



# stm

INTERNATIONAL ASSOCIATION OF SCIENTIFIC, TECHNICAL & MEDICAL PUBLISHERS

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## Why hasn't the journal changed more as a result of the internet?

**Michael A Mabe**

*CEO, STM*

&

*Visiting Professor, Information Science,  
University College, London*



## Head in the sand...



*stm*

# Complacent...



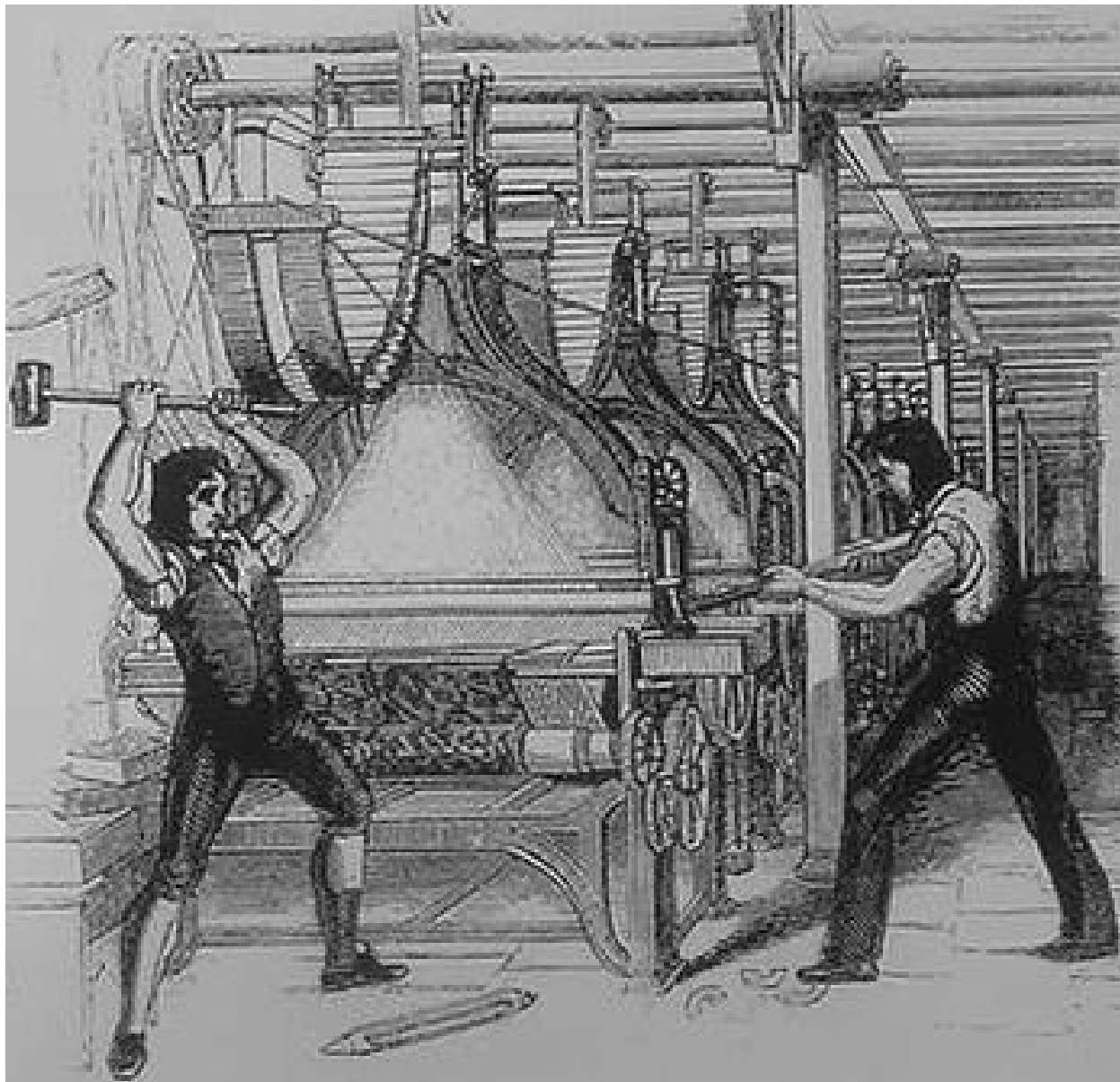
## COMPLACENCY

Complacency is the cocoon of surprise

*stm*

MDK 437  
BUSINESS SOLUTIONS

# Luddite...



*stm*

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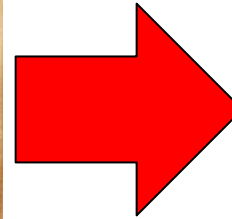
# Not alone in wondering why not much change...

- Michael Clarke
  - *Scholarly Kitchen* 4 Jan 2010
    - Why hasn't scientific publishing been disrupted more?
- Joe Esposito
  - Posts and articles (*Logos* **21.13-19**, 2010)
    - Publishing After the Apocalypse
- Geoff Bilder
  - Presentations
    - Digital Incunabula

# The Digital Incunabula Argument

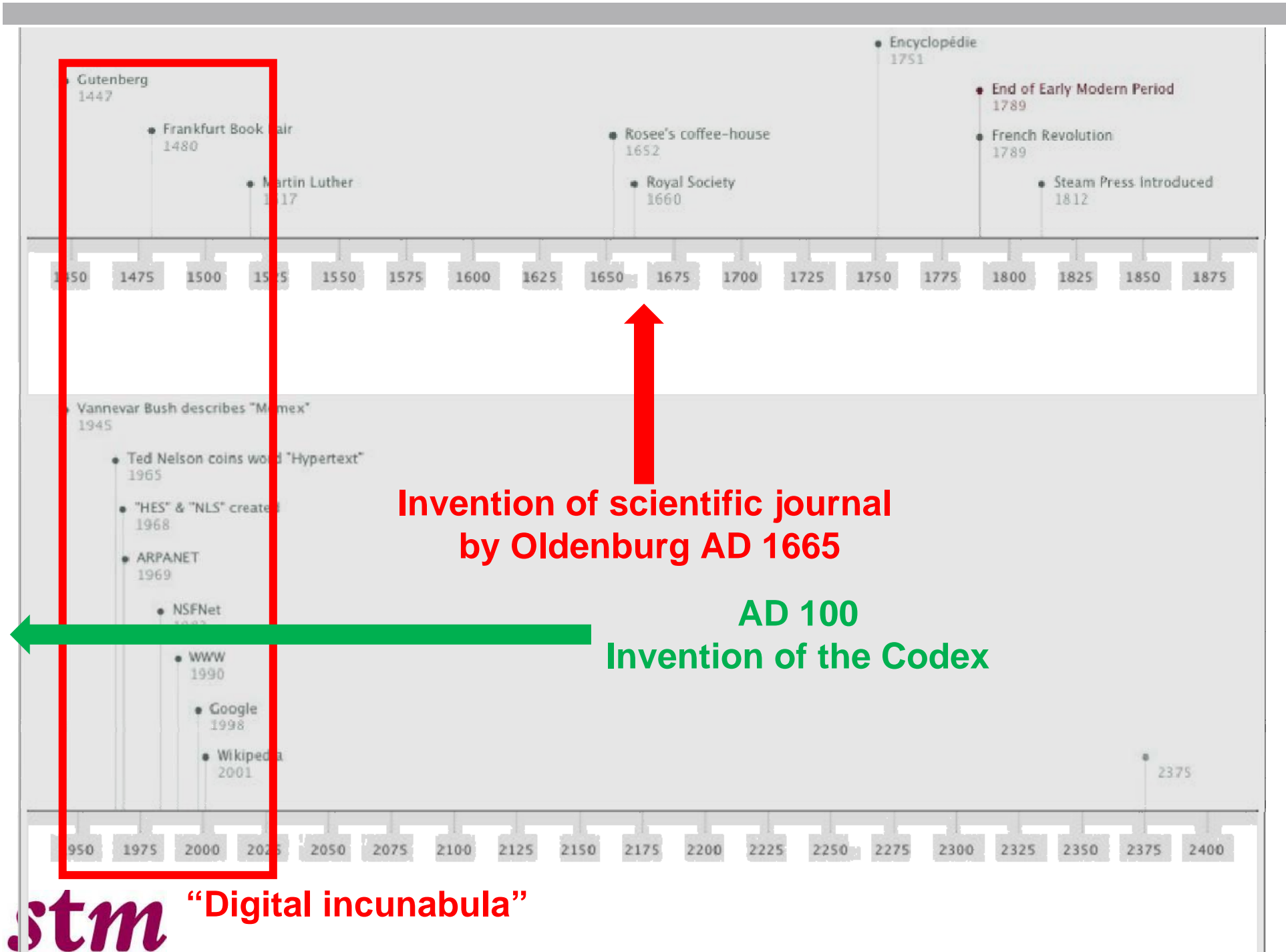


Pre 1450:  
hand written illuminated mss



Post 1450: incunabulum  
printed book with hand  
Illumination (Gutenberg Bible)

*stm*



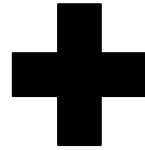
**stm** "Digital incunabula"

*Pre-Classical and Classical*



Scrolls

*continuous linear access*



*Classical*



Wax tablet note books

*random access*

Late antiquity and mediaeval



Codex: manuscript book

*random access*



# First revolution



- Scrolls:
  - Linear, continuous

First reason for lack of change:

“Pages” and “book structure” are deeply embedded in the culture of reading and are reader friendly

Two millenia of habit and utility take some undoing

Even when all file types are offered (and they mostly are) downloads of PDFs predominate



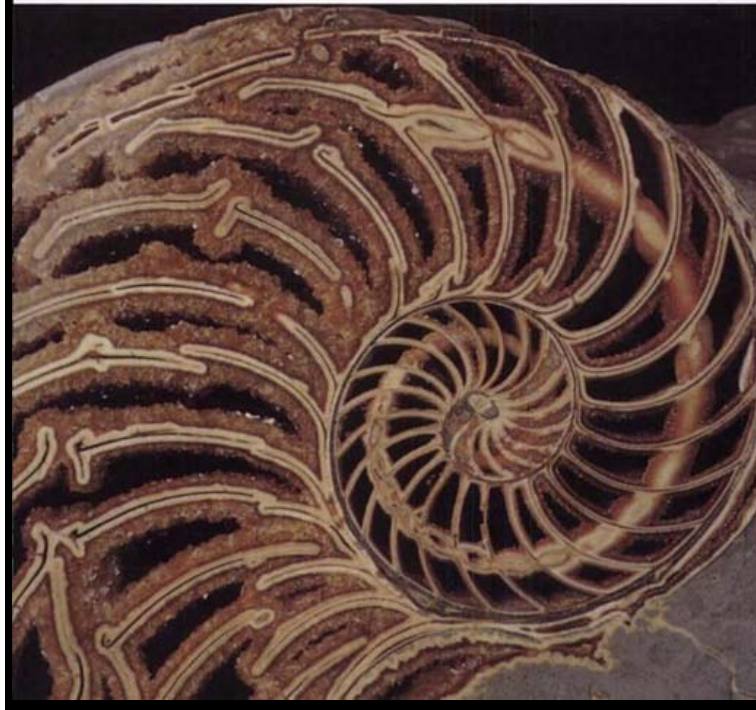
ss

- Pages

*stm*

# On Growth and Form

D'ARCY THOMPSON



**Prof. Sir D'Arcy Wentworth  
Thompson**

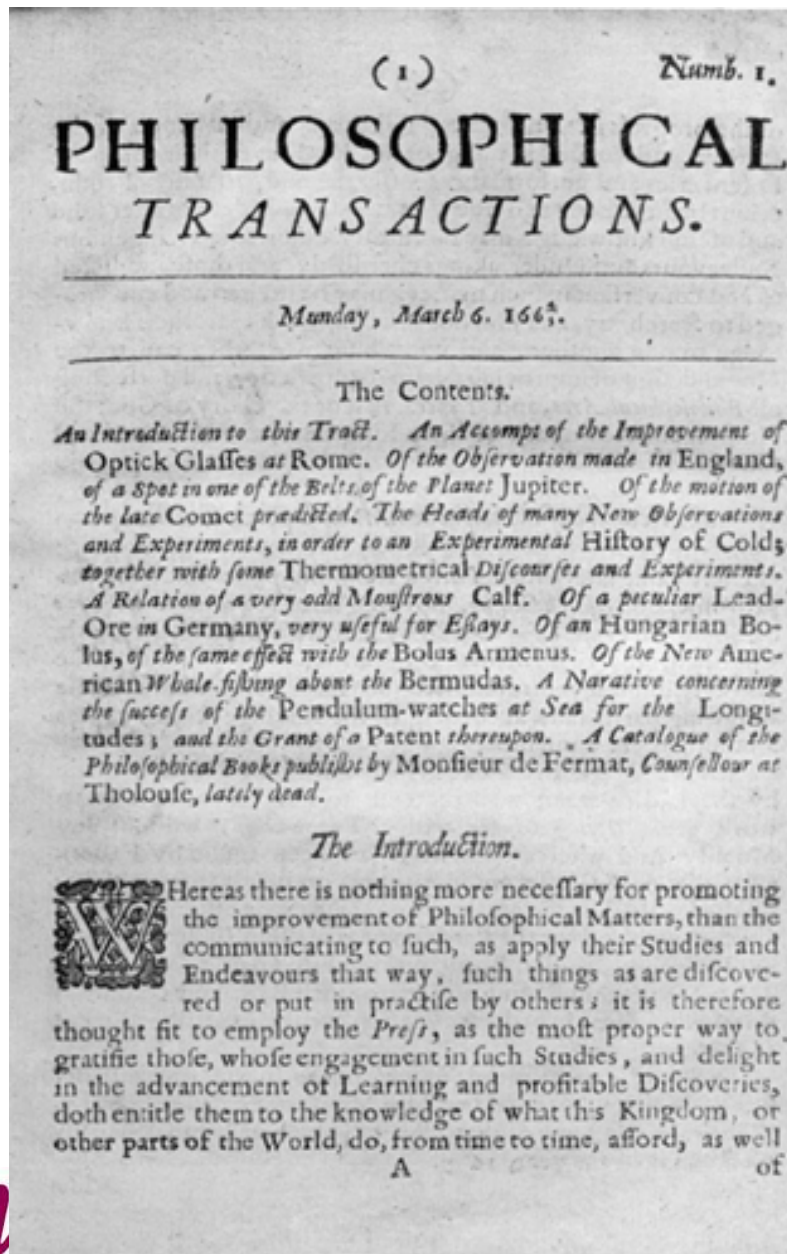
***On Growth and Form***

First Published 1917



***stm***

From this...



stm

...to this

Downloaded from [rsta.royalsocietypublishing.org](http://rsta.royalsocietypublishing.org) on 15 June 2009

PHILOSOPHICAL  
TRANSACTIONS  
—OF—  
THE ROYAL  
SOCIETY

Phil. Trans. R. Soc. A (2009) 367, 2717–2727  
doi:10.1098/rsta.2009.0027

REVIEW

## Information security: where computer science, economics and psychology meet

By ROSS ANDERSON<sup>1,\*</sup> AND TYLER MOORE<sup>2</sup>

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<sup>2</sup>Center for Research on Computation and Society, Harvard University, 33 Oxford Street, Cambridge, MA 02138, USA

Until ca. 2000, information security was seen as a technological discipline, based on computer science but with mathematics helping in the design of ciphers and protocols. That perspective started to change as researchers and practitioners realized the importance of economics. As distributed systems are increasingly composed of machines that belong to principals with divergent interests, incentives are becoming as important to dependability as technical design. A thriving new field of information security economics provides valuable insights not just into 'security' topics such as privacy, bugs, spam and phishing, but into more general areas of system dependability and policy. This research programme has recently started to interact with psychology. One thread is in response to phishing, the most rapidly growing form of online crime, in which fraudsters trick people into giving their credentials to bogus websites; a second is through the increasing importance of security usability; and a third comes through the psychology-and-economics tradition. The promise of this multidisciplinary research programme is a novel framework for analysing information security problems—one that is both principled and effective.

Keywords: information security; economics; incentives; psychology

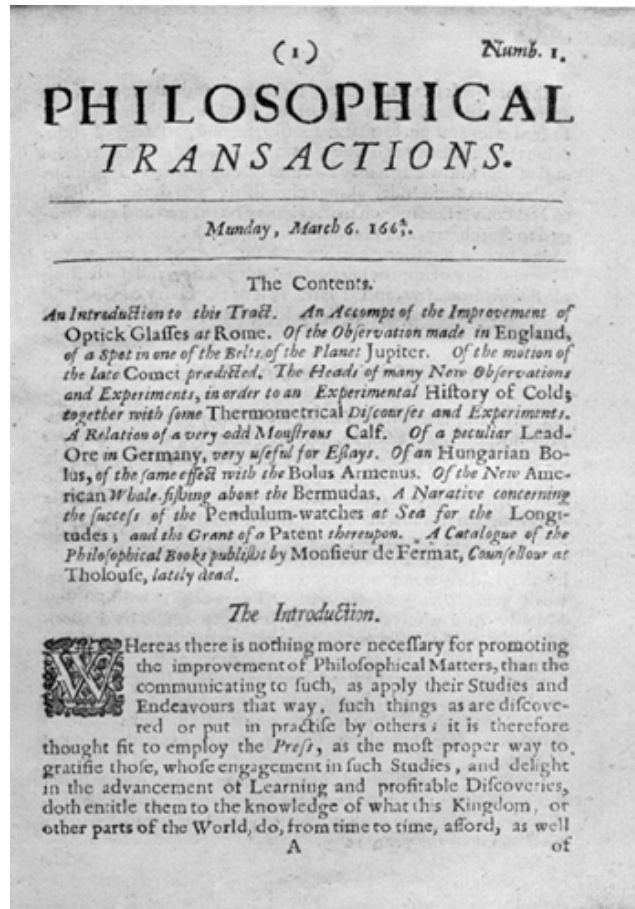
### 1. Introduction

As the Internet has grown, system engineers have realized that security failure is caused at least as often by bad incentives as by bad design. Indeed, the former often explain the latter. Systems are particularly prone to failure when the person operating them does not suffer the full costs of failure. Things also break when system users have conflicting interests, or even just no real reason to cooperate. Thus, while security engineers used to worry about malicious outsiders, the greatest concern now is selfish insiders. As a result, the tools of game theory and microeconomic theory are becoming just as important to the security engineer as the mathematics of cryptography.

\* Author for correspondence ([ross.anderson@cl.cam.ac.uk](mailto:ross.anderson@cl.cam.ac.uk)).

One contribution of 16 to a Theme Issue 'Crossing boundaries: computational science, e-Science and global e-Infrastructure II. Selected papers from the UK e-Science All Hands Meeting 2008'.

# From this...



No article structure

stm

# ...to this...

### Lamination microstructure in shear deformed copper single crystals

Olga Dmitrieva<sup>a</sup>, Patrick W. Dond<sup>b</sup>, Stefan Müller<sup>b</sup> and Dierk Raabe<sup>a</sup>

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<sup>b</sup>Hausdorff Center for Mathematics and Institute for Applied Mathematics, University Bonn, Endenicher Allee 60, D-53115 Bonn, Germany

Received 10 November 2008; revised 14 March 2009; accepted 19 March 2009. Available online 8 May 2009.

#### Abstract

We investigate the formation of microscopic patterns in a copper single crystal deformed in a shear experiment. Using high-resolution electron backscatter diffraction imaging, we find a band-like microstructure consisting of confined areas in the sample with rotated lattice. Digital image correlation allows us to exactly determine the macroscopic state of deformation of the sample. This data can be used as a side condition to calculate the lamination parameters from the theory of kinematically compatible lamination of separate material regions, each deforming in single slip. The parameters given by the theory agree with the measured properties, i.e. a lattice rotation of 3° and a lamination normal rotated 7° counterclockwise from a  $\langle 111 \rangle$  direction.

**Keywords:** Plasticity; Microstructure; Laminates; Single crystals; Digital image correlation

#### Article Outline

- 1. Introduction
- 2. Experiments
  - 2.1. Sample preparation and shear experiments
  - 2.2. Digital image correlation method
  - 2.3. Structural characterization using high-resolution EBSD
  - 2.4. FEM
- 3. Experimental and FEM results
  - 3.1. Deformation of the single-crystal sample
  - 3.2. Structural characterization of the deformed sample
    - 3.2.1. BSE overview imaging
    - 3.2.2. EBSD characterization
    - 3.2.3. High-resolution EBSD
    - 3.2.4. BSE imaging of the microbands
  - 3.3. Crystal plasticity finite-element simulation of the shear experiment
- 4. Energy minimizing microstructure
  - 4.1. Loss of convexity and formation of microstructure
  - 4.2. Piecewise affine deformations
  - 4.3. A lamination microstructure accommodating the measured macroscopic boundary values
- 5. Conclusions

Acknowledgements  
References

#### 1. Introduction

Many studies on the behavior of metals under stress aim at understanding the evolution of plastic deformation. Since plastic behavior of materials is the result of the interaction of lattice defects at several length scales, the overall macroscopic properties are strongly influenced by the formation of internal microstructures. The main concern of this work is to obtain a better understanding of deformation patterning phenomena in plasticity, particularly regarding the formation of

Highly structured

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# Fundamental needs of researchers (I)

## AUTHOR MODE

- To be ***seen*** to report an idea ***first***
- To feel ***secure*** in communicating that idea
- [For empirical disciplines] To ***persuade*** readers that their results are general and arise from enactment of the scientific method
- To have their claim ***accepted*** by peers
- To ***report*** their idea to the ***right audience***
- To get ***recognition*** for their idea
- To have a permanent ***public record*** of their work

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## Fundamental Needs of Researchers (II)

### READER MODE

- To *identify* relevant content
- To *select* based on *trust* and *authority*
- To *locate* and *consume* it
- To *cite* it
- To be sure it is *final* and *permanent*

## Functions of the journal à la Oldenburg



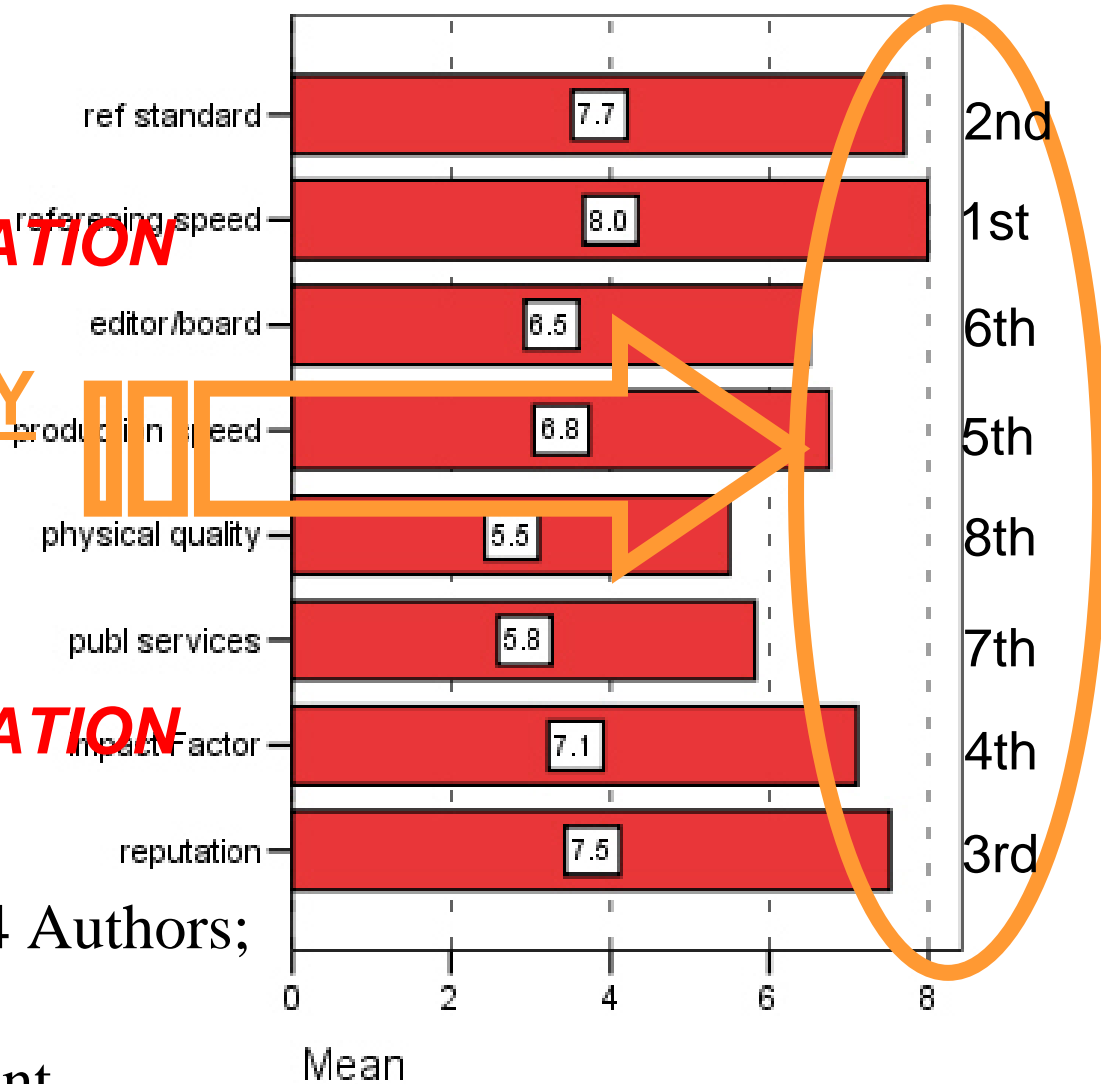
# Evidence of researcher needs

**CERTIFICATION**

**QUALITY  
&  
SPEED**

**REGISTRATION**

Data from 63,384 Authors;  
0= unimportant  
10= very important

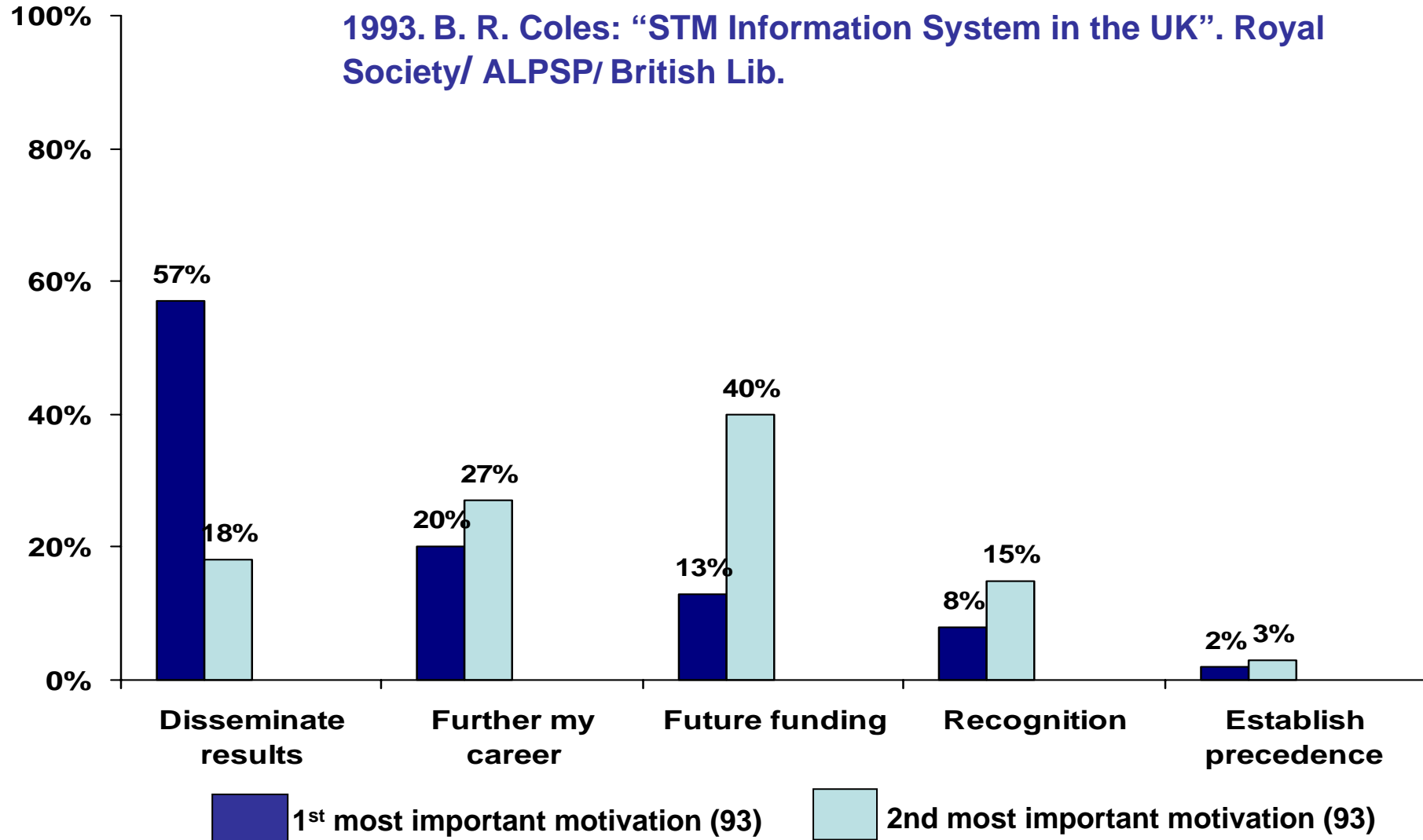


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# Motivations for Publishing

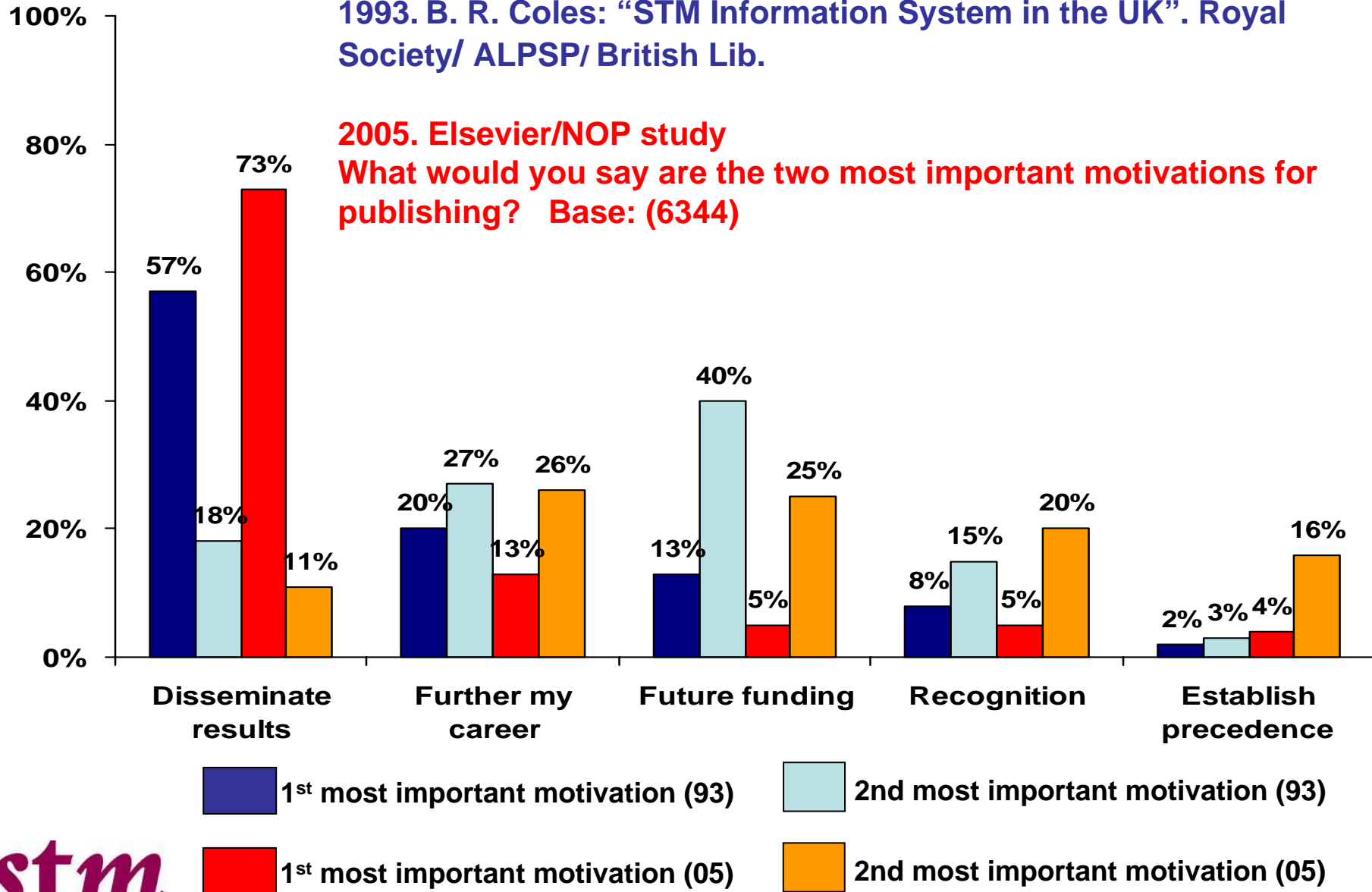
1993. B. R. Coles: "STM Information System in the UK". Royal Society/ ALPSP/ British Lib.



# Motivations for Publishing

1993. B. R. Coles: "STM Information System in the UK". Royal Society/ ALPSP/ British Lib.

2005. Elsevier/NOP study  
 What would you say are the two most important motivations for publishing? Base: (6344)



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# Similarities

- Form follows function...
  - ... and function follows *need*
- At fundamental level
  - researcher human needs change little over time...
    - ... so functions remain constant
    - ... and gross form remains stable

# Example from 15 March 2012

OPEN ACCESS Freely available online



## Cryptic Diversity in Indo-Pacific Coral-Reef Fishes Revealed by DNA-Barcoding Provides New Support to the Centre-of-Overlap Hypothesis

Nicolas Hubert<sup>1,2\*</sup>, Christopher P. Meyer<sup>3</sup>, Henrich J. Bruggemann<sup>1</sup>, Fabien Guérin<sup>4</sup>, Roberto J. L. Komeno<sup>5</sup>, Benoit Espiau<sup>2</sup>, Romain Causse<sup>6</sup>, Jeffrey T. Williams<sup>7</sup>, Serge Planes<sup>2</sup>

**1** Laboratoire ECOMAR, Faculté des Sciences et Technologies, Université de La Réunion, Saint-Denis, Réunion, France, **2** CNRS-EPHE, CRIOBE – CBETM, Université de Perpignan Via Domitia, Perpignan, France, **3** Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C., United States of America, **4** UMR PVBMT, Faculté des Sciences et Technologies, Université de La Réunion, Saint-Denis, Réunion, France, **5** Institut Halieutique et des Sciences Marines, Université de Toliara, Toliara, Madagascar, **6** Département Milieux et Peuplements Aquatiques, Muséum National d'Histoire Naturelle, Paris, France, **7** Department of Vertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C., United States of America

### Abstract

Diversity in coral reef fishes is not evenly distributed and tends to accumulate in the Indo-Malay-Philippines Archipelago (IMPA). The comprehension of the mechanisms that initiated this pattern is in its infancy despite its importance for the conservation of coral reefs. Considering the IMPA either as an area of overlap or a cradle of marine biodiversity, the hypotheses proposed to account for this pattern rely on extant knowledge about taxonomy and species range distribution. The recent large-scale use of standard molecular data (DNA barcoding), however, has revealed the importance of taking into account cryptic diversity when assessing tropical biodiversity. We DNA barcoded 2276 specimens belonging to 668 coral reef fish species through a collaborative effort conducted concomitantly in both Indian and Pacific oceans to appraise the importance of cryptic diversity in species with an Indo-Pacific distribution range. Of the 141 species sampled on each side of the IMPA, 62 presented no spatial structure whereas 67 exhibited divergent lineages on each side of the IMPA with K2P distances ranging between 1% and 12%, and 12 presented several lineages with K2P distances ranging between 3% and 22%. Thus, from this initial pool of 141 nominal species with Indo-Pacific distribution, 79 dissolved into 165 biological units among which 162 were found in a single ocean. This result is consistent with the view that the IMPA accumulates diversity as a consequence of its geological history, its location on the junction between the two main tropical oceans and the presence of a land bridge during glacial times in the IMPA that fostered allopatric divergence and secondary contacts between the Indian and Pacific oceans.

**Citation:** Hubert N, Meyer CP, Bruggemann HJ, Guérin F, Komeno R JL, et al. (2012) Cryptic Diversity in Indo-Pacific Coral-Reef Fishes Revealed by DNA-Barcoding Provides New Support to the Centre-of-Overlap Hypothesis. PLoS ONE 7(3): e28987. doi:10.1371/journal.pone.0028987

**Editor:** Vincent Laudet, Ecole Normale Supérieure de Lyon, France

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# Example from 14 November 1985

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LETTERS

NATURE VOL. 318 14 NOVEMBER 1985

## **C<sub>60</sub>: Buckminsterfullerene**

**H. W. Kroto\*, J. R. Heath, S. C. O'Brien, R. F. Curl  
& R. E. Smalley**

Rice Quantum Institute and Departments of Chemistry and Electrical Engineering, Rice University, Houston, Texas 77251, USA

During experiments aimed at understanding the mechanisms by which long-chain carbon molecules are formed in interstellar space and circumstellar shells<sup>1</sup>, graphite has been vaporized by laser irradiation, producing a remarkably stable cluster consisting of 60 carbon atoms. Concerning the question of what kind of 60

Received 13 September; accepted 18 October 1985.

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## Form *follows* function

- Relatively short articles
- Author names prominent
- Dates of submission, acceptance, publication present
- Registration, certification, dissemination and archive achieved simultaneously via the act of formal publication
- Branded by journal title

# Form & Function: Micro Level

Szostak *Journal of Systems Chemistry* 2012, 3:2  
<http://www.jsystchem.com/content/3/1/2>



**PERSPECTIVES** **Open Access**

## The eightfold path to non-enzymatic RNA replication

Jack W Szostak

Registration

**Abstract**

The first RNA World models were based on the concept of an RNA replicase - a ribozyme that was a good enough RNA polymerase that it could catalyze its own replication. Although several RNA polymerase ribozymes have been evolved *in vitro*, the creation of a true replicase remains a great experimental challenge. At first glance the alternative, in which RNA replication is driven purely by chemical and physical processes, seems even more challenging, given that so many unsolved problems appear to stand in the way of repeated cycles of non-enzymatic RNA replication. Nevertheless the idea of non-enzymatic RNA replication is attractive, because it implies that the first heritable functional RNA need not have improved replication, but could have been a metabolic ribozyme or structural RNA that conferred any function that enhanced protocell reproduction or survival. In this review, I discuss recent findings that suggest that chemically driven RNA replication may not be completely impossible.

**Keywords:** Non-enzymatic replication, RNA World, protocell, origin of life, prebiotic chemistry, fidelity

Navigation

Whole article:  
archive

**Acknowledgements**  
I thank Niam Prywes, Aaron Englehart, Matt Powner, Anders Bjorkbom, Irene Chen and Itay Budin for helpful comments on the manuscript, and all of the current and former members of my laboratory for helpful discussions.

**Competing Interests**  
The authors declare that they have no competing interests.

Received: 23 November 2011 Accepted: 3 February 2012  
Published: 3 February 2012

### References

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27. Budin I, Szostak JW: Physical effects underlying the transition from primitive to modern cell membranes. *Proc Natl Acad Sci USA* 2011, 108:5249-5254.
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Registration &  
Certification

Navigation

stn



# Generational Change?

Second reason for lack of change:

Fundamental needs of researchers are remarkably static, with little change as a result of digitisation

These needs are like evolutionary selection pressure

When animals fit an unchanging niche they hardly change

There are NEW tools but they serve OLD purposes

“When I was a child, I spake as a child...: but when I became a man, I put away childish things.”

— *Corinthians 13:11*

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# Information Ecology

- Communication Niches
  - Mode
    - 1:1, 1:many, many:many
  - Directionality
    - unidirectional, interactive
  - Delivery regime
    - oral, written
  - Temporality
    - Live or recorded
  - Register:
    - private, public, informal, formal
  - Enhancement:
    - local, at a distance

# Information Ecology: Talk Niche

- Case of an oral presentation (like this!)
  - Mode: one-to-many
  - Directionality: unidirectional (except for Q&A)
  - Delivery regime: oral
  - Temporality: live
  - Register: public, formal
  - Enhancement: in the lecture hall none
    - but technology allows development to “at a distance”
      - *broadcast*, but reduced directionality
      - *webcast*, no reduced directionality

Delivery	Mode	Instances
		<i>Local</i>

Third reason for lack of change:

There are only so many information niches

**Oral**

Each one is occupied by communication instances which are not changed by technology merely enhanced

Little change in human senses: most options remain  
 READ, WRITE, SPEAK, LISTEN

**Written**

many.many

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# Future Change

- Formal scholarly publishing system has evolved to satisfy
  - Human needs of researchers
  - Philosophical requirements of knowledge generation...and to occupy its
  - Information ecological niches
- Needs and niches are relatively constant over time
- Conservatism of form reflects this constancy
- Technology enables greater efficiency
  - New tools, but *new* tools for *old* purposes

# Independent evolution of the eye

