

Dr. Manoj Kamalanathan

Bigelow Laboratories for Ocean Sciences,
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Education

- 2016 PhD, Department of Biological Sciences, Monash University, Melbourne, Australia
Thesis title: Optimization of microalgae for enhanced biodiesel production.
Committee members: Prof. John Beardall and Prof. Ros Gleadow
- 2010 M.Sc. Applied Microbiology, Vellore Institute of Technology (VIT), Vellore, India
8.65 Cumulative Grade Point Average (CGPA) (highest 10)
- 2008 B.Sc. Microbiology with a 1st class, Jai Hind College, Mumbai University, India

Research experience

- 04/22-Present Senior Research Scientist
Bigelow Laboratories for Ocean Sciences, Maine, USA
Project Title: Farmed Kelp Blue Carbon
Project Description: Developing tools to characterize and quantify net carbon stored through kelp farming using various methods including qPCRs, stable isotope labelling and macromolecular characterization.
Project Title: A novel in silico and experimental bioengineering strategy to enhance the high value product production: astaxanthin in *Haematococcus pluvialis*.
Project Description: This project will develop a novel systems biology strategy to ensure high astaxanthin yields in *H. pluvialis* without compromising biomass yields and productivity.
Project Title: Photo-oxidation or Enzymatic Catalysis Facilitating the Preservation of High Molecular Weight Dissolved Organic Nitrogen in the Lakes
Project Description: The proposed project will study the mechanisms and processes that could explain how proteinaceous materials cross-link into molecules of higher molecular weight, while becoming intrinsically less biodegradable, leading to their preservation as the majority of HMW DON in the lakes.
Project Title: Better Utilization of CO₂ and Bicarbonate for Biomass and Lipid Enrichment (BUBBLE)
Project Description: The proposed project will utilize the microalgae culture collection of the NCMA to achieve the department of energy's benchmark targets of microalgal productivity (20 g/m²/day) and Carbon Use Efficiency (70%).
Project Title: Optimization of MICP for improved performance of coastal risk reduction features
Project Description: The proposed project will optimize the MICP process to develop a cost and labor effective continuous microbial calcification for building coastal protective structures such as artificial submerged reefs and revetments.
- 10/19-03/22 **Assistant Research Scientist**
Department of Marine Biology
Texas A&M University at Galveston, Texas, USA
Project Title: Oil spills during natural and man-made disasters: protecting estuaries through science and promoting social well-being.
Project Description: The broad focus of my current project is to understand the how exposure to Per- and polyfluoroalkyl substances (PFAS) and/or oil affects phytoplankton-bacteria interaction and marine snow dynamics. This is a multidisciplinary collaborative project involving physiologist, biogeochemist, and social scientist.
Project Title: Microbially-Induced Calcium Carbonate Precipitation (MICP)
Project Description: I am working with the U.S. Army Corps, civil engineers and coastal engineers to apply microbially-induced calcium carbonate precipitation in developing submerged nearshore artificial reefs to counter wave attack and erosion problems.

- 01/16-10/19 **Postdoctoral Research Associate**
 Department of Marine Biology
 Texas A&M University at Galveston, Texas, USA
Project Title: Aggregation and degradation of dispersants and oil by microbial exopolymers
Project Description: The broad focus of my current project is to study the effects of Deepwater Horizon oil spill on phytoplankton, phytoplankton-bacteria interaction and the role of their exopolysaccharide production in determining the fate of the oil. This is a multidisciplinary collaborative project with seven different laboratories in two different countries.
- 09/15-12/15 **Research Assistant**
 Department of Biological Sciences
 Monash University, Melbourne, Australia
Project Title: Metabolism in anoxic permeable sediments are dominated by eukaryotic dark fermentation.
Project Description: This project focused on understanding the immense amount of dissolved inorganic carbon and hydrogen production in anoxic sediments across the beaches in Melbourne, Australia.
- 03/12-09/15 **PhD student**
 Department of Biological Sciences
 Monash University, Melbourne, Australia
Project Title: Optimization of microalgae for enhanced biofuel production
Project Description: My PhD focused on testing various ways to enhance growth and lipid synthesis for biofuel production wherein, I studied the impacts of nitrogen and phosphorus availability on the physiology and lipid production in microalgae. Also a comparison of heterotrophic and mixotrophic growth to phototrophic growth of microalgae by studying the photosynthetic physiology and biochemical changes under those conditions.
- 07/10-03/12 **Junior Research Fellow**
 Cancer Research Institute, Advanced Center for Treatment, Research and Education in Cancer, Navi-Mumbai, India
Project Title: Transcriptome Analysis of Carcinogen Induced Lung Cancer in Mice and the Chemopreventive Action of Black Tea Polyphenols.
Project Description: A mouse model for studying chemically induced lung cancer was developed and the chemopreventive effects of purified black tea polyphenols on the induced lung cancer were studied. This study showed that black tea polyphenol slowed the progression in cancer in A/J mice.
- 01/10-06/10 **Internship**
 Department of Food Technology at Bhabha Atomic Research Centre (BARC), Mumbai, India
Project Title: Studies on *Aeromonas* isolates from food
Project Description: The sensitivity of food pathogen *Aeromonas* sp. to gamma irradiation was studied and the D-10 value (the amount of gamma radiation required to reduce the microbial population by 90%) for seven isolates of *Aeromonas* sp. was determined. In addition, Pulse Field Gel Electrophoresis profiling of *Aeromonas* isolates was also performed.

List of Publications

- 2022 **Kamalanathan, M.**, Mapes, S., Prouse, A., Faulkner, P., Klobusnik, N., Hillhouse, J., Hala, D., & Quigg, A. Core metabolism plasticity in phytoplankton: Response of *Dunaliella tertiolecta* to oil exposure. *Journal of Phycology* (accepted).
- 2021 **Kamalanathan, M.**, Hillhouse, J., Claflin, N., Rodkey, T., Mondragon, A., Prouse, A., Nguyen, M., & Quigg, A. Influence of nutrient status on the response of the diatom *Phaeodactylum tricornerutum* to oil and dispersant. *PloS one*, 16(12), e0259506.
<https://doi.org/10.1371/journal.pone.0259506>

- 2021 Hala, D., Faulkner, P., He, K., **Kamalanathan, M.**, Brink, M., Simons, K., Apaydin, M., Hernout, B., Petersen, L.H., Ivanov, I., & Qian, X. An integrated in vivo and in silico analysis of the metabolism disrupting effects of CPI-613 on embryo-larval zebrafish (*Danio rerio*). *Comparative Biochemistry and Physiology Part C: Toxicology & Pharmacology*, 109084. <https://doi.org/10.1016/j.cbpc.2021.109084>
- 2021 Quigg, A., Xu, C., Chin, W. C., **Kamalanathan, M.**, Sylvan, J., Finkel, Z. V., Irwin, A.J., Ziervogel, K., Wade, T.L., Knap, T. and Hatcher, P.G., & Santschi, P. (2021, May). Crude oil and particulate fluxes including marine oil snow sedimentation and flocculant accumulation: Deepwater Horizon oil spill study. In *International Oil Spill Conference* (Vol. 2021, No. 1, p. 689531). <https://doi.org/10.7901/2169-3358-2021.1.689531>
- 2021 Quigg, A., Santschi, P. H., Burd, A., Chin, W. C., **Kamalanathan, M.**, Xu, C., & Ziervogel, K. From nano-gels to marine snow: A synthesis of gel formation processes and modeling efforts involved with particle flux in the ocean. *Gels*, 7(3), 114. <https://doi.org/10.3390/gels7030114>
- 2021 Quigg, A., Parsons, M., Bargu, S., Ozhan, K., Daly, K. L., Chakraborty, S., **Kamalanathan, M.**, Erdner, D., Cosgrove, S. & Buskey, E. J. Marine phytoplankton responses to oil and dispersant exposures: Knowledge gained since the Deepwater Horizon oil spill. *Marine Pollution Bulletin*, 164, 112074. <https://doi.org/10.1016/j.marpolbul.2021.112074>
- 2021 Santschi, P. H., Chin, W. C., Quigg, A., Xu, C., **Kamalanathan, M.**, Lin, P., & Shiu, R. F. Marine gel interactions with hydrophilic and hydrophobic pollutants. *Gels*, 7(3), 83. <https://doi.org/10.3390/gels7030083>
- 2021 **Kamalanathan, M.**, Mapes, S., Hillhouse, J., Clafin, N., Leleux, J., Hala, D., & Quigg, A. (2021). Molecular mechanism of oil induced growth inhibition in diatoms using *Thalassiosira pseudonana* as the model species. *Scientific reports*, 11(1), 1-12. <https://doi.org/10.1038/s41598-021-98744-9>
- 2021 **Kamalanathan, M.**, Schwehr, K., Labonté, J., Taylor, C., Bergen, C., Patterson, N., Clafin, N., Santschi, P., and Quigg, A. The interplay of phototrophic and heterotrophic microbes under oil exposure-a microcosm study. *Frontiers in Microbiology*, 12. <https://doi.org/10.3389/fmicb.2021.675328>
- 2021 Quigg, A., Parsons, M., Bargu, S., Ozhan, K., Daly, K., Chakraborty, S., **Kamalanathan, M.**, Erdner, D., Cosgrove, S., Buskey, E. Marine phytoplankton responses to oil and dispersant exposures: Knowledge gained since the Deepwater Horizon oil spill. *Marine Pollution Bulletin*, 164, 112074. <https://doi.org/10.1016/j.marpolbul.2021.112074>
- 2021 Quigg, A., Santschi, P., Xu, C., Ziervogel, K., **Kamalanathan, M.**, Chin, WC., Burd, A., Wozniak, A., Hatcher P. Aggregation and degradation of dispersants and oil by microbial exopolymers (ADDOMEx): towards a synthesis of processes and pathways of marine oil snow formation in determining the fate of hydrocarbons. *Frontiers in Marine Science* (In press). <https://doi.org/10.3389/fmars.2021.642160>
- 2021 Hala, D., Faulkner, P., He, K., Kamalanathan, M., Brink, M., Simons, K., Apaydin, M., Hernout, B., Petersen, L., Ivanov, I., Qian, X. An integrated in vivo and in silico analysis of the metabolism disrupting effects of CPI-613 on embryo-larval zebrafish (*Danio rerio*). *Comparative Biochemistry and Physiology Part C: Toxicology & Pharmacology*, 248, 109084. <https://doi.org/10.1016/j.cbpc.2021.109084>
- 2020 Ross, A., Hotard, A., **Kamalanathan, M.**, Nolen, R., Hala, D., Clay, L., Kaiser, K., and Quigg, A. 2020. Awareness Is Not Enough: Frequent Use of Water Pollution Information and Changes to Risky Behavior. *Sustainability*, 12(20), 8695. <https://doi.org/10.3390/su12208695>
- 2020 Bacosa, H., **Kamalanathan, M.**, Cullen, J., Shi, D., Xu, C., Schwehr, K., Hala, D., Wade, T., Knap, T., Santschi, P., and Quigg, A. Marine Snow Aggregates are Enriched in Polycyclic Aromatic Hydrocarbons (PAHs) in Oil Contaminated Waters: Insights from a Mesocosm Study. *J. Mar. Sci. Eng.* 2020, 8(10), 781. <https://doi.org/10.3390/jmse8100781>

- 2020 Genzer, J. L., **Kamalanathan, M.**, Bretherton, L., Hillhouse, J., Xu, C., Santschi, P. H. and Quigg, A. Diatom aggregation when exposed to crude oil and chemical dispersants: potential impacts of ocean acidification. *PLoS ONE*, 15(7), e0235473. <https://doi.org/10.1371/journal.pone.0235473>
- 2020 Xu, C., Lin, P., Sun, L., Chen, H.-M., Xing, W., **Kamalanathan, M.**, Hatcher, P.G., Conte, M.H., Quigg, A. and Santschi, P.H. 2020. Molecular nature of marine particulate organic iron-carrying moieties revealed by electrospray ionization Fourier-transform ion cyclotron resonance mass spectrometry (ESI-FTICRMS). *Frontiers in Earth Science*, 8, 266. <https://doi.org/10.3389/feart.2020.00266>
- 2020 Bacosa, H. P., Steichen, J. L., **Kamalanathan, M.**, Windham, R., Lubguban, A., Labonté, J.M., Hala, D., Santschi, P.H. and Quigg, A. Polycyclic aromatic hydrocarbons (PAHs) and putative PAH-degrading bacteria in Galveston Bay, Texas (USA) following Hurricane Harvey (2017). *Environmental Science and Pollution Research*, 1-13. <https://doi.org/10.1007/s11356-020-09754-5>
- 2020 **Kamalanathan, M.**, Doyle, S., Xu, C., Achberger, A., Wade, T., Schwehr, K., Santschi, P., Sylvan, J., & Quigg, A. Exoenzymes as a signature of microbial response to marine environmental conditions. *mSystems* 5(2). <https://doi.org/10.1128/mSystems.00290-20>
- 2020 Steichen, J. L., Labonté, J., Windham, R., Hala, D., Kaiser, K., Setta, S., Faulkner, P.C., Bacosa, H., Yan, G., **Kamalanathan, M.**, & Quigg, A. (2020). Microbial, physical, and chemical changes in Galveston Bay following an extreme flooding event, Hurricane Harvey. *Frontiers in Marine Science*, 7, 186. <https://doi.org/10.3389/fmars.2020.00186>
- 2020 Shiu, R-F., Chiu, M-H., Vazquez, C., Tsai, Y-Y., Le, A., Kagiri, A., **Kamalanathan, M.**, Bacosa, H., Doyle, S., Sylvan, J., Santschi, P., Quigg, A., Chin, W-C. Protein to carbohydrate (P/C) ratio changes in microbial extracellular polymeric substances induced by oil and Corexit. *Marine Chemistry*, 103789. <https://doi.org/10.1016/j.marchem.2020.103789>
- 2020 Santschi, P., Xu, C., Schwehr, K., Lin, P., Sun, L., Chin, W-C., **Kamalanathan, M.**, Quigg, A. Can the protein/carbohydrate (P/C) ratio of exopolymeric substances (EPS) be used as a proxy for its 'stickiness' and other biophysical properties? *Marine Chemistry*, 218, 103734. <https://doi.org/10.1016/j.marchem.2019.103734>
- 2019 Bera, G., Doyle, S., Passow, U., **Kamalanathan, M.**, Wade, T., Sylvan, J., Sericano, J., Gold, G., Quigg, A., & Knap, A. Biological Response to Dissolved versus Dispersed Oil. *Marine Pollution Bulletin*, 150, 110713. <https://doi.org/10.1016/j.marpolbul.2019.110713>
- 2019 **Kamalanathan, M.**, & Quigg, A., Physiological Limitations and Solutions to Various Applications of Microalgae. In *Microalgae-From Physiology to Application*. IntechOpen. <https://doi.org/10.5772/intechopen.90206>
- 2019 **Kamalanathan, M.**, Chiu, M., Bacosa, H., Schwehr, K., Tsai, S., Doyle, S., Yard, A., Mapes, S., Vasequez, C., Bretherton, L., Sylvan, J., Santschi, P.H., Chin, W., & Quigg, A. Role of polysaccharides in diatom *Thalassiosira pseudonana* and its associated bacteria in hydrocarbon presence. *Plant Physiology*. <https://doi.org/10.1104/pp.19.00301>
- 2019 Bretherton, L., Hillhouse, J., Bacosa, H., Setta, S., Genzer, J., **Kamalanathan, M.**, Finkel, Z.V., & Quigg, A. Growth dynamics and domoic acid production of *Pseudo-nitzschia* sp. in response to oil and dispersant exposure. *Harmful Algae*, 86, 55-63. Doi: <https://doi.org/10.1016/j.hal.2019.05.008>
- 2019 Bretherton, L., **Kamalanathan, M.**, Genzer, J., Hillhouse, J., Setta, S., Liang, Y., Brown, C.M., Xu, C., Sweet, J., Passow, U., Finkel, Z.V., Irvin, A., Santschi, P.H., & Quigg, A. Response of natural phytoplankton communities exposed to crude oil and chemical dispersants during a mesocosm experiment. *Aquatic Toxicology*, 206, 43-53. <https://doi.org/10.1016/j.aquatox.2018.11.004>

- 2018 Bacosa, H., **Kamalanathan, M.**, Chiu, M., Vasquez, C., Tsai, S., Sun, L., Labonte, J., Schwehr, K., Hala, D., Santschi, P., Chin, W., Quigg, A. Extracellular polymeric substances (EPS) producing and oil degrading bacteria isolated from the northern Gulf of Mexico. PLoS One, 13(12): e0208406. <https://doi.org/10.1371/journal.pone.0208406>
- 2018 Sun, L., Chiu, M. H., Xu, C., Lin, P., Schwehr, K. A., Bacosa, H., **Kamalanathan, M.**, Quigg, A., Chin, W.C., & Santschi, P. H. The effects of sunlight on the composition of exopolymeric substances and subsequent aggregate formation during oil spills. Marine Chemistry, 203, 49-54. <https://doi.org/10.1016/j.marchem.2018.04.006>
- 2018 **Kamalanathan, M.**, Xu, C., Schwehr, K., Bretherton, L., Beaver, M., Doyle, S., Genzer, J., Hillhouse, J., Sylvan, J., Santschi, P.H., & Quigg, A. Extracellular enzyme activity profile in a chemically enhanced water accommodated fraction of surrogate oil: towards understanding microbial activities after the Deepwater Horizon oil spill. Frontiers in microbiology, 9, 798. <https://doi.org/10.3389/fmicb.2018.00798>
- 2018 **Kamalanathan, M.**, Schwehr, K. A., Bretherton, L., Genzer, J., Hillhouse, J., Xu, C., Williams, A., Santschi, P., & Quigg, A. Diagnostic tool to ascertain marine phytoplankton exposure to chemically enhanced water accommodated fraction of oil using Fourier Transform Infrared spectroscopy. Marine pollution bulletin, 130, 170-178. <https://doi.org/10.1016/j.marpolbul.2018.03.027>
- 2018 Bretherton, L., Williams, A., Genzer, J., Hillhouse, J., **Kamalanathan, M.**, Finkel, Z. V., & Quigg, A. Physiological response of 10 phytoplankton species exposed to macondo oil and the dispersant, Corexit. Journal of phycology, 54(3), 317-328. <https://doi.org/10.1111/jpy.12625>
- 2017 **Kamalanathan, M.**, Chaisutyakorn, P., Gleadow, R., & Beardall, J. A comparison of photoautotrophic, heterotrophic, and mixotrophic growth for biomass production by the green alga *Scenedesmus* sp.(Chlorophyceae). Phycologia, 57(3), 309-317. <https://doi.org/10.2216/17-82.1>
- 2017 **Kamalanathan, M.**, Dao, L. H. T., Chaisutyakorna, P., Gleadow, R., & Beardall, J. Photosynthetic physiology of *Scenedesmus* sp.(Chlorophyceae) under photoautotrophic and molasses-based heterotrophic and mixotrophic conditions. Phycologia, 56(6), 666-674. <https://doi.org/10.2216/17-45.1>
- 2017 Bourke, M. F., Marriott, P. J., Glud, R. N., Hasler-Sheetal, H., **Kamalanathan, M.**, Beardall, J., Greening, C. & Cook, P. L. Metabolism in anoxic permeable sediments is dominated by eukaryotic dark fermentation. Nature geoscience, 10(1), 30. <https://doi.org/10.1038/ngeo2843>
- 2016 Quigg, A., Passow, U., Chin, W. C., Xu, C., Doyle, S., Bretherton, L., **Kamalanathan, M.**, Williams, A.K., Sylvan, J.B., Finkel, Z.V. & Knap, A. H. The role of microbial exopolymers in determining the fate of oil and chemical dispersants in the ocean. Limnology and Oceanography Letters, 1(1), 3-26. <https://doi.org/10.1002/lol2.10030>
- 2016 **Kamalanathan, M.**, Gleadow, R., & Beardall, J. Use of a chemical inhibitor as an alternative approach to enhance lipid production in *Chlamydomonas reinhardtii* (Chlorophyceae). Phycologia, 56(2), 159-166. <https://doi.org/10.2216/16-49.1>
- 2016 **Kamalanathan, M.**, Pierangelini, M., Shearman, L. A., Gleadow, R., & Beardall, J. Impacts of nitrogen and phosphorus starvation on the physiology of *Chlamydomonas reinhardtii*. Journal of applied phycology, 28(3), 1509-1520. <https://doi.org/10.1007/s10811-015-0726-y>
- 2015 **Kamalanathan, M.**, Gleadow, R., & Beardall, J. Impacts of phosphorus availability on lipid production by *Chlamydomonas reinhardtii*. Algal Research, 12, 191-196. <https://doi.org/10.1016/j.algal.2015.08.021>

List of first author conference presentations (O-oral; P-poster)

- 2021 O Polysaccharide and its role during an oil spill. Association for the Sciences of Limnology and Oceanography (ASLO) Virtual meeting.
- 2021 O The interplay of phototrophic and heterotrophic microbes under oil exposure-a microcosm study. Association for the Sciences of Limnology and Oceanography (ASLO) Virtual meeting
- 2020 P *The two different sides of diatom's response to oil exposure. Gulf of Mexico Oil Spill and Ecosystem (GoMOSES) in Tampa, USA*
- 2019 O *Phytoplankton's narrative of Deepwater horizon oil spill. Guest speaker at Texas A&M University at Galveston, USA*
- 2019 O *Intracellular mechanisms contributing to oil resistance by the green alga, Dunaliella tertiolecta. Gulf of Mexico Oil Spill and Ecosystem (GoMOSES) in New Orleans, USA*
- 2018 O *Identification of biochemical pathways contributing to the oil tolerating of Dunaliella tertiolecta. Gulf and Estuarine Research Society (GERS) 2018 biennial conference in Texas A&M University at College Station, USA*
- 2018 P *Use of a stoichiometric metabolic model to optimize astaxanthin production: A laboratory and In-silico study. Algal Biomass Summit in Houston, USA*
- 2018 O *Chemical communication profiling using extracellular enzyme activity in Chemically Enhanced Water Accommodated Fraction of Surrogate Oil from BP Oil Spill. Association for the Sciences of Limnology and Oceanography (ASLO) meeting in Hawaii, USA*
- 2018 O *Extracellular enzyme activities in a mesocosm experiment: Insight into the microbial world during Deepwater Horizon Oil Spill. Gulf of Mexico Oil Spill and Ecosystem (GoMOSES) in New Orleans, USA*
- 2017 P *Rapid macromolecular characterization and prediction of phytoplankton and marine aggregate's exposed to chemically enhanced (COREXIT) water accommodated fraction of oil using Fourier Transform Infrared (FTIR) spectroscopy. Gulf of Mexico Oil Spill and Ecosystem (GoMOSES) in New Orleans, USA*
- 2017 O *The mystery behind polysaccharide secretion by phytoplankton during an oil spill. Post-Doctoral Symposium in Texas A&M University at College Station, USA*
- 2016 O *Extracellular enzyme activity profile in chemically enhanced water accommodated fraction of surrogate oil from BP oil spill. Post-Doctoral Symposium in Texas A&M University at College Station, USA*
- 2017 O *Prediction of marine aggregate's exposure to chemically enhanced (COREXIT) water accommodated fraction of oil using Fourier Transform Infrared (FTIR) spectroscopy. American Chemical Society meeting, Galveston, USA*
- 2015 O *Use of heterotrophy and mixotrophy for algal biomass production. Annual meeting of the Australian Society for Phycology and Aquatic Botany (ASPAB) in Tasmania, Australia*
- 2015 O *Use of heterotrophy and mixotrophy for algal biomass production. Sixth European Phycological Congress in London, UK*
- 2014 O *Can algae save the world? Bio Postgrad Student Conference in Monash University, Melbourne, Australia*
- 2013 P *Impacts of nutrient availability on lipid production by Chlamydomonas reinhardtii. Algal Biomass Summit in Orlando, USA*
- 2012 O *Impacts of nutrient availability on lipid production by Chlamydomonas reinhardtii. Annual meeting of the Australian Society for Phycology & Aquatic Botany in Adelaide, Australia*

List of co-author conference presentations (O-oral; P-poster)

- 2020 P Hillhouse, J., Claflin, N., **Kamalanathan, M.**, Quigg, A. Effects of nutrient availability on the diatom Phaeodactylum tricornutum in the presence of oil. In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2020. Tampa, FL: 02/03/20-02/06/20.
- 2020 P Claflin, N., Hillhouse, J., **Kamalanathan, M.**, Quigg, A. The Effects of Photo Oxidized Oil and increased nutrient availability on marine phytoplankton communities in Gulf of Mexico Oil Spill & Ecosystem Science Conference 2020. Tampa, FL: 02/03/20-02/06/20.
- 2019 O Bretherton, L., **Kamalanathan, M.**, Genzer, J., Hillhouse, J., Setta, S., Liang, Y., et al. Response of Natural Phytoplankton Communities Exposed to Crude Oil and Chemical Dispersants during a

- Mesocosm Experiment. In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2019. New Orleans, LA: 02/04/19-02/07/19.
- 2019 O Chin, W., Vazquez, C., Tsai, S., Xu, C., **Kamalanathan, M.**, Bacosa, H., et al. Impacts of Crude Oil and Corexit on Extracellular Polymeric Substances: Their Production and Chemical Composition. In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2019. New Orleans, LA : 02/04/19-02/07/19.
- 2019 O Genzer, J., Hillhouse, J., **Kamalanathan, M.**, Bretherton, L., & Quigg, A. Comparison of Marine Snow Formations of Stationary and Exponentially Growing *Thalassiosira pseudonana* in Current and Future Ocean Conditions. In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2019. New Orleans, LA: 02/04/19-02/07/19.
- 2019 P Hillhouse, J., Genzer, J., **Kamalanathan, M.**, & Quigg, A. Effects of Nitrogen Availability on the Diatom *Thalassiosira pseudonana* in the Presence of Oil and Surfactant. In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2019. New Orleans, LA : 02/04/19-02/07/19.
- 2019 P Light, B. D., Mondragon, A., Hillhouse, J., Rodkey, T., **Kamalanathan, M.**, Maples, S., et al. The Effects of Crude Oil and Corexit on the Diatom *Phaeodactylum Tricornutum* Under Nutrient Stress. In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2019. New Orleans, LA : 02/04/19-02/07/19: Poster.
- 2018 P Bacosa, H., **Kamalanathan, M.**, Chiu, M. - H., Tsai, S. - M., Sun, L., Schwehr, K. A., et al. Exopolymeric substance (EPS) production by bacterial isolates from the northern Gulf of Mexico in response to WAF, CEWAF and Corexit. In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2018. New Orleans, LA : 02/05/18-02/08/18.
- 2018 P Bacosa, H., **Kamalanathan, M.**, Cullen, J., Xu, C., Schwehr, K. A., Kaiser, K., et al. Marine snow aggregates are enriched in polycyclic aromatic hydrocarbons (PAHs) in oil contaminated waters; insights from a mesocosm study. In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2018. New Orleans, LA : 02/05/18-02/08/18.
- 2018 O Bretherton, L., Hillhouse, J., Setta, S., Genzer, J., **Kamalanathan, M.**, Bacosa, H., et al. Can oil spills cause toxic algal blooms in the Gulf of Mexico? In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2018. New Orleans, LA : 02/05/18-02/08/18.
- 2018 P Bretherton, L., Williams, A., Genzer, J., Hillhouse, J., **Kamalanathan, M.**, Finkel, Z., et al. Small Scale Biological Responses of Phytoplankton Species Exposed to Oil and Surfactant. In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2018. New Orleans, LA : 02/05/18-02/08/18.
- 2018 P Genzer, J., Bretherton, L., Setta, S., Hillhouse, J., **Kamalanathan, M.**, & Quigg, A. The effect of removing carbon limitation on diatom aggregation and physiological responses when exposed to oil. In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2018. New Orleans, LA : 02/05/18-02/08/18.
- 2018 P Mapes, S., **Kamalanathan, M.**, Chiu, M. - H., Bacosa, H., Schwehr, K., Bretherton, L., et al. Role of polysaccharide secretion by diatoms during an oil spill in the context of bacteria-diatom interaction. In Gulf of Mexico Graduate Student Symposium 2018. Dauphin Island, AL : 03/02/18-03/04/18.
- 2018 P Schwehr, K. A., Chiu, M. - H., **Kamalanathan, M.**, Xu, C., Sun, L., Lin, P., et al. Insights on Does oil aggregate or emulsify with added dispersant? Results from measurements of surface tension, FTIR, and microscopy of Formation from colloidal EPS protein-polysaccharide interactions with oil and/or dispersants are added. In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2018. New Orleans, LA : 02/05/18-02/08/18.
- 2018 O Schwehr, K. A., Chiu, M. - H., **Kamalanathan, M.**, Xu, C., Sun, L., Lin, P., et al. Insights on Marine Oil Snow or Emulsion Formation from Protein-Polysaccharide Interactions with Oil and Dispersant from Surface Tension and Microscopy. In Ocean Sciences Meeting 2018. Portland, OR : 02/11/18-02/16/18
- 2018 P Sun, L., Chiu, M. - H., Xu, C., Lin, P., Schwehr, K. A., Bacosa, H., **Kamalanathan, M.**, et al. The effects of sunlight on the composition of exopolymeric substances affecting the aggregates formation during oil spills. In Ocean Sciences Meeting 2018. Portland, OR : 02/11/18-02/16/18.
- 2018 P Sun, L., Chiu, M. - H., Xu, C., Lin, P., Schwehr, K. A., Bacosa, H., **Kamalanathan, M.**, et al. The effects of sunlight on the composition of exopolymeric substances affecting aggregate formation during oil spills. In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2018. New Orleans, LA : 02/05/18-02/08/18.

- 2018 P White, A. R., Jalali, M., Bacosa, H., **Kamalanathan, M.**, Sun, L., Xu, C., et al. The effect of EPS composition on the aggregate formation on a crude oil drop interface. In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2018. New Orleans, LA : 02/05/18-02/08/18.
- 2017 O Bacosa, H., **Kamalanathan, M.**, Cullen, J., Schwehr, K. A., Hala, D., & Quigg, A. Marine snow aggregates are enriched in polycyclic aromatic hydrocarbons (PAHs) in oil contaminated waters; insights from a mesocosm study. In 2nd Annual Texas A&M Postdoctoral Research Symposium. College Station, TX : 09/20/17-09/20/17.
- 2017 O Bretherton, L., Hillhouse, J., Setta, S., Genzer, J., **Kamalanathan, M.**, Bacosa, H., et al. Can oil spills cause toxic algal blooms in the Gulf of Mexico? In 2nd Annual Texas A&M Postdoctoral Research Symposium. College Station, TX : 09/20/17-09/20/17.
- 2017 O Bretherton, L., **Kamalanathan, M.**, Genzer, J., Hillhouse, J., Couffer, B., & Quigg, A. Using diatoms to understand the toxicity of oil spills and chemical dispersants. In ASLO 2017 Aquatic Sciences Meeting. Honolulu, HI : 02/26/17-03/03/17.
- 2017 O Bretherton, L., **Kamalanathan, M.**, Genzer, J., Hillhouse, J., Setta, S., Couffer, B., et al. Multi-parameter assessment of fast repetition rate (FRR) fluorescence signals in natural phytoplankton communities exposed to the water accommodated fraction of oil and the chemical dispersant Corexit. In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2017. New Orleans, LA : 02/06/17-02/09/17.
- 2017 P Genzer, J., Bretherton, L., Setta, S., Hillhouse, J., **Kamalanathan, M.**, Chen, X., et al. The effects of removing carbon limitation on diatom aggregation and physiological responses when exposed to Macondo surrogate oil. In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2017. New Orleans, LA : 02/06/17-02/09/17.
- 2017 P Genzer, J., Bretherton, L., Setta, S., Hillhouse, J., **Kamalanathan, M.**, Passow, U., et al. Effects of Macondo surrogate oil and increased carbon dioxide on marine diatom, *Thalassiosira pseudonana*. In ASLO 2017 Aquatic Sciences Meeting. Honolulu, HI : 02/26/17-03/03/17.
- 2017 P Hillhouse, J., Bretherton, L., **Kamalanathan, M.**, Genzer, J., & Quigg, A. Impact of phosphorus limitation on phytoplankton in the Gulf of Mexico in the presence of oil and dispersants. In ASLO 2017 Aquatic Sciences Meeting. Honolulu, HI : 02/26/17-03/03/17.
- 2017 P Nguyen, M., Bretherton, L., **Kamalanathan, M.**, Hillhouse, J., Genzer, J., & Quigg, A. The effects of three different types of crude oil on marine diatom, *Thalassiosira pseudonana*. In Texas A&M University Galveston Student Research Symposium. Galveston, Texas : 04/18/17-04/19/17.
- 2017 P Whitaker, E. A., **Kamalanathan, M.**, Quigg, A., & Sylvan, J. B. Exoenzymatic response of coastal and offshore surface ocean microbial communities to exposure to oil and an oil/dispersant mixture. In Gulf of Mexico Oil Spill & Ecosystem Science Conference 2017. New Orleans, LA : 02/06/17-02/09/17.
- 2016 P Bretherton, L., **Kamalanathan, M.**, Genzer, J., Hillhouse, J., & Quigg, A. (2016). A multi-parameter approach to assessing fluorescence signals in natural phytoplankton communities exposed to crude oil and dispersants. In 2016 Texas A&M University Postdoctoral Research Symposium. College Station, TX : 09/21/16.
- 2016 O Bretherton, L., **Kamalanathan, M.**, Genzer, J., Hillhouse, J., Santschi, P., & Quigg, A. Multi-parameter assessment of fast repetition rate (FRR) fluorescence signals in natural phytoplankton communities exposed to oil and dispersants. In American Chemical Society Southwest Regional Meeting 2016 (ACS SWRM-2016). Galveston, TX : 11/10/16-11/13/16.

Outreach activities

- 07/15-11/15 Volunteered for **Scientist in School Program** by Commonwealth Scientific and Industrial Research Organization (CSIRO). Interacted with school students, performed scientific experiments biweekly, and encourage students to perform and present their experiment.
- 03/26/16 Presented the ongoing **Gulf Research** on oil-spill at The Witte Museum. Dispatches from the Gulf Documentary was shown followed by a two-hour Q&A session with the audience.
- 02/16/16 Presented the research work oil-spill and microbes at **Science Olympiad** to school students.
- 10/14/18-5/20/2019 Mentored a beginner team of 10-12 year old school kids with Into Orbit season of First Lego League (**FLL**) **Astromech TECH robotics competition**.

- 03/22/2019 Harmony School of Advancement- Career Fair 2019. Interacted with school students, explained the oil-spill and microbial research work.
- 07/23/2019 Presented the research work oil-spill and microbes at **Sea Camp** to school students.
- 9/2019-1/2020 Helped two student from Friendswood High School, Liliana Molis and Hailey Romine, in data analysis, sample processing and preparation and maintenance of laboratory materials.

Teaching experience

- 9/2020 **Guest Lecture, Texas A&M University at Galveston**
Human impacts in the marine environment (Graduate class) on Oil spills and Phytoplankton
- 4/19 **Guest Lecture, Texas A&M University at Galveston**
Biotechnology and Synthetic Biology (Third year Marine Biology) on the fundamentals of genetic engineering and synthetic biology and its applications
- 10/18 **Guest Lecture, Texas A&M University at Galveston**
Fundamentals of Microbiology (Third year Marine Biology) on application of microbes to produce biofuel, single cell protein, wastewater treatment, and microbial fuel cell (electricity)
- 11/17 **Guest Lecture, Texas A&M University at Galveston**
Biochemistry (First year Marine Biology) on introduction to photosynthesis
- 08/12-10/15 **Teaching Assistant, Monash University**
Second year - Molecular Biology and Human Genetics
Third Year - Global Change Biology Practical
- 09/15 **Guest Lecture, Monash University**
Human Genetics (Second year Biology) on Mendelian Genetics

Mentoring experience

- 01/16- Present I have supervised nine students (4 from Marine biology and 5 from Marine Chemistry)
- Nathan Klobusnik:** Optimization of microbially induced calcium precipitation using natural Galveston Bay microbial community (Since August 2020-present).
- Alexandra Yard:** I helped to design and conduct experiments for STEM Undergraduate Research Thesis in collaboration with Santschi lab. The project is entitled “The toxicity of weathered oil on oil resistant and oil sensitive species of diatoms.”
Intracellular mechanisms contributing to oil resistance by the green alga *Dunaliella tertiolecta* (6 months).
- Julissa Freund:** Impacts of photo-oxidized dispersed oil on *Phaeodactylum tricorutum* (2.5 months).
- Christian Taylor and Nicole Patterson:** Short-term monitoring of exchange of metabolites between natural communities of phytoplankton and bacteria through radiolabelling in the presence and absence of oil (3 month).
- Brandon Reeves:** Whole genome sequencing and draft genome assembly of *Heamatococcus pluvialis* (2 months).
- Jennifer Genzer:** The effect of Ocean acidification on diatom’s physiology and aggregation in the presence and absence of oil (2 years).
- Savannah Mapes:** Role of diatom polysaccharide synthesis in *Thalassiosira pseudonana* and the associated bacterial in response to hydrocarbon exposure (3 years).
The effect of oil and dispersant on the growth, physiology and brevetoxin production by marine dinoflagellate *Karenia brevis* (2 years).
- Noah Claffin:** Role of extracellular enzymes in marine snow formation in the presence of oil and dispersant (6 months).
- Charles Bergen:** Intracellular mechanisms contributing to oil sensitivity by the marine diatom *Thalassiosira pseudonana* (6 months).
- Jocelyn Simmons:** Diagnostic tool to ascertain marine phytoplankton exposure to chemically enhanced water accommodated fraction of oil using Fourier Transform Infrared spectroscopy (4 months).

- 03/12-09/15 I have informally supervised 3 bachelors and a master student in three independent projects during my PhD.
Rafael Barty Dextro (Exchange bachelor student from Brazil): Effect of nitrate and ammonium on growth, physiology and lipid production of *Chlamydomonas reinhardtii* (6 months).
Danilo Couto de Souza (Exchange bachelor from Brazil): Effect of nitrate and ammonium on Krebs's cycle of the green alga *Scenedesmus* sp. (2 months).
Lauren Ann Shearman: Impacts of nitrogen and phosphorus starvation on the physiology of *Chlamydomonas reinhardtii* (2 months).
Panjaphol Chaisutyakorna (Exchange master's student from Thailand): A comparison of photoautotrophic, heterotrophic, and mixotrophic growth for biomass production by the green alga *Scenedesmus* sp. (3 months).
Shannen Thora Lea Sait: Optimization of *Haematococcus pluvialis* for astaxanthin production (3 months).

Awards

- 2015 Monash Postgraduate Publication Award (Melbourne, Australia)
2015 Australian Society for Phycology and Aquatic Botany student international travel award (Melbourne, Australia)
2015 British Phycological Society Travel bursary award (London, United Kingdom)
2014 People's Choice Award for the best talk (GEZ Who's Talking) at the Bio Postgrad Student Conference (Melbourne, Australia)
2013 Algae Biomass Summit in Orlando, Poster, runner up in the biology category (Orlando, USA)
2013 Postgraduate Travel Grant Award from Monash University Institute of Graduate Research (Melbourne, Australia)
2012 Highly Commended PhD Talk at ASPAB in Adelaide (Adelaide, Australia)
2012 Faculty of Science Dean's International Postgraduate Research Scholarship Award (Melbourne, Australia)
2012 Monash Graduate Scholarship Award from Monash University (Melbourne, Australia)
2010 Awarded the Junior Research Fellowship from ACTREC (TMC) (Navi-Mumbai, India)

Convened Sessions

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| 2018 | ASLO Summer meeting | Marine Microbial Biochemistry, Productivity and Climate Change |
| 2016 | ACS Southwest Regional Meeting (SWRM) | Chemical & Biological Processes Regulating Transport of Pollutants in the Gulf of Mexico & its Estuaries |

Journal Reviewer

Environmental Science and Technology, Frontiers in Microbiology, Aquatic toxicology, ACS Sustainable Chemistry & Engineering, Journal of Applied Phycology, Algal Research, Marine Pollution Bulletin, Phycologia, BMC Microbiology, PLoS One, Estuaries and Coasts, Process Biochemistry, Marine Ecology, Journal of Marine Science and Engineering, MDPI Biology, Bulletin of Environmental Contamination and Toxicology

Analytical Skills

Proteomics, Genomics, Gas Chromatography-Mass Spectroscopy (GC-MS), Liquid chromatography - Mass spectroscopy (LC-MS), Fourier Transform Infrared Spectroscopy (FT-IR), Radioisotope labelling experiments, Enzyme kinetics, Phyto-PAM (Pulse Amplitude Modulated) Fluorometer, Fluorescence Induction and Relaxation Fluorometer (FIRE), Turner Fluorometer, Clark type oxygen electrode

Membership

- Association for the Sciences of Limnology and Oceanography (ASLO) (2017-Present)
Algae biomass Organization (2013-2015)
British Phycological Society (2014-2016)
International Society for Applied Phycology (2014-2016)
Australasian Society for Phycology and Aquatic Botany (2012-Present)
Royal Society of Victoria (2014-Present)