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OF IDEAS TO  
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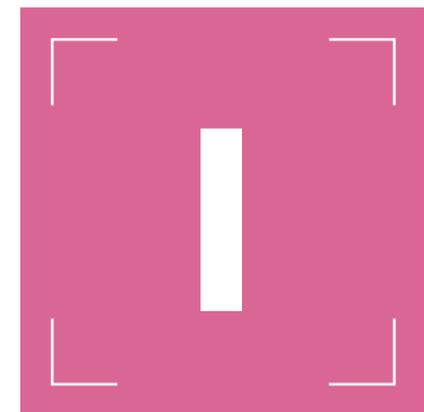
# 2014

LEANDER KAHNEY ON THE FUTURE OF APPLE  
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**+120** MORE IDEAS THAT WILL CHANGE THE WORLD

# Games head to the lab

Behavioural scientists will be looking to online gaming communities to study offline society.  
By Alexander Peysakhovich & David Rand



In 2011, the videogames developer Riot Games had a problem: how do you get groups of strangers to co-operate, coordinate and work together to get things done? Many companies struggle with these issues when managing their employees. But Riot, developers of the online hit *League of Legends*, was actually concerned about interactions between its players, then 32-million-strong worldwide. *League of Legends* is built around groups of five randomly matched players battling against each other, and key to the game's fun factor is players working together as a team. But some players were being nasty and unpleasant. To solve this co-operation problem, Riot brought in a team of PhD behavioural scientists. The result was a huge decrease in "toxic" behaviour and some important insights into co-operative behaviour that, in 2014, will spread into fields far beyond massively multiplayer online gaming.

## GM SILK

Artificial spider silk, tougher than Kevlar and produced by genetically modified bacteria, will be commercialised next year by a Japanese startup.

Riot's experiments with building norms again antisocial behaviour, as well as similar efforts by behavioural scientists working in other gaming communities - including *EVE Online*, *World of Warcraft* and Valve - demonstrates a powerful new truth: large-scale online games are creating cultural ecosystems with much of the social and economic complexity seen offline. As a result, these virtual worlds offer an opportunity for researchers to understand the dynamics of societies, economies and cultures.

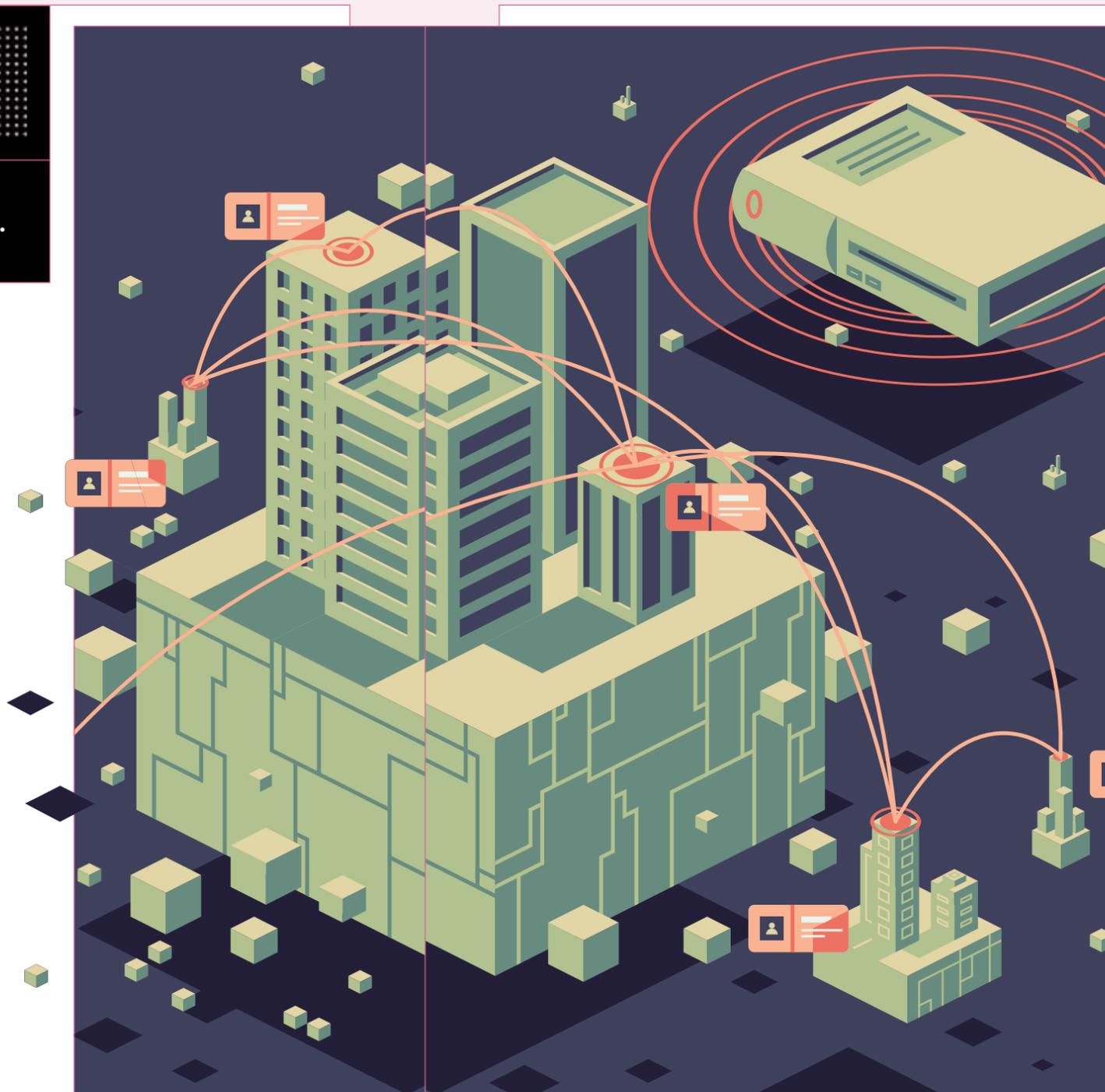
Game theory, whereby complex social interactions are boiled down to simple games, has long been central to fields such as economics, biology, psychology and philosophy. Such games serve as useful paradigms for studying behaviour in controlled experiments, and have taught us a great deal about human social interaction. However, they are extreme simplifications.

The powerful opportunity that online gaming communities offer is their coupling of the control and observability found in simple laboratory games with socially rich interactions, cultures and economies. This combination gives researchers the ability to directly test the effect of different policies on the evolution of society. In the real world, history only runs once. This makes assessing the effect of specific policies and interventions extremely difficult: we can play out different "what-if" scenarios (in our heads or using models and simulations), but we'll never really know what would have happened had different policies been adopted.

In virtual worlds, however, there can be many simultaneously evolving arcs of history. Most online games have multiple servers, separate but initially identical worlds between which most players never travel. Comparing these parallel universes gives researchers counter-factual analyses that are impossible offline.

Thus online games can make the experimental method, so central to our success in the natural sciences, available to the world of macro-level social science. A major

reason that important social-scientific issues are hotly debated and poorly understood is the inability to perform experiments. However, in online games, such macro-scale experiments are possible. In fact, experiments of this kind are a standard part of the game-development cycle - new features are tested on a single server before going out to the whole community. Virtual worlds also make it easy to perform smaller scale, randomised field experiments, linked



SPOT ILLUSTRATION: YELLOWHAMMER

to "actual" behaviour in the virtual world rather than just decisions in an artificially constructed lab environment.

The resulting gains in knowledge about human behaviour and social organisation will not just benefit academics locked inside an ivory tower. Improving our understanding of gaming worlds will result in game communities that are more co-operative, game economies that are more stable and gameplay that is more fun. This same

knowledge can also help to make the offline world safer, happier and more productive by informing public policy and institution design. Alexander Peysakhovich is a post-doctoral researcher at Harvard University's Program for Evolutionary Dynamics. David Rand is an assistant professor of psychology, economics, cognitive science and management at Yale University

**DARK MATTER IN THE SPOTLIGHT**  
The most mysterious substance in the universe will reveal its secrets to the latest supersensors.  
By Seth Shostak

Researchers in two Earth-bound laboratories, and one that is orbiting the Earth, will take us closer to understanding dark matter by increasing their instruments' sensitivity to weakly interacting massive particles (WIMPs), which many astrophysicists believe make up this elusive substance.

Dark matter makes up 80 per cent of the mass of the universe, but since hints of its existence were first found in the 30s, its composition has remained a mystery. That may change in 2014 via experiments at the Cryogenic Dark Matter Search (CDMS) in Minnesota and at the Gran Sasso National Laboratory in Italy, and aboard the International Space Station (ISS).

WIMPs are the top candidate for dark matter because they nicely fit the required

## ELECTRICAL HYDROGELS

Bio-inspired robots will move via a technique called "ionoprinting", developed by researchers at North Carolina State University. A 99.9 per cent water hydrogel is injected with copper ions. When an electrical current is applied, the gel flexes, like a squid's tentacles, to propel the device.

