

David M. Fields

Education

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

Academic/Professional Appointments

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

Publications

- 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. Pantoja. 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 CIC-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 CIC-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 electophysiological 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 CO₂ 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 pCO₂. 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 CO₂ 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 CO₂-acidified seawater. Ecol Evol7(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:Calgidae) to host related sensory cues Journal of Fish Diseases 41:875-884 DOI: 10.1111/jfd.12690.

White M, Fields DM Balch WM, Lubelczyk L, Drapeau D, Bowler B, Waller J. 2018 Testing the Tums hypothesis: Dissolution of coccoliths buffers copepod guts. Science Reports (In Review)

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

Goode A, Fields DM, Archer SD, Martinez Martinez J. 2018 Physiological responses of *Oxyrrhis marina* to a diet of virally infected *Emiliana huxleyi*.PeerJ 6:e26851v1.

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.

- Núñez-Acuña G, Gallardo-Escárate C, Fields DM, Skiftesvik AB, Browman HI. 2018 Silencing of ionotropic receptor 25a decreases chemosensory activity in the salmon louse *Lepeophtheirus salmonis* during the infective stage *Gene* (Accepted).
- Fields DM, Browman HI, Fields DM, Handegard NO... 2018. Seismic blasting has regional effects of survival of *Calanus finmarchicus*. *ICES* (Accepted)
- *Thompson c. Fields DM, Shema SD, Runge J, Browman HI. 2019 Effect of OA on energetics in Salmon lice *JPR* (in Review)
- *Escobar, R.H., D.M. Fields, H.I. Browman, S.D. Shema, R.M. Bjelland, A.-L. Agnalt, A.B. Skiftesvik, C.M.F. Durif & O.B. Samuelsen. The effects of hydrogen peroxide on mortality, escape response and oxygen consumption of *Calanus* spp. *Ecotoxicology and Environmental Safety*. (in Review)
- Floge et al 2018 Marine viruses stimulate carbon flux to lower and higher trophic levels *Nature* (In review)

Grants and Awards

* Pending; **Planned submission

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	NSF - Sensory Systems	
	3 Yr Post Doctoral Salary		
	“Signal Recognition by Zooplankton”		
2000-2002	Co P.I. – P.I. Browman, H.	Research Council of Norway	
	“Sensory biology and behaviour studies of salmon lice nauplii and copepodids.”		
2002-2004	Co P.I. P.I. Kona Blue Water Farms.	NSF – ATP	
	Consultant – David Fields		
2003-2008	P.I. David Fields	NSF -IOS	\$351,163
	“Mechanoreception in marine copepods: detecting complex fluid signals”		
2003-2005	Co P.I. – P.I. Browman, H.	Research Council of Norway	
	“The sensory biology of host detection in the parasitic salmon louse, <i>Lepeophtheirus salmonis</i> : electrophysiological and behavioural investigations”		
2005-2006	Co P.I. – PI Annette Sharone	NSF	\$1.6 Mil
	Centers for Ocean Sciences Education Excellence - Oceans in the Earth-Sun System		
2004-2006	Co P.I. – 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	PI -David Fields	NSF-Biological OCE	\$462,847
	The role of phytoplankton ballast material in deterring copepod grazing		
2007-2008	REU Supplement. Mechanoreception in Marine Copepods:		
	Detecting Complex Fluid Signals		
2007-2010	Co PI – PI Incze L.	ONR-Marine Mammal S&T	\$620,968
	Energy transfer to upper trophic levels on a small offshore bank.		
2007-2011	P.I – David Fields	NSF-IOB	\$322,532
	Collaborative Research: From structure to information in mechanosensory systems. The role of sensor morphology in detecting fluid signals.		
2007-2009	P.I – David Fields	NSF-IOB	\$ 6000
	REU Supplementary Award		
2008-2010	PI -David Fields	NSF-Bio OCE	\$ 6000
	REU Supplementary Award		
2008-2011	Co PI – Co PI R Wahle	NSF-Bio OCE	\$420,076
	REU Site Proposal - Bigelow lab REU Site		

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

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

Published Abstracts - Reports

- Fields, D.M 1990. Early to bed early to rise: proximate cues for crepuscular activities in the cleaning wrasse, *Labroides phthirophagus*. *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 – 5th 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:10²¹ 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
- Vermont AI¹, Waller JD^{1,4}, Martínez Martínez J¹, Gilg IC¹, Leavitt AH¹, Floge SA^{1,3}, Archer SD¹, Wilson WH^{1,2}, Fields DM¹2015. Virus infected algae deters grazing by marine copepods . Ocean Sciences Meeting, Honolulu, HI. Poster presentation. Feb 2014
- Gilg IC, Archer SD, Martínez Martínez J, Floge 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
- 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
- Bragdon BL, Layman JJ, Floge SA, Fields DM, Sullivan MB. Effect of Myovirus Infection on *Synechococcus* Photosynthesis. ALSO Hawaii – 2017
- Floge 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

2018

- 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
- 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 CO₂ 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

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- Present	Personnel Committee

Courses Taught

1986 - 1987	High school science teacher. Steamboat Springs CO. Grades 9-12. Taught all levels of biology and math including calculus.
1993	Co-Taught advanced undergraduate marine zooplankton. 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 **Lecturer for Animal Behavior Course.**
University of Wisconsin - Milwaukee, WI. - Dr. J.R. Strickler
Animal Behavior - Course # 204 - 530 – 3 lectures.
- 1998 **Lecturer for Ecology Course.**
Georgia Institute of Technology. Atlanta GA. - Dr. M. Weissburg
Ecology
- 1999 **Lecturer for Ecology Field Course.**
Georgia Institute of Technology. Atlanta GA. - Dr. T. Snell
Ecology – Use of optical tools in the field.
- 2000 **Lecturer for Biological Oceanography.**
Georgia Institute of Technology. Atlanta GA. - Dr. J. Montoya
Oceanography - Two lectures (Global Warming).
- 2000 **Lecturer for Ecology Field Course.**
Georgia Institute of Technology. Atlanta GA. - Dr. T. Snell
Ecology – Use of optical tools in the field. Predation – Fish and zooplankton
- 2002 **Senior Seminar Course.**
Georgia Institute of Technology. Atlanta GA. (8 lectures).
- 2004- Present **BLOOM – Bigelow Laboratory High school Program**
- 2005 **Ecology “Down Under”. 6 Week Block Course**
Georgia Institute of Technology. Atlanta GA. (24 lectures)
- 2005 **Small-Scale Physical-Biological Interactions in the Plankton**
Bigelow Laboratory for Ocean Sciences. West Boothbay Harbor. ME
Intensive 7 day Workshop
- 2006 **Ecology “Down Under”. 6 Week Block Course**
Georgia Institute of Technology. Atlanta GA. (24 lectures)
- 2007 **Ecology “Down Under”. 6 Week Block Course**
Georgia Institute of Technology. Atlanta GA. (24 lectures)
- 2007 **Small-Scale Physical-Biological Interactions in the Plankton**
Bigelow Laboratory for Ocean Sciences. West Boothbay Harbor. ME
Intensive 7 day Workshop
- 2010-Present **BLOOM Maine High School Teacher training**
- 2012-14,16-18 Colby Sea-Mester – Field Component (6 cruises)

Students Supervised

Graduate Students

- 2001 **Ph.D. Committee** – Ben Preston - Georgia Institute of Technology.
- 2010 **Ms Committee** – Yin Chang - Georgia Institute of Technology.
- 2011 **Ph.D. Committee** - Sara Lapensa Universidad de Valencia, Spain
- 2012 **Ph.D. Committee** – Soren Hansen University of Maine Orono
- 2012 **Ph.D. Committee** – Rachael Lasley - Georgia Institute of Technology.
- 2016 **MS student** – Jessica Waller - University of Maine Orono.
- 2017 **MS student** – Maura Niemisto - University of Maine Orono.
- 2018 **PhD Students** – Alex Ascher – University of Maine Orono

Undergraduate Students

- 1993 **Supervised Undergraduate Project.**
State University of New York - Stony Brook, NY. Peter Esser - Project title “Examining the escape behavior of zooplankton”. (Professor Dr. J. Yen).
- 1997 **Supervised Undergraduate Project.**
University of Wisconsin - Milwaukee, WI. Michelle Taylor - Project title “Mechanical signals eliciting the escape of copepods”. (Professor Dr. J. R. Strickler).
- 1997 **Supervised Undergraduate Research Education (REU) Student.**
University of Wisconsin - Milwaukee, WI. Dinora Carolina Penalva- Project title “Feeding rates of Daphnia pulex at different temperatures”.

- 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.**
University of Arizona – Arizona. Alexis Gillmore. Feeding rates of marine copepods
- 2010 **Supervised Intern Project.**
Tuff University. Thomas Quincy Browne. Feeding rates of marine copepods
- 2010 **Supervised Undergraduate REU Project.**
FIT - Whitney Westman – Barnacle feeding in a viscous flow. **Voted best student
project**
- 2010 **Supervised Undergraduate REU Project.**
Umaine Orono – Brandon Walus- Effect of water soluble fraction of oil on zooplankton
- 2011 **Supervised Undergraduate REU Project.**
UNM – Alex Vermont- **DMSP Production during grazing by copepods**
- 2012 **Supervised Undergraduate REU Project.**
Colby College – Melanie Ross. Direct and indirect effects of Ocean Acidification on
Acartia tonsa.
- 2012 **Supervised Undergraduate REU Project.**
Michigan State – Ashley Poehls. Effects of Ocean Acidification on *Pleurochrysis sp.*
- 2013 **Supervised Undergraduate REU Project.**
Lewis and Clark – Charlotte Francisco. Effects of temperature and salinity on *Acartia
tonsa*.
- 2013 **Supervised Undergraduate REU Project.**
UNE – Jesica Waller. Effects of ocean acidification on *Acartia tonsa*.
- 2014 **Supervised Undergraduate REU Project.**
Umaine – Amy Webb.
- 2014 **Supervised Undergraduate REU Project.**
Colby College – Alexa Williams.
- 2015 **Supervised Undergraduate REU Project.**
Warren Wilson College – Halley McVeigh
- 2015 **Supervised Undergraduate REU Project.**
Colby College – Madison Marra
- 2015 **Supervised Undergraduate REU Project.**
Rochester NY Community College – Aleem
- 2016 **Supervised Undergraduate REU Project.**
Colby College – Brian Kim

- 2016 **Supervised Undergraduate REU Project.**
Colby College – Melanie Ross
- 2016 **Supervised Undergraduate REU Project.**
UNE – Briar Bragdon
- 2016 **Supervised Undergraduate REU Project.**
Devin Domeyer
- 2016 **Supervised Undergraduate REU Project.**
College – Sarah Caron
- 2016 **Supervised Undergraduate REU Project.**
College – Darcia Gonzalez
- 2017 **Supervised Undergraduate REU Project.**
Colby College – Yu Jin
- 2017 **Supervised Undergraduate REU Project.**
South Carolina State University – Deja Best
- 2017 **Supervised Undergraduate REU Project.**
Devin Domeyer
- 2018 **Supervised Undergraduate REU Project.**
XXXXX
- 2018 **Supervised Undergraduate REU Project.**
Mara McDonough

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

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

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 xiphias* 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 - present American Geophysical Union.
- 1997 - present The Oceanography Society
- 1997 – present AAAS