

Why do we need Translational Ecology?



'One of the penalties of an ecological education is that one lives alone in a world of wounds...'
Aldo Leopold, *Round River*.

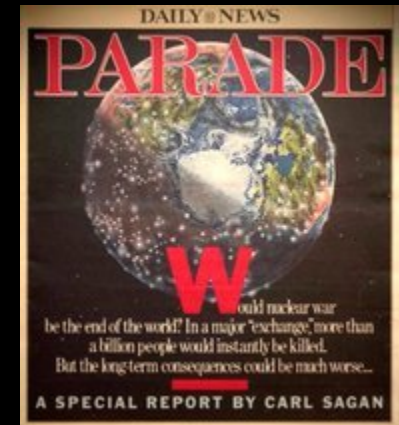
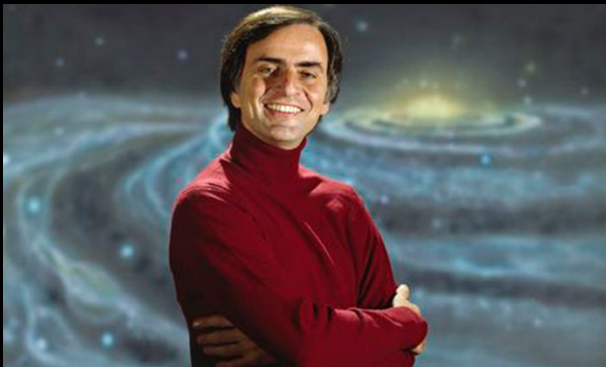
Historical perspective: tensions in science

I. Scientific engagement with society

- Early ecologists (Forbes, Clements, Elton, Leopold)
- Medicinal botany, physiology, microbiology
- Atomic scientists

II. Costs associated with engagement

- Disparagement of 'popularization' of science
- Devaluation of 'applied' research
- Discouragement of engaging in issues of societal import
- The "objectivity imperative"





KEEP CALM

AND

GET BACK TO THE

IVORY

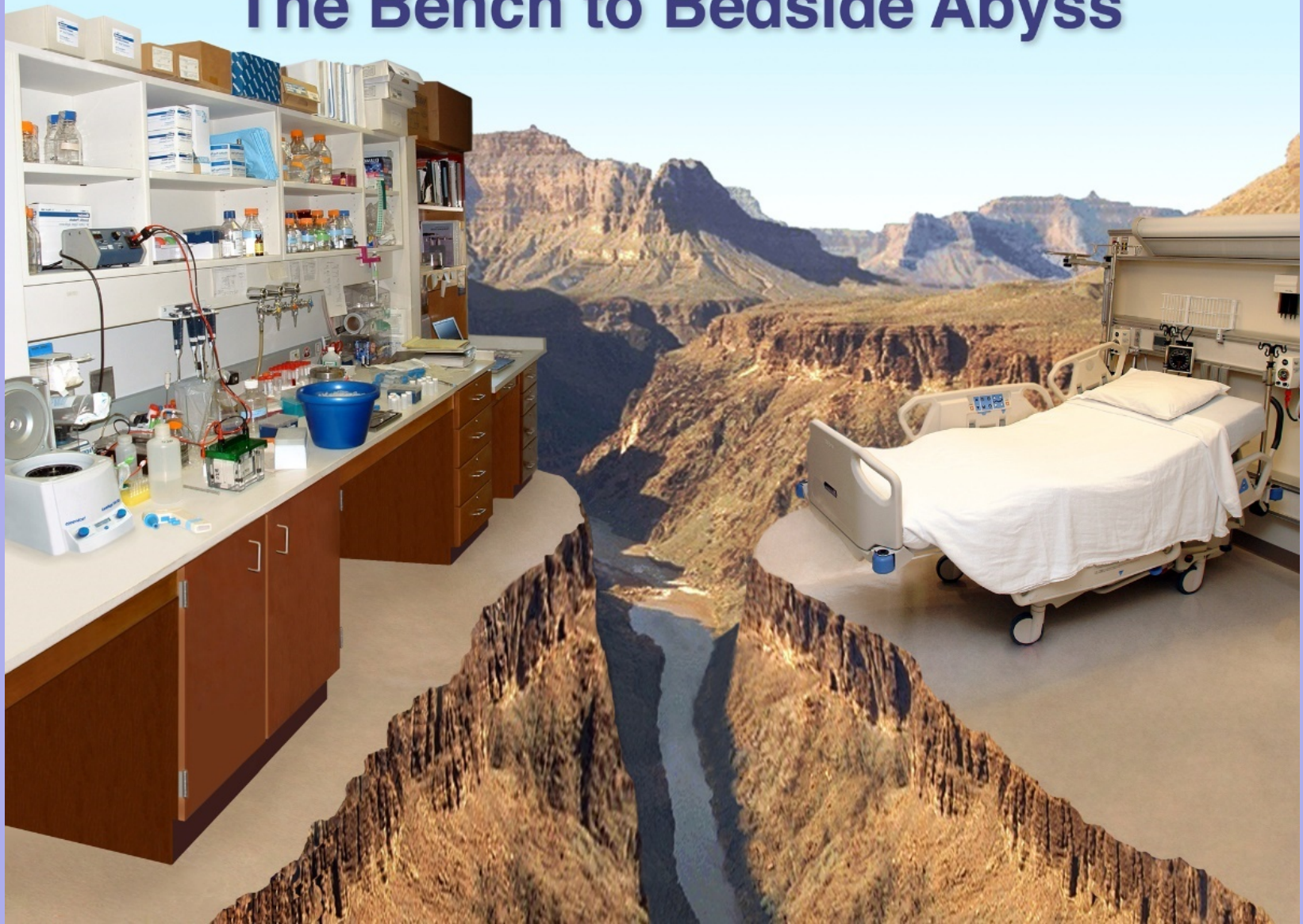
TOWER



WE ARE NOT ALONE.



The Bench to Bedside Abyss



Bench^{to}Bedside

Science Translational Medicine



SOCIETY FOR TRANSLATIONAL MEDICINE

Print ISSN 2305-5839
Online ISSN 2305-5847
Vol 4, No 4 Feb 2016

ANNALS OF TRANSLATIONAL MEDICINE

Current State of Translational Medicine

PARTNERS
Clinical Innovation
Research & Development

- 17 year innovation adoption curve from discovery into accepted standards of practice
- Lack of innovation adoption planning in the discovery process
- Even if an innovation is accepted as a standard of practice, patients have a 50:50 chance of receiving appropriate care, a 5-10% probability of incurring a preventable, anticipatable adverse event
- Adverse effect anticipation in discovery and surveillance in the trial/post-market process is inadequate
- The market is balking at healthcare inflation; new diagnostics and therapeutics will find increasing resistance for reimbursement

Science Translational Medicine

26 March 2016

Immunotherapy
Harnessing Immunity



EATRIS

European Infrastructure for
Translational Medicine



MASTER'S IN TRANSLATIONAL MEDICINE

THE CITY COLLEGE
OF NEW YORK

W.A. Schlesinger,
2010, *Science*:

Call for 'translational ecology' to
'connect end-users of
environmental science to the
field research carried out by
scientists...'

'two-way communication'

'partnership'

'relevance'



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Translational Ecology

ECOLOGY IS WELL INTO ITS SECOND CENTURY AS AN ORGANIZED SCIENTIFIC DISCIPLINE, RICH WITH observations, experiments, and a general understanding of how the natural world works. Today's environmental scientists have a powerful array of tools and techniques to measure and monitor the environment and to interpret vast and diverse data. Yet despite producing an enormous amount of new information, ecologists are often unable to convey knowledge effectively to the public and to policy-makers. Unless the discoveries of ecological science are rapidly translated into meaningful actions, they will remain quietly archived while the biosphere degrades.

Global warming, the Gulf of Mexico oil disaster, invasive species—these are but a few of the issues concerning environmental scientists and, increasingly, the public. What is needed is a new partnership between scientists and advocacy groups that conveys ecological information accurately and in ways that stakeholders (including policy-makers, resource managers, public health officials, and the general public) can understand. Just as physicians use "translational medicine" to connect the patient to new basic research, "translational ecology" should connect end-users of environmental science to the field research carried out by scientists who study the basis of environmental problems. Translational ecology requires constant two-way communication between stakeholders and scientists. It should continually alert scientists to aspects of the environment in need of study to produce new data, while clearly synthesizing what is already known from field studies and its relevance to policy. The partnership's purpose should be to ensure that all stakeholders know the implications of scientific discoveries and understand their impact on alternative ecological diagnoses.

Good examples of translational ecology involve interdisciplinary teams of scientists, engineers, public health experts, and members of the end-user community. A recent study of the environmental impacts of mountain-top-removal mining involved a collaboration between ecologists and public health experts.* Earth Justice and other nonprofit groups used this material to convince the U.S. Environmental Protection Agency (EPA) to issue new guidelines that will severely limit most such mining practices. In earlier years, research by wetland ecologists helped the EPA outline how to recognize and delineate wetlands, based on soil characteristics. Other scientists are now working with advocacy groups to help policy-makers understand the implications of human perturbations of the global nitrogen cycle. And we can be sure that scientific analysis of the impacts of deep-water petroleum extraction will also be forthcoming—in this case, unfortunately, as a retrospective.

Translational medicine grew from the recognition that basic research findings were not moving effectively into the development of drugs and treatments. To overcome this problem, in 2006 the U.S. National Institutes of Health established a Consortium for Transforming Clinical and Translational Research, which grants Clinical and Translational Science Awards. These awards have recently been increased to over \$250 million for the next 5 years, expanding the consortium to 55 institutions nationwide. Translational ecology should similarly connect the end-users of environmental science with the major funders of environmental research.

This week, the Ecological Society of America concludes its annual meeting in Pittsburgh. The world's largest international organization of ecologists can play a critical role in spurring translational ecology. It has drawn together more than 3000 scientists, policy-makers, and citizens to explore the causes and consequences of this year's theme, global warming. Many of the sessions call for ecologists to take charge and improve science education and literacy, so that issues related to global warming are not misunderstood. Connecting ecology to stakeholders in these and other ways should enhance the understanding and application of ecological concepts, ensuring that scientific rigor is brought to bear on the world's many environmental challenges.

— William H. Schlesinger

10.1126/science.1195624

*M. A. Palmer *et al.*, *Science* 327, 148 (2010).



Challenges & barriers to translational ecology

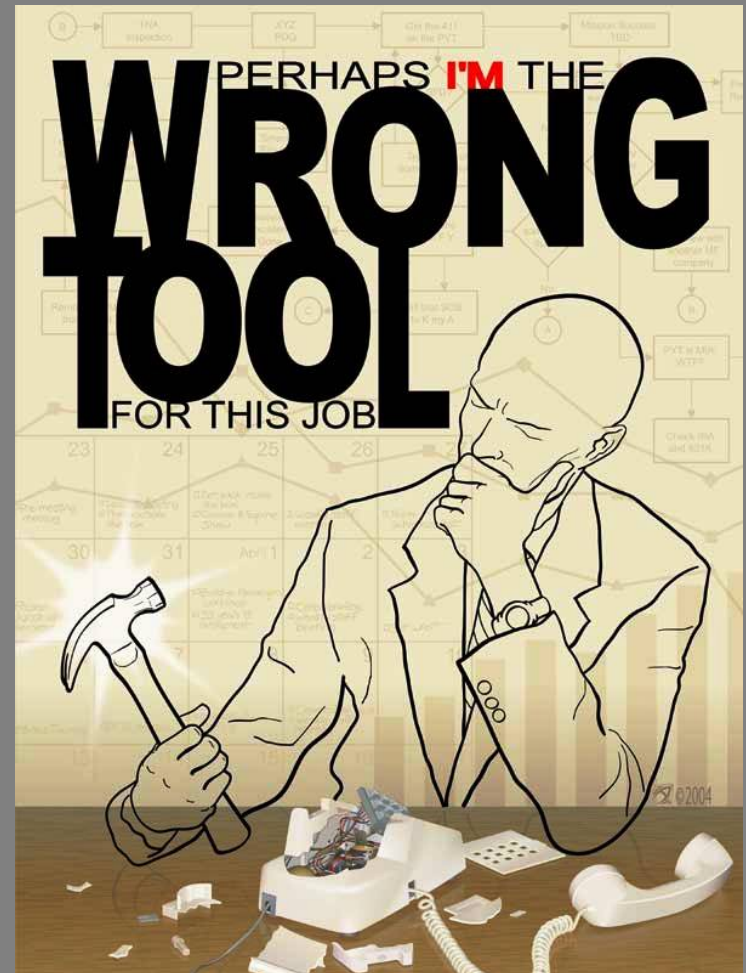


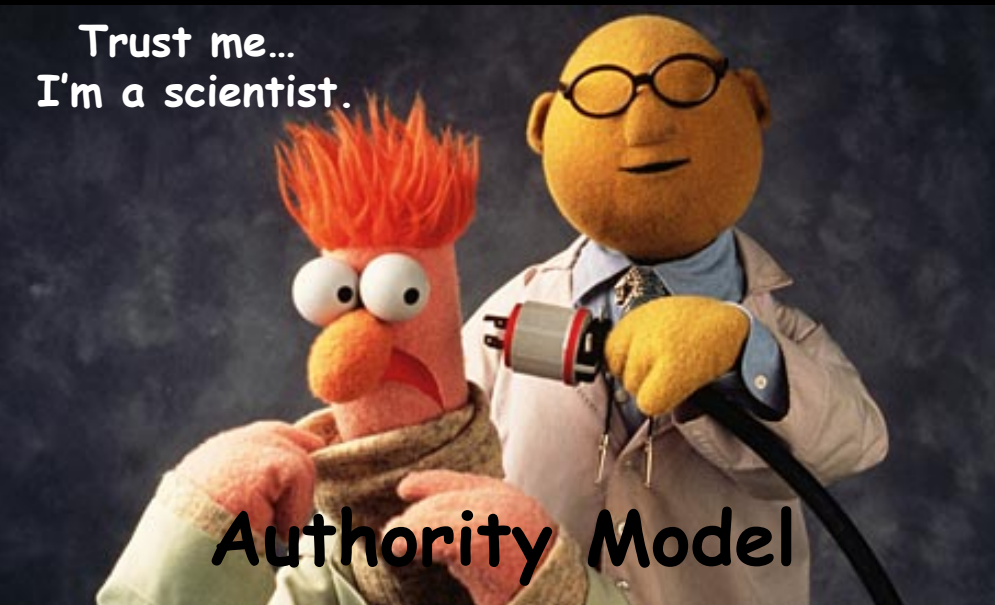
The culture of ecological science (practice and communication)



Kaplan's Law of the Instrument

“...a scientist formulates problems in a way which requires for the solution just those techniques in which he himself is particularly skilled.”





The culture of institutional rewards (tenure, promotion, retention)



Translational Ecology isn't for everyone

Honesty



Humility



Know the stakes



Listening skills



Courage



Need for boundary-spanning individuals...

'Those who can, should.'

