Are there engineering solutions to the problem of declining coral reefs?

NRPOP-PEOPLE Guest Lecture
10-11 a.m., September 18, 2018
Engineering Board Room EN4002
Memorial University
Contact: Dr. Bing Chen, nrpop@mun.ca
Light refreshments will be served

Globally, coral reefs are suffering from massive declines. It has been shown repeatedly, in many different ways, that the value of reefs for provision of food, shoreline protection, and for the economies of many countries exceeds a third of one million dollars per hectare per year. This excludes social costs, but it does show that the living component of our planet should be considered more centrally. Implications to biodiversity, property and to human food security are enormous.

Reasons for the accelerating decline of reefs are well understood. There are two components to this, firstly the factors that kill a reef, and secondly those that prevent recovery. These used to be the same, namely local forms of pollution (sewage discharge, oil, sedimentation, shoreline disruption, over-fishing, etc.). But today, reasons for their initial killing are now pre-eminently 'marine heat waves' driven by atmospheric CO2 rise. Solutions lie no longer with biologists figuring out what is happening but, I suggest, with engineers to better solve the pollution events and CO2 rise, and with politicians to wake up to the problems and threats and urgently address resource allocation to assist with solutions. Current management of all this remains very inadequate, and is failing. Prognoses are, sadly, for further decline as marine heat waves are increasing both in intensity and frequency. For many regions of the tropics we are now at or possibly beyond that cusp of when frequency of recurrence of reef-killing episodes waves is exceeding the ability of reefs to recover during cooler periods between them.

While research on coral reef system and its conservation has increased hugely in the last 30 years, reefs worldwide continue their decline. Genetic engineering to increase corals' resilience is currently inadequate. Solutions now lie with engineering responses to our available knowledge, alongside sensible and urgent political responses and support.

Invited Speaker

Charles Sheppard

OBE, PhD, FLS

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Professor Emeritus, University of Warwick, United Kingdom

Recognitions

- **Awarded with the O.B.E. in 2014 for services to conservation**
- **Recognised in 2015 as being one of the 'Top 20 most impressive examples of UK research contributing to global development.' by UKCDS** (a group of 14 UK government bodies, selected from the 7,000 UK scientists submitted in University assessment exercise)
- **Awarded Emeritus Professorship, University of Warwick, 2015**
- **Awarded Zoological Society of London's** medal for Outstanding contributions to Conservation

Primary Research Interests

- Distinguishing between direct, local and global impacts on marine ecosystems
- Development and coordination of a 20 year, 100+ persons science programme in the Chagos, Indian Ocean
- Development of Marine Protected Areas in several Caribbean and Arabian countries
- Biogeography and biodiversity of Indo-Pacific coral reefs.
- Marine science in the increasingly disturbed Arabian marine environment

Advisory roles

- Government of UK for researching impacts of US naval base in Indian Ocean
- Work in Caribbean UK Overseas Territory (BVI) on marine reserve establishment
- Governments of several Arabian States for analyses of marine impacts Several advisory roles for major oil and mineral companies

Appointments

- Advisory panels for various EU, Arabian and UK grant bodies (marine science)
- Review member of Intergovernmental Panel for Climate Change, from 2004.

Publications and media

- **Chief Editor for 24 years:** ***Marine Pollution Bulletin****,* the largest wholly environmental marine science journal.
- Currently Editor: *Advances in Marine Biology*
- 40 invited (and fully funded) marine science conference keynote presentations in last 10 years.
- TV and radio presentations in numerous countries
- 200+ papers in refereed journals
- 50+ articles in popular magazines
- 15 books (written, edited or co-edited)