

THE SO-CALLED GLOBAL CITIES—LARGE METROPOLITAN AREAS THAT COMBINE CULTURAL, ECONOMIC, AND OFTEN POLITICAL DOMINANCE—

have long been considered by their residents to be closer to each other in terms of financial connections, career opportunities, and cultural exposure than to the nation-states surrounding them geographically. Now, for many of their denizens, rapid technological and social developments have allowed them to become so closely drawn together that they are functionally (and often experientially) the same place—a “metametropolis.” Seamless multi-lingual and increasingly multi-cultural interaction technology allows coworking and cosocializing in virtual re-creations of actual cityscapes, whether in Shanghai, New York, or Paris. The local time zone is less relevant than ever as people disregard their chronobiology. These aren’t just digital connections, despite early critics referring to the concept of the “metacity” as “Facebook urbanism.” The richest citizens of global metacities are hyper-mobile, zipping between global destinations in a matter of hours in orbital jets, while specialized shipping companies make same-day deliveries (of food, gifts, even pets) between metacities easy and affordable to those not in the “orbital jet set.” As one might expect, the gap between those who inhabit the metametropolis and the broader citizenry (many of whom don’t have access to the social, financial, and cultural centers) grows ever wider. The result is ever more troubling political friction between haves and have-nots.

- Edifices of cultural heritage are dematerialized: famous buildings, streets, rivers, and museums are reproduced in high-resolution virtual worlds, allowing broader access to cosmopolitan experiences even as physical structures are increasingly compromised by climate instability and lack of funding for upkeep. Forests in New Zealand and castles in Belgium can be experienced for free through the World Heritage Foundation, but it will still cost you to ride to the top of the virtual Empire State Building.
- Diasporas forge the tightest corridors of the metacity, as social connections, and now smells and sensations, follow them from city to city. Communities maintain cultural diversity and create new fusions, confounding the assumption that global convergence means homogeneity.
- A key characteristic of a metacity—and a sure sign that a large urban area is joining the global metametropolis—is the breakdown of standard day/night work cycles. More and more businesses operate 24 hours a day, or with multiple short breaks throughout the day. Metacity denizens typically match waking/sleep patterns with close colleagues and friends, regardless of location. Special lighting and drugs are commonplace tools for adaptation.
- The consequences of not being connected to this shared experience of international urbanism are dire, including social isolation. Citizens of metacities do not generally acknowledge their dependence on their physical neighbors who are not hooked in—or even the parts of their own countries that support them with food and other resources.

- **All major global cities** are functionally the same “place.”
- **Social and cultural experience** can be unhinged from geography.
- **Multi-sensory virtual experience** and rapid physical mobility create a new world map.
- **Perceptual fluidity** can merge virtual representations and physical instances of buildings, artifacts, and landscapes into new “places.”

LINKS TO FORECASTS:

- **HYPER-URBANIZATION** is a vibrant, diverse experience accessible to anyone with sufficient bandwidth.
- **DEMATERIALIZATION** renders many experiences of physical geography obsolete.
- **INFORMATION INTENSIFICATION** filters the experience of place to create new ways of comprehending the world.

SIGNALS

Global Cities Index identifies core connected cities

Numerous efforts to rank cities on the basis of political, cultural, and economic influence consistently come up with the same locations—all displaying dense interconnections. These form the core of an emerging metametropolis, even without virtualization of their landmark environments.



atkearney.at

Virgin Galactic develops commercial suborbital travel

Richard Branson’s Virgin Galactic “spaceline” has announced the sale of commercial suborbital trips. Initially, the company will run to and from a spaceport in New Mexico, but eventually the company will expand to service between cities. It is now accepting bookings for \$200,000 per person.



virinalgalactic.com

Telectroscope “art tunnel” connects New York and London

The Telectroscope art project purported to offer a “tunnel underneath the Atlantic Ocean” between London and New York, with a real-time video connection between the two. The project envisioned a form of “visual amplification” to let passersby peer across the ocean to the city at the other side.



en.wikipedia.org

STARTING FROM THE UNLIKELY PLATFORM OF OPEN INTELLECTUAL PROPERTY (IP), THE PIRATE PARTY

—a movement begun in Sweden in 2006 and subsequently spread globally—has won the hearts, minds, and votes of electorates in Western Europe, North and South America, and even Russia. Through a decade of joblessness, climate disasters, and growing corruption of legacy institutions, a generation of debt-burdened youth has come to see the writing on the wall: in a world of private ownership, they will own little. Instead, they have turned to open-source strategies to create their own version of success, but rather than simply rejecting the established political system, they seek to take it over. Well-versed in micro-trade, micro-jobs, and micro-enterprises, these pioneers of social abundance have rejected attempts to enclose open platforms for everything from friends to maker communities, from learning to scientific discovery to social services. Labels like “worker” and “consumer” are meaningless to them, as they consider themselves to be neither. Rallying behind a cry for “netarchical” processes rather than hierarchical structures, they have gathered support beyond angry young people, gaining followers among a growing segment of chronically unemployed middle-aged adults as well as the under-funded retired. Their numbers add up to votes, influence, and a critical mass for fundamental change. Their 2022 bumper sticker? *Everything Is Free!*

- A “Robin Hood” philosophy penetrates the economy. Even as new laws seek to protect formulas, designs, and distribution platforms, hackers find workarounds, open-source strategists build public platforms to displace private platforms, and Pirate Party lawyers work to establish new net-friendly open-source protocols and licenses, using early innovations like Creative Commons as a model.
- DIY cities that have opened their data to the public are the hot zones of innovation in goods and services as well as civic engagement. They are also the epicenters both of the Pirate Party constituency and of a nascent economic revival.
- New manufacturing processes and home-brewed synthetic materials produce very cheap goods that can be replicated everywhere, draining value out of old economy sectors such as mining, manufacturing, and shipping, as well as new economy sectors like design.
- Currencies fragment into myriad forms of tradable value, and while “Everything Is Free,” lots of social economies run on metrics of contribution, reputation, competency, and celebrity.
- The productive cycles of daily life become even less routine, as everyone tries to optimize physical and mental well-being by attending to individual chronobiological cycles.
- The principles of netarchy become increasingly well-defined and codified in law—for example, by adopting creative commons policies.

THE PIRATE PARTY WINS!

- **The netarchical society** privileges peer-to-peer social relationships over hierarchical economic or power relationships.
- **Consumerism and the culture of consumption** are summarily rejected in favor of a perspective that ranks sharing and creation as daily goals.
- **The concept of intellectual property** is seen as a category error—the value of a creation comes not from owning it, but from using it.
- **Secrecy is rarely justified** and transparency is accepted as the default behavior.

LINKS TO FORECASTS:

■ **HYPER-URBANIZATION** and increased living density make privacy less possible and prompt growing friction from competitive hierarchical behaviors.

■ **DEMATERIALIZATION** coevolves with the Pirate Party, as digitized, atomized, and eco-systematized goods and services are particularly amenable to collaborative creation and open-source sharing.

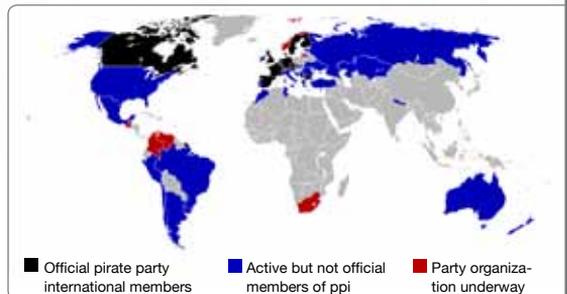
■ **SOCIAL PRODUCTION** advances the idea that shared creation is a sign of citizenship, not employment.

■ **INFORMATION INTENSIFICATION** fosters experiments in transparency, collaborative knowledge creation, and open-source processes as useful models for coping with massive amounts of information.

SIGNALS

The Pirate Party does win!

Since 2006, Pirate Party groups have had increasing success in European elections. In 2009, the Swedish Pirate Party received 7.1% of the vote for the European Parliament, securing one seat. In 2011, the German Pirate Party won 8.9% of the vote for the Berlin state parliament, gaining 15 seats. Pirate Party members have been elected to positions in five European countries.



en.wikipedia.org

Secret copyright negotiations held

International negotiations crafting the Anti-Counterfeiting Trade Agreement (ACTA), which puts restrictions on online speech to protect IP, were held entirely in secret for “National Security”—but treaty drafts were regularly shown to and evaluated by large media companies and lobbying groups (but not civil society or public-interest organizations).



ustr.gov

Plug-ins override DNS blocking

Proposed IP legislation (the “Stop Online Piracy Act,” or SOPA, which was stalled in early 2012) would have required that American ISPs forbid access to websites accused of supporting piracy by blocking DNS, the means by which domain names are translated into numerical Internet addresses. Soon after this component of SOPA was announced, two unofficial plug-ins—DeSopa and The Pirate Bay Dancing—appeared at the Firefox website, allowing users to undo easily any DNS blocking. (The Pirate Bay is a major source of pirated media.)



geek.com

SOCIAL, ECONOMIC, AND CREATIVE CONNECTIONS VIA THE INTERNET HAVE LONG BEEN CONSIDERED TO EXTEND HUMAN COGNITION, even

when simply serving as “offloaded memory storage.” Now, advanced versions of these technologies produce an extraordinary level of intimacy between mind and machine. Not only do these cloud-based platforms house documents and recordings, but the development of neural interfaces now allows machines to record linguistically translatable thoughts and images from our visual imagination, even dreams. Although quite popular, such systems are highly controversial: the key debate is about ownership of the products of the extended mind. In keeping with precedents set by early social media platforms, most advanced social media companies interpret their terms of service as assigning all intellectual property rights for user expressions, even those rendered by neural interfaces, to the platform company. Any mental creation, invention, or expression (either recorded manually or simply by thought) is now considered property of the social network owners, to be used as they see fit. Lawsuits and threats of legislation cause some of the smaller networks to reconsider their positions, but the two dominant platforms insist they are in the legal right. Calls for boycotts have even less effect: with over 2.5 billion people and millions of businesses relying on these networks as their sole mental extension platform and brain operating system, it is not surprising that less than 1% of network users close their accounts.

- Those who own the cognitive extension platforms claim that they are providing all the necessary materials for creative thought, and since many of these ideas would not have been thought without the aid of their technologies, they should co-own the IP generated from these augmented minds.
- Some companies vow to leave their recording functions completely free, but consider expanding advertising into their extension platforms. Others offer a “freemium” model, wherein those who use it for free are exposed to ads, while others can pay to have an advertising-free cognitive experience.
- One popular use is the production of an emotional lifetrack (like a soundtrack that accompanies a film) for users. Massive personal databases live in the cloud, and without access to the extended mind, many users find it difficult to define their full selves, including their memories, ideas, and dreams.
- The pollution of our cognitive ecology with advertising, the terms of services associated with accessing our own minds, and the move for some platforms to “own” the products of our minds has made for a complex and ethically ambiguous relationship between people and their technologically extended minds.

- **Ideas and dreams** can be recorded directly from the brain to the cloud.
- **Intellectual property ownership** can be extended to thoughts, not just expressions of thoughts.
- **Human mental autonomy** and independence are no longer sacred.
- **Identity extends** beyond the biological body and mind.

LINKS TO FORECASTS:

■ **DEINDUSTRIALIZATION** privileges knowledge and idea-based products, turning the “cognitive ecology” into a potentially lucrative new market.

■ **INFORMATION INTENSIFICATION** drives extended mind technologies as isolated biological brains prove insufficient to handle massive waves of information.

■ **BIOMOLECULARIZATION** provides the underlying science that supports the exploration and exploitation of cognitive structures.

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Facebook claims ownership of user-posted content

In 2009, Facebook changed their terms of service in order to claim a license to use any and all user-posted content as the company pleases, even if a user closes his or her account. Ownership of user-generated content has been a controversial issue for social media platforms, but considering that many business models are built around selling user content and data, the incentive structure for the social media platform favors increased control over user data.



cac.ophony.org

Students relinquish rights to work they produce for classes

Universities have been at the frontlines of debates about who actually owns the intellectual property produced by employees and students. The University of Hawaii's Academy of Creative Media requires film school students to assign copyright to the University for all work they produce in their courses. Because the ACM provides students a “valuable opportunity to learn, grow, and create,” it claims it deserves to own the materials produced for their courses.



hawaii.edu

Researchers decode what the mind sees

Researchers at the University of California Berkeley's Gallant Lab have created a neural imaging and reconstruction technology that can translate neurological signals from the visual cortex into visible images. In other words, the machine can re-create what a person is seeing by using neurological data—laying the groundwork for entirely new means of expression and capture of human experience.



us.industrysourcing.com

IN A WORLD OF HYPER-RATIONALISM, AN UNDERTOW OF IRRATIONAL THOUGHT IS MANIPULATED WITH INCREASING PRECISION BY PERSUASIVE TECHNOLOGIES.

These technologies build on new insights from neuroscience that recognize weaknesses in human processing of signals from their environment and target these weak spots as a back door into human behavior and human perception. While some technologies manipulate the brain directly through novel neural interfaces, the more common persuasive technologies are subtly embedded in digital data streams that pervade everyday life. Whether direct or indirect, they are generally employed by advertisers, politicians, and the military, as well as by educators and even health care professionals. Some are used with full disclosure, while others remain cloaked in secrecy. And while mostly uncoordinated, the ultimate outcome of all these manipulations is a growing level of mental illness—or behaviors and experiences that are defined as delusional, irrational, and anti-social.

- The burden of this cultural disorder is borne primarily by the health care system, where the cost of mental health treatment escalates sharply.
- Educators and even self-help programs employ some of the same tools and technologies that have produced this large-scale dysfunction, in an attempt to control the irrational behaviors.
- Democratic processes are effectively undermined—and even attacked—as widespread mental illness calls their effectiveness into question. The mentally ill lose their voting rights in many places, disenfranchising up to 50% of the population in some states.
- Corporate workplaces struggle to screen for so-called delusional workers while employing persuasive technologies to enhance human performance.
- Social protest is increasingly framed as mental illness—especially if it attacks “unseen actors planting ideas in our heads and manipulating our thoughts.”
- In the most disturbing expression of this technology, applications ranging from truth-telling aerosols to hallucinations triggered by radio frequencies are used as general-purpose weapons in localized conflicts, targeting people with impeded mental capacity to recruit them for the most violent acts of war.

- **Human perception and behavior** can be precisely controlled to tap irrational mental processes.
- **Cultural delusion** becomes a valid mental health diagnosis.
- **Sophisticated remote interfaces** to the human brain can be weaponized to control behavior.
- **It is both possible and acceptable for advertising** to be placed directly into our thoughts and dreams.

LINKS TO FORECASTS:

■ **HYPER-URBANIZATION** introduces a variety of new social-psychological disorders as people adjust to radically new landscapes with increasing human density.

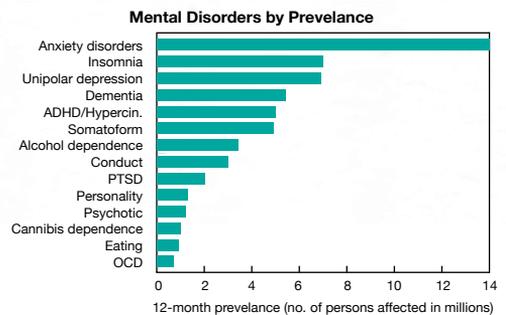
■ **INFORMATION INTENSIFICATION** and the offloading of personality into the cloud undermines the sense of an independent psyche.

■ **BIOMOLECULARIZATION** provides both psychological and physiological tools for manipulating human perception and behavior.

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Nearly 40% of Europeans suffer from mental illness

A recent study by the Institute of Clinical Psychology and Psychotherapy at Dresden University suggests that 38% of the population suffers from mental disorders ranging from depression and phobia to psychotic disorders.



“Human factors” experiments demonstrate remote mind manipulation

Over the last 40 years, the U.S. government has funded over 100 “special access” programs designed to test the viability of remote interaction with the human brain.

- 1990 — Aerosols tested as means to encourage “truth telling” in interrogation.
 - 1978 — Los Alamos National Labs operationalizes communication 1 km away by RF into the auditory cortex in humans.
 - 1975 — Air Force Human Resources Laboratory tests radio frequency transmission (RF) for instilling fear and hallucinations.
- grist.org

“Mind control” flyer appears in San Francisco’s financial center

A flyer posted anonymously on lampposts in San Francisco’s financial center in August 2011 made accusations against unnamed “controllers” beaming thoughts into people’s brains. The author appears to suffer from paranoid schizophrenia, but apparently does not realize the full extent and impact of the science he refers to—in other words, he doesn’t realize why and how he may be right.

Reflect on the number of times per day you have conversations with imaginary friends inside your head where the discussion is very detailed, lengthy, political in nature, and, it seems like you experience how the other person physically feels like. This is actually the result of remotely based technology being applied to your head to influence you.

Anonymous flyer in San Francisco

BREAKTHROUGHS IN THE ABILITY TO READ AND WRITE BRAIN SIGNALS LEAD TO A VARIETY OF DEVELOPMENTS IN THOUGHT-MEDIATED TECHNOLOGIES,

but none more important than the rise of so-called intuition networks that link the subconscious minds of multiple participants. By connecting two or more minds together via wireless networks—referred to by some as “telepathic” networks or even mirror neurons at a distance—these intuition networks allow for deeper thinking on complex problems than would normally be possible. Experimental applications are widespread: counter-terrorism and border control personnel are able to spot subtle cues of furtive behavior, leading to calls for the reduction of crude airline security rules. Scientists and other researchers are able to devise long-term, complex solutions to knotty environmental, economic, and social problems. Businesses leap on the technology as a better way to spur innovation. Fears about mind control and the potential for catastrophic software bugs keep telepathic networks from being widely used, but they are quickly adopted by organizations seeking radical advantages over their opponents.

- Security is a significant issue, with fears of hacking, spam, even “neuro-cyberwar.” Few provable cases of such attacks can be found, but governments pursue research into encryption, neural defense, and hacking methods.
- The first versions of this technology rely on fMRI tools, and intuition networks are initially static and expensive. Within a few years, portable and, eventually, wearable versions make intuition networks much more commonplace.
- Some tools emerge from efforts to help people with neurological damage or disorders such as autism cope with complex social environments. These tools are quickly adopted by the so-called neurotypical as a means of allowing more nuanced relationships. The social grammar employed by social support technology is embraced in intuition networks, simplifying their adoption.
- Experiments put the maximum functional size of an intuition network somewhere around 100–120 people, paralleling Robin Dunbar’s research on social cohesion. Intuition networks numbering more than 120 people are generally too “noisy” for useful results, and networks numbering more than 250 tend to turn into “consolidated personality mills,” more commonly referred to as “hive minds,” with a small number of dominant personalities. While highly unusual in reality, they prove irresistible as plot devices for movies.
- Networks with mixes of culture, gender, and demographics provide the most provocative and valuable new insights, giving new clout to regions with heterogeneous populations.

- **A specific region of the brain** is dedicated to intuition.
- **It's possible to reliably stimulate the intuition** regions of the brain, influencing subconscious processing without implanting specific memories or thoughts.
- **Remote brain-to-brain stimulation** supports a larger-than-human mind that can produce useful results.
- **Such extended minds** are viable economic entities.

LINKS TO FORECASTS:

■ **SOCIAL PRODUCTION** of innovation and insight drives collaboration toward a “society of mind.”

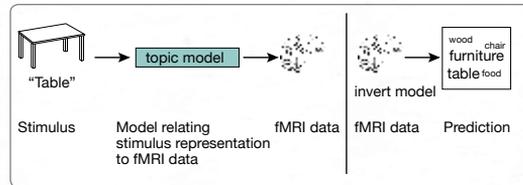
■ **INFORMATION INTENSIFICATION** both demands and reveals new social processes for managing information complexity and expanding human cognitive capacity.

■ **BIOMOLECULARIZATION** provides molecular-scale understanding of cognition, intuition, and the subconscious sociality of the brain.

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Scientists “read” text from brain images

Using fMRI techniques, a team of Princeton University researchers has demonstrated that it is possible to read meaning into brain images, having once established a model for classes of words related to a topic. The process starts by “training” the human-machine system to link a body of text to a specific visual image (for example, of a table) and then captures the fMRI image for that brain activity. Inverting the process, it uses fMRI images to predict words when people think about an object.



frontiersin.org

Ultrasound stimulates neural circuits for treatment of neurological disorders

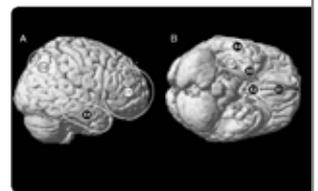
SynSonic has patented several technologies for non-invasive ultrasound stimulation of brain circuits, with initial applications in the treatment of neurological diseases such as Parkinson’s disease and epilepsy. The company anticipates that, in the coming decades, such ultrasonic neuromodulation technology will be used not only in medical applications, but also in military defense applications, brain-computer interfaces, and the entertainment industry.



pages.synsonix.com

Neural correlates of intuition reveal “automatic” self-knowledge

Using brain imaging to distinguish different kinds of activity in the brain, a number of researchers have identified two distinct systems at work when people respond to questions or information about themselves. The C-system is the evidence-based system involved in effortful and intentional social cognition. The X-system appears to construct implicit, tacit, or automatic self-processes that operate without effort, intention, or awareness. A recent study by Matthew Liebermann and coworkers suggests that, in domains where people have a lot of experience, they draw primarily on this latter system, which is affective and slow to change.



scn.ucla.edu

IN THE FACE OF ALL KINDS OF CRISES, FROM ANTIBIOTIC RESISTANCE TO DWINDLING ENERGY RESERVES, the world is mobilizing at the microbial scale.

Bacteria are the focus of policy worldwide: communities work to lower their antibiotic resistance scores, medical practice shifts to maximize microbial diversity, measures of energy independence veer from in-ground reserves to fermentation capacity, and bioterrorism jumps to the top of the list of state security concerns. From early efforts to map the microbial diversity of regions of the body (mouth, eyes, ears, gut, and more), microbial mapping has spread beyond the body to microbial signatures for homes and gardens, schools and neighborhoods, even social networks. Real estate developers strive to meet standards for microbe-efficient residences, while epidemiologists study their effects on health. At the heart of these efforts is a widespread commitment to a new microbial literacy in every dimension of daily life, and with this literacy comes a growing comprehension of the nature of life as a superorganism. Humans are no longer simply individuals with occasionally bothersome bugs in their guts and lungs—they are complex ecosystems without readily definable boundaries. Policy drives them to apply this newfound understanding to the shared problems that plague civilization in the 2020s.

- Personal microbial signatures become the basis of new kinds of identity profiles that tend to pigeonhole people into obvious and non-obvious categories: high or low insurance risks, fast or slow learners, and leaders or followers.
- Early studies of the impact of social networks on health, happiness, and physical fitness (with benefits at up to three degrees of separation) find a biological basis in the bacterial pathways that link humans even more intimately than social media.
- Households become “designer microbiomes” as subsidies support homeowners in a rapid reconfiguration of houses and apartments to create a microbial ecosystem that provides solutions to energy, cleaning, food preservation, lighting, and human waste.
- Healthy building design rejects conventional mechanical ventilation as deleterious to microbial diversity. Strategies that bring the outside in draw on studies of the microbial signatures of children raised in rural homesteads compared with those raised in air-conditioned urban residences.
- Microbial testing at airport security gates is introduced to test for possible explosive residues as widespread microbial literacy brings with it a growing incidence of bioterrorism.
- Personhood arguments and the movement to protect the rights of non-human species extend to microbes, as people raise issues about microbial rights and microbial citizenship.

- **Microbial ecosystems** can be designed and managed at multiple scales, from the organ to the organism, superorganisms, and even entire communities.
- **Microbial signatures** shape human capacities.
- **Humans have identities** as superorganisms and those identities can be altered.
- **The built environment** is itself a microbiome—in effect, an agglomeration of superorganisms.

LINKS TO FORECASTS:

■ **HYPER-URBANIZATION** creates health crises that have both their roots and their solutions in microbial ecosystem management.

■ **DEINDUSTRIALIZATION** drives a paradigm shift from mechanical systems to biosystems in which microbes play a leading role.

■ **DEMATERIALIZATION** provides the design and manufacturing tools for assembling complex bioprocesses and bio-organisms at multiple scales.

■ **BIOMOLECULARIZATION** creates a literacy of very small-scale life, using tools for measuring and manipulating microbes.

SIGNALS

Second Genome jumpstarts microbial profiling

Second Genome, a tech transfer company that emerged from work at the Lawrence Berkeley National Laboratory, is fast-tracking microbial profiling with its PhyloChip, which the company says “provides a rapid, accurate, comprehensive way of detecting the presence, quantity, and diversity of bacteria in an air, water, soil, or clinical sample without having to rely on inefficient bacterial culturing.” The chip is being rapidly deployed in a wide variety of academic and industrial settings, but the company is also seeking to contribute to the mapping of the second “human” genome—namely the genome of all the bacteria that make up the human superorganism.



lbl.gov

New BioBE Center targets the microbiome of the built environment

Newly established at the University of Oregon, the Biology and Built Environment Center (BioBE) is working to understand the “built environment microbiome.” Recognizing the trillions of diverse microorganisms that populate buildings, the center hopes to define a new architecture-biology interface that optimizes both human health and environmental sustainability.



biology.uoregon.edu

Microbial Home project explores microbial efficiency in homes

Philips has developed a concept home that takes a micro-biosystem approach to the domestic processes typically carried out in a home, in an attempt to create an integrated cyclical ecosystem. At the core of this home is a bio-digester kitchen island that uses microbial cultures to convert various forms of waste in the house to energy for cooking and lighting. The design project also explores bio-lights made up of glass cells containing a live bacterial culture that emits soft green light by bioluminescence.



design.philips.com