ZNANSTVENO IZDAVAŠTVO

U KONTEKSTU OTVORENOSTI, KORISNOSTI I UPOTREBLJIVOSTI

Jadranka Stojanovski
Sveučilište u Zadru / Institut Ruđer Bošković

INTERNET U STVARNOM VREMENU ILI KOJOM SE BRZINOM GENERIRAJU PODACI

1665

Journal des Scavans (Paris) i Philosophical Transactions of the Royal Society (London)

Henry Oldenburg

"That it may be the more evident to you that the humanities and science are not yet banished from among us by the clash of arms, I am writing to tell you that a certain most ingenious person here, named *Leewenhoeck*, has devised microscopes which far surpass those which we have hitherto seen, manufactured by Eustachio Divini and others. The enclosed letter from him, wherein he describes certain things which he has observed more accurately than previous authors, will afford you a sample of his work : and if it please you, and you would test the skill of this most diligent man and give him encouragement, then pray send him a letter containing your suggestions, and proposing to him more difficult problems of the same kind".

Tho[s]

For my honoured friend Mr Henry Oldenburg

To be left with Mr Martin Stationer at ye Bell in Pauls Church-yard or without Temple barr

Rec. Febr. 2. 70/71

Answ. Feb. 4.

London

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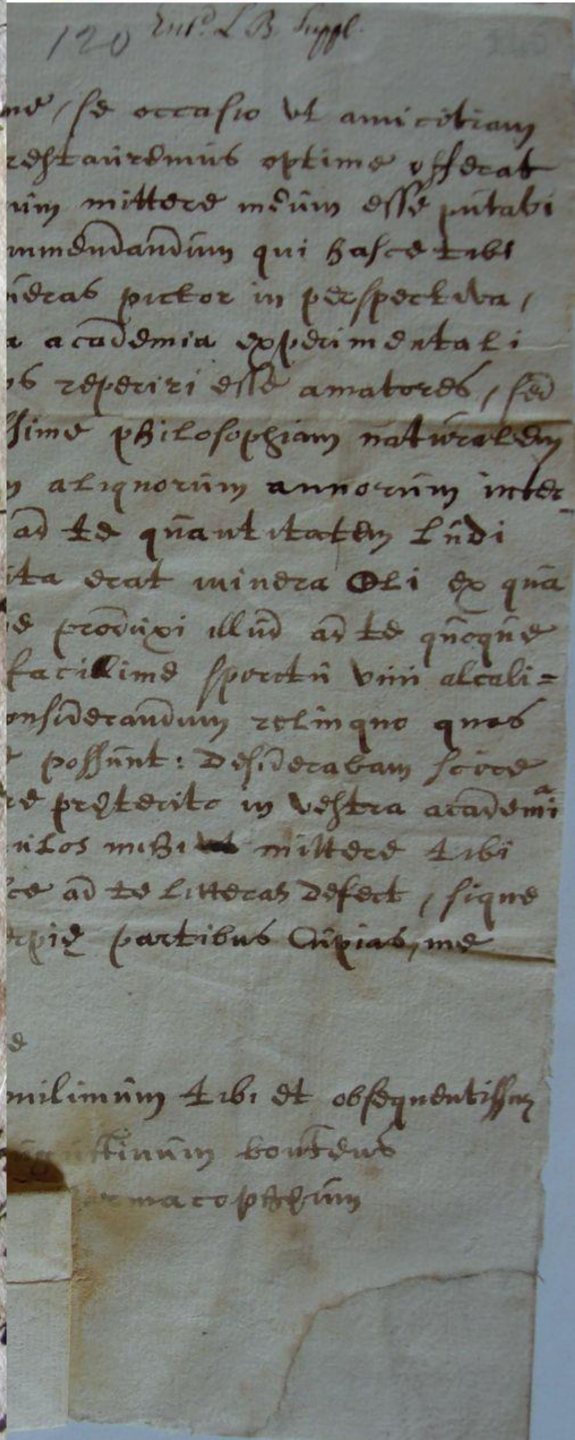

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...militimum tibi et obsequentissim

...ugustinum bouteus

...armacopaeum

Phil. Trans. R. Soc. Lond. B **326**, 535–553 (1990)
Printed in Great Britain

Protein structure and function at low temperatures†

By R. Jaenicke

Institut für Biophysik und Physikalische Biochemie, Universität Regensburg, D-8400 Regensburg, F.R.G.

Proteins represent the major components in the living cell that provide the whole repertoire of constituents of cellular organization and metabolism. In the process of evolution, adaptation to extreme conditions mainly referred to temperature, pH and low water activity. With respect to life at low temperatures, effects on protein structure, protein stability and protein folding need consideration.

The sequences and topologies of proteins from psychrophilic, mesophilic and thermophilic organisms are found to be highly homologous. Commonly, adaptive changes refer to multiple alterations of the amino acid sequence, which presently cannot be correlated with specific changes of structure and stability; so far it has not been possible to attribute specific increments in the free energy of stabilization to well-defined amino-acid exchanges in an unambiguous way.

The stability of proteins is limited at high *and* low temperatures. Their expression and self-organization may be accomplished under conditions strongly deviating from optimum growth conditions. Molecular adaptation to extremes of temperature seems to be accompanied by a flattening of the temperature profile of the free energy of stabilization. In principle, the free energy of stabilization of proteins is small compared to the total molecular energy. As a consequence, molecular adaptation to extremes of physical conditions only requires marginal alterations of the intermolecular interactions and packing density. Careful statistical and structural analyses indicate that altering the number of ion pairs and hydrophobic interactions allows the flexibility of proteins to be adjusted so that full catalytic function is maintained at varying temperatures.

1. Introduction

Proteins as the major components of the living cell provide the basic elements of cellular organization and metabolism. Their structure–function relation is generally assumed to be optimized with respect to the physical conditions characteristic for the natural biotope. Adaptation to extreme conditions during evolution mainly refers to temperature, pH and low water activity (Jaenicke 1981). Low water activity and extremes of pH do not necessarily require molecular adaptation of the cellular inventory as avoidance may take the place of adaptation; for example high salinity or a pH value less than 1 or greater than 11 may be compensated by compatible solutes or proton pumps. In the case of temperature, it is evident that cells are more or less isothermal with respect to their environment. As a consequence, both psychrophiles and thermophiles have to adapt their cell inventory to their respective set of conditions. Strategies promoting thermal stability of proteins have been investigated for many years. The outcome is that in the native state of functional proteins, stabilizing and destabilizing interactions more or less balance each other so that no general mechanism of temperature adaptation can be put forward. Adaptation at the protein level may be

† Dedicated to Professor Hans Neurath on the occasion of his eighteenth birthday.

he Triumph over the Most Terrible of the f Death

ID, and Pere Domingo, MD

s ago, Edward Jenner performed an the foundation for the eradication of rmed humankind's fight against dis- ted humankind as no other disease ence and diffusion were without par- ought down at least three empires. d helplessly as their children suc- e or were disfigured or blinded by it. to contain smallpox by isolating its by using variolation with varying de- vever, the definitive solution was not work was done at the end of the 18th who had developed cowpox from con- rs informed Jenner that they were uman form of the disease; he listened and raised it to the status of scientific discover vaccination, but he was the that this technique offered a reliable llpox. It was also a reliable defense s, such as poliomyelitis, measles, and hough this was not known in Jenner's

lable at http://www.acponline.org.

7:635-642.

icia Primària Gràcia, Institut Català de la la Santa Creu i Sant Pau, Barcelona, ior addresses, see end of text.

ays present, filling the churchyard enting with constant fear all whom it en, leaving on those whose lives it as traces of its power, turning the ling at which the mother shuddered, eyes and cheeks of the betrothed horror to the lover (1).

en one of humankind's greatest time immemorial. Even illnesses plague, cholera, and yellow fever a universal and persistent impact. ed to have appeared at the time tural settlements in northeastern 000 BC (2). It probably spread dia by means of Egyptian mer- millennium BC (3). The earliest sions resembling those of small- faces of mummies from the time h Egyptian Dynasties (1570 to 1085 BC) and in the well-preserved mummy of Ramses V, who died as a young man in 1157 BC (4–6).

The first recorded smallpox epidemic occurred in 1350 BC during the Egyptian–Hittite war. The illness was passed to the Hittite population by Egyptian prisoners and affected soldiers and civilians alike. The Hittite King Suppiluliumas I and his heir, Arnuwandas, were victims; their civilization fell into sharp decline (2).

During the epidemic in Athens in 430 BC, Thucydides noted that those who survived the disease were later immune to it (7). These observations were reiterated by Rhazes (Abu Bakr Muhammad Ibn Zakariya al-Razi), to whom we owe the first medical description of smallpox, *De variolis et morbillis commentarius*, which was written in about AD 910. Rhazes also noted that the illness was transmitted from person to person (8). His explanation of why survivors of smallpox do not develop the disease a second time is the first theory of acquired immunity.

The Fall of Empires: Variola Rex and the Course of History

Smallpox greatly affected the development of western civilization. The first stages of the decline of the Roman Empire, around AD 180, coincided with a large-scale epidemic: the plague of Antonine, which killed between 3.5 and 7 million persons (9, 10). The Arab expansion, the Crusades, and the discovery of the West Indies all contributed to the spread of the illness. Unknown in the New World, smallpox was introduced by Spanish and Portuguese conquistadors. It decimated the local population and was instrumental in the fall of the empires of the Aztecs and the Incas. When the Spanish arrived in 1518, Mexico had about 25 million inhabitants; by 1620, this number had diminished to 1.6 million (11). A similar decrease occurred on the eastern coast of what became the United States, where the advent of smallpox had disastrous consequences for the native population (12), and the disease continued to be spread through the relentless process of European colonization (13). The devastating effect of smallpox gave rise to one of the first examples of biological warfare. In a letter written to Colonel Henry Bouquet in 1763, Sir Jeffrey Amherst, com-

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PHILOSOPHICAL TRANSACTIONS: GIVING SOME ACCOMPT OF THE PRESENT Undertakings, Studies, and Labours OF THE INGENIOUS IN MANY CONSIDERABLE PARTS OF THE WORLD.

Vol I.

For *Anno* 1665, and 1666.

In the *SAVOY*,
Printed by *T. N.* for *John Martyn* at the Bell, a little without *Temple-Bar*, and *James Allestry* in *Duck-Lane*, Printers to the *Royal Society*.

PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

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In this Issue

The social network and communicative complexity in animals

Papers of a Theme Issue organized and edited by Todd M. Freeberg, Robin I. M. Dunbar and Terry J. Ord

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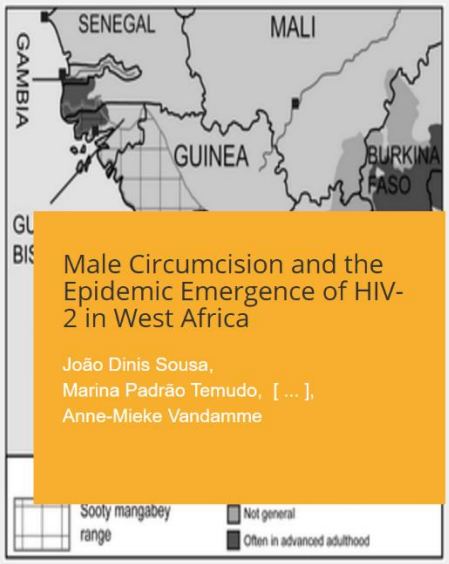
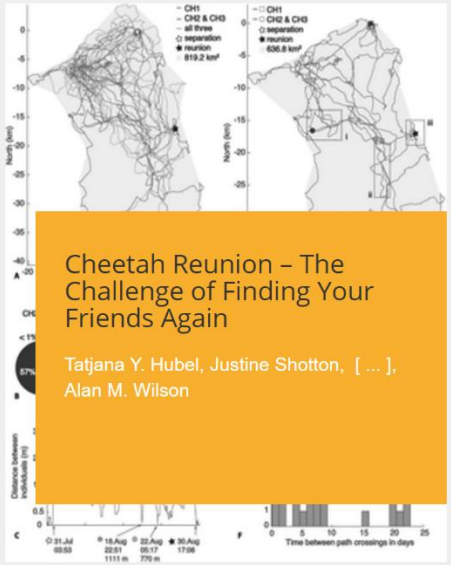


Male Circumcision and the Epidemic Emergence of HIV-2 in West Africa

João Dinis Sousa, Marina Padrão Temudo, [...], Anne-Mieke Vandamme



Cheetah Reunion – The Challenge of Finding Your Friends Again

Tatjana Y. Hubel, Justine Shotton, [...], Alan M. Wilson

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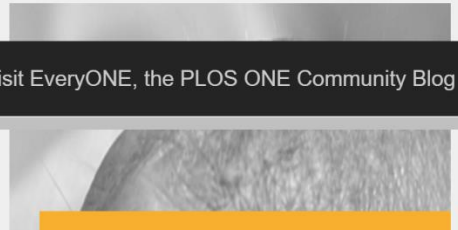

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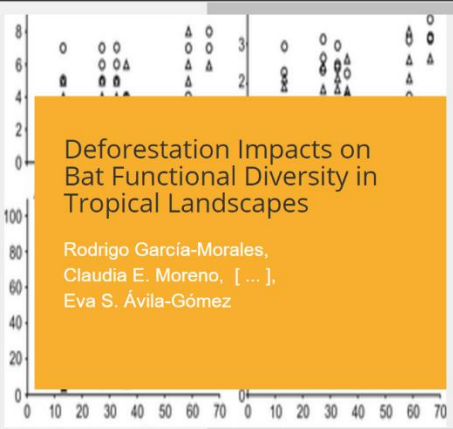
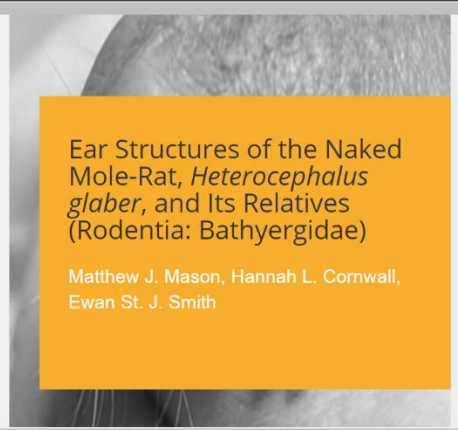


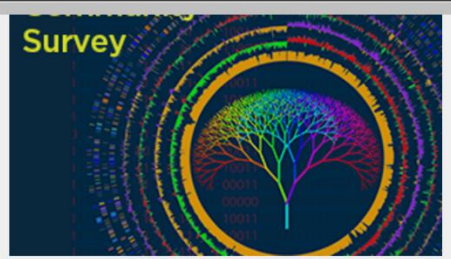
Deforestation Impacts on Bat Functional Diversity in Tropical Landscapes

Rodrigo García-Morales, Claudia E. Moreno, [...], Eva S. Ávila-Gómez



Ear Structures of the Naked Mole-Rat, *Heterocephalus glaber*, and Its Relatives (Rodentia: Bathyergidae)

Matthew J. Mason, Hannah L. Cornwall, Ewan St. J. Smith



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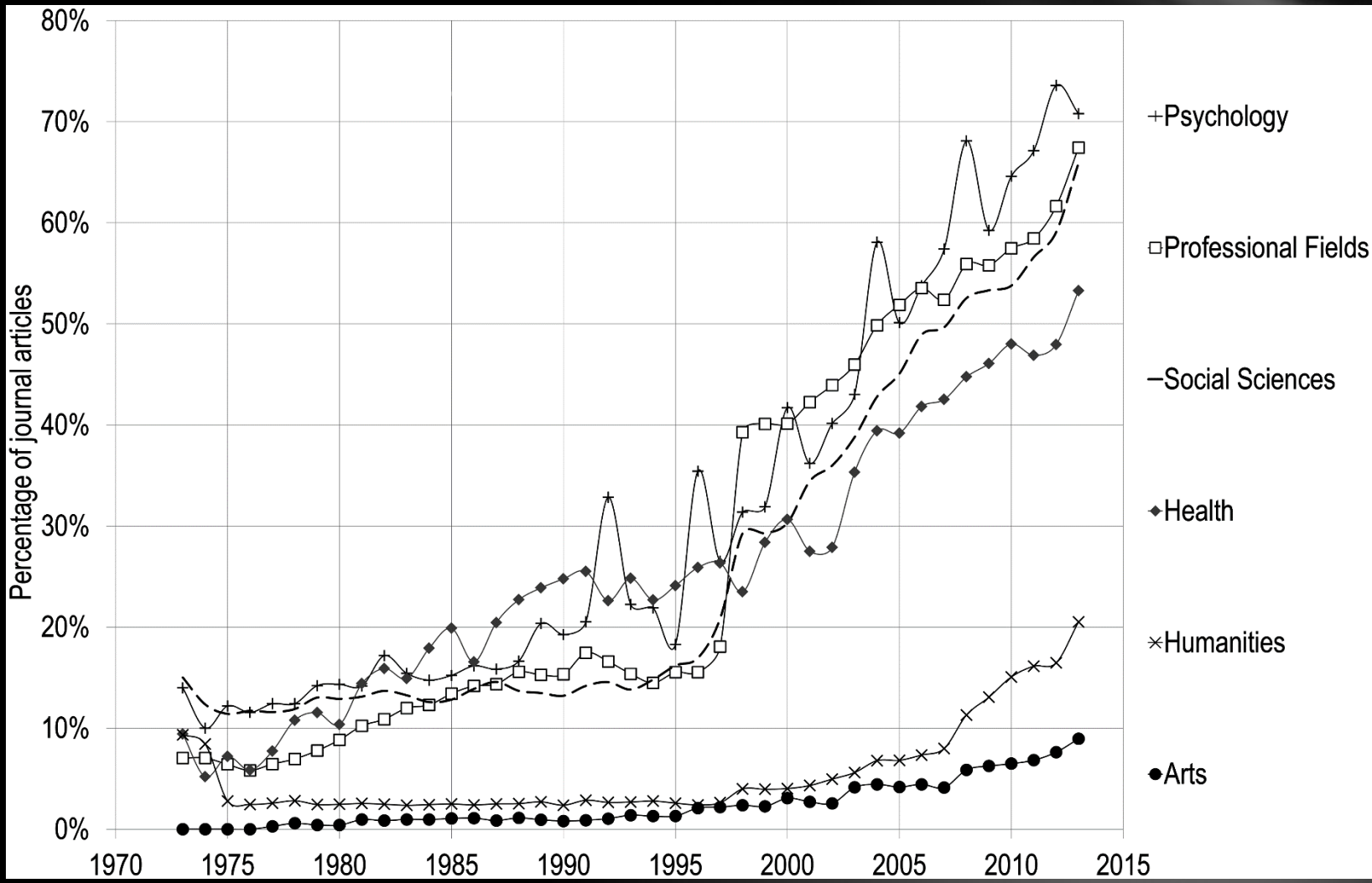
- 1.900 milijardi USD (2016 Global R&D Funding Forecast)
- 2 milijuna radova godišnje
- 80% svih znanstvenih istraživanja financira se javnim sredstvima
- većina znanstvenih radova šalje se u časopise velikih komercijalnih izdavača
- 15%-80% ne bude nikada citirano
  - *"Only" 12% of medicine articles are not cited, compared to about 82% (!) for the humanities. It's 27% for natural sciences and 32% for social sciences" (cite)*
- 50%-80% NE MOŽE SE REPRODUCIRATI!

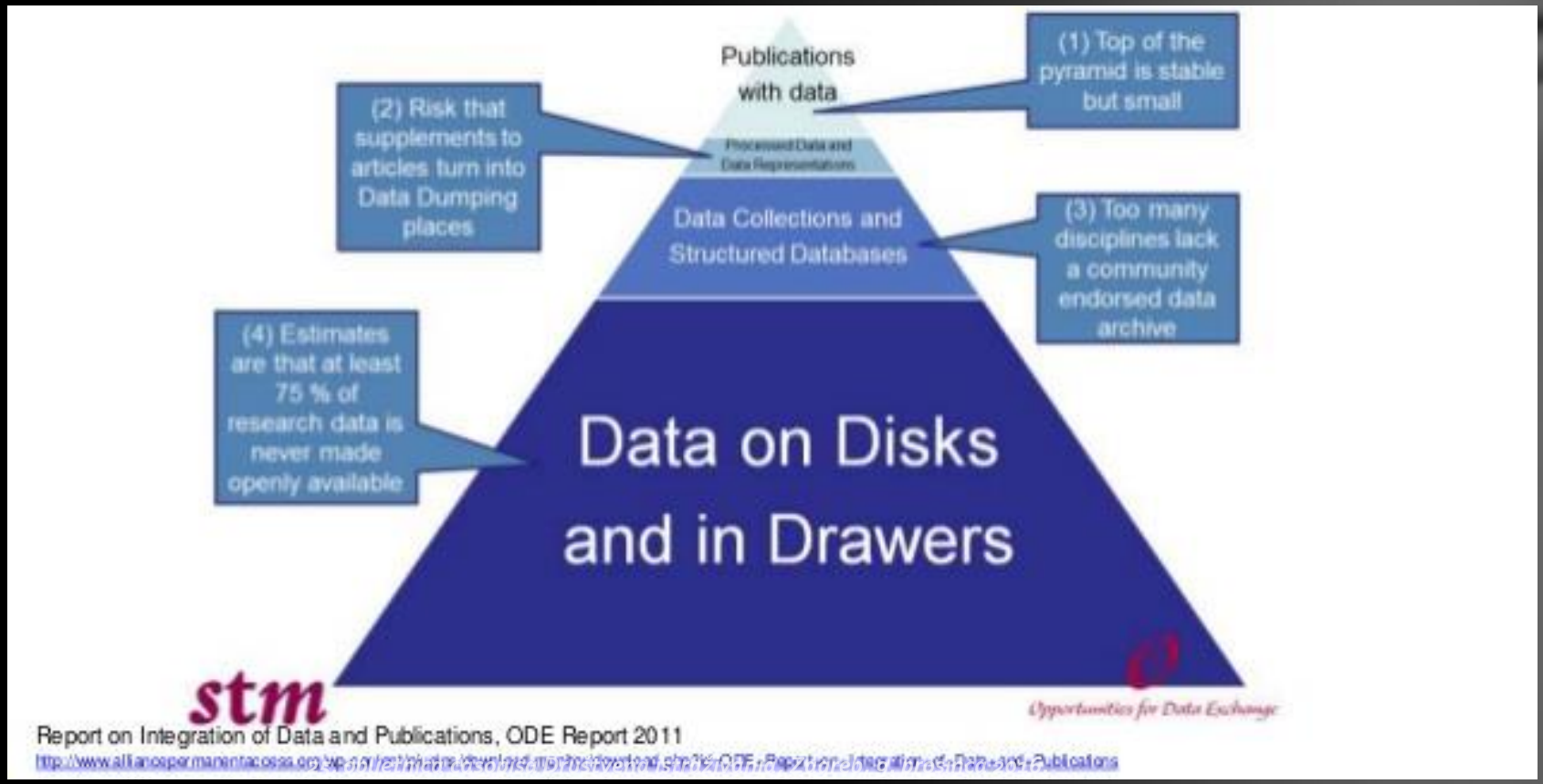
Postotak radova koji objavljuje 5 najvećih izdavačkih kuća



The Oligopoly of Academic Publishers in the Digital Era
Vincent Larivière, Stefanie Haustein, Philippe Mongeon
PLOS One, 2015

Istraživački podaci nedostupni

- samo 25% istraživačkih podataka je donekle zbrinuto i dostupno



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Znanstveno izdavaštvo danas

- nije više samo tekst
- pristup nije više najvažniji problem, već nemogućnost korištenja
- brza mreža snažnih računala čini naša očekivanja puno većim

PDF?

- kao ispis na papiru
- statičan, smrznut
- bez valjanih metapodataka
- ne može se nerijetko pretražiti

- još uvijek smo u tiskanom dobu…
- …a živimo u digitalnom

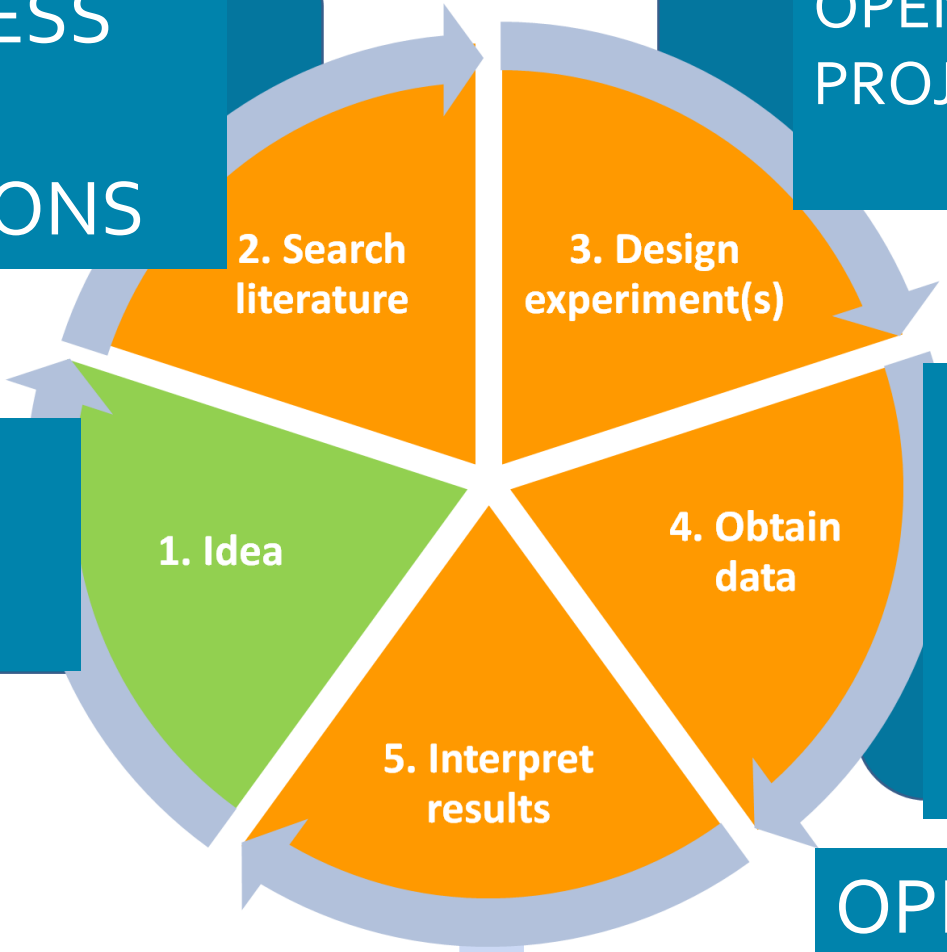
Otvorenost

- otvaranje svih faza istraživačkog ciklusa može voditi značajnim promjenama i napretku znanosti kroz dijeljenje i suradnju
- polako otvaramo pristup sadržaju i istraživačke procese: otvoreni pristup (publikacijama), otvoreni podaci, otvorena recenzija, otvoreno autorstvo, otvoreni formati, otvorena prosudba…
- dostupnost za korištenje: publikacije, podatci, modeli, izvorni kodovi, izvori, transparentne metode, standardi, formati, identifikatori, api-ji, licencije, izobrazba, politike…

otvaranje = promjena

OPEN ACCESS TO PUBLICATIONS

OPEN NOTEBOOK PROJECT



OPEN NOTEBOOK PROJECT

OPEN DATA

OPEN SOFTWARE

OPEN DATA, OPEN SOFTWA

OPEN ACCESS TO PUBLICATIONS

- At group meetings
- At a symposium or conference

Communicate results

- Write a patent
- Write a journal article and get published

http://cossrvmleoo.utep.ed

Otvoreni formati

- PDF – portabilan i jednostavan za korištenje – ali velika ograničenja
- PDF/A – neka poboljšanja
- ne podržava multimediju, interaktivnost, interoperabilnost, reproducibilnost…

- različite discipline – različiti softveri i formati
- HTML
- Teχ /Lateχ

- XML (eXtensible Markup Language)

Otvorena recenzija

Research article 01 Oct 2015

Influence of synoptic patterns on surface ozone variability over the eastern United States from 1980 to 2012

L. Shen et al.

Download

- Final revised paper (published on 01 Oct 2015)
- Supplement to the final revised paper
- Discussion paper (published on 05 May 2015)
- Supplement to the discussion paper

Interactive discussion

Status: closed

AC: Author comment | **RC**: Referee comment | **SC**: Short comment | **EC**: Editor comment

- Printer-friendly version - Supplement

RC C3294: 'Review comments', Anonymous Referee #1, 07 Jun 2015

AC C5473: 'Response to the comments from Reviewer 1', Lu Shen, 30 Jul 2015

RC C3313: 'Review of Shen et al.', Anonymous Referee #2, 07 Jun 2015

AC C5474: 'Response to the comments from Reviewer 2', Lu Shen, 30 Jul 2015

Peer review completion

AR: Author's response | **RR**: Referee report | **ED**: Editor decision

AR by Lu Shen on behalf of the Authors (30 Jul 2015) ▸ Author's response ▸ Manuscript

ED: Referee Nomination & Report Request started (02 Aug 2015) by Steven Brown

Što mogu biti/sadržavati publikacije?

- Animacija i virtualna stvarnost – uz pomoć animirane grafike autor može pokazati razlike između opaženih fenomena i modela
- autor može zabilježiti svoja razmišljanja kao dio publikacije – **audio, video**
- **istraživački podaci** (datasets) – kao dio publikacije ili zasebno
- „živa matematika" i numerički kodovi, 2D i 3D grafičke prezentacije, interaktivnost
- buduće reference, povezani radovi
- slike, interaktivni dijagrami
- algoritmi koje je moguće pokrenuti na zahtjev u stvarnom vremenu
- interaktivna kontrola nad provedbom udaljenih programa
- društvene mreže povezanih istraživača
- ranije verzije radova s komentarima
- metapodaci (verzije, provjera citata…)

Semantičke publikacije

UKLJUČIVANJE POSTOJEĆIH ISTRAŽIVAČKIH PODATAKA

TAG CLOUD – DOPUNA SAŽETKU

INTERAKTIVNI GRAFIČKI PRIKAZI

OBJEDIN… PODA… VIŠE R…

PODA…CI NA KOJIM…IA SE GRAF. …RIKAZ TEM…ELJI

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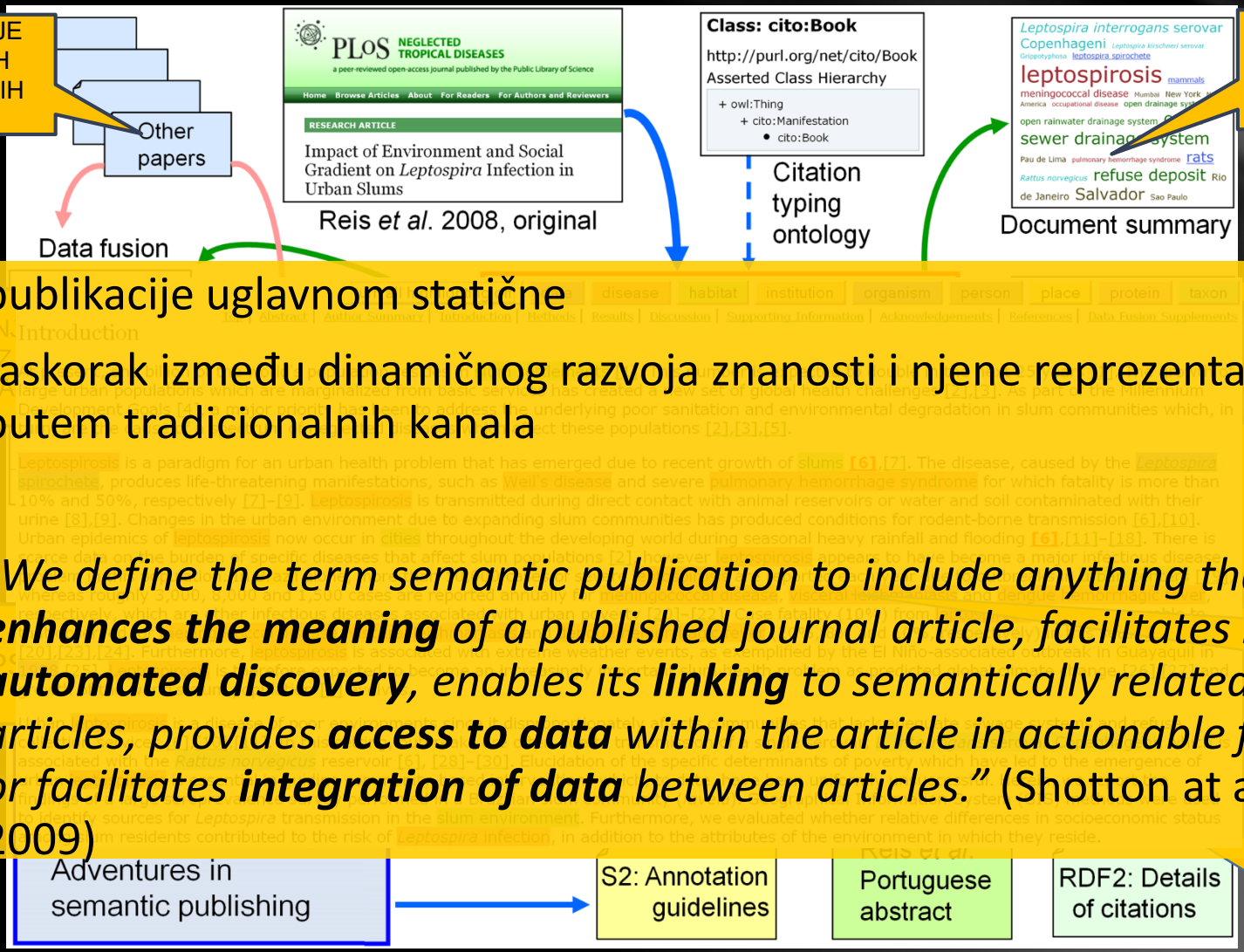
RAČUNALNO ČITLJIVI METAPODATCI



- publikacije uglavnom statične
- raskorak između dinamičnog razvoja znanosti i njene reprezentacije putem tradicionalnih kanala
- *„We define the term semantic publication to include anything that **enhances the meaning** of a published journal article, facilitates its **automated discovery**, enables its **linking** to semantically related articles, provides **access to data** within the article in actionable form, or facilitates **integration of data** between articles.”* (Shotton at al, 2009)

NASTOJANJA

- pomak prema digitalnom, umreženom, virtualnom okruženju
- od linearnih tiskanih publikacija prema neometanom i trajnom protoku znanstvenih informacija
- odmak od PDF-a
- unaprjeđivanje uređivačkih politika, etička pitanja
- eksperimentiranje
- praćenje uspješnosti časopisa
- praćenje kriterija kojima se vode znanstvenici/autori
- prepoznavanje njihovih potreba

Prednosti otvorene znanosti

unaprjeđivanje učinkovitosti istraživanja - minimalizacija dupliranja

ubrzavanje tempa novih otkrića

omogućavanje i poticanje interdisciplinarnih istraživanja

promoviranje znanstvene strogosti i reproducibilnosti

unaprjeđivanje kvalitete

poboljšanje suradnje

promocija znanstvenih aktivnosti i poticanje „znanstvene pismenosti" javnosti

povećanje ekonomskog i društvenog utjecaja znanstvenih istraživanja

osiguravanje novih mogućnosti za inovacije

Leslie Chan, OpenAIRE Meeting, Athens, 2014

Dobrobiti za sve sudionike

Znanstvenici:

- veća vidljivost njihovog znanstvenog rada, veći utjecaj, veća citiranost, mogućnosti suradnje; veća i lakša dostupnost znanstvenih informacija

Ustanove:

- veća vidljivost znanstvene aktivnosti ustanove; promocija ustanove u znanstvenom svijetu, ali i u javnosti

Javnost:

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- „mašinski čitljivi" radovi
- RDF, povezani podaci (*linked data*)
- istraživački podaci zbrinuti i dostupni
- različiti formati (pored PDF-a)
- identifikacija autora (ORCID)
- identifikacija publikacije (DOI?)
- …
- sve je u otvorenom pristupu i raspoloživo za korištenje

jadranka.stojanovski@unizd.hr
jadranka.stojanovski@irb.hr