

# Helen S. Findlay – Curriculum Vitae

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## BIOGRAPHY

I am a biological oceanographer at Plymouth Marine Laboratory interested in understanding the effects of climate change and ocean acidification on marine ecosystems, and the application of this knowledge to maintain a healthy, sustainable ocean. I use a combination of experimental, observational, and modelling tools to investigate the impacts of climate change and ocean acidification on marine organisms and ecosystem functioning, with a particular focus on the Arctic. I am a member of the Executive Council for the Global Ocean Acidification Observing Network (GOA-ON) and lead coordinator for the North East Atlantic Ocean Acidification (NEA-OA) regional hub of GOA-ON, which aim to establish accurate global monitoring of acidification, shared knowledge and capacity building, to underpin solutions. I contribute to raising public awareness of ocean health and to training the next generation of scientists through school educational programmes, such as Encounter Edu's 'Arctic Live'; and to policy solutions through engagement with, for example, UNFCCC, the UK's Department of Food and Rural Affairs (DEFRA), the Arctic Council AMAP Working Group and the International Alliance to Combat Ocean Acidification.

## EDUCATION

- 2006 – 2009    **PhD Biological Oceanography**, Plymouth Marine Laboratory and University of Plymouth: *An evaluation of the relative influence of elevated temperature and ocean acidification on processes influencing the distribution of rocky shore species*. Supervisors: Michael A Kendall, John I Spicer, Stephen Widdicombe & Carol Turley (NERC funded)
- 2005 – 2006    **MSc Oceanography (Distinction)**, National Oceanography Centre, Southampton & the University of Southampton. NERC awarded studentship. Dissertation: *Ecosystem modelling of the Norwegian Sea*. Supervisors: Toby Tyrrell & Richard GJ Bellerby
- 2001 – 2004    **First Class BSc (Hons) Biology**, University of York. Awarded department prize for best research project: *Modelling of autumn plankton blooms*. Final year project supervisor: Jonathon Pitchford.

## PROFESSIONAL ACTIVITIES

### PROFESSIONAL APPOINTMENTS

- 2013 – Present **Senior scientist**, Plymouth Marine Laboratory. Role includes undertaking commissioned research; writing proposals, publications, reports; knowledge exchange and training; facilitating meetings and workshops; managing staff and students (4 PhD students and 10 Masters students since 2010); managing the Western Channel Observatory carbonate chemistry analysis and submission of data to relevant data centres.
- 2012 – 2013 **Research scientist**, Plymouth Marine Laboratory. Role included undertaking commissioned research; writing proposals, publications, and reports.
- 2010 – 2012 **Lord Kingsland Fellowship**: Post-doctoral fellowship, Plymouth Marine Laboratory. Primary research focus was the Catlin Arctic Survey 2010 and 2011, investigating ocean acidification and climate change impacts on Arctic marine species and providing knowledge to the public and stakeholders.

**Maternity Leave:** May 2016 – May 2017 and Sep 2018 – Sep 2019

### INTERNATIONAL SCIENTIFIC ENGAGEMENT

- Sep 2020 **Co-coordinator for NEA-OA Hub sessions** “Northeast Atlantic Hub, Part 1 Carbonate chemistry” and “Northeast Atlantic Hub, Part 2 Biological impacts” during the GOA-ON Ocean Acidification week.
- Jun 2020 **Co-facilitator and co-coordinator of the Virtual Ocean Dialogues - 'Deep Dive' session on Ocean Acidification and Climate-Ocean Impacts'** organized by the World Economic Forum and Friends of Ocean Action.
- Dec 2019 **UNFCCC 25<sup>th</sup> Conference of Parties**: Organised and presented at the UK Pavilion (Ocean acidification - managing and adapting to the challenge of ocean acidification: strategies from around the world) and at the Cryosphere Pavilion (Polar Ocean Acidification – highlighting issues and raising ambition). Invited presenter for two side events at the Cryosphere Pavilion (Tackling Polar ocean acidification, organised by the Arctic Council; and Polar Ocean Acidification, short debate, organised by the International Cryosphere Climate Initiative).
- 2019 – Present **International Cryosphere Climate Initiative (ICCI)**: Invited to join the High Urgency Cryosphere Group. The role of the group is to communicate the latest scientific advances in cryosphere climate science, contribute to reports, and provide policy relevant material including presentations. The core aim is to increase awareness of stakeholders to the importance of the cryosphere to the climate and the consequences for the cryosphere if CO<sub>2</sub> emissions are not reduced.
- 2018 – Present **North East Atlantic Ocean Acidification Regional Hub of GOA-ON co-founder and co-chair**. Roles include: Overall coordination, leading the data working group, contributing to the OSPAR Intersessional Correspondence Group on Ocean Acidification Quality Status Report 2023, updating website and social media, member of steering groups (e.g. for the JNCC

Defra-funded Ocean Acidification and the Sea Bed project), securing funding, organising workshops and meetings.

- 2017 – Present **Global Ocean Acidification Observing Network Executive Council member**. Roles include regional coordination, providing advice, setting agendas, contributing to reports and guidance documents, for example the United Nations Decade for a Sustainable Ocean, the United Nations Sustainable Development Goals 14.3.1. Indicator.
- Sep 2017 **Organising Committee member & Panel member** at the UK Arctic Science Conference, Oban, Scotland.
- Oct 2015 **Invited lecturer** for the Asian workshop on Ocean Acidification, Xiamen, China. Teaching techniques for biological observation and ocean acidification experiments.
- Jun 2015 **Invited panel member** for the ocean acidification discussion panel, presenting on changes in the Arctic, at the IOC-UNESCO World Ocean Day, Paris, France.
- Feb 2015 **Keynote speaker at the MEOPAR expert workshop**, presenting on the current status of ocean acidification research in the Arctic and future recommendations. Victoria, Canada.
- Nov 2014 **Invited lecturer** for the Latin American workshop on Ocean Acidification, Chile. Teaching techniques for biological observation and ocean acidification experiments.
- Nov 2014 **Invited speaker** at the KIOST Ocean Acidification workshop, South Korea. Presenting work on natural variability and species responses to ocean acidification.
- Oct 2014 **Co-organiser and session chair** during the Arctic in Rapid Transition 2<sup>nd</sup> Science Workshop, France.
- May 2013 **Arctic Ocean Acidification Conference, Bergen, Norway**. Panel session coordinator and moderator for APECS “Ocean acidification in the future: From science to policy – tips for early career scientists”. Invited panel member: Arctic Council AMAP working group panel “Getting ready for a high CO<sub>2</sub> Arctic Ocean”.
- 2010 – 2012 **Scientific Steering Committee Chair**: ICES/PICES Early Career Scientist Conference, Mallorca.
- Oct 2010 **Invited delegate** at the Royal Society Early Career Frontiers of Science Meeting, Perth, Australia.

## FUNDING & RESEARCH PROJECTS

- 2017 – 2021 NERC ODA National Capability: Addressing Challenges of Coastal Communities through Ocean Research for Developing Economies (ACCORD). Co-Investigator.
- 2018 – 2020 AXA XL Arctic Live. Project partner together with Encounter Edu and University of Exeter.
- 2018 – 2019 UK DEFRA: North East Atlantic Ocean Acidification Hub. Principal Investigator.
- 2018 – 2021 European Space Agency: OceanSODA. Co-Investigator.
- 2014 – 2016 European Space Agency: Pathfinder- Ocean acidification. Co-Investigator.

## Helen S. Findlay - CV

- 2013 – 2015 IUCN Polar Programme: Ocean Acidification in Arctic Fjords. Principal Investigator.
- 2014 – 2017 NERC Shelf Seas Programme: Benthic consortium. Co-Investigator, module leader and PML project coordinator.
- May 2011 Geo Mission expedition funding: Carbon cycling and ocean acidification in the High Arctic. Principal Investigator.
- May 2010 Royal Geographic Society (with IBG) Ralph Brown expedition grant: Carbon cycling and ocean acidification in the High Arctic. Principal Investigator.
- May 2010 Royal Society International Travel Grant: Catlin Arctic Survey 2010 and collaborations with Dr C Lovejoy, Laval University, Quebec, Canada. Principal Investigator.
- 2010 – 2013 NERC UK Ocean Acidification Research Programme: Benthic Consortium, Grant NE/H01747X/1. Co-Investigator.
- 2008 - 2012 EU FP7 Integrated Project: European Project on Ocean Acidification (EPOCA), benthic research team member
- Aug 2008 ARCFAC European Centre for Arctic Environmental Research, Grant ARCFAC-026129-2008-2: Evaluating the impact of ocean acidification on arctic marine invertebrates. Co-investigator.
- Jul 2007 Plymouth Marine Science Education Fund, grant to attend EMBS conference, Kiel.

## SUPERVISION

### PhD Students:

- 2020 – 2024 Caitlin McAndrey, Adapting to climate change: transgenerational acclimation as a mechanism of rapid evolution. Co-supervisor. NERC funded, joint with Plymouth University.
- 2018 – 2022 Hannah Green, Monitoring ocean acidification in the Arctic Ocean using Satellite remote sensing. Primary supervisor. AXA XL funded, joint with Exeter University.
- 2016 – 2020 Louise Cornwell, Trade-offs between local acclimation and resilience in a rapidly changing ocean: Exploring the mechanisms behind the response of zooplankton to environmental stressors. Primary supervisor. NERC funded, joint with Exeter University.
- 2013 – 2017 Matthew Keys, Effect of future CO<sub>2</sub>, temperature and nutrient regimes on primary production in the Western English Channel. Co-supervisor. NERC funded, joint with University of Essex.
- 2011 – 2016 Ruth Calder-Potts, Ecosystem response to multiple stressors: hypoxia, temperature and CO<sub>2</sub>. Co-supervisor, NERC funded, joint with Plymouth University.

### Masters students

- 2020 – 2021 Chloe Shute, Arctic Live: ocean acidification and marine plastics in a changing arctic ocean. Co-supervisor, joint with University of Exeter.

- 2014 – 2015 Stephanie Mangan, How does environmental variability influence ocean acidification responses in key marine biota? Co-supervisor joint with University of Exeter.
- 2013 – 2014 Theresa Vanello, Arctic krill physiology and energetics under different ocean acidification scenarios. Principal supervisor joint with Plymouth University).
- 2012 Laura Hobbs, Effects of rising temperature and CO<sub>2</sub> on natural phytoplankton communities at station L4, Western English Channel. Principal supervisor joint with Plymouth University.
- 2012 Rebekah Simpson, The effect of climate change on the physiological and functional responses of barnacles and predicting subsequent changes in barnacle zonation. Co-supervisor joint with Plymouth University.
- 2012 Jennifer Lewis, The effect of long term acclimation to elevated CO<sub>2</sub> and temperature on the ability of marine organisms to respond to further changes. Co-supervisor joint with Plymouth University.
- 2010 Tom Greenwood, Barnacle growth and development under high CO<sub>2</sub> conditions. Co-supervisor joint with Plymouth University.
- 2009 – 2010 Elena Aliosio, The effect of CO<sub>2</sub> and benthic substrate on growth and physiology of juvenile scallops. Co-supervisor joint with Plymouth University.
- 2009 Gemma Cripps, Assessing the impacts of alkalinity addition as a geo-engineering strategy, on benthic organisms. Co-supervisor joint with Plymouth University.
- 2007 Alice Jones, Assessing the impacts of temperature and ocean acidification on early embryo development. Co-supervisor joint with Plymouth University.

## PUBLICATIONS

### In peer-review:

Green HL, **Findlay HS**, Shutler JD, Land PE, Bellerby R (in review) Satellite observations are needed to understand ocean acidification and multi stressor impacts on fish stocks in a changing Arctic Ocean. *Front. Mar. Sci.*

### Peer-review, published:

Cornwell LE, Fileman ES, Bruun JT, Hirst AG, Tarran GA, **Findlay HS**, Lewis C, Smyth TJ, McEvoy AJ and Atkinson A, 2020. Resilience of the Copepod *Oithona similis* to Climatic Variability: Egg Production, Mortality, and Vertical Habitat Partitioning. *Front. Mar. Sci.* 7:29. doi: 10.3389/fmars.2020.00029

Kitidis V, Shutler JD, Ashton I, Warren M, Brown I, **Findlay HS**, et al. 2019. Winter weather controls net influx of atmospheric CO<sub>2</sub> on the north-west European shelf. *Scientific Reports*. 9:20153, doi.org/10.1038/s41598-019-56363-5.

Land PE, **Findlay HS**, Shutler JD, Ashton I, Girad-Ardhuin F, Reul N, Piolle J-F, Chapron B, Quifen Y, Salisbury J, Vandemark D, Bellerby RGJ, Bhadury P, Sabia R, 2019. Optimum satellite and in situ inputs to empirical algorithms for deriving carbonate system parameters in the Global Ocean, the Greater Caribbean, the

Amazon plume, and the Bay of Bengal. *Remote Sens. Environ.* 235: 111469, doi.org/10.1016/j.rse.2019.111469

Ravaglioli C, Bulleri F, Ruhl S, McCoy SJ, **Findlay HS**, Widdicombe S, Querios AM, 2019. Ocean acidification and hypoxia alter organic carbon fluxes in marine soft sediments. *Global Change Biol.* 00:1-14, doi:10.1111/gcb.14806.

Mangan S, Wilson R, **Findlay HS**, Lewis CN, 2019. Acid-base physiology over tidal periods in the mussel *Mytilus edulis*: size and temperature are more influential than seawater pH. *Proc. Nat. Acad. Sci.* 286: 20182863, doi.org/10.1098/rspb.2018.2863

Keys M, Tilstone G, **Findlay HS**, Widdicombe C, Lawson T, 2018. Effects of elevated CO<sub>2</sub> and temperature on phytoplankton community biomass, species composition and photosynthesis during an experimentally induced autumn bloom in the Western English Channel. *Biogeosciences*, 15, 3203–3222, doi.org/10.5194/bg-15-3203-2018

Cornwell L, **Findlay HS**, Lewis C, Fileman ES, Smyth TJ, Hirst AG, McEvoy AJ, Widdicombe CE, Castellani C, Atkinson A, 2018. Functional traits in copepods drive contrasting reproductive responses to the seasonality of temperature and food. *J. Plankton Res.* doi:10.1093/plankt/fby007

Calder-Potts RN, Spicer JI, Calosi P, **Findlay HS**, Queirós AM, Widdicombe S, 2018. Density-dependent responses of the brittlestar *Amphiura filiformis* to moderate hypoxia and consequences for nutrient fluxes. *Mar. Ecol. Prog. Ser.* 594: 175-191, doi.org/10.3354/meps12503.

Thompson LR, et al. & The Earth Microbiome Project Consortium\*, 2017. A communal catalogue reveals Earth's multiscale microbial diversity. *Nature*, doi:10.1038/nature24621. \*Including: Findlay HS

Mangan S, Urbina MA, Wilson R, **Findlay HS**, Lewis C, 2017. Fluctuating seawater pH/pCO<sub>2</sub> regimes are more energetically expensive than static pH/pCO<sub>2</sub> levels in the mussel *Mytilus edulis*. *Proc. Royal Soc. B* 20171642, doi:10.1098/rspb.2017.1642.

Vad J, Orejas C, Moreno-Navas J, **Findlay HS**, Roberts JM, 2017. Assessing the living and dead proportions of cold-water coral colonies: implications for deep-water Marine Protected Area monitoring in a changing ocean. *PeerJ*, 5: e3705, doi:10.7717/peerj.3705

Venello TA, Calosi P, Turner LM, **Findlay HS**, 2017. Overwintering individuals of the Arctic krill *Thysanoessa inermis* appear tolerant to short term exposure to low pH conditions. *Polar Biology*, 41(2), 341-352, DOI 10.1007/s00300-017-2194-0

Keys M, Tilstone GH, **Findlay HS**, Widdicombe C, 2017. Effects of elevated CO<sub>2</sub> on phytoplankton community biomass and species composition during a spring *Phaeocystis* spp. bloom in the western English Channel, *Harmful Algae*, 67: 92-106, DOI: 10.1016/j.hal.2017.06.005

Henry LA, Stehmann MFW, De Clippele L, **Findlay HS**, Golding N, Roberts JM, 2016. Seamount egg-laying grounds of the deepwater skate *Bathyraja richardsoni* (Garrick 1961). *J. Fish Biol.* DOI: 10.1111/jfb.13041

Fransson A, Chierici M, Hop H, **Findlay HS**, Kristiansen S, Wold A, 2016. Late winter-to-summer change in ocean acidification state in Kongsfjorden, with implications for calcifying organisms. *Polar Biology*, 39(10), 1841-1857, DOI: 10.1007/s00300-016-1955-5

Collard M, Rastrick SPS, Calosi P, Demolder Y, Dille J, **Findlay HS**, Hall-Spencer JM, Milazzo M, Moulin L, Widdicombe S, Dehairs F, Dubois P, 2016. The impact of ocean acidification and warming on the skeletal mechanical properties of the sea urchin *Paracentrotus lividus* from laboratory and field observations. *ICES J. Mar. Sci.*, 73: 727-738, doi:10.1093/icesjms/fsv018.

Werner K, Fritz M, Morata N, Keil K, Pavlov A, Peeken I, Nikolopoulos A, **Findlay HS**, Kedra M, Majaneva S, Renner A, Hendricks S, Jacquot M, Nicolaus M, O'Regan M, Sampei M, Wegner S, 2016. Arctic in Rapid Transition: Priorities for the future of marine and coastal research in the Arctic. *Polar Science*. DOI: 10.1016/j.polar.2016.04.005

**Findlay HS**, Edwards L, Lewis CN, Cooper GA, Clement R, Hardman-Mountford N, Vagle S, Miller LA, 2015. Late winter biogeochemical dynamics under sea ice in the Canadian High Arctic. *Polar Research*. 34: 24170, doi: 10.3402/polar.v34.24170.

Graham H, Rastrick SPS, **Findlay HS**, Bentley MG, Widdicombe S, Clare AS, Caldwell GS, 2015. Sperm motility and fertilisation success in an acidified hypoxic environment. *ICES Journal of Marine Science*.

Tait K, Beesley A, **Findlay HS**, McNeill C, Widdicombe S, 2015. Elevated CO<sub>2</sub> induces a bloom of microphytobenthos within a shell gravel mesocosm. *FEMS Microbiol. Ecol.*, 91, fiv092, doi: 10.1093/femsec/fiv092.

Hennige SJ, Wicks LC, Kamenos NA, **Findlay HS**, Roberts JM, 2015. Hidden impacts of ocean acidification to live and dead coral framework. *Proc. Royal Soc. B.*, doi:10.1098/rspb.2015.0990.

Calder-Potts R, Spicer JJ, Calosi P, **Findlay HS**, Widdicombe S, 2015. A mesocosm study investigating the effects of hypoxia and population density on respiration and reproductive biology in the brittlestar, *Amphiura filiformis*. *Mar. Ecol. Prog. Ser.*, doi: 10.3354/meps11379.

Nunes J, McCoy SJ, **Findlay HS**, Hopkins FE, Kitidis V, Queiros AM, Raynor L, Widdicombe S, 2015. The effects of short-term acidification on the intertidal macroalgae *Palmaria palmate* and *Saccharina latissima*. *ICES J. Mar. Sci.*, doi: 10.1093/icesjms/fsv081.

**Findlay HS**, Gibson G, Kedra M, Morata N, Orchowska M, Pavlov A, Reigstad M, Silyakova A, Tremblay J-E, Walczowski W, Weydmann A, Logvinova C, 2015. Responses in Arctic marine carbon cycle processes: conceptual scenarios & implications for ecosystem. *Polar Res.*, 34: 24252, doi.org/10.3402/polar.v34.24252.

Land PE, Shutler JD, **Findlay HS**, Girard-Arduin G, Reul N, Piolle J-F, Chapron B, Quilfen Y, Salisbury J, Vandemark D, Bellerby RGJ, Bhadury P, Sabia R, 2015. Salinity from space unlocks satellite-based monitoring of ocean acidification. *Envir. Sci. & Technol.*, 49: 1987-1994, doi: 10.1021/es504849s.

Queirós A, Fernandes J, Faulwetter S, Nunes J, Rastrick S, Mieszkowska N, Artioli Y, Yool A, Calosi P, Arvanitidis C, **Findlay HS**, Barange M, Cheung W, Widdicombe S, 2015. Quantifying ecosystem-level consequences of ocean acidification and warming by scaling up individual level responses of a predator snail and its trophic interactions. *Global Change Biol.*, 21(1): 130–143, doi: 10.1111/gcb.12675

Monier A\*, **Findlay HS\***, Charvet S, Lovejoy C, 2014. (\*contributed equally). Late winter under ice pelagic microbial communities in the high Arctic Ocean and the impact of short-term exposure to elevated CO<sub>2</sub> levels. *Frontiers in Microbiology*. 5: 490. doi: 10.3389/fmicb.2014.00490

Henry L-A, Vad J, **Findlay HS**, Murillo J, Milligan R, Roberts JM, 2014. Environmental variability and biodiversity of megabenthos on the Hebrides Terrace Seamount (Northeast Atlantic). *Nature Scientific Reports*, 4: 5589, doi: 10.1038/srep05589.

**Findlay HS**, Hennige SJ, Wicks LC, Moreno Navas J, Woodward EMS, Roberts JM, 2014. Fine-scale nutrient and carbonate system dynamics around cold-water coral reefs in the northeast Atlantic. *Nature Scientific Reports*, 4: 3671-3681, doi:10.1038/srep03671

Hennige SJ, Wicks LC, Kamenos NA, Bakker D, **Findlay HS**, Dumousseaud C, Roberts JM, 2014. Short-term responses of the cold water coral *Lophelia pertusa* to predicted rises in atmospheric CO<sub>2</sub>. *Deep Sea Res. II*, 99: 27-35, doi.org/10.1016/j.dsr2.2013.07.005.

Williamson P, Turley C, Brownlee C, **Findlay HS**, Ridgwell A, Schmidt DN, Schroeder DC, Blackford J, Tyrell T, Pinnegar JK, 2013. Impacts of ocean acidification. *MCCIP Science Review 2013*, 34-48, doi:10.14465/2013.arc05.034-048.

Lewis CN\*, Brown KA, Edwards L, Cooper G, **Findlay HS\***, 2013. (\*contributed equally) Sensitivity to ocean acidification parallels natural pCO<sub>2</sub> gradients experienced by Arctic copepods under winter sea ice. *PNAS* 110: E4960-E4967, doi:10.1073/pnas.1315162110.

Land PE, Shutler JD, Cowling RD, Woolf DK, Walker P, **Findlay HS**, 2013. Climate change impacts on sea-air fluxes of CO<sub>2</sub> in three Arctic seas: a sensitivity study using Earth observation. *Biogeosci.* 10: 8109-8128, doi:10.5194/bg-10-8109-2013

Kamenos NA, Burdett HL, Aloisio E, **Findlay HS**, Martin S, Longbone C, Dunn J, Widdicombe S, Calosi P, 2013. Coralline algal structure is more sensitive to rate, rather than the magnitude, of ocean acidification. *Global Change Biology*, 19: 3621-3628, doi:10.1111/gcb12351.

Russel B, Connell SD, **Findlay HS**, Tait K, Widdicombe S, Mieszkowska N, 2013. Unbalanced ecosystems: ocean acidification and temperature increase primary productivity but suppress consumption. *Phil. Trans. R. Soc. B.*, 368, 20120438, doi: http://dx.doi.org/10.1098/rstb.2012.0438.

**Findlay HS**, Artioli Y, Moreno Nava J, Hennige SJ, Wicks LC, Huvenne VAI, Woodward EMS, Roberts JM, 2013. Tidal downwelling and implications for the carbon biogeochemistry of cold-water corals in relation to future ocean acidification and warming. *Glob. Change Biol.* 19, 2708-2719, doi: 10.1111/gcb.12256

Cripps G, Widdicombe S, Spicer JI, **Findlay HS**, 2013. Assessing the potential biological effects of alkalinity addition as a geoengineering strategy to mitigate ocean acidification. *Mar. Poll. Bull.*, 71, 190-198.

Shutler JD, Land PE, Brown CW, **Findlay HS**, Donlon CJ, Medland M, Snooke R, Blackford JC, 2013. Coccolithophore surface distributions in the North Atlantic and their modulation of the air-sea flux of CO<sub>2</sub> from 3 years of satellite Earth observation data. *Biogeosci.* 10, 2699–2709, doi:10.5194/bg-10-2699-2013

McConville K, Halsband C, Fileman E, Somerfield PJ, **Findlay HS**, Spicer JI, 2013. Effects of elevated CO<sub>2</sub> on the reproduction of two calanoid copepods *Mar. Poll. Bull.*, doi.org/10.1016/j.marpolbul.2013.02.010

Burdett HL, Aloisio E, Calosi P, **Findlay HS**, Widdicombe S, Hatton AD, Kamenos NA, 2012. The effect of chronic and acute low pH on the intracellular DMSP production and epithelial cell morphology of red coralline algae, *Mar. Biol. Res.*, 8: 756-763

**Findlay HS**, Wood HL, Kendall MA, Spicer JI, Twitchett R, Widdicombe S, 2011. Comparing the impact of high CO<sub>2</sub> on calcium carbonate structures in different marine organisms. *Mar. Biol. Res.*, 7: 565-575

**Findlay HS**, Calosi P, Crawford K, 2011. Determinants of the PIC:POC response in the coccolithophore *Emiliania huxleyi* under future ocean acidification scenarios. *Limnol. Oceanogr.* 56: 1168-1178

**Findlay HS**, Burrows MT, Kendall MA, Spicer JI, Widdicombe S, 2010. Does ocean acidification affect population dynamics: A modelling study? *Ecology*, 91: 2931-2940

Irie T, Bessho K, **Findlay HS**, Calosi P, 2010. Increasing costs due to ocean acidification drives phytoplankton to be more heavily calcified: Optimal growth strategy in coccolithophores. *PLoS-ONE* 5: e13436, doi: 10.1371/journal.pone.0013436

Turley C, Brownlee C, **Findlay HS**, Mangi S, Ridgwell A, Schmidt D, Schroeder DC, 2010. Ocean acidification in MCCIP Report Card 2010-11, Online science reviews, 27pp. [www.mccip.org.uk/arc](http://www.mccip.org.uk/arc).

Turley C, Eby M, Ridgwell AJ, Schmidt DN, **Findlay HS**, Brownlee C, Riebesell U, Fabry VJ, Feely RA, Gattuso J-P, 2010. The societal challenge of ocean acidification. *Mar. Poll. Bull.* 60: 787-792.

**Findlay HS**, Kendall MA, Spicer JI, Widdicombe S, 2010. Relative influences of ocean acidification and temperature on intertidal barnacle post-larvae at the northern edge of their geographic distribution. *Est., Coast. Shelf Sci.*, 86: 675-682.

**Findlay HS**, Kendall MA, Spicer JI, Widdicombe S, 2010. Post-Larval development of two intertidal barnacles in elevated CO<sub>2</sub> and temperature. *Mar. Biol.*, 157: 725-735, DOI 10.1007/s00227-009-1356-1.

**Findlay HS**, Kendall MA, Spicer JI, Widdicombe S, 2009. Future high CO<sub>2</sub> in the intertidal may compromise adult barnacle (*Semibalanus balanoides*) survival and embryo development rate. *Mar. Ecol. Prog. Ser.*, 389: 193-202

Turley C, **Findlay HS**, Mangi S, Ridgwell A, Schmidt DN, 2009. CO<sub>2</sub> and ocean acidification in Marine Climate Change Ecosystem Linkages Report Card 2009. (Eds. Baxter JM, Buckley PJ and Frost MT), Online science reviews, 25pp.

Arnold KE, **Findlay HS**, Spicer JI, Boothroyd D, 2009. Effect of CO<sub>2</sub>-related acidification on aspects of the larval development of the European lobster, *Homarus gammarus* (L.). *Biogeosci.*, 6, 1747-1754

**Findlay HS**, Kendall MA, Spicer JI, Turley C, Widdicombe S, 2008. Novel microcosm system for investigating the impacts of elevated carbon dioxide and temperature on intertidal organisms. *Aq. Biol.*, 3: 51-62

**Findlay HS**, Tyrrell T, Bellerby RGJ, Merico A, Skjelvan I, 2008. Carbon and nutrient dynamics of the Norwegian Sea. *Biogeosci.*, 5, 1395-1410

**Findlay HS**, Yool A, Nodale M, Pitchford JW, 2006. Modelling of autumn plankton bloom dynamics. *J. Plank. Res.*, 28(2): 209-220

Non-peer-review, published:

**Findlay HS**, Turley C, 2021. Ocean acidification and climate change. In: Letcher TM (Ed) *Climate change: observed impacts on Planet Earth Edition 3*, Elsevier, 251.

Bednaršek N, **Findlay HS** (Eds.) Chapter 5: Polar Ocean Acidification, Warming and Freshening. In: Pearson P. (2019) Cryosphere1.5°C: Where Urgency and Ambition Meet - Why Cryosphere Dynamics Must Mean 1.5° Pathways for 2020 NDCs. [www.iccinet.org/cryosphere15](http://www.iccinet.org/cryosphere15)

Ostle C, Williamson P, Artioli Y, Bakker DCE, Birchenough S, Davis CE, Dye S, Edwards M, **Findlay HS**, Greenwood N, Hartman S, Humphreys MP, Jickells T, Johnson M, Landschützer P, Parker R, Pearce D, Pinnegar J, Robinson C, Schuster U, Silburn B, Thomas R, Wakelin S, Walsham P, Watson AJ (2016) Carbon dioxide and ocean acidification observations in UK waters: Synthesis report with a focus on 2010 - 2015. doi: 10.13140/RG.2.1.4819.4164.

Turley C, **Findlay HS**, 2016. Ocean acidification. In: Letcher TM (Ed) Climate change: observed impacts on Planet Earth Edition 2, Elsevier, Ch. 18.

**Findlay HS**, Cottier F, Morata N, Hindshaw R, Nikolopoulos A, Ardyna M, Marz C, Queguiner B, Roca-Marti M, Bourgois S, 2015. Arctic Oceanography - Oceanography: Atmosphere-Ocean Exchange, Biogeochemistry & Physics. Arctic in Rapid Transition priority sheets for future direction of Arctic sciences. ISTAS Workshop, Brest, France, doi: 10.2312/ART.0329.18991

Turley C, **Findlay HS**, 2009. Ocean acidification as an indicator for climate change. In: Letcher T (Ed) Climate change: observed impacts on Planet Earth, Elsevier, Ch. 21.

**Findlay HS**, Wood HL, Kendall MA, Spicer JJ, Twitchett R, Widdicombe S, 2009. Calcification, a physiological processes to be considered in the context of the whole organism. Biogeosci. Discussions, 6: 2267-2284.

## INTERDISCIPLINARY ACTIVITIES

### OUTREACH ACTIVITIES

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|-------------|--|
| Ongoing     | Invited chapter author in Women4Oceans book about the oceans and threats to them.  |
| Ongoing     | Lecturer for the “Biological monitoring in the field” module for the Ocean Acidification Course - Ocean Teacher Global Academy.  |
| 2014 – 2020 | Partner in Encounter Edu’s Arctic Live outreach campaigns. Live lessons, demonstrations, question and answer session.  |
| Aug 2019    | School summer holiday Science presentation “The Arctic Ocean”, Tavistock, UK   |
| Oct 15      | Invited speaker: Royal Society of Chemistry, Public lecture series. “Ocean acidification: de-gassing the myths”. <a href="https://www.youtube.com/watch?v=OyZATKk6Z4A">https://www.youtube.com/watch?v=OyZATKk6Z4A</a> |
| Feb 2015    | Invited chapter author “The Youth Quick Guide to the Oceans”, FAO, PML & YUNGA publication.  |
| Dec 2013    | Exeter Impact Award shortlist in the category “Outstanding Impact in Policy and Education” for the ocean acidification frozen oceans work with Digital Explorer and Exeter University.                                 |
| 2011 – 2018 | Invited member for the Editorial Board of Ocean Challenge, the main publication of the Challenger Society for Marine Science.  |

Helen S. Findlay - CV

- Nov 2011 Invited speaker: Royal Geographical Society (with IBG) Monday Night Lecture series. "Challenging countries, challenging perspectives".
- 2011 – Present Encounter Edu Ocean Ambassador, incl. development of Frozen Ocean Classroom resource material (shortlisted for the Best Secondary Resource with ICT, Education Resource Awards, Awarded Silver in the Geographical Association Publishers Awards, 2012); teacher training activities; public outreach events.
- 2010 – 2011 School networking and seminars on Ocean acidification and the Arctic Ocean at Ridgeway School, Plymouth (resulting student projects displayed at the South West Big Bang Science Fair 2011) and Devonport High School for Girls, Plymouth.
- 2011 Nuffield Student Placement. Richard Kleinjens from Ridgeway School Plymouth to work on ocean acidification and rocky shore organisms
- 2011 CBBC Newsround live interview while on the Catlin Arctic Survey 2011.  
[http://news.bbc.co.uk/cbbcnews/hi/newsid\\_9460000/newsid\\_9468000/9468005.stm](http://news.bbc.co.uk/cbbcnews/hi/newsid_9460000/newsid_9468000/9468005.stm)
- 2010 Royal Geographical Society (with IBG) Educational resources 'From the Field' Goldsmiths Awards in collaboration with The Goldsmiths' Company. These resources were awarded the Highly Commended award from the Scottish Association of Geography Teachers in 2011 and awarded Silver in the Geographical Association Publishers Awards in 2012.  
<http://www.rgs.org/OurWork/Grants/Grant+recipients/Recipients+by+Grant/Goldsmiths+Awards+Teaching+Resources.htm>
- 2010 – 2011 Articles in: Ocean Challenge Magazine (Vol. 18, Winter 2011); The Circle, WWF's magazine (No. 4 2010); Eureka, The Times magazine (Issue 16, Jan 2011); New Scientist, Graduate Careers Special (22 May 2010).
- 2010 – 2011 Featured on television and radio: Channel 4 news (May 2010); CNN (Jul. 2011); BBC Radio Devon (2008-2010).
- 2010 – 2011 Invited speaker and panel chair for the Oceans Panel at The Royal Geographical Society (with IBG) Explore Conference.
- 2009 – 2010 EPOCA Arctic Campaigns 2009 and 2010, website set up, maintenance and blogs.  
[www.epocaarctic2009.wordpress.com](http://www.epocaarctic2009.wordpress.com) and [www.epocaarctic2010.wordpress.com](http://www.epocaarctic2010.wordpress.com)
- 2009 Ridgeway School "The other CO<sub>2</sub> problem", science advisor for film making, Plymouth UK.
- 2009 – 2018 UK's Science, Technology, Engineering and Mathematics Network (STEMNET) Ambassador.
- 2008 – 2009 National Science Week and Artemis Transat Race Science: School outreach demonstrations.

## TRAINING

- Nov 2019 'Meetings that Matter, Workshops that Work', The barefoot thinking company ltd. Plymouth, UK.

## Helen S. Findlay - CV

- Mar 2018 Research & Impact: Parliamentary "Roadshow", UK Parliament Education & Engagement Service. Plymouth, UK
- Jan 2008 'Challenge of Science Leadership', The barefoot thinking company ltd. Plymouth, UK
- 2014 – 2015 NERC Growing Future Leaders: High Potential Development Scheme. London, UK
- Apr 2012 ECP Exploration Medicine Course (this course is recognised by all outdoor governing bodies e.g. MLTB, BCU, IRATA, RYA etc. as well as exceeding the recommendations for the HSE recognised Appointed Person in the workplace). Surrey, UK
- Nov 2011 Effective postgraduate supervision. Plymouth University, UK
- Feb 2011 Safety Management in a Research Environment. Plymouth, UK
- Sep 2010 Foundation in Management. Plymouth, UK
- Sep 2009 Biogeochemical modelling in R. NIOO, Netherlands
- Feb 2009 Carbon biogeochemistry. Bjerknes Centre for Climate Research, Bergen, Norway
- Feb 2009 PRIMER-e, Multivariate analysis for ecology. Plymouth, UK
- Jul 2008 Ecosystem modelling. Scottish Association for Marine Science, Scotland
- Jan 2008 Antarctic biology course, United States Antarctic Program. Funded by National Science Foundation. United States Antarctic Research Station, McMurdo, Antarctica
- Sep 2007 NERC Statistics for Environmental Evaluation. University of Glasgow, Scotland

## FIELD EXPERIENCE

**Ny Ålesund International Arctic base, Svalbard.** Marine research based from shore using small boats within the fjord and coastal environment, using the marine laboratory for experiments. Measurements include CTD, nutrients, carbonate chemistry, plankton sampling, benthic sampling, molecular sampling. Jul.-Aug. 2008 & Apr.-May 2009, Mar.-Apr. 2014.

**RRS James Cook, North Atlantic.** Research cruise to study the impacts of ocean acidification on cold-water corals. Responsible for carbonate chemistry analysis and collection of nutrient samples, as well as analysis of CTD data. May-Jun. 2012.

**Catlin Arctic Survey Ice base, Canadian High Arctic.** Research on ocean acidification impacts of plankton. Roles included setting up the ice base, maintaining the field site, collecting data for CTD, nutrients, carbonate chemistry, plankton, molecular samples, ice core sampling, atmospheric CO<sub>2</sub> sampling, ADCP data. Feb.-May 2010 & Feb.-May 2011.

**McMurdo American Antarctic Base, Antarctica.** Training course on how to conduct research in polar regions, including training on logistics, field work, remote field training, and biology of polar organisms. Jan.-Feb. 2008.

**Volcanic vent sites, Ischia, Italy.** Field assistant, roles included snorkelling and shore collection of data using quadrat sampling and carbonate chemistry analysis. Apr.-May 2007.

**White Shark Trust, South Africa.** Field assistant, roles included photographing sharks, spotting, assisting with tagging. Sep. 2001.

## REVIEWING

- MPhil External examiner, Plymouth University.
- Arctic Council Reviewer and scientific expert for Arctic Council working group Arctic Monitoring and Assessment Programme (AMAP).
- Funding Reviewer for research proposals: Research Grants Council (RGC) of Hong Kong, European Research Council, Australian Antarctic Division, National Fellowships Committee for Sigma Delta Epsilon, Graduate Women in Science, French Polar Institute, Helmholtz-Postdoc-Programme, Norwegian Research Council, National Science Foundation, Plymouth Marine Laboratory internal grant review council member.
- Journals Reviewer for publications: Journal of Marine Research, Marine Pollution Bulletin, Journal of Experimental Marine Biology and Ecology, PLoS ONE, Global Change Biology, Marine Ecology Progress Series, Marine Biology, Hydrobiologia, Biogeosciences, Limnology & Oceanography, Scientific Reports, Ecology and Evolution, Oceanology, Proceedings of the Royal Society B, Environmental Pollution, Biology Letters, Frontiers of Marine Science.

## PROFESSIONAL MEMBERSHIPS

- 2010 – 2018 Fellow of Royal Geographical Society
- 2012 – 2016 Executive Committee Member, Arctic in Rapid Transition (ART) Network
- 2010 – Present Challenger Society Member
- 2010 – Present Member of the Association for Polar Early Career Scientists (APECS)