reviews for University of Wisconsin

**Journal reviewer:**

Journal of Experimental Biology  
 Journal of Plankton Research (JPR).  
 Hydrobiologia.  
 ICES  
 Limnology and Oceanography (L&O).  
 Limnology and Oceanography Fluids  
 Estuaries.  
 PLOS  
 Progress in Oceanography  
 Proceedings of the National Academy of Science (PNAS)  
 2007-2008 Contributing Editor - Aquatic Biology.  
 2007-2008 Review Editor - Marine Ecological Progress Series (MEPS).  
 2015+ Review Editor ICES  
 2022-2026 ASLO Margalef Award Selection Committee

**Education Panel**

Panel for Interdisciplinary Program in Biology and Mechanical Engineering.  
 University of Wisconsin - Milwaukee, WI.  
 Nation REU Panel Workshop – OCE EAR GEO 2012/2014

**Relevant Experience**

**Lipid research.**

1987 - 1988 Weyerhaeuser Paper Company. Federal Way, WA - lipid extractions and quantitative analysis.  
 1989 - 1991 State University of New York - Stony Brook (Jeannette Yen) - Analyzed lipid content of Long Island Sound copepods using a Mark IV Iatroscan for lipid identification and quantification.  
 1993-1996 **Field station.** - Designed and managed field station at Natural Energy Laboratory of Hawaii, Kailua-Kona, HI.  
 1994-1996 **Industrial larval biology.** - Black Pearl Inc. Kailua-Kona, HI

**Scientific cruises.**

1990 *Oceanus* - Bermuda-Woods Hole - (David Carron P.I.) 700m net collections - Feeding of *Pleuromamma xiphius* on micro-zooplankton  
 1991 - 1996 *Onrust* - Long Island Sound - Seven single day cruises for copepod and algal collections.  
 1997 *Neeskay* - Lake Michigan (Fox Point Cruise) - Plankton tows from 20 meters.  
 1999 *Pt. Sur*- Monterey Canyon – Plankton Hauls at 800- 1000meters  
 2005-2010 *Galatea* – Gulf of Maine 10 day cruises / year  
 2004-Present RV IRA-C – 8 trips/Yr  
 2014 Gould – Antarctica (10 days sampling cruises)

**Thesis Advisors**

**Ph.D.** Jeannette Yen Don Ping Wang  
 J. Rudi Strickler Akira Okubo  
 Steve Morgan Darcy J. Lonsdale

**Post Doctoral Advisors**

J.R. Strickler M.J. Weissburg

### **Additional Education**

1991	PADI Diver Certification. (210+ Dives) Certified University of Hawaii Diver.
1993	Small Boat License. Certified U.S. Coast Guard Auxiliary. Stony Brook, New York
1997	Instrument shop certification –UWM
1998	Instrument shop certification – GIT
2010	Small Boat License. Certified U.S. Coast Guard Auxiliary.
2014	Small Boat License. Certified U.S. Coast Guard Auxiliary.

### **Professional Societies**

1989 - present	Association for Scientists of Limnology and Oceanography.
1994 - 2015	American Geophysical Union.
1997 - 2018	The Oceanography Society
1997 – 2013	AAAS