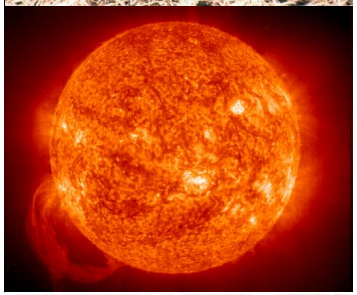
Social Machines + Knowledge Turning

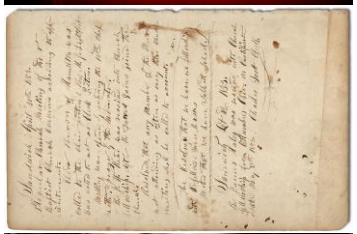
A Big Question in Computation, Intelligence and Life

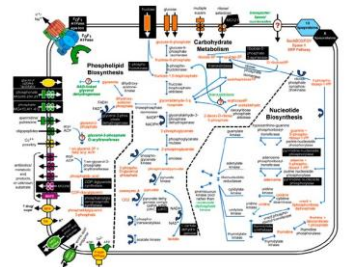
Professor Carole Goble FREng FBCS

The University of Manchester, UK

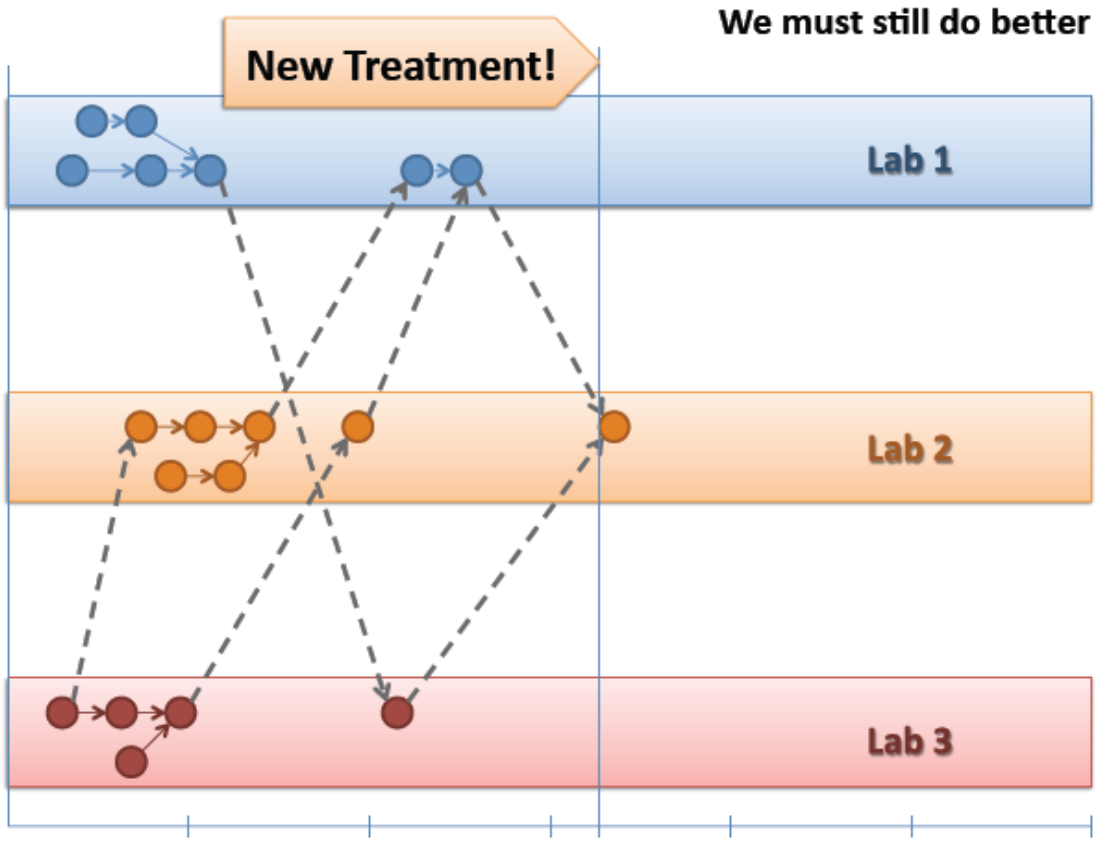
The Alan Turing Centenary Conference, Manchester, UK
Panel, 24 June 2012. turing100.org





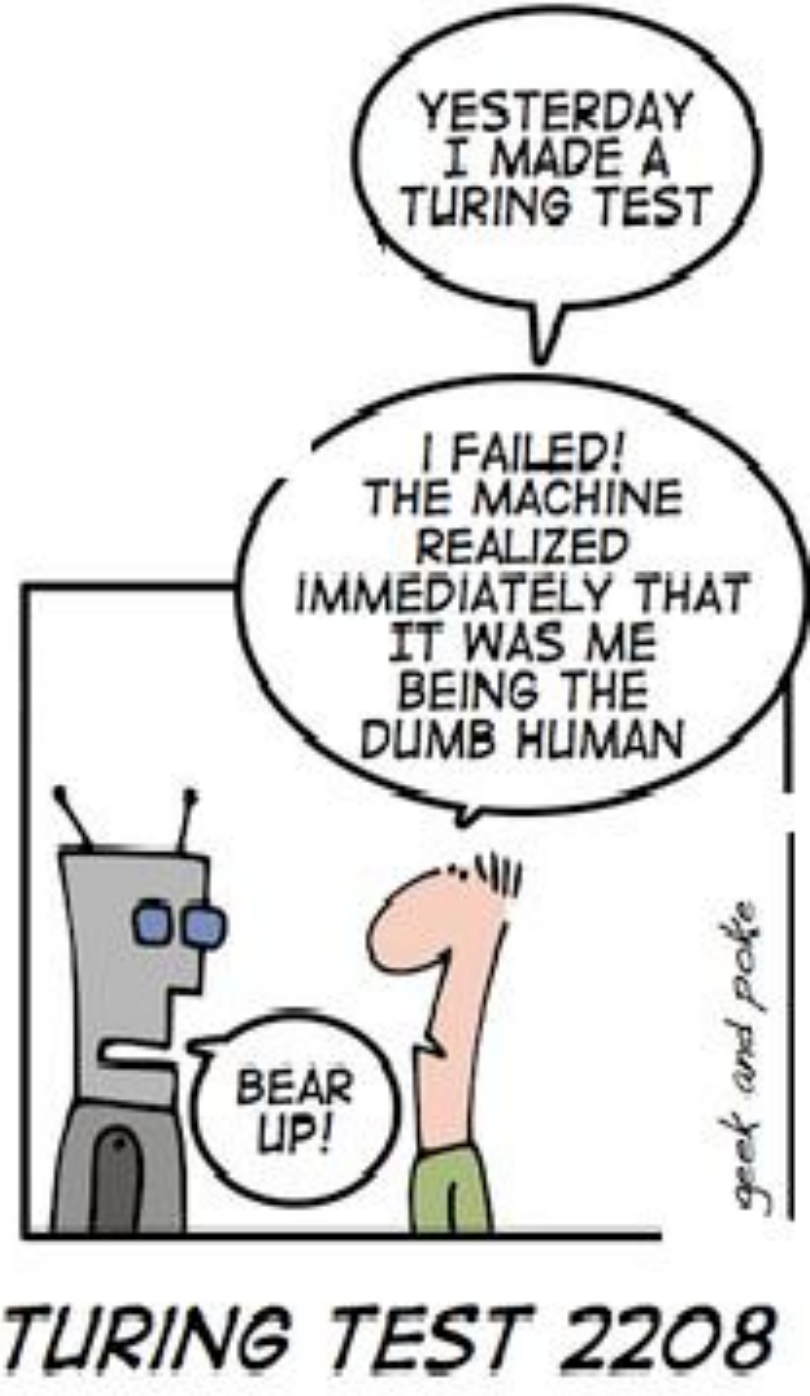


Science: Improving Knowledge Turning, Enabling Reproducibility

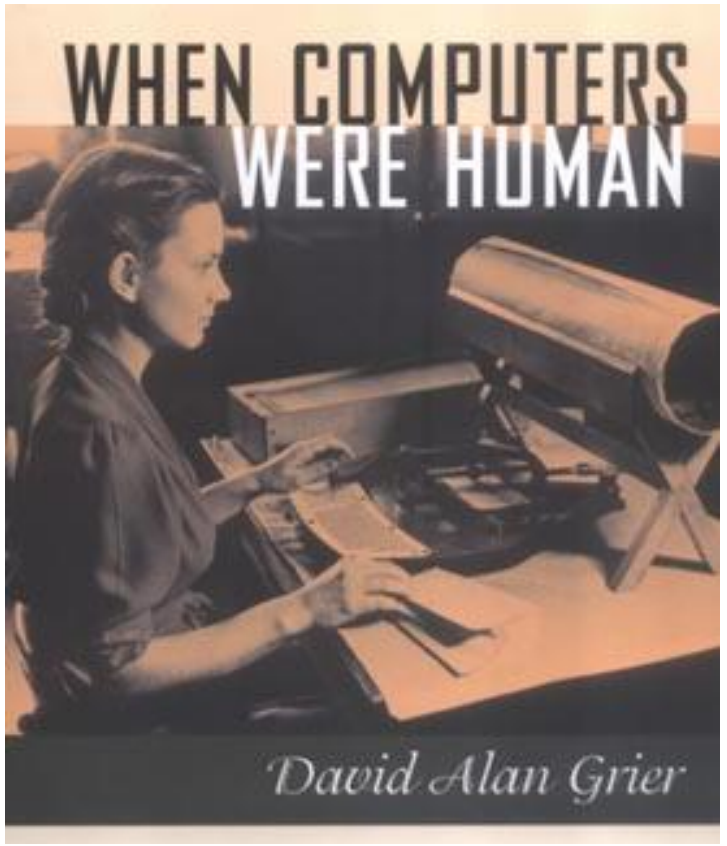


[Josh Sommer]

- The Turing Test: putting a human (computer) and a machine (automatic computer) on an equal footing.
- Convince a human that a machine is a human individual
- Serve a machine with a collective of humans acting as a computational entity



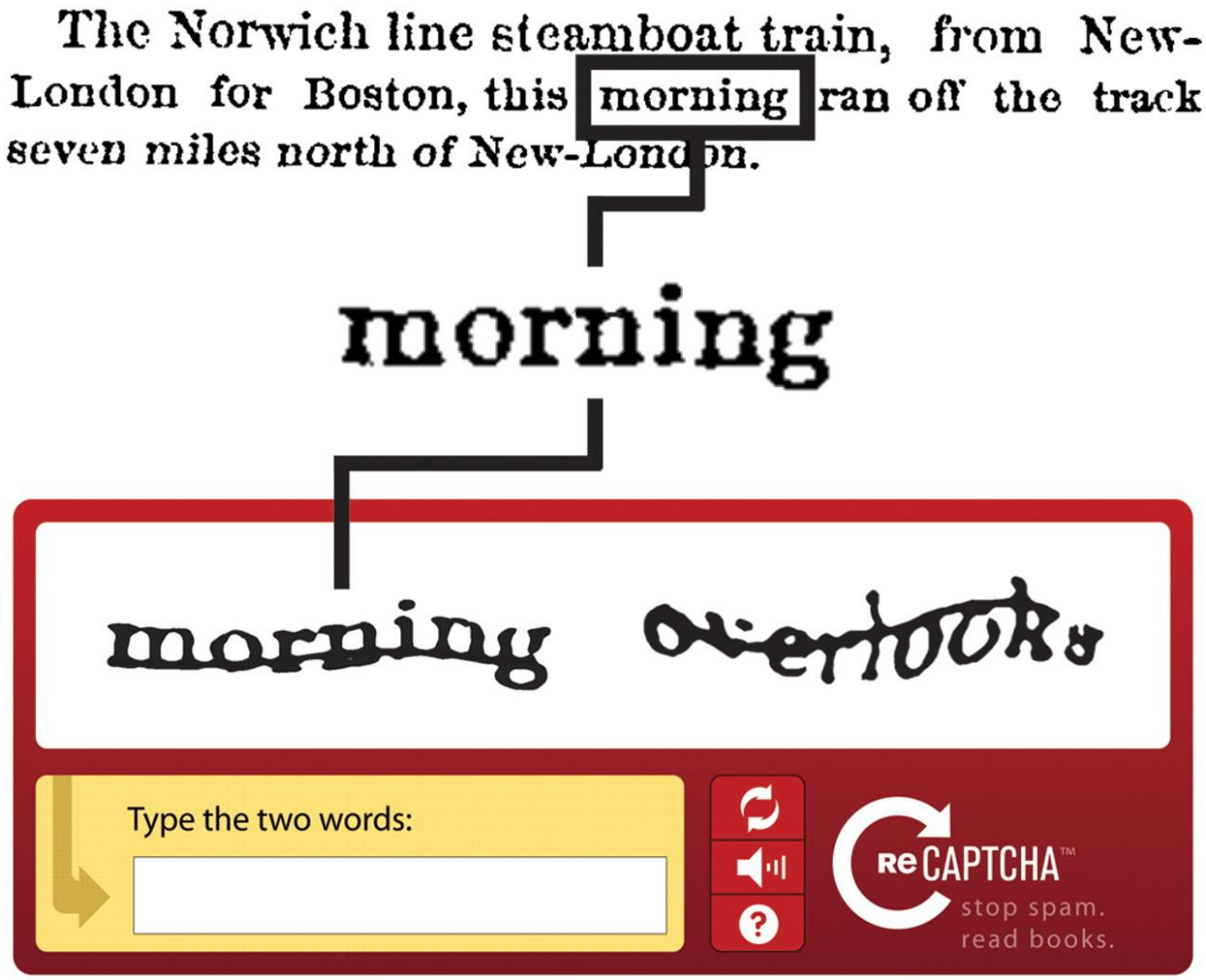
- Why emulate a human to solve (complex) tasks?
- Get many humans to help to solve complex tasks along with the machine.
- Get many humans to cooperate with each other



Can we define and reliably build Universal Social Machines?

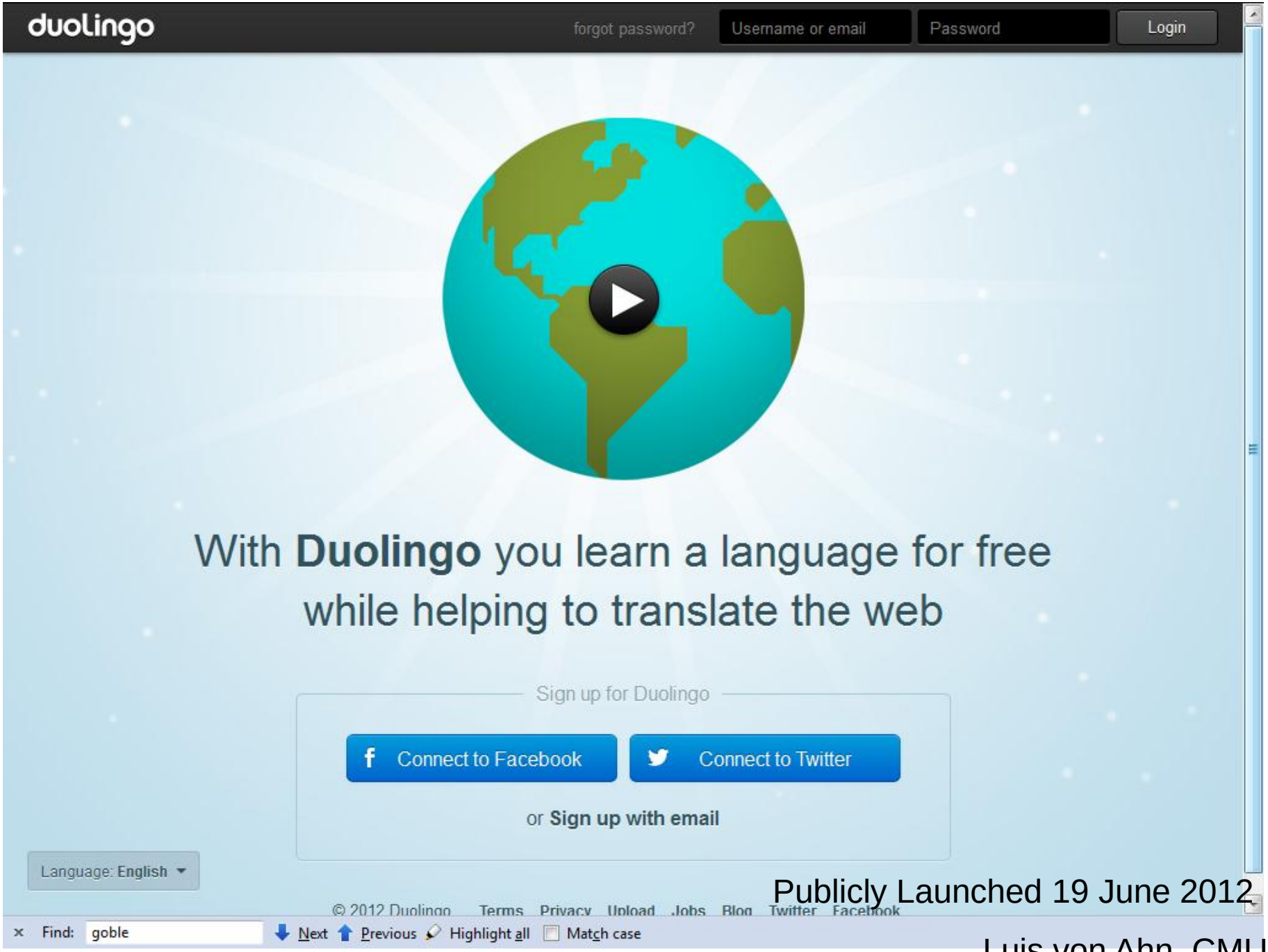
Combine humans and machines in one system

Berners-Lee, *Weaving the Web*, 1999



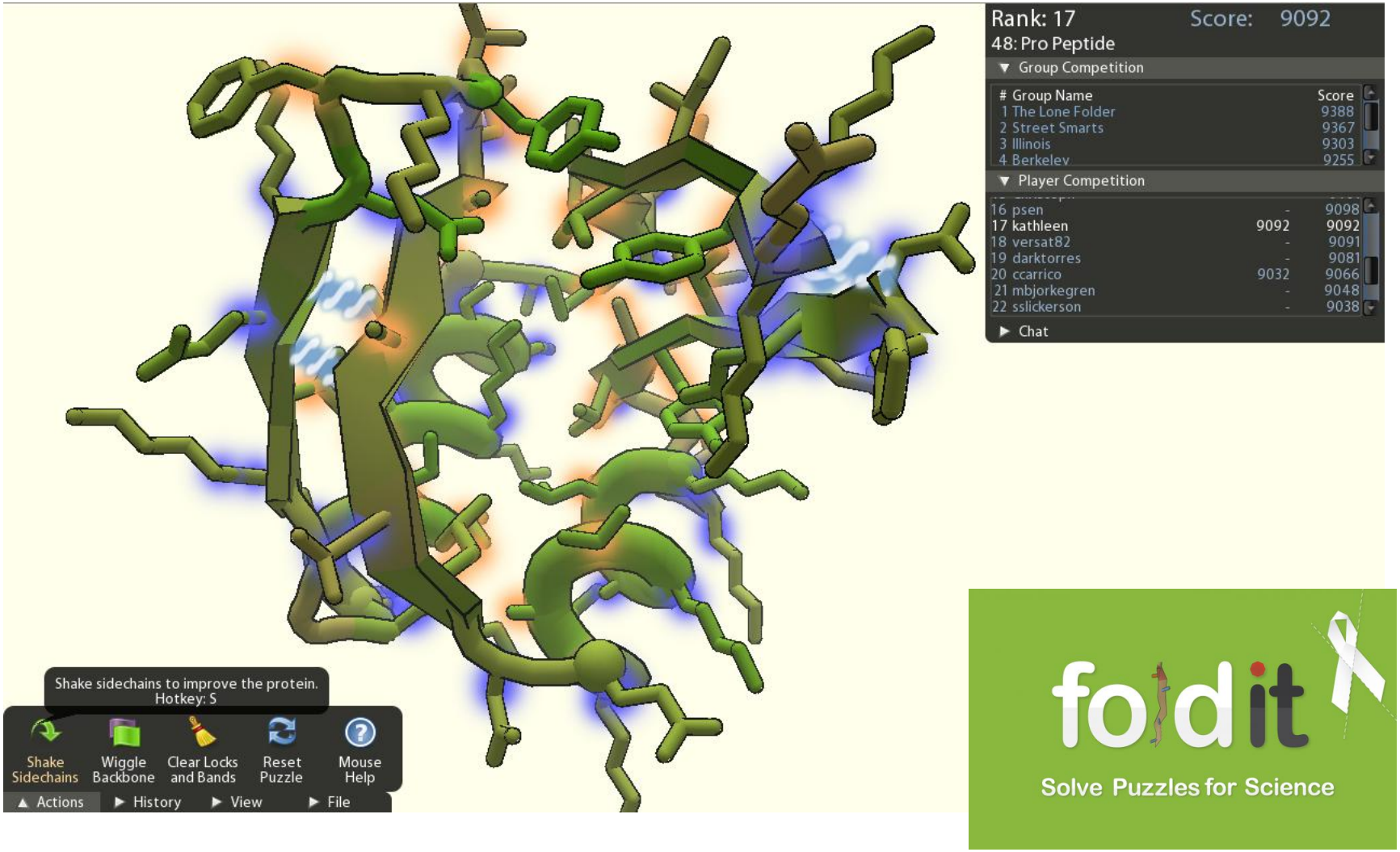
Completely Automated Public Turing test to tell Computers and Humans Apart

Luis von Ahn, CMU



Publicly Launched 19 June 2012

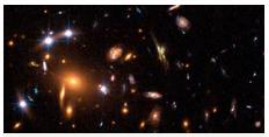
Luis von Ahn, CMU



Crystal structure of M-PMV retroviral protease

Nature Structural and Molecular Biology, doi:10.1038/nsmb.2119

http://fold.it



How do galaxies form?
NASA's Hubble Space Telescope archive provides hundreds of thousands of galaxy images.

GALAXY ZOO

Explore the surface of the Moon
We hope to study the lunar surface in unprecedented detail.

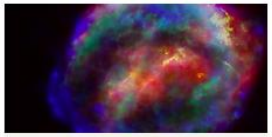
MOON ZOO

Study explosions on the Sun
Explore interactive diagrams to learn out about the Sun and the spacecraft monitoring it.

SOLAR STORMWATCH

How do galaxies merge?
One important area of research in astronomy studies the role of interacting galaxies.

GALAXY ZOO

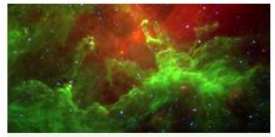


Search for exploding stars
Help to find Supernovae, astronomers are ready to follow up.

GALAXY ZOO

Find planets around stars
Lightcurve changes from the Kepler spacecraft can indicate transiting planets.

planethunters.org



How do stars form?
We're asking you to help us find and draw circles on infrared image data from the Spitzer Space Telescope.

THE MILKY WAY PROJECT

ZOONIVERSE

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Model Earth's climate using wartime ship logs

Help scientists recover worldwide weather observations made by Royal Navy ships.

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Humanities

Study the lives of ancient Greeks

The data gathered by Ancient Lives helps scholars study the Oxyrhynchus collection.

ANCIENT LIVES

Nature

Hear Whales communicate

You can help marine researchers understand what whales are saying

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Insulin

From Wikipedia, the free encyclopedia

Not to be confused with Inulin.

Insulin is a hormone, produced by the pancreas, which is central to regulating carbohydrate and fat metabolism in the body. Insulin causes cells in the liver, muscle, and fat tissue to take up glucose from the blood, storing it as glycogen inside these tissues.

Insulin stops the use of fat as an energy source by inhibiting the release of glucagon. With the exception of the metabolic disorder diabetes mellitus and metabolic syndrome, insulin is provided within the body in a constant proportion to remove excess glucose from the blood, which otherwise would be toxic. When blood glucose levels fall below a certain level, the body begins to use stored sugar as an energy source through glycogenolysis, which breaks down the glycogen stored in the liver and muscles into glucose, which can then be utilized as an energy source. As a central metabolic control mechanism, its status is also used as a control signal to other body systems (such as amino acid uptake by body cells). In addition, it has several other anabolic effects throughout the body.

When control of insulin levels fails, diabetes mellitus will result. As a consequence, insulin is used medically to treat some forms of diabetes mellitus. Patients with type 1 diabetes depend on external insulin (most commonly injected subcutaneously) for their survival because the hormone is no longer produced internally.[2] Patients with type 2 diabetes are often insulin resistant and, because of such resistance, may suffer from a "relative" insulin deficiency. Some patients with type 2 diabetes may eventually require insulin if other medications fail to control blood glucose levels adequately. Over 40% of those with Type 2 diabetes require insulin as part of their diabetes management plan.

Insulin also influences other body functions, such as vascular compliance and cognition. Once insulin enters the human brain, it enhances learning and memory and benefits verbal memory in particular.[3] Enhancing brain insulin signaling by means of intranasal insulin administration also enhances the acute thermoregulatory and glucoregulatory response to food intake, suggesting that central nervous insulin

Insulin

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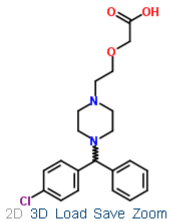

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Cetirizine

2577 (ChemSpider ID)
$C_{21}H_{25}ClN_2O_3$
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USPTO (764) | USPTOA | EPA | EPB | WOPCT | JP | Google Patents

764 patents found in USPTO.

Patent No.	Title
6255487	Process of preparing [2-(1-pipera
6245353	Solid, rapidly disintegrating cetiri
6384038	Methods and compositions using

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Kepler	30
GWorkflowDL	24
LONI Pipeline	22
BioExtract Server	16
Trident (Packa...	10
Chemistry Plan	7

Filter by tag

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myGrid	104

Taverna 2

Pathways and Gene annotations for QTL region (v7)

View
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Paul Fisher

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This workflow searches for genes which reside in a QTL (Quantitative Trait Loci) region in the mouse, Mus musculus. The workflow requires an input of: a chromosome name or number; a QTL start base pair position; QTL end base pair position. Data is then extracted from BioMart to annotate each of the genes found in this region. The Entrez and UniProt identifiers are then sent to KEGG to obtain KEGG gene identifiers. The KEGG gene identifiers are then used to searcg for pathways in the KEGG path...

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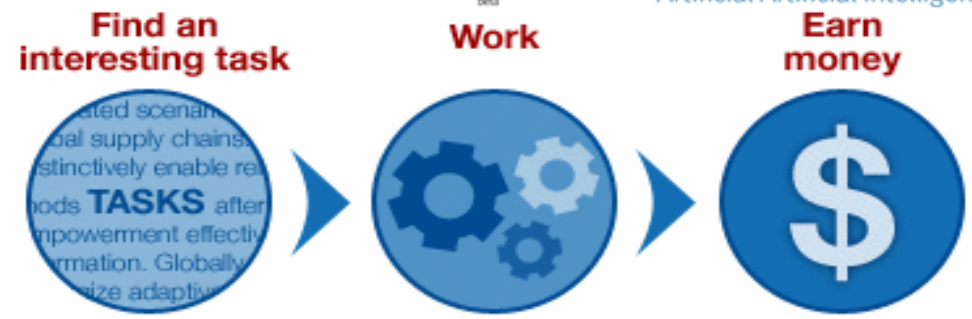
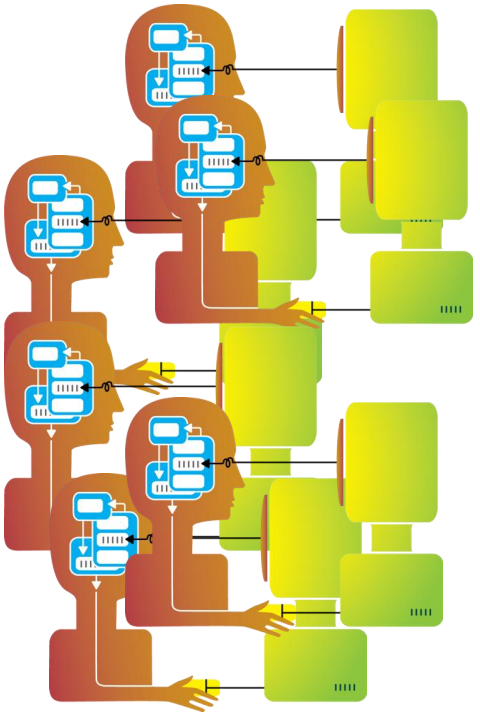


Social Machines
for Scientific Knowledge Turning

- What is social computation?
  - Indefinite, behaviour evolving, human incorporating systems
  - Asynch/synch properties
  - Behave like a Turing Machine?
- Theoretical foundations
- Empirical observations, micro and macro behaviours
- Socio-technical design and engineering practices
- Legal, Ethical, Cognitive…
- Economic and business models



SOCIAM, FuturICT

MIT, Yale, RPI, Southampton, Oxford, Edinburgh, Trento

Giunchiglia, Robertson, Hall, Shadbolt, Berners-Lee, De Roure, Hendler