

Interview with an expert: Q&A session with Dr. Robert Morrison

by Sri Chaudhuri

Dr. Robert Morrison is a soil physicist with over 45 years of experience as an environmental consultant on projects related to soil and groundwater contamination, including site investigations and remediation. Dr. Morrison wrote the first book on environmental forensics in 1999 and is often credited with coining the term *environmental forensics*. He has a B.Sc. in Geology, master's degrees in Environmental Studies and Environmental Engineering, and a Ph.D. in Soil Physics from the University of Wisconsin at Madison. INEF Social Media person Sri Chaudhuri had an opportunity to ask Dr. Morrison a few questions about environmental forensics, INEF, and his career – his candid thoughts on being an expert witness and the challenges facing the field are worth a read!



You are credited with coining the term “Environmental Forensics” – what made you come up with the expression? How would you define Environmental Forensics?

The term environmental forensics arose from litigation in the mid-1980s in the United States (U.S.) that dealt with comprehensive general liability insurance policies. In the 1970's, insurance companies added a clause stating that coverage for various kinds of contaminant releases would apply only if the releases were “sudden and accidental.” Courts in the U.S. interpreted the term “sudden” to have a temporal meaning while others considered the term to be more akin to “unexpected”. In order

to develop scientifically defensible evidence as to whether a contaminant release was sudden and accidental, environmental consultants began using a variety of techniques; chief among them was chemical fingerprinting borrowed from the petroleum industry and contaminant modeling primarily in groundwater. Given that a definition of the term “forensic” - which is related to the word forum - can be defined as the application of scientific methods and techniques to investigate a crime, the term environmental forensics was coined to describe these types of investigations, (although most forensic investigations are not criminal).

Dr. Brian Murphy and I worked on a formal definition of environmental forensics over the course of about ten years and arrived at the following definition which has been accepted by the scientific and legal community: “*Environmental forensics is the systematic and scientific evaluation of physical, chemical and historical information for the purpose of developing defensible scientific and legal conclusions regarding the source or age of a contaminant release into the environment.*” Or in English, who, when, and where.

How did the field of Environmental Forensics come about?

During the late 1980's and 1990's in the U.S., environmental consultants, scientists, and regulators were asked to provide evidence regarding the age and source of contaminant releases. Individuals from a myriad of disciplines, primarily geologists and chemists, became involved in these investigations but didn't have a professional forum to share techniques and evolving methodologies used to address environmental forensic questions. During these early years, environmental forensic sessions were often an addendum or afterthought to other meetings with no journal

or organization dedicated to this coalescing discipline. At one such meeting in Amherst, Massachusetts in the early 2000's, Dr. Murphy and I were attending an Association for Environmental Health and Sciences (AEHS) meeting with an environmental forensics session; while queuing up at the buffet line, just prior to the oatmeal, Brian yelled across the buffet table, "Bob we should have our own society and peer-reviewed journal." The Journal of Environmental Forensics was launched in 2000 and it became the recognized publication for environmental forensics. At another breakfast at a Society of Environmental Toxicology and Chemistry (SETAC) Global Conference in Sydney in 2008, Drs. Paul Philp, Stephen Mudge, and I met and agreed to form an environmental forensics society which Steve named the International Network of Environmental Forensics (INEF). Dr. Mudge subsequently arranged a meeting with representatives of the Royal Society of Chemistry (RSC) who agreed to sponsor INEF; Stephen Mudge and Dr. Gwen O'Sullivan subsequently organized the first INEF conference at St. John's College in Cambridge, United Kingdom, and the rest is history.

When did you first become interested in science?

As a freshman in college when I realized that there was no money in being an art historian (*we quite appreciate Dr. Morrison's candour and humour here*).

What did you study in university and how did it relate to Environmental Forensics?

My academic studies included geology, groundwater, soil physics, chemistry and statistics, all of which are foundational to most environmental forensic investigations. In addition to these fundamental disciplines, the biological sciences and advanced exploratory data analysis have emerged as important academic disciplines.

What advice do you have for those wanting to work in Environmental Forensics or those interested in studying it?

The world is your oyster in terms of career opportunities. Regardless of your career path, several areas of study will serve you well including a comprehensive understanding of physical chemistry, organic chemistry, and statistics. In the U.S. it's not uncommon for students entering law school to have majored in chemistry or the environmental sciences.

Can you tell us a little bit about your career? What do you currently do?

I currently serve as an expert witness in environmental forensic cases or provide confidential consultant services to environmental attorneys. For example, in the Deepwater Horizon release, prominent environmental forensic scientists were retained as both testifying experts and as non-testifying experts to work on all aspects of the case, including natural resource damages, damage assessments, marine pollution issues, geochemistry, aerial and remote sensing imagery interpretation, degradation issues, and more.

You have a lot of experience interacting with the legal side of Environmental Forensics. As a scientist, what is it like to be an expert witness?

For me, providing expert witness services is the apex of all intellectual challenges as it requires a current and thorough understanding of the scientific literature regarding the subject of the litigation. An expert witness also needs to keep an open mind to a variety of perspectives for a given forensic question. As an expert witness your responsibility is to provide a judge or jury with your best scientific interpretation of an issue so that they can make informed and reasoned decisions, which have real world implications. Working with environmental attorneys is incredibly engaging as their

academic careers and training provide them with the ability to think in a non-linear fashion while as scientists we are more linear in our thinking with an emphasis of employing the scientific method at every opportunity. Most attorneys I work with extremely intelligent and grasp ideas and their ramifications quickly, which for me is quite humbling.

Two items of advice which are almost axioms for life for someone who is, or plans to be an expert witness: (1) be thoroughly prepared at all times, and (2) be truthful. Successful expert witnesses "leave their egos" at the door of the courtroom and are truthful to a fault. At one trial, a lawyer asked me a question to which I did not know the answer so I answered "I do not know". The judge interpreted the proceedings and informed everyone in the courtroom that those four words were the most credible words that an expert witness can say in a court proceeding. While as an expert, you cannot use these words very often, it goes to the issue that honesty is at a premium for all expert witnesses.

What are some of the biggest challenges that face the field of Environmental Forensics in the near future?

Commercialization. Environmental forensic investigations and expert witness services are provided at premium fees, and are therefore often subject to abuse. The greatest challenge is the seduction of providing environmental forensic services as an advocate for a client in contrast to the role as an advocate of sound science. As individuals and companies are paid higher sums of money for their services, greater pressure is often brought to bear to render opinions and interpretations favorable to the client but which are marginally or non-defensible from a scientific perspective. These ethical and professional challenges are ones that we need to resist as individuals and an environmental forensic community.

Is there anything else you would like to share?

INEF and all those who contribute their time and resources to it are to be applauded for their efforts as their work allows all of us to prosper and to become more skilled at providing forensic services to the global environmental community.

I would like to add Live Long and Prosper but someone else has apparently used this phrase.