

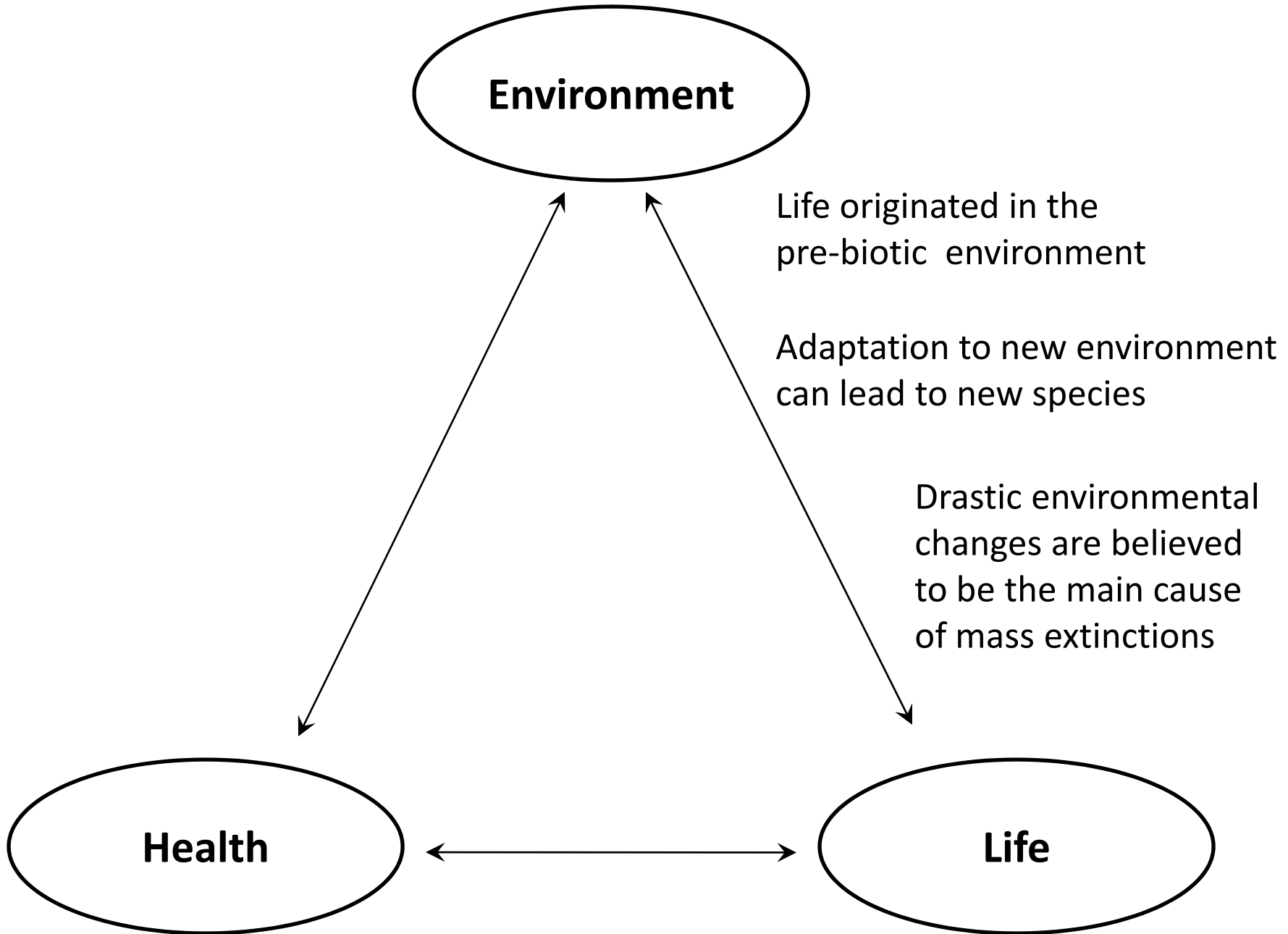


Environment, Health and Life:  
a theme topic of REACH 2010 Symposium

Coordinators: Debashish Chowdhury (Convener) and Siddhartha Panda

## **An OVERVIEW**

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# Environment (Effects on HEALTH & LIFE)

## Land

Deforestation & soil erosion by mining.  
Consequences: loss of habitat for wildlife, desertification.

Soil contamination by pesticides, herbicides & rubbish dump.  
Consequences: threat to food safety.

Soil contamination by microbes from human and animal wastes  
Consequences: spread of bacterial/viral infection

Transfer of contaminants from land to water

# Environment (Effects on HEALTH & LIFE)

## Water

Contamination of  
surface water (river, stream, lake, etc.) & ground water:  
(inorganic contaminants: arsenic, etc. )  
(organic pollutants: harsh detergents)  
(Microbial contaminants: bacteria, amoeba, etc.)  
Consequences: poisoning, water borne disease

Chemical and nuclear waste disposal in ocean  
(oil spill, leaking nuclear-powered submarines, etc.)  
Consequences: threat to marine ecosystems

# Environment (Effects on HEALTH & LIFE)

## Air

Air pollution by smoke, dust & volatile organic compounds:  
Consequences: cardiopulmonary diseases & allergic reaction

Accidental leakage of toxic gas or radiation  
(e.g., Bhopal gas tragedy, Chernobyl disaster)

## ***Black carbon for green environment- Nishith Verma***

## ***Remediation of pollution in natural systems- Saumyen Guha***

Removal of toxic contaminants and pollutants from air and water can be carried out using

- (i) non-living materials, or
- (ii) living matter.

**Dr. Nishith Verma** will follow the route (i) while

**Dr. Saumyen Guha** will follow the route (ii).

The material used must have the ability to selectively

- (a) adsorb, or (b) bind with the targetted pollutant molecules.

The speakers will discuss

- (a) the strategies followed for selecting or synthesizing such materials,
- (b) how the process is implemented for this purpose,
- (c) the measured properties which characterize the efficiency of their performance.  
and
- (d) how the system needs to be monitored and how the collected toxic materials are to be disposed, if these are not converted to more useful form.

## ***Chemiresistor sensors for environmental monitoring- Clifford Ho***

Storage tanks containing volatile toxic materials need regular monitoring for early detection of possible leakage. Desirable characteristics of such a sensor are high levels of

- (i) sensitivity,
- (ii) stability, and
- (iii) selectivity.

**Dr. Clifford Ho** (Sandia National Lab, USA) will describe the sensors which they have designed and packaged as a product.

## ***Technologies with minimal environmental footprint- Vinod Tare***

Recycling is perhaps the best method of waste management.

But, waste is usually ***an inhomogeneous mixture of multiphase components***. An efficient recycling requires

- (i) a convenient sorting of the waste products into different categories, each characterized by a common property, and
- (ii) their processing into usable (preferably, of high-value) products.

**Dr. Vinod Tare** will focus on human waste management. He will share his experience in

- (a) designing a system for sorting of the waste products,
- (b) managing transportation and adopting useful systems for processing and recycling of the waste products, and
- (c) implementation of pilot projects.



## ***Lighting up human tissue to detect tumors- Asima Pradhan***

A diagnostic tool for a disease has to be

- (i) fast,
- (ii) precise,
- (iii) easy to interpret in an unambiguous manner,
- (iv) least damaging to the body, and
- (v) capable of accessing all those parts of the body which need to be probed for the diagnostic test.

**Dr. Asima Pradhan** will present a summary of the techniques for detection of cancer and the efforts made by her own research group in this regard using a laser-based optical technique.

## ***Drug discovery: a multidisciplinary science- Vinod Bhakuni***

Modern methods of drug discovery involve several stages of investigation:

- (i) selection of the most appropriate target in the infected host,
- (ii) design and synthesis of the likely candidate drug molecule(s) and the vehicle(s) for their delivery to the target,
- (iii) fast screening of the synthesized molecules in search of the best candidate for treating widest possible spectrum of patients, and without (or with minimal) adverse side effects.

**Dr. Vinod Bhakuni** (CDRI, Lucknow) will talk about the multidisciplinary approach adopted in modern research on drug discovery.

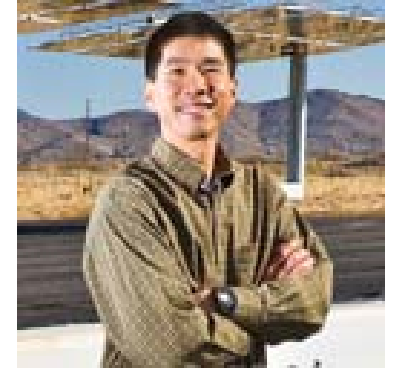
## Our Thanks to the Invited Speakers



Vinod Bhakuni, CDRI, Lucknow



Vinod Tare, CE, IITK



Clifford Ho,  
Sandia National Lab., USA



Asima Pradhan, PHY/CELT, IITK



Nishith Verma, ChE, IITK



Saumyen Guha, CE, IITK

and all the invited participants, as well as faculty colleagues and students who have contributed POSTERS.

## Acknowledgments

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**Professor V. Chandrasekhar**, Convener, Organizing committee,  
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**Professor Debasis Kundu**, **Professor Monika Katiyar** and **Professor  
Baquer Mazhari**, Members, Organizing Committee, REACH2010

**THANK You**