Liste erstellt am 2011-09-29

Literatur

Aktuell

Baez 2011

John C. Baez & John Huerta, *Exotische Zahlen und die Stringtheorie*. Spektrum der Wissenschaft **2011**, x, 54–60.

Ein im 19. Jahrhundert entdecktes und in vergessenheit geratenes Zahlensystem hält vielleicht die einfachste Erklärung dafür bereit, dass unser Universum zehndimensional sein könnte.

Baumard 2011

Nicolas Baumard & Pierre Liénard, *Second- or third-party punishment? When self-interest hides behind apparent functional interventions*. PNAS **108** (2011), E753.

Dressler 2011

Marc Dressler, *Thomas Bayes und die Tücken der Statistik*. Spektrum der Wissenschaft **2011**, x, 70–73.

Der englische Pfarrer ist erst nach seinem Tod für ein Theorem berühmt geworden, das den Grad unserer Unkenntnis zu berechnen gestattet.

Ge 2011

Song Ge & Tao Sang, *Inappropriate model rejects independent domestications of indica and japonica rice*. PNAS **108** (2011), E755.

Howarth 2011

Robert W. Howarth, Anthony Ingraffea & Terry Engelder, *Should fracking stop?* nature **477** (2011), 271–275.

Extracting gas from shale increases the availability of this resource, but the health and environmental risks may be too high.

Point: Yes, it's too high risk

Natural gas extracted from shale comes at too great a cost to the environment, say Robert W. Howarth and Anthony Ingraffea.

Counterpoint: No, it's too valuable

Fracking is crucial to global economic stability; the economic benefits outweigh the environmental risks, says Terry Engelder.

Johnson 2011

Dominic D. P. Johnson & James H. Fowler, *The evolution of overconfidence*. nature **477** (2011), 317–320.

n477-0317-Supplement.pdf

Confidence is an essential ingredient of success in a wide range of domains ranging from job performance and mental health to sports, business and combat1-4. Some authors have suggested that not just confidence but overconfidence-believing you are better than you are in reality-is advantageous because it serves to increase ambition, morale, resolve, persistence or the credibility of bluffing, generating a self-fulfilling prophecy in which

exaggerated confidence actually increases the probability of success3-8. However, overconfidence also leads to faulty assessments, unrealistic expectations and hazardous decisions, so it remains a puzzle how such a false belief could evolve or remain stable in a population of competing strategies that include accurate, unbiased beliefs. Here we present an evolutionary model showing that, counterintuitively, overconfidencemaximizes individual fitness and populations tend to become overconfident, as long as benefits from contested resources are sufficiently large compared with the cost of competition. In contrast, unbiased strategies are only stable under limited conditions. The fact that overconfident populations are evolutionarily stable in a wide range of environments may help to explain why overconfidence remains prevalent today, even if it contributes to hubris, market bubbles, financial collapses, policy failures, disasters and costly wars9-13.

Kump 2011

Lee R. Kump, *Was lehrt uns die letzte Erderwärmung?* Spektrum der Wissenschaft **2011**, x, 76–81.

Vor 56 Millionen Jahren ereignete sich die rasanteste globale Erwärmung in vorgeschichtlicher Zeit. Lange galt sie als warnendes Beispiel für die Gegenwart. Doch nun fanden Forscher heraus, dass der damalige Temperaturanstieg wesentlich langsamer als gedacht vonstattenging. Der heutige Klimawandel ist viel dramatischer.

Mathew 2011

Sarah Mathew & Robert Boyd, *Reply to Baumard and Liénard: Mechanistic accounts need to specify why reputation systems yield cooperative outcomes on observed scales.* PNAS **108** (2011), E754.

Molina 2011

Jeanmaire Molina et al., *Reply to Ge and Sang: A single origin of domesticated rice.* PNAS **108** (2011), E756.

Jeanmaire Molina, Martin Sikora, Nandita Garud, Jonathan M. Flowers, Samara Rubinstein, Andy Reynolds, Pu Huang, Scott A. Jackson, Barbara A. Schaal, Carlos D. Bustamante, Adam R. Boyko and Michael D. Purugganan

Rojstaczer 2011

Stuart Rojstaczer & Christopher Healy, *Where A Is Ordinary: The Evolution of American College and University Grading, 1940–2009.* Teachers College Record (2011) preprint. <http://www.tcrecord.org/Content.asp?ContentId=16473>.

Findings/Results: Contemporary data indicate that, on average across a wide range of schools, A's represent 43 % of all letter grades, an increase of 28 percentage points since 1960 and 12 percentage points since 1988. D's and F's total typically less than 10 % of all letter grades. Private colleges and universities give, on average, significantly more A's and B's combined than public institutions with equal student selectivity. Southern schools grade more harshly than those in other regions, and science and engineering-focused schools grade more stringently than those emphasizing the liberal arts. At schools with modest selectivity, grading is as generous as it was in the mid-1980s at highly selective schools. These prestigious schools have, in turn, continued to ramp up their grades. It is likely that at many selective and highly selective schools, undergraduate GPAs are now so saturated at the high end that they have little use as a motivator of students and as an evaluation tool for graduate and professional schools and employers.

Conclusions/Recommendations: As a result of instructors gradually lowering their standards, A has become the most common grade on American college campuses. Without regulation, or at least strong grading guidelines, grades at American institutions of higher learning likely will continue to have less and less meaning.

Swindles 2011

Graeme T. Swindles, Ian T. Lawson, Ivan P. Savov, Charles B. Connor & Gill Plunkett, *A 7000 yr perspective on volcanic ash clouds affecting northern Europe*. Geology **39** (2011), 887–890.

The ash cloud resulting from the A.D. 2010 eruption of Eyjafjallajökull in Iceland caused severe disruption to air travel across Europe, but as a geological event it is not unprecedented. Analysis of peats and lake sediments from northern Europe has revealed the presence of microscopic layers of Icelandic volcanic ash (tephra). These sedimentary records, together with historical records of Holocene ash falls, demonstrate that Icelandic volcanoes have generated substantial ash clouds that reached northern Europe many times. Here we present the first comprehensive compilation of sedimentary and historical records of ash-fall events in northern Europe, spanning the past 7000 yr. Ash-fall events appear to have been more frequent in the past 1500 yr. It is unclear whether this reflects a true increase in eruption frequency or dispersal, or is an artifact of the records or the way in which they have been generated. In the past 1000 yr, volcanic ash clouds reached northern Europe with a mean return interval of 56 ± 9 yr (the range of return intervals is between 6 and 115 yr). Probabilistic modeling using the ash records for the last millennium indicates that for any 10 yr period there is a 16 % probability of a tephra fallout event in northern Europe. These values must be considered as conservative estimates due to the nature of tephra capture and preservation in the sedimentary record.

van Veelen 2011

Matthijs van Veelen & Martin A. Nowak, *Selection for positive illusions*. nature **477** (2011), 282–282.

Everybody knows that overconfidence can be foolhardy. But a study reveals that having an overly positive self-image might confer an evolutionary advantage if the rewards outweigh the risks.

It would also be interesting to establish a link between the authors≈f findings and overconfidence in trading behaviour13, the willingness to buy overly complex financial products (which are thought to have led to the current crisis in the banking system), political decisions that lead to war14, and the evolution of fighting behaviour in animals15. Given that 94 % of college professors rate themselves as above average, there should be enough overconfidence around to tackle all the natural follow-up questions.

Energie

Kim 2011

Younggy Kim & Bruce E. Logan, *Hydrogen production from inexhaustible supplies of fresh and salt water using microbial reverse-electrodialysis electrolysis cells*. PNAS **108** (2011), 16176–16181.

There is a tremendous source of entropic energy available from the salinity difference between river water and seawater, but this energy has yet to be efficiently captured and stored. Here we demonstrate that H2 can be produced in a single process by capturing the salinity driven energy along with organic matter degradation using exoelectrogenic bacteria. Only five pairs of seawater and river water cells were sandwiched between an anode, containing exoelectrogenic bacteria, and a cathode, forming a microbial reverse-electrodialysis electrolysis cell. Exoelectrogens added an electrical potential from acetate oxidation and reduced the anode overpotential, while the reverse electrodialysis stack contributed 0.5–0.6 V at a salinity ratio (seawater:river water) of 50. The H2 production rate increased from 0.8 to 1.6 m3-H2/m3-anolyte/day for seawater and river water flow rates ranging from 0.1 to 0.8 mL/M min. H2 recovery, the ratio of electrons used for H2

evolution to electrons released by substrate oxidation, ranged from72 % to 86 %. Energy efficiencies, calculated from changes in salinities and the loss of organic matter, were 58 % to 64 %. By using a relatively small reverse electrodialysis stack (11 membranes), only ≈1 % of the produced energy was needed for pumping water. Although Pt was used on the cathode in these tests, additional tests with a nonprecious metal catalyst (MoS2) demonstrated H2 production at a rate of 0.8 m3/m3/d and an energy efficiency of 51 %. These results show that pure H2 gas can efficiently be produced from virtually limitless supplies of seawater and river water, and biodegradable organic matter.
electrohydrogenesis | microbial electrolysis cell | microbial fuel cell | renewable energy | sustainable energy