



Dr. Kamila Markram

Co-Founder & CEO at Frontiers

Autism Project Director at Brain Mind Institute, Swiss Federal Institute for Technology (EPFL)

Profile at Frontiers:

<http://community.frontiersin.org/people/KamilaMarkram/79>

■ Synopsis

Kamila is a neuroscientist, autism researcher and co-founder and CEO of [Frontiers](#), a leading open-access academic publisher and social network for researchers. She is on a mission to make research freely available for the benefit of humanity, popularize science and the people behind the discoveries to help create aspirational role models for the younger generations.

Frontiers is a community-rooted gold open-access publisher that has attracted over 160,000 active leading researchers as authors and editors. Based on scalable in-house technology, Frontiers was the first to take scholarly publishing entirely online, made peer-review efficient and transparent, provide impact metrics for papers and researchers, and merge open-access publishing with a research network platform to catalyze research dissemination and popularizes research to the public, including kids. Frontiers is today the 4th largest open-access publisher, has received the industry-leading *ALPSP Award For Innovation In Publishing*, and formed an [alliance](#) with the world's most prestigious science journal publisher, Nature Publishing Group, to advance the global Open Science movement.

Kamila is also the director of a neuroscience team that studies autism at the Swiss Federal Institute of Technology Lausanne (EPFL). She co-developed the "Intense World Theory of Autism" which proposes that autism is the result of a "super"-brain that perceives, absorbs and feels too causing autistic people to withdraw from an overly intense world. This theory fundamentally challenges the established dogmas in autism research and has been [featured](#) in popular science magazines and TV documentaries, most recently in a documentary by Academy Award winning film-maker Roger Ross Williams in his current project *Life, Animated* about the exceptional life of an autistic boy.

Kamila obtained an MSc in Psychology, summa cum laude, from the Technical University Berlin in 2003, completed her masters-thesis at the Max-Planck Institute for Brain Research in Frankfurt and obtained an award-winning PhD degree in Neuroscience at the EPFL in 2006. She frequently speaks at universities and conferences on topics related to autism, Open Science and the future of scholarly publishing, including the National Academy of Sciences, Science Foo Camp and the Euroscience Open Forum.

In 2004, Kamila married her soul mate Henry Markram, renowned neuroscientist and director of the [Human Brain Project](#), Europe's 1 billion Euro flagship project to simulate the human brain on super-computers. They are part of a patchwork family of 5 kids: 2 recent, Olivia (3) and Charlotte (1), and 3 from Henry's first marriage, Linoy (25), Kali (23) and Kai (19).

■ Personal Data

Born Kamila Senderek on Dec. 23rd, 1975, in Wroclaw, Poland
Fluent in German, English, Spanish and Polish. Basic in French and Portuguese.

■ Positions

2007 - present **Co-Founder & CEO, Frontiers**

In 2007, Kamila and her husband, Henry Markram, both neuroscientists, founded Frontiers, an academic publishing and networking company, in order to democratize scholarly publishing, take it online and provide better and innovative solutions on how science is reviewed, published, evaluated, communicated and disseminated to both academics as well as the general public.

Today, Frontiers counts more than 160,000 leading researchers as users, including 50,000 world-renowned scientists, clinicians and scholars serving on the Frontiers editorial board, making it the largest in the world. Since 2008, Frontiers has published over 25,000 peer-reviewed articles across over 48 academic journals covering more than 400 specialty niches across science, medicine and technology and is rapidly expanding its reach across all of academia, including the humanities. Frontiers articles have received over 50 million views and downloads and are regularly featured in leading newspapers, radio and TV programs, such as the BBC, TIME, New York Times etc.

Under Kamila's leadership as CEO and also the conceptual architect behind the scalable IT, Frontiers became self-sustainable in a record of just 4 years and 5'000 published articles (the largest open-access publisher, PLoS, needed 10 years and 22'500 articles), and became the 4th-largest open-access scholarly publisher in 2013 (out of 3'000 open-access publishers). Several of Frontiers' journals already take the #1 position amongst many long-standing and well-established scholarly journals: for example, Frontiers publishes the world's largest journal in Psychology and the largest open-access journals in Physiology, Plant Science, Immunology and has several journals competing to become the highest volume publishing journals in their respective categories. The Frontiers team grew from ~10 in 2012 to over 140 by September 2014, across Lausanne (HQ), Madrid and London and soon Silicon Valley.

In 2013 the Holtzbrinck Group, owner of Macmillan Science and Education and Nature Publishing Group (NPG), the publisher of the world's most prestigious science journals, made a substantial investment into Frontiers, which not only spurred cooperations with the various Holtzbrinck companies and a strategic alliance with NPG, but also validated Frontiers high-quality and fast rising open-access platform and business, and catalyzed the subsequent expansion of journals across the entire academic tree.

Frontiers was the top **Gold winner** of the industry-leading prestigious *ALPSP Award for Innovation in Publishing* in 2014. Frontiers in Young Minds, a scientific journal for children that translates cutting-edge research into kids articles and involves kids in the review process, was featured as a "Great Website for Kids" by the American Library Association.

Frontiers in the press, a selection:

I owe my business to my frustration as a scientist (2014)

<http://blogs.nature.com/ofschemasandmemes/2014/06/23/i-owe-my-business-to-my-frustration-as-a-scientist-frontiers-co-founder-kamila-markram>

Academic publishing: Free-for-all (2013)

<http://www.economist.com/news/science-and-technology/21577035-open-access-scientific-publishing-gaining-ground-free-all>

How Interactive Peer Review Works (2013)

http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2013_04_09/caredit.a1300068

Rethinking Peer Review in Academic Publishing: An Interview with Frontiers (2013)

<http://chronicle.com/blogs/profhacker/rethinking-peer-review-in-academic-publishing-an-interview-with-frontiers/45291>

Changing Nature (2013)

<http://www.economist.com/blogs/babbage/2013/02/scientific-publishing>

2007 - present **Autism Project Director, Swiss Federal Institute of Technology, Lausanne**

Kamila leads a neuroscience team that studies autism in several rodent models using a spectrum of approaches at the genetic, molecular, cellular, synaptic, circuit, systems and behavioral level. She is the author of the scientifically and publically acclaimed *Intense World Theory of Autism* which proposes that autism is caused by a hyper-functional brain that processes and stores too much information and that many symptoms of autism may be secondary to exaggerated fear memories and an overly intensely perceived world. The theory challenges current dogmas in autism research and has triggered a heated debate in the research community, received attention in the press, and lots of support by autistic people and their parents.

Intense World in the press, a selection:

The boy whose brain could unlock autism. Matter (2013)

<https://medium.com/matter/70c3d64ff221>

Do supercharged brains give rise to autism? New Scientist (Issue 2674, 19 Sep. 2008)

<http://www.newscientist.com/article/mg19926741.700-do-supercharged-brains-give-rise-to-autism.html>

Inside an autistic brain. RTS - Swiss TV emission, minute 17:30 onwards:

<http://www.rts.ch/emissions/36-9/2467700-au-coeur-du-cerveau-autiste.html>

Education

2006 – 2007 Post-doctorate, Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland

Laboratory of Neural Ensemble Physiology, Prof. Dr. Miguel Nicolelis

Studied autism in awake behaving rats using multi-electrode recordings in the amygdala, an emotion center of the brain.

2003 – 2006 PhD in Neuroscience and Developmental Neurobiology, EPFL, Lausanne, Switzerland

Laboratory of Behavioural Genetics, Prof. Dr. Carmen Sandi

Received: Brain & Mind Award for Outstanding Progress in a PhD

Studied mechanisms of emotional learning and memory in the amygdala at the synaptic and behavioural level. Discovered that fear memories are amplified in the VPA rat model of autism, laying the foundation for the Intense World Theory of Autism.

2001 – 2002 Diploma Thesis, Max-Planck-Institute for Brain Research, Frankfurt, Germany

Department of Neurophysiology, Prof. Dr. Wolf Singer, Dr. Sergio Neuenschwander, Prof. Dr. Klaus Eyferth (TUB)

Grade: excellent (1)

Studied oscillation and synchronization patterns in the cat visual cortex in vivo using multi-electrode recordings.

2000 - 2001 Student Research Assistant at the Department of Biological Psychology and Psychophysiology at the Humboldt-University at Berlin, Germany

Prof. Dr. Werner Sommer and Dr. Jörg Sangals

Assisted in performing and analyzing EEG-experiments in human subjects studying attention and memory.

1999 - 2000 ERASMUS student at Complutense de Madrid (UCM), Spain

Assisted in performing and analyzing behavioural and neuroanatomical experiments on the effects of alcohol on learning and memory in rats, leading to two publications.

- 1998 – 2003 **Diploma/Master in Psychology, Technische Universität Berlin (TUB), Germany**
Grade: excellent (1)
- 1996 – 1998 **Studied Philosophy at Freie Universität Berlin (FUB), Germany**
- 1995 – 1996 **Gap year in Mexico City, studying and doing voluntary work**
- 1995 **Abitur, Gymnasium Lünen-Altlünen, Lünen, Germany**
- 1992 – 1993 **Exchange program with intercultural organisation (AFS)**
Lived for 1 year with a Mexican family in Oaxaca, Mexico, attended secondary school: URSE of Oaxaca.

■ Stipends, Fellowships and Awards

- 2014 Frontiers received the top “Gold” ALPSP Award for Innovation in Publishing, an industry-leading award that recognizes the best innovators in scholarly publishing
- 2014 “Frontiers for Young Minds”, the free scientific journal for kids, edited by kids, is featured as a “Great Website for Kids” by the American Library Association
- 2007 Travel Award for the Genes, Brain and Behaviour Conference of the International Behavioural and Neural Genetics Society Annual Meeting, Doorwerth, The Netherlands
- 2006 Alliance Award for the patent Methods for Treating and/or Preventing Pervasive Developmental Disorders in a Subject, EPFL, Switzerland
- 2005 Stipend Award for the Cold Spring Harbor Laboratory summer course Neurobiology of Learning, Cold Spring Harbour, USA
- 2004 Stipend Award for the RIKEN summer school Learning and Memory, Wako-Shi, Japan
- 2004 Brain & Mind Award for Outstanding Progress in a PhD, EPFL
- 2001 Stipend Award for the FENS Winter School on the “Structure and formation of neuronal representations”, Kitzbuehel, Austria
- 1999 Stipend Award for ERASMUS university exchange program to Madrid, Spain (selected amongst hundreds of applicants)
- 1992 Stipend Award for Associated Field Service (AFS) school exchange program to Oaxaca, Mexico (selected amongst hundreds of applicants)

■ Selected Conferences

- 2014 SCIENCE FOO CAMP, GOOGLE (Mountain View, USA)
“Big” Publishing: how open science and open data transform the scholarly publishing industry
- 2014 EUROPEAN SCIENCE OPEN FORUM (Copenhagen, Denmark)
I owe my business to my frustration as a scientist
<https://esof2014.pathable.com/#meetings/174669>
- 2014 OPENAIRE (Athens, Greece)
Open Science: The Future of Scholarly Publishing
<https://www.coar-repositories.org/community/events/annual-meeting-2014/program/>
http://www.slideshare.net/OpenAIRE_eu/frontiers-at-open-aire-140522km-35790455

- 2014 NATIONAL ACADEMY OF SCIENCE JOURNAL SUMMIT (Washington DC, USA)
Transparent Peer-Review
- 2013 EPFL OPEN ACCESS CONFERENCE (Lausanne, Switzerland)
Open Science in the 21st Century
<http://video.epfl.ch/2192/1/10>
- 2013 OPEN KNOWLEDGE CONFERENCE (Geneva, Switzerland)
Open Technology and Research
<https://vimeo.com/79932550>
- 2013 CONFERENCE ON OPEN ACCESS SCHOLARLY PUBLISHING (Riga, Latvia)
Frontiers: Community-Rooted Scholarly Publishing
<http://oaspa.org/conference/presentations-coasp-2013/>
- 2013 SPOTON LONDON
Open, Portable, Decoupled? How should peer review change?
<https://www.youtube.com/watch?v=hoWKJD0FuhQ>
- Motivations for data sharing*
https://www.youtube.com/watch?v=_BOiimfXpx8
- 2012 SPOTON LONDON
Keynote: Publishing Science in the Internet Age
<https://www.youtube.com/watch?v=jclSOMszEcQ>

■ Patents

Methods for treating and/or preventing Pervasive Developmental Disorders in a Subject

By Henry Markram, Tania Rinaldi, Karina Kulungara, Brandi Mattson, Maria Toledo Rodriguez and Kamila Markram (2005).

■ Publications

12 peer-reviewed scientific publications, 500 citations, >100'000 views and downloads

1. Favre MR, La Mendola, DMarkram H; **Markram, K** (2014). **Predictable enriched environments reduce hyper-emotionality in the VPA rat model of autism.** *In preparation.*
2. Favre MR, Rinaldi Barkat T, LaMendola D, Khazen G, Markram H, **Markram K** (2013). **General developmental health in the VPA rat model of autism.** *Frontiers in Behavioral Neuroscience.* Doi: 10.3389/fnbeh.2013.00088.
<http://journal.frontiersin.org/Journal/10.3389/fnbeh.2013.00088/abstract>
1'300 views & downloads
3. Delattre V, LaMendola D, Meystre J, Markram H, **Markram K** (2013). **Nlgn4 knockout induces network hypo-excitability in juvenile mouse somatosensory cortex in vitro.** *Scientific Reports.*
<http://www.nature.com/srep/2013/131009/srep02897/full/srep02897.html>
500 views & downloads
4. **Markram K**, Markram H (2010). **The Intense World Theory – A Unifying Theory of the Neurobiology of Autism.** *Frontiers in Human Neuroscience.* Doi: 10.3389/fnhum.2010.00224
<http://journal.frontiersin.org/Journal/10.3389/fnhum.2010.00224/abstract>
65'000 views & downloads

5. Testa-Silva G, LeBe JV, Riachi I, Rinaldi T, **Markram K**, Markram H (2009). **Enhanced long-term microcircuit plasticity in the valproic acid animal model of autism.** *Frontiers in Synaptic Neuroscience*. Doi:10.3389/neuro.19.001.2009
<http://journal.frontiersin.org/Journal/10.3389/neuro.19.001.2009/abstract>
3,500 views & downloads
6. Conboy, L, Bisaz, R, **Markram K**, Sandi, C (2008). **The Role of NCAM in Learning and Emotion.** *Neurochemical Research*. DOI: 10.1007/s11064-008-9601-4.
7. Markram H, Rinaldi T, **Markram K** (2007). The Intense World Syndrome – an alternative hypothesis for autism. *Frontiers in Neuroscience*, 1(1): 77-96.
<http://journal.frontiersin.org/Journal/10.3389/neuro.01.1.1.006.2007/abstract>
8'000 views & downloads
8. **Markram K**, Rinaldi T, La Mendola D, Sandi C, Markram H (2007). **Abnormal fear conditioning and amygdala processing in an animal model of autism.** *Neuropsychopharmacology*. doi: 10.1038/sj.npp.1301453.
<http://www.nature.com/npp/journal/v33/n4/full/1301453a.html>
9. **Markram K**, Lopez-Fernandez MA, Abrous DN, Sandi C. (2007). **Amygdala upregulation of NCAM polysialylation induced by auditory fear conditioning is not required for memory formation, but plays a role in fear extinction.** *Neurobiology of Learning and Memory*. 87(4): 573-82.
<http://www.sciencedirect.com/science/article/pii/S1074742706001638>
10. **Markram K**, Gerardy-Schahn R, Sandi C (2007). **Selective learning and memory impairments in mice deficient for polysialylated NCAM in adulthood.** *Neuroscience*, 144 (3): 788-96.
<http://www.sciencedirect.com/science/article/pii/S0306452206013704>
11. Garcia-Moreno LM, Capilla A, Garcia-Sanchez O, Luque J, **Senderek K**, Conejo NM and Arias JL. (2004). **Alcohol tolerance in rats submitted to different periods of chronic an acute ethanol intake.** *Psicothema*, 16: 211-216.
<http://www.psicothema.com/psicothema.asp?id=1184>
12. Garcia-Moreno LM, Conejo NM, Capilla, A, Garcia-Sanchez O, **Senderek K** and Arias JL (2002). **Chronic alcohol intake and object recognition in young and adult rats.** *Progress in Neuro-Psychopharmacology & Biological Psychiatry*, 26: 831-837.
<http://www.ncbi.nlm.nih.gov/pubmed/12369254>

Other publications:

1. Markram H, **Markram K** (2011). **Frontiers Research: Seek, Share & Create in Common Knowledge; the challenge of transdisciplinarity.** p 145-162. *EPFL Press*
http://books.google.ch/books?hl=en&lr=&id=Mt6kOqcVNoC&oi=fnd&pg=PA145&dq=info:4q94FNpRSQJ:scholar.google.com&ots=0OP7jfnbNX&sig=_gL1dS0fkr8qPlqE-Nd2ABylm_U&redir_esc=y#v=onepage&q&f=false
2. **Markram K** (2006). **The role of the amygdala in emotional memories: a multidisciplinary approach PhD Thesis.** Ecole Polytechnique de Lausanne (EPFL). DOI: 10.5075/epfl-thesis-3621
<http://www.frontiersin.org/profile/publications/22629126>
3. **Markram K** (2002). **Response Coordination: Does It Depend on Ongoing Neural Interactions?** Masters Thesis. Max-Planck Institute for Brain Research, Technical University of Berlin
<http://www.frontiersin.org/profile/publications/22629127>

frontiers

open-access publisher and research network

A compilation of news stories on Dr. Kamila Markram, the Neuroscientist behind the “Intense World Theory of Autism” and Co-Founder and CEO of Frontiers, the community-rooted open-access publisher.

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Maia Szalavitz's article on The Intense World Theory is featured in the prestigious German newspaper, Die Zeit.

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The Intense World Theory offers a new approach to autism that resonates with autistic persons and their families. Journalist Maia Szalavitz follows up with an article on her personal experience.

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Henry and Kamila Markram, co-authors of the Intense World Theory, answer questions about their novel and unifying approach to autism that challenges several dogmas in the research field.

Daily Beast: A Radical New Autism Theory16

A groundbreaking study adds support to the Intense World Theory suggesting that people with autism-spectrum disorders do not lack empathy – rather they feel others' emotions too intensely to cope.

RTS: Au coeur du cerveau autiste (Inside an autist's brain).....17

Many autistic persons show hyper-sensibility to their surroundings, such as odour, touch, sound and light. The Intense World Theory presents new avenues to account for these symptoms and may help to facilitate the lives of autistic persons.

New Scientist: Do supercharged brains give rise to autism? 18

Image a world where every sound jars like a jackhammer, every light is a blinding strobe and clothes feel like sandpaper – this, say neuroscientists Kamila and Henry Markam, is how it feels to be autistic.

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Open-Science platform Frontiers has won the gold award at the ALPSP Awards for Innovation in Publishing – the leading industry award that recognizes the best innovators.

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The winners of the ALPSP Awards 2014 were announced at an award's ceremony the ALPSP International Conference. Frontiers won the Gold prize for Innovation in Publishing.

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With a raft of open-access policies and mandates that impact researchers and their institutions, Research Information asks Kamila Markram about Frontiers' approach to open-access.

Nature: I owe my business to my frustration as a Scientist - Kamila Markram19

Ahead of Europe's largest science conference, the European Science Open Forum (ESOF), Nature interviews speaker Kamila Markram on why she founded Frontiers and the growing numbers of academics starting companies.

ALA: ALSC recommends more Great Websites for Kids.....

Frontiers for Young Minds, a science journal edited by kids, for kids, is featured as a "Great Website for Kids" – an online resource of exceptional websites for children, by the Association for Library Service to Children.

Research Information: Algorithms help assign reviewers more quickly 1

Kamila Markram talks to Research Information about the innovative Frontiers Peer Review process that automates reviewer allocation to speed up the process.

Bilan: A l'EPFL, le Facebook des savants recrute à tout va.....

The Swiss equivalent of the Economist, Bilan magazine, runs a feature on Frontiers as a leading open-access publisher and research networking platform for academics.

Research Information: Mining for insight23

Kamila Markram talks to Research Information about Frontiers' encompassing approach to text and data mining.

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Lencsi, the Frontiers mascot, is featured in an article about pets in the office.

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Pioneering publishers like Frontiers are providing open-access publishing to overcome barriers created by traditional publishing.

The Economist: Free-for-all: Open-access scientific publishing is gaining ground..27
The Economist charts the growing open-access movement and features Frontiers as one of the leading innovative open-access publishers.

Arts Technica: Open access science news is mostly good, with a bit of ugly 9
Frontiers is listed as one of the main progressive open-access publishers on the scholarly publishing landscape.

Science: Interactive Peer Review: What's In It for Reviewers?3
The prestigious journal, Science, runs a series of articles on the Interactive Peer Review that Frontiers as pioneered since 2007.

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The benefits of Interactive Peer Review, pioneered by Frontiers, for authors are discussed.

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One of the fastest-growing open-access publishers, Frontiers, has been snapped by by Nature Publishing Group.

Research Information: NPG invests in Swiss OA publisher.....35
The historic partnership between the world's most prestigious science journal, Nature, and Frontiers is reported on by numerous publications.

Bilan: Les publications suisses Frontiers vont connaître une grande expansion.....36
The partnership with Nature is enabling Frontiers to launch more open-access journals while innovating in an ecosystem of open-science tools for researchers.

The Chronicle of Higher Education: Rethinking Peer Reviewg: Interview with Frontiers37
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Virtual reality can be used to give the illusion of going "back in time", reveals a study published in Frontiers in Psychology.

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The highest levels of ultraviolet radiation ever recorded on Earth is reported in a study by NASA scientists published in <i>Frontiers in Environmental Science</i> .	
Washington Post: How humans learned how to talk	4
How did we begin to talk? Professors from the Massachusetts Institute of Technology propose a theory, published in the journal <i>Frontiers in Psychology</i> , based on bird song.	
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Exercise may help to keep the brain robust in people who have an increased risk of Alzheimer's diseases, concludes a study in <i>Frontiers in Aging Neuroscience</i> .	
Guardian: Man develops powerful love of Johnny Cash following deep brain stimulation	4
A patient with OCD, treated with deep brain stimulation, suddenly started to enjoy Johnny Cash music, report a team of doctors in the journal <i>Frontiers in Neurology</i> .	
The New York Times: How a Lizard Gets Rid of a Suitor	44
A <i>Frontiers in Ecology and Environment</i> paper details how female dragon lizards' size and color intensity help males in their search for mates.	
BBC: Virtual arm eases phantom limb pain	44
Doctors have devised a new way to treat amputees with phantom limb pain using computer-generated augmented reality, reports a study in <i>Frontiers in Neuroscience</i> .	
BBC: Mathematics: Why the brain sees maths as beauty	45
Mathematicians appreciate complex mathematical formulae in same way they do of beauty, such as, artistic masterpieces and music, according to brain scans published in <i>Frontiers in Human Neuroscience</i> .	
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A drug that could enable adults to acquire perfect pitch has been discovered, according to research published in <i>Frontiers in Systems Neuroscience</i> .	
Wired: Otogenetics used to stop rats binge drinking	47
Scientists have used a revolutionary technique that controls neurons using light to cure alcohol addiction in rats, shows research published in <i>Frontiers in Neuroscience</i> .	
Huffington Post: Aerobic Exercise can improve your memory and slow aging	48
Older adults can improve their memory and overall cognitive health by regularly exercising, according to a study published in <i>Frontiers in Aging Neuroscience</i> .	
NBC: Wolves can also be man's best friend	49
Wolves had a pre-existing capacity to learn from social partners and may help to explain how humans domesticated dogs from an extinct population of gray wolves some 18,000 years ago.	
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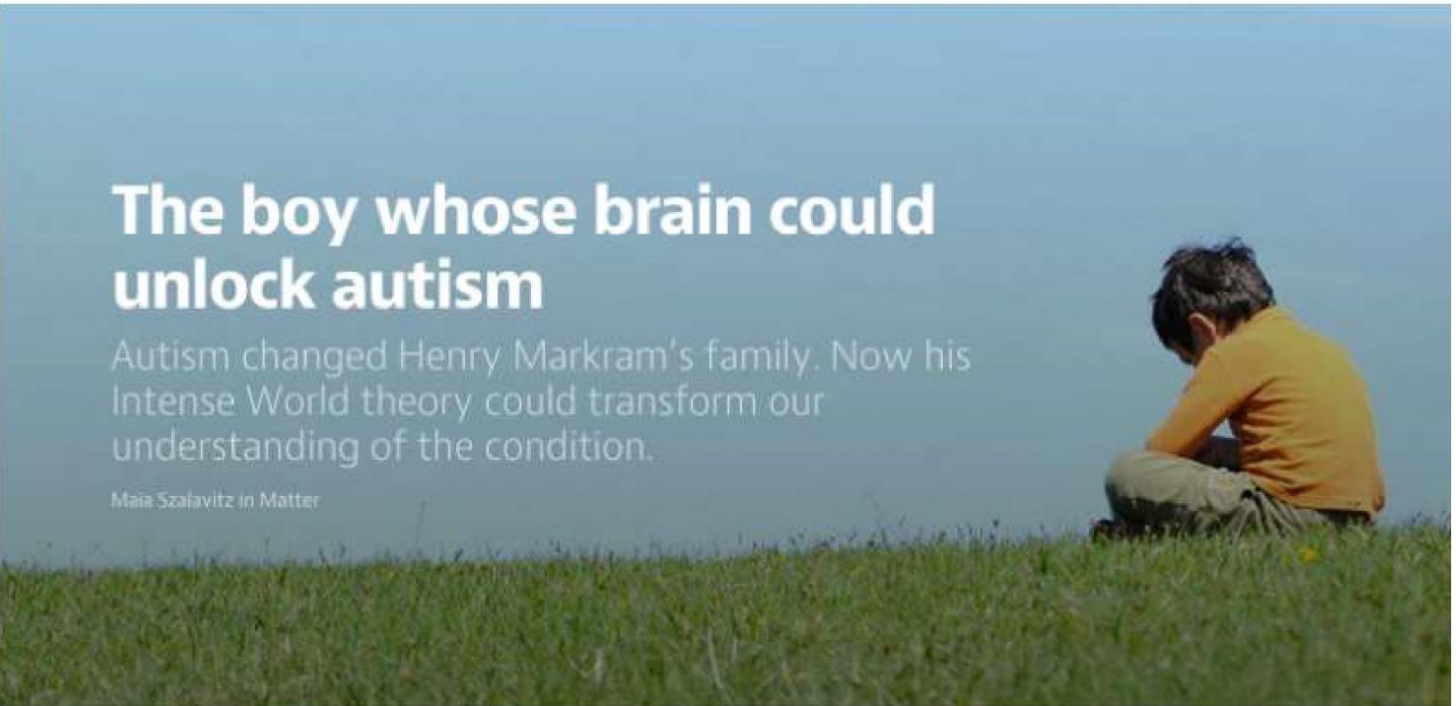
Matter: [The boy whose brain could unlock autism](#) ↗

12 Dec 2013

The boy whose brain could unlock autism

Autism changed Henry Markram's family. Now his Intense World theory could transform our understanding of the condition.

Maia Szalavitz in Matter



SOMETHING WAS WRONG with Kai Markram. At five days old, he seemed like an unusually alert baby, picking his head up and looking around long before his sisters had done. By the time he could walk, he was always in motion and required constant attention just to ensure his safety.

“He was super active, batteries running nonstop,” says his sister, Kali. And it wasn’t just boyish energy: When his parents tried to set limits, there were tantrums—not just the usual kicking and screaming, but biting and spitting, with a disproportionate and uncontrollable ferocity; and not just at age two, but at three, four, five and beyond. Kai was also socially odd: Sometimes he was withdrawn, but at other times he would dash up to strangers and hug them.

Things only got more bizarre over time. No one in the Markram family can forget the 1999 trip to India, when they joined a crowd gathered around a snake charmer. Without warning, Kai, who was five at the time, darted out and tapped the deadly cobra on its head.

Coping with such a child would be difficult for any parent, but it was especially frustrating for his father, one of the world's leading neuroscientists. Henry Markram is the man behind Europe's \$1.3 billion Human Brain Project, a gargantuan research endeavor to build a supercomputer model of the brain. Markram knows as much about the inner workings of our brains as anyone on the planet, yet he felt powerless to tackle Kai's problems.

"As a father and a neuroscientist, you realize that you just don't know what to do," he says. In fact, Kai's behavior—which was eventually diagnosed as autism—has transformed his father's career, and helped him build a radical new theory of autism: one that upends the conventional wisdom. And, ironically, his sideline may pay off long before his brain model is even completed.

IMAGINE BEING BORN into a world of bewildering, inescapable sensory overload, like a visitor from a much darker, calmer, quieter planet. Your mother's eyes: a strobe light. Your father's voice: a growling jackhammer. That cute little onesie everyone thinks is so soft? Sandpaper with diamond grit. And what about all that cooing and affection? A barrage of chaotic, indecipherable input, a cacophony of raw, unfilterable data.

Just to survive, you'd need to be excellent at detecting any pattern you could find in the frightful and oppressive noise. To stay sane, you'd have to control as much as possible, developing a rigid focus on detail, routine and repetition. Systems in which specific inputs produce predictable outputs would be far more attractive than human beings, with their mystifying and inconsistent demands and their haphazard behavior.

This, Markram and his wife, Kamila, argue, is what it's like to be autistic.

They call it the “intense world” syndrome.

THE MARKRAMS' FIRST PUBLICATION of their intense world research appeared in 2007: a paper on the VPA rat in the *Proceedings of the National Academy of Sciences*. This was followed by an overview in *Frontiers in Neuroscience*. The next year, at the Society for Neuroscience (SFN), the field's biggest meeting, a symposium was held on the topic. In 2010, they updated and expanded their ideas in a second *Frontiers* paper.

Since then, more than three dozen papers have been published by other groups on VPA rodents, replicating and extending the Markrams' findings. At this year's SFN, at least five new studies were presented on VPA autism models. The sensory aspects of autism have long been neglected, but the intense world and VPA rats are bringing it to the fore.

Tall like her husband, with straight blonde hair and green eyes, Kamila wears a navy twinset and jeans when we meet in her open-plan office overlooking Lake Geneva. There, in addition to autism research, she runs the world's fourth largest open-access scientific publishing firm, *Frontiers*, with a network of over 35,000 scientists serving as editors and reviewers. She laughs when I observe a lizard tattoo on her ankle, a remnant of an adolescent infatuation with *The Doors*.





IM NAMEN DES VATERS, DES SOHNES UND DES MENSCHLICHEN GEHIRNS

WAS IM KOPF DIESES JUNGEN MANNES VOR SICH
GEHT, IST EIN RÄTSEL. VOR ALLEM
FÜR SEINEN VATER, EINEN DER BERÜHMTESTEN
HIRNFORSCHER DER WELT

Text Maia Szalavitz

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Foto: David H. Green/Alamy

begann, alles über Autismus zu lesen, was er in die Finger bekommen konnte. Das war in den Neunzigern, als die Diagnose gerade Eingang in die Psychiater-Bibel *DSM-III* gefunden hatte. Der Film *Rain Man* mit Dustin Hoffman als autistischem »Savant« hatte 1988 die Idee in die Welt gesetzt, dass Autismus auch eine Quelle für eine unglaubliche, spezielle Intelligenz sein könnte. Noch in der Mitte des 20. Jahrhunderts hatte man Autismus dem Liebeszug durch gefühlkühle Mütter zugeschrieben.

Die populäre Theorie geht heute davon aus, dass Autismus das Resultat einer Fehlfunktion gewisser Hirnareale ist, die für das soziale Verhalten verantwortlich sind. Nach der »Theory of Minds«, in den achtziger Jahren von Uta Frith, Alan Leslie und Simon Baron-Cohen entwickelt, bilden autistische Kinder erst spät die Fähigkeit aus, zwischen ihrem eigenen und dem Wissen anderer zu unterscheiden. Forscher haben diesen Mangel an perspektivischen Denken unglücklicherweise als fehlende kognitive Empathie eingestuft. So entstand der bis heute gängige Irrtum, es sei Autisten egal, wenn jemand sich verletzt oder Schmerzen fühlt. Autisten fehlt es nicht unbedingt an emotionaler Empathie. Sie können durchaus mitfühlen.

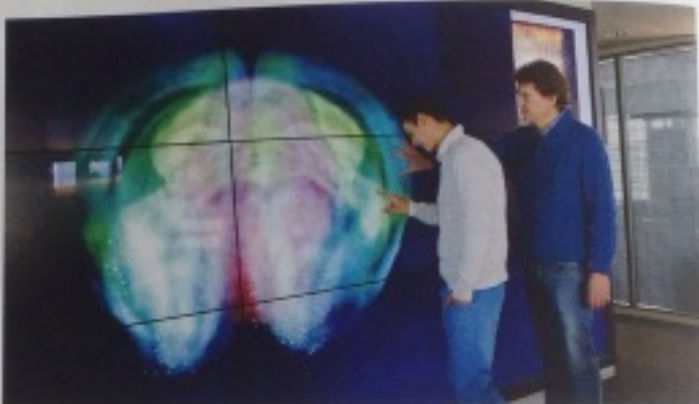
»Als wir damals auf die Forschung zu Autismus schauten, konnten wir es nicht glauben«, sagt Markram. »Jeder dachte, dass diese Menschen keine Emotionen haben. Aber Kai, so merkwürdig es klingen mag, konnte wirklich in dich hineinschauen, sogar viel tiefer als andere.« Er mochte auch menschliche Nähe.

1999 begann Markram, als Gastprofessor der University of California in San Francisco selbst auf dem Gebiet zu forschen. Sein Kollege Michael Merzenich vermutete bereits, dass Autismus durch ein Ungleichgewicht zwischen erregenden und beruhigenden Neuronen ausgelöst wird. Ein Fehler, durch den impulsive Aktionen nicht gebremst werden, so wie die plötzliche Bewegung von Kai, als er die Kobra anfing. Diese Theorie war der Ausgangspunkt für die Arbeit Markrams und seiner zweiten Frau Kamila, die er in Österreich am Rande einer Konferenz kennengelernt hatte.

»Kamila war unglaublich«, sagt Markram: »Sie war mit Kai viel systematischer und konnte klare Regeln aufstellen. Und wir hatten nie das Problem, dass Kai seine Stief-

mutter nicht mochte.« Seine Frau und er seien über den Stand der Forschung frustriert gewesen. Sie beschlossen, zunächst das Hirn auf möglichst simpler Grundlage zu Hirs auf möglichst simpler Grundlage zu untersuchen, und beauftragten die Studentin Tania Rinaldi Barkat, ein geeignetes Tiermodell zu suchen. Schon bald fand Barkat heraus, dass Ratten, die vor der Geburt mit dem Epilepsipräparat Valproinsäure (VPS) behandelt worden waren, menschlchen Autisten am meisten ähnelten. Diese »VPS-Ratten« zeigen ein gestörtes Sozialverhalten und neigen dazu, Handlungen ständig zu wiederholen. Zudem er-

Neuronen«, erklärt Barkat. Die VPS-Zellen reagierten doppelt so heftig wie normale Zellen und waren besonders stark untereinander verbunden. Hätte eine normale Zelle beispielsweise zehn Verbindungen gehabt, so hatte eine VPS-Zelle zwanzig. Die VPS-Zellen waren hyperaktiv. Mit der Folge, dass die Ratten sich schneller fürchten und auch schneller lernten, wovon sie Angst haben sollten. Andersherum brauchte es lange, bis sie eine einschüchternde Situation als gefahrlos erkannten. »Die Konditionierung auf Angst war extrem«, sagt Markram. »Wir schauten auf die Zellen im Amygdala-Hirn-



Das menschliche Gehirn versteht kaum jemand so gut wie Harry Markram (rechts), doch das seines Sohnes gibt ihm Rätsel auf

gab eine Studie 2005, dass schwangere Mütter, die VPS genommen hatten, ein siebenfach höheres Risiko hatten, ein autistisches Kind zur Welt zu bringen. Barkat machte sich an die Arbeit. Frühere Studien hatten gezeigt, dass das Timing und die Dosis entscheidend waren, am »besten« funktionierte es, wenn man den Ratten VPS am zwölften Tag der Schwangerschaft gab. Zwei Jahre lang studierte Barkat die Neuronen der Ratten. Doch die Vermutung, dass die beruhigenden Neuronen bei Autisten weniger aktiv sind, konnte sie nicht belegen. Markram wollte die Versuche bereits abblasen, als Barkat darauf bestand, ein letztes Mal ins Labor zu gehen und statt der beruhigenden nun die Erregesneuronen zu betreiben. Das war der Durchbruch.

»Es gab einen Unterschied in der Erregbarkeit, und zwar im ganzen Netzwerk der

areal, und wieder waren diese hyperaktiv. Es schien alles einen Sinn zu ergeben.«

Den Markrams wurde klar: Eine Hyperaktivität der Hirnareale, die für Wahrnehmung, Gedächtnis und Emotionen zuständig sind, könnte beides erklären – die Talente der Autisten und ihre Handicaps. Das Problem der VPS-Ratten war nicht, dass sie nicht lernen konnten. Sie lernten zu schnell, mit zu viel Angst, und ihre Lernenerfahrung war nur schwer umkehrbar.

Die Markrams erinnerten sich an bestimmte Momente mit Kai: wie er seine Ohren zuhielt und sich weigerte, ins Kino zu gehen. Wie er laute Geräusche verabscheute und neues Essen nicht ausprobieren wollte. Die Idee einer zu intensiven Welt – plötzlich bekam sie eine praktische Bedeutung.

Die VPS-Ergebnisse legten auch nahe, dass Autismus sich nicht nur auf ein Hirn-

Henry Markram. »Ja, Kai hat Einschränkungen, aber irgendwas spielt in seinem Hirn verrückt. Es ist, als hätte er meine Macken, nur heftiger.« Eine davon ist das Beharren auf Pünktlichkeit. »In meinem Fall ist das ein Vorteil, denn es bedeutet, dass ich einhalte, was ich verspreche.« Aber in Kais Fall ist es extremer. Erwa vor Reisen: »Er sitzt dann da, plant etwas und zieht es genau so durch. Er steigt in das Flugzeug, komme, was wolle.« Sollte Kais Hirn wirklich feiner eingestellt sein als das seines Vaters, wäre er in der Lage, noch brillanter als dieser zu werden.

les Stigma bekämpfen wollten. Aber bei einigen Arten von Autismus handele es sich nun mal um eine geistige Behinderung.

»Wenn man eine Person mit Autismus gesehen hat, dann hat man genau eine Person mit Autismus gesehen«, sagt Matthew Belmonte, der am Groden Center auf Rhode Island das Phänomen erforscht. Man könne zwar annehmen, dass Autisten eine Form von Intelligenz hätten, die nicht einfach zu messen sei, sich aber von Fall zu Fall stark unterscheide. »Biologisch gesehen, ist Autismus nicht immer ein und dieselbe Krank-



Familienbande: Henry Markram und seine Frau Kamila (links), Kai und seine Schwester

In den Büros von Markrams Human Brain Project in Lausanne können Besucher erahnen, wie es sich anfühlt, diese besonderen Fähigkeiten zu haben. In einem kleinen Vorführraum mit saphirfarbenen Sitzen werden 3-D-Brillen ausgeteilt. Sobald die Lichter ausgehen, fliegen die Besucher durch ein hell gefärbtes, animiertes Netzwerk von Neuronen, die so scharf umrissen sind, als könnte man sie jederzeit anfassen. Die Animation zieht einen dermaßen in ihren Bann, dass man kaum den Erklärungen zuhören kann, die das Projekt

heit. Es gibt eine Menge möglicher Gründe«, sagt Belmonte. Die Intense-World-Theorie könne vielleicht für manche Autismusformen die Erklärung liefern, für andere aber sicher nicht.

Kamila Markram betont jedoch, ihre Daten würden belegen, dass die am stärksten Behinderten eigentlich die begabtesten seien. »Wenn man sich das Ganze physiologisch anschaut, sind die Gehirne dieser Autisten besonders stark vernetzt.« Die Frage wäre dann nur, wie man diese

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Matter: My own intense world ↗

2 January 2014



If the Asperger Syndrome diagnosis had existed when I was a toddler, I probably would have qualified. I began reading at 3 years old; had intense intellectual obsessions and obsessive compulsive behavior; preferred thinking about ideas to socializing; and was overwhelmed by emotion, sensation, and experience.

I banned my mother from singing songs in a minor key because they made me cry. I had a photographic memory and memorized much of the periodic table. I hated being touched—unless I was in control—and I refused to wear itchy fabrics or try new foods. I was diagnosed by a child psychiatrist when I was in preschool as “emotionally labile” and “hyperesthetic”—A.K.A oversensitive, as well as gifted. My parents and teachers saw me as brilliant—but I was also called “selfish,” “bossy,” and “not a people person.”

Simon Foundation Autism Research Initiative: Intense world theory raises intense worries

21 January 2014



Intense world theory raises intense worries

Anna Remington, Uta Frith

21 January 2014



Intense effects: Although the intense world theory of autism is theoretical, the therapies it suggests are real and may be just as likely to do harm as good.

In the past few years, a new theory of autism —the 'intense world theory,' proposed by Henry and Kamila Markram^{1, 2}— has attracted much interest from the popular press. Two welcome features of the theory are that it promotes a more positive view of autism and that the Markrams base it on a biological understanding of the disorder.

It proposes that autism is the result of hyperfunctioning of neural circuitry, leading to both feats of talent and a state of over-arousal. Journalist Maia Szalavitz describes this theory at length in the new online magazine *Matter*.

Although we all yearn for an overarching theory of autism, and the idea is appealing, the theory has thus far received very little academic scrutiny. We know all too well the damage that can result when researchers prematurely release a hypothesis into the public domain — for instance, the unsubstantiated claims of a link between the measles, mumps and rubella vaccine and autism.

Our particular concern regarding the intense world theory centers on drastic suggested treatments for individuals with autism, namely withdrawing stimulation during infancy. The Markrams do not merely hint at such interventions, but explicitly spell them out. Yet if the theory is incorrect, these treatments could be damaging. As studies of Romanian orphans have strikingly shown, insufficient stimulation and impoverished neuronal input in early development are damaging to children's social, cognitive and emotional functioning³.

So we ask: Where has this intense world theory emerged from? Is it as positive as it purports to be, and what does it mean for autism?

Model rats:

The intense world theory is based on data from two experimental studies using the valproic acid (VPA) rat model of autism. Exposure to VPA, an epilepsy drug, during pregnancy results in reduced social interactions, increased repetitive behaviors and loss of cerebellar neurons in the rat pups.

The Markrams and their colleagues found that the amygdalae and medial prefrontal cortices of these rats are hyperreactive, hyperconnected and hyperplastic^{4, 5}. Their brains show a change in the balance of excitatory and inhibitory nerve signals, and in the efficiency of communication between neurons, which may have significant behavioral effects.

The Markrams extrapolated these findings to suggest the presence of increased activity in certain regions of the brains of humans with autism, leading to overactive perception, memory and attentional processes. These, they say, are hypercapabilities that all individuals with autism possess. These features manifest as extreme sensitivity to sensory stimuli, elevated fear and over-emotionality. The intense world theory suggests that to deal with this intensity, people with autism tend to shut down and withdraw from the world.

This idea of sensory overload in autism is not a new one, and indeed the American Psychiatric Association recently modified the diagnostic criteria for autism to include unusual sensory responses as a core feature. However, whereas the VPA rat model may demonstrate hypersensitivity, the human data are much less clear-cut.

In people with autism, sensory symptoms appear to vary wildly: from hypersensitivity (strong reactions to sounds, light and touch) to hyposensitivity (failure to orient to sounds, and low sensations of pain) and 'sensory-seeking' behaviors (a craving for intense sensory stimulation), as described in a 2005 review of almost 50 years of literature on sensory abnormalities in autism⁶ and a 2013 discussion of the issue⁷.

"We know all too well the damage that can result when researchers prematurely release a hypothesis into the public domain."

Wrong Planet: Interview: Henry and Kamila Markram about the Intense World Theory for Autism ↗

6 January 2012



The online resource and community for Autism and Asperger's

Interview: Henry and Kamila Markram about The Intense World Theory for Autism

Email 192 Share 1857 ShareThis 7789

Posted on Friday, January 06 @ 12:20:09 EST by



Our quirky autistic columnist, John Scott Holman, interviewed Henry and Kamila Markram, originators of the Intense World Theory. Read their compelling and refreshing insights in this Wrong Planet exclusive...

1. The Intense World Theory sheds light on the mystery of autism, and offers fascinating and refreshing insights. This theory may baffle those with a limited understanding of neuroscience. How would you explain Intense World Theory to the layman?

The Intense World Theory states that autism is the consequence of a supercharged brain that makes the world painfully intense and that the symptoms are largely because autistics are forced to develop strategies to actively avoid the intensity and pain. Autistics see, hear, feel, think, and remember too much, too deep, and process information too completely. The theory predicts that the autistic child is retreating into a controllable and predictable bubble to protect themselves from the intensity and pain. The theory originated from neuroscientific discoveries on an animal model of autism and was extended by accounting for previous research on autism in humans. It is a unifying theory because it takes into account and explains the many different results and interpretations from a spectrum of studies on autism.



The brain is supercharged because the elementary functional units of the brain are supercharged. These units are called neural microcircuits. Neural microcircuits are the smallest ecosystem of neurons that can support each other to carry out functions. The brain is made up of millions of these units. These microcircuits are hyper-reactive and hyper-plastic. That means that they react and process information much faster and more intensely, they can learn much more and remember much longer, and they can remember things with much greater detail. The Intense World Theory proposes that having such powerful units makes orchestration difficult – like trying to play a piano with a million run-a-way keys. The microcircuits that are mostly affected will depend on genetics, toxic insults during pregnancy and the kind of environmental exposure after birth. Each autistic child will therefore be unique because different microcircuits are hyper-functional and they dominate the idiosyncratic pattern that emerges.



The theory predicts that there are three factors in the cause of autism; a genetic predisposition, a toxic insult during pregnancy and environmental exposure after birth. Our genes normally switch on an off in a well-timed and precise sequence like the playing of a piece of music throughout life. Autism is a triggered acceleration of this cascade of gene expression during brain development. We believe toxins during pregnancy trigger this acceleration. Many possible genetic mutations can lower the threshold for triggering the accelerated cascade. Environmental exposure that normally accelerates brain development accelerates brain development even further in autistics making the brain too sensitive, too early.

The danger of accelerated brain development is that all the steps needed to complete the trimming down of the connections between neurons is not completed and that some microcircuits that should wait their turn to develop, develop too early and begin to dominate over the other microcircuits driving hyper-preferences, repetitiveness, idiosyncrasies and eventually making unlearning and rehabilitation very difficult.

While it will be difficult to reverse and correct these developmental changes completely, the theory points to many exciting new possibilities for diagnosing, treating and helping autistic children benefit from their unique brain. For example, if the environment can be carefully controlled after birth, then the autistic child could potentially keep the supercharged microcircuits as well as their ability to orchestrate these microcircuits to fully express their genius without the suffering that can come with a supercharged brain.

2. Describe the evolution of Intense World Theory from inspiration to publication.

Our research into autism started in 1998 while Henry Markram was at the Weizmann Institute. Henry has an autistic child (now 16 years old) and was of course motivated to understand him. At that time most researchers were looking at the cerebellum, brain stem and other areas for alterations and very few were looking at neocortical alterations. Henry thought this was odd since most of the symptoms in autism are related to alterations in perception, attention and memory, and such advanced functions depend heavily on normal neocortical functions. In 2000 Henry went on sabbatical to Michael Merzenich lab at UCSF and proposed that perhaps the excitatory-inhibitory balance was affected. Henry first thought that inhibition was impaired and received a grant from NAAR (National Alliance of Autism Research) to establish how the inhibitory system is recruited in the normal brain and in animal models of autism.

This research continued when Henry moved to the Swiss Federal Institute for Technology in Lausanne (EPFL). His student Tania Rinaldi used the valproic animal model of autism, which seemed promising based on the work of Patricia Rodier. They could not find malfunctions in the inhibitory synapses and started looking at the excitatory connections. They found that too many excitatory connections were formed in the neocortex of autistic animals. They also found that the circuit responded much too strongly when stimulated and that the synapses learned much easier than normal about the stimulus.

Kamila Markram, a behavioral neuroscientist working in Carmen Sandi's laboratory, then stressed the importance of also examining the amygdala because autism has a profound emotional component and because previous theories suggest that the amygdala is malfunctioning, that it is hypo-functioning and that autists can't interpret people's feelings and have dampened down emotions. Kamila carried out behavioral studies on the animal model and found that the autistic animals developed excessive fear memories; that these fears lasted much longer and were difficult to undo. She also found that they generalized these memories too easily to associated stimuli (i.e. once afraid of a sound with a certain pitch, they become afraid of all sounds regardless of the pitch). Kamila realized that this could lead to autistic children quickly to becoming fearful of parts of the world for no apparent reason and it would make rehabilitation very difficult. This also suggested that one would need to be extremely careful when exposing an autistic child to the world and especially when punishing an autistic child. They will never forget the punishment and generalize it quickly to a point where they will fear so many things that they not be able to function normally. Kamila then re-examined all previous studies by all major laboratories that studied autism and reinterpreted their results in this new light.

Kamila and Henry then came up with a unifying theory that accounts for the facts and first called this the intense world syndrome hypothesis. Further experiments in their lab on how genes and proteins are expressed as well as an even deeper analysis of past studies culminated in the Intense World Theory.



3. Many members of the autistic community have embraced Intense World Theory, claiming it to be an accurate reflection of their own experiences, and a radical departure from the outdated and socially stigmatizing disease models of the past. Why has it taken so many years for the scientific community to draw a conclusion which autistics themselves find to be quite obvious? What prevented Intense World Theory from emerging years ago?

The main reason is that historically autism has been classified as a form of mental retardation. Biologically, mental retardation results from malfunctions in genes, proteins, cells, synapses and circuits and so most researchers were just looking for evidence of malfunctions because scientists mostly look for evidence to support current theories and hypotheses. Autism is still today classified as a form of mental retardation in the bible of brain diseases, the Diagnostic and Statistical Manual of Mental Disorders. This superficial classification has led to scientists looking for malfunction, hypofunction, and deficits at the biological level. So the research has become messy and confused and many mistakes have been made in the interpretation of experimental results.

The second major mistake is that scientists have reasoned that because every autistic child is so unique that there are many different causes of autism. The consequence has been that each researcher has made localized interpretations of their data and proposed their own isolated theory of autism ignoring "the other forms" effectively hiding behind "the spectrum". We can see the result – today there are dozens of fragmented theories of autism that each focus on a specific aspect of autism.

15

The third major mistake has been the belief that autism is primarily a genetic disorder. There is of course good reason for this because the second twin of identical twins has a much higher chance of having autism than in the general population, but this has led researchers to hunt only for the genetic malfunction while ignoring the fact that the twin of an autistic child that has the "bad" gene(s) does not have autism.

11 May 2011



Maia Szalavitz

A Radical New Autism Theory

A groundbreaking study suggests people with autism-spectrum disorders such as Asperger's do not lack empathy—rather they feel others' emotions too intensely to cope.

People with Asperger's syndrome, a high functioning form of autism, are often stereotyped as distant loners or robotic geeks. But what if what looks like coldness to the outside world is in fact a response to being overwhelmed by emotion—an excess of empathy, not a lack of it?



This idea resonates with many people suffering from autism-spectrum disorders and their families. It also jibes with new thinking about the nature of autism called the “intense world” theory. As posited by Henry and Kamila Markram of the Swiss Federal Institute of Technology in Lausanne, suggests that the fundamental problem in autism-spectrum disorders is not a social deficiency, but rather an hypersensitivity to experience, which includes an overwhelming fear response.

“I can walk into a room and feel what everyone is feeling. The problem is that it all comes in faster than I can process it.”

“There are those who say autistic people don't feel enough,” says Kamila Markram. “We're saying exactly the opposite: They feel too much.” Virtually all people with ASD report various types of oversensitivity and intense fear. The Markrams argue that social difficulties of those with ASDs stem from trying to cope with a world where someone has turned the volume on all the senses and feelings up past 10. If hearing your parents' voices while sitting in your crib felt like listening to Lou Reed's *Metal Machine Music* on acid, you, too, might prefer to curl in a corner and rock.

RTS: [Au coeur du cerveau autiste \(Inside an autist's brain\)](#) ↗

15 September 2010

RTS.ch

15 septembre 2010

Au coeur du cerveau autiste

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NewScientist

Do supercharged brains give rise to autism?

- › 19 September 2008 by [Maia Szalavitz](#)
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IMAGINE a world where every sound jars like a jackhammer, every light is a blinding strobe, clothes feel like sandpaper and even your own mother's face appears as a jumble of frightening and disconnected pieces. This, say neuroscientists Kamila and Henry Markram of the Swiss Federal Institute of Technology in Lausanne, is how it feels to be autistic.

According to their "intense world" hypothesis, all of autism's baffling and sometimes incongruous features - social problems, language impairment and obsessive behaviour, sometimes allied to dazzling savant abilities - can be explained by a single neurological defect: a hyperactive brain that makes ordinary, everyday sensory experiences utterly overwhelming.

If they're right - and the idea is generating a deal of interest among autism experts - the husband-and-wife team could be on course to add a significant new theory to autism research. "It is a very compelling idea," says neurobiologist Asaf Keller at ...

Bookseller: Frontiers is major winner at ALPSP innovation awards ↗

12 September 2014

THE BOOKSELLER



Frontiers is major winner at ALPSP innovation awards

12.09.14 | Benedicte Page

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Open science platform Frontiers has won the gold award at the Association for Learned & Professional Society Publishers (ALPSP) Awards for Innovation in Publishing, made this evening (11th September) at the ALPSP 2014 international conference in Heathrow.

Lausanne-based Frontiers, in which Nature Publishing Group bought a majority stake in 2013, is a community-oriented open access publisher and research network for scientists, with a community of 45,000 editors and 100,000 authors from 140 countries. The ALPSP judges said: "This innovative application of social media to peer review brings authors and reviewers together in discussion which in turn leads to better content, speedier review process and increased transparency."

The silver award was given to IOP e-books from IOP Publishing, which caters for the physics community, with the judges recognising "the boldness of IOP's reinvention of a core business, which sets digital and the user at the heart of its strategy."

JournalGuide from Research Square was given the bronze award. JournalGuide is a tool helping authors to make an informed decision about the best journal to send their research to, and is said to be "particularly beneficial to early career researchers and those working in regions where academic publishing is developing rapidly."

Also shortlisted were bioRxiv from Cold Spring Harbor Laboratory Press; Edifix from Inera Inc; ReadCube Connect from Labtiva Inc; and RightsLink for Open Access from the Copyright Clearance Centre.

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[ALPSP: ALPSP Awards spotlight on... Frontiers, a community-run open-access publisher and research network](#) ↗

11 September 2014



The Association of
Learned & Professional
Society Publishers

Thursday, 11 September 2014

ALPSP Awards spotlight on... Frontiers, a community-run open-access publisher and research network

The [ALPSP Awards for Innovation in Publishing](#) will be announced at the conference this week. In the final post in our series about the finalists, [Kamila Markram](#), co-Founder and CEO of [Frontiers](#), answers questions about the Frontiers Open-Science platform.



Kamila Markram is co-founder and CEO of Frontiers

ALPSP: Tell us a bit about your company

KM: We founded Frontiers in 2007 to enable researchers to drive open-access publishing. To achieve this, we built an Open-Science platform with innovative web tools that support researchers in every step of the publishing process. These include collaborative peer review, detailed article and author impact metrics, democratic research evaluation and social networking.

From our beginnings as a group of just a few scientists, Frontiers has evolved to be the fourth leading open-access publisher worldwide. We have published almost 24,000 articles and are on track to publish our 30,000th article before the end of 2014. Our portfolio of open-access titles is also growing rapidly: in just 7 years, we have launched 48 open-access journals across all STM fields.

ALPSP: What is the project that you submitted for the Awards?

KM: [The Frontiers Open-Science platform](#), which embodies our community-driven philosophy and hosts our innovative online tools to improve all aspects of reviewing, publishing, evaluating and disseminating articles.

ALPSP: ALPSP Awards 2014 - Winners announced ↗

11 September 2014



ALPSP Awards 2014 - Winners announced

The winners of this year's awards were announced at the ALPSP International Conference Dinner on Thursday 11 September at the Park Inn Heathrow Hotel and Conference Centre, London, UK (www.alpsconference.org).

[Download press release as pdf.](#)

ALPSP Award for Contribution to Scholarly Publishing 2014

The Council of ALPSP was delighted present this award to **Fred Dylla** in recognition of his efforts to develop and implement creative solutions for broadening access to scholarly publications.

Fred became Executive Director and CEO of the American Institute of Physics in 2007, after more than 30 years as a practising scientist. Since then, he has become a dedicated advocate for scientific journals, working to build consensus among stakeholders to advance public access in a way that recognizes and sustains the value that publishers bring to science and scholarship. In 2009, Fred helped organize the Scholarly Publishing Roundtable, which informed the America COMPETES Act of 2010 and subsequently provided guidance for the US funding agencies to develop public access policies. In 2010, he proposed to CrossRef the FundRef project, and in 2011-13, he helped organize a number of publisher-funding agency collaborations that laid the groundwork for the Clearinghouse for the Open Research of the United States (CHORUS). Fred also serves on the Board of Directors of the International Association of Scientific, Technical and Medical publishers (STM), and on the Executive Council of the Professional and Scholarly Publishing (PSP) Division of the Association of American Publishers (AAP). As an international spokesperson for developments in the US public access movement, he has given keynote addresses at important industry meetings, including Academic Publishing in Europe (APE) and ALPSP conferences.

Fred is widely known and respected in scholarly publishing for his close working relationships with colleagues in the publishing and librarian communities and in the federal government to implement public access projects that protect scientific integrity and the scholarly publishing enterprise.

ALPSP Awards for Innovation in Publishing 2014

The ALPSP Awards were open to any new development, product, service, launch or project which were both innovative and of significant value to scholarly communication. Winning projects needed to demonstrate excellence in terms of originality and innovation, significance and value to their community, utility and long-term viability.

The judges awarded Gold to *Frontiers*, the open science platform. This innovative application of social media to peer review brings authors and reviewers together in discussion which in turn leads to better content, speedier review process and increased transparency.

Research Information: [OA interviews: Kamila Markram, Frontiers](#) ↗

August/September 2014

OPEN-ACCESS PUBLISHING

OA interviews: Kamila Markram, Frontiers

With the raft of policies and mandates that impact researchers and their institutions **Sian Harris** asks a range of publishers and publishing services companies about their approaches to open access

Research Information: AugustSeptember2014



Kamila Markram, co-founder and CEO of Frontiers

Our approach has always been much more than just providing free access to research. The whole publishing process at Frontiers is community-driven, with active researchers taking all editorial decisions. We take great care in building our journal editorial boards: over 45,000 of the world's leading researchers have joined us, many from top universities, making the Frontiers editorial board the largest in publishing.

We developed a Collaborative Peer Review to improve the quality of articles. This provides a rigorous in-depth review that is also constructive, fair and transparent. Reviewers have a mandate to work with authors directly in our online Collaborative Review Forum, and their names are disclosed upon publication to acknowledge their contribution and to improve constructiveness. The entire process is highly efficient and fast, driven by our own software and workflows, enabling constructive interactions without administrative efforts from our academic editors and reviewers.

Frontiers journals publish articles through a gold OA publishing model that requires authors to pay an article-processing fee upon article acceptance. This enables articles to be published immediately without restriction. We also offer many article types that are free of charge. For example, Frontiers Focused Reviews, which are reviews of an original discovery, are published for free.

In the past few years, a growing number of governments, institutions and funders have implemented progressive OA policies. One key challenge we need to overcome, however, is the lack of a unifying policy across these stakeholders. For example, some policies favour green OA with varying embargo periods, while others prefer gold. This patchwork of policies has caused confusion among researchers and institutions, and hinders progress towards universal gold OA. Also, most stakeholders do not, or cannot, enforce their OA policies, which has led to a slower uptake. But overall I think we have already reached a tipping point and all research will be made accessible via gold OA within the next decade.

[Nature: I owe my business to my frustration as a Scientist - Frontiers Co-Founder Kamila Markram](#) ↗

23 June 2014

of schemes and memes

a community blog from *nature.com*

I owe my business to my frustration as a Scientist – Frontiers Co-Founder Kamila Markram

23 Jun 2014 | 10:44 BST | Posted by Alex Jackson | Category: Communities Happenings, Events, Featured, Science communication and outreach, Science policy

Ahead of [ESOF 2014](#), we talk to three leading figures in science, technology and academia who through frustrations of not having the effective tools necessary to do their work, decided to build their own.

In this **three-part series** in the run-up to Europe's largest, general science meeting held every two years, this year in Copenhagen (June 21-26), we look at the increasing number of start-up companies that are "spinning out" of academic institutions worldwide.



Kamila Markram co-founded Frontiers in 2007 with a mission to improve academic publishing and the dissemination of articles.

Here, the co-founder and CEO of [Frontiers](#), Kamila Markram talks about the growing numbers of academics starting companies as a result of frustrations and advances in open science.

Kamila's Background:

Kamila Markram is a neuroscientist, autism researcher and co-founder and CEO of Frontiers, an open-access publisher and research network. Frontiers innovates in peer review, article-level metrics, post-publication review, research networking and a growing ecosystem of open-science tools. With over 20,000 articles published in 47 community-run journals across 29 STM fields and 50,000 researchers on its editorial boards, Frontiers is the fourth leading open-access publisher worldwide. In 2013, Frontiers joined the Nature Publishing Group family in a partnership to advance Open Science.

ALA: ALSC recommends more Great Websites for Kids ↗

17 June 2014



ALSC recommends more Great Websites for Kids

For Immediate Release
Tue, 06/17/2014

Contact:

Laura M. Schulte-Cooper
Program Officer, Communications
ALSC
lschulte@ala.org

CHICAGO — The Association for Library Service to Children (ALSC), a division of the American Library Association, has added more sites to Great Websites for Kids, its online resource containing hundreds of links to exceptional websites for children.

The newly added sites are:

Creative Kids Central - <http://classicalkusc.org/kids/>
Frontiers for Young Minds - <http://kids.frontiersin.org/>
Harry Potter Alliance - <http://thehpalliance.org/>
Latinos in Kid Lit - <http://latinosinkidlit.com/about/>
Ocean Portal - <http://ocean.si.edu/>
Optics for Kids - www.optics4kids.org/
Paka Paka - www.pakapaka.gob.ar/
Periodic Table of Elements - http://pt.kle.cz/en_US/index.html
Planet D - www.diabetes.org/living-with-diabetes/parents-and-kids/everyday-life/
Plaza Sésamo - www.plazasesamo.com/
Quarked! Adventures in the Subatomic Universe! - www.quarked.org/
Semillitas de aprendizaje - www.rif.org/kids/leadingtoreading/es/leadingtoreading.htm

"Looking for some musical inspiration? How about a few fun science and book related sites to complement your Summer Reading program? Need to refresh your list of sites in Spanish? New resources abound in the newest list chosen by the Great Websites for Kids Committee," said Kimberly Probert Grad, library information supervisor, Brooklyn (N.Y.) Public Library, and Lara Crews, children's librarian, Forsyth County (N.C.) Public Library, co-Chairs of the Great Websites for Kids Committee.

Great Web Sites for Kids (GWS) features links to high-quality websites of interest to children 14 years of age and younger, organized into diverse subject headings such as art; music; computers and technology; geography and maps; museums; mathematics; and much more. Each site entry includes a brief annotation and a grade-level rating. GWS users can also rate sites, save their favorites for easy access, and share sites via social media and email.

Members of the ALSC GWS Committee review potential sites for inclusion and vote on the sites to be included. They also regularly check the entire site to ensure currency and re-evaluate sites when necessary.

Members of the 2014 Great Websites for Kids Committee are: Lara Crews, co-chair, Forsyth County (N.C.) Public Library; Kimberly Probert Grad, co-chair, Brooklyn (N.Y.) Public Library; Paige Bentley-Flannery, Deschutes Public Library, Bend, Ore.; Krishna Grady, Darien (Conn.) Library; Joanne Kelleher, Kings Park (N.Y.) Central School District; Edward McCoy, Oakland (Calif.) Public Library; Alia Shields, Cherry Hill (N.J.) Public Library; Lisa Taylor, Barnegat (N.J.) Branch Library; and Katie Scherrer, Connected Communities, Lexington, Ky.

 [Subscribe](#)

Related

gws.ala.org

Research Information

PEER REVIEW

Algorithms help assign reviewers more quickly

Automating allocation of reviewers can speed up the review process - but the information about the reviewers' interests need to be good. **Sian Harris** speaks to the co-founder and CEO of open-access publisher Frontiers

Research Information: February/March 2014



Launching a new publisher with a new publishing model opens up opportunities to experiment with new approaches to publishing. This is what seven-year old Swiss open-access publisher Frontiers has been doing with its peer-review process.

'When we started Frontiers we did it in the conventional way, with associate editors assigning reviewers but we found that it was a very lengthy process. It could easily take two months to invite reviewers because it is an iterative process and then we'd have to chase up to get the reports,' said Kamila Markram, the company's CEO and co-founder.

She recounted how her husband and Frontiers co-founder Henry Markram was an editor on the board of another journal where every time an article was submitted to that journal all of the board was informed and given the opportunity to review the paper. The board found this useful as a way to keep track of current research, even if they were not interested in a particular paper, she noted.

8 October 2013

Bilan

LA RÉFÉRENCE SUISSE DE L'ÉCONOMIE

A l'EPFL, le Facebook des savants recrute à tout va

8 Octobre 2013

PAR FABRICE DELAYE Créée par Kamila et Henry Markram, Frontiers Media révolutionne l'édition scientifique. La start-up a créé 80 places de travail en une année.



EDITION «L'idée est née en 2007 dans une piscine en marge d'une conférence scientifique au Brésil.» Pour expliquer les origines de Frontiers, Kamila Markram évoque une conversation avec son mari, le professeur de l'EPFL et principal artisan du Human Brain Project, Henry Markram. En déplacement, ils réalisent que la publication scientifique doit basculer à l'âge d'internet. «Le processus de revue par des pairs est opaque, lent, et crée beaucoup de frustration chez les scientifiques.»

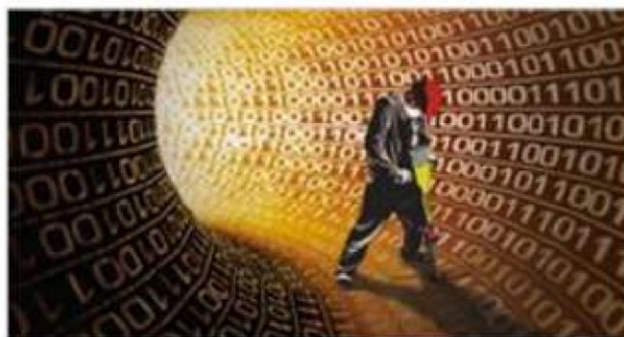
Research Information

TEXT AND DATA MINING

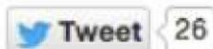
Mining for insight

Siân Harris investigates the role of text and data mining in research - and what the publishing industry is doing, and could do, to help

Research Information:
August/September 2013



Photobank.kiev.ua/svkv/Shutterstock.com



Text and data mining is a hot topic. It has been extensively discussed in copyright and open-access discussions and has been mentioned in many recent policies in these areas. But is there a fundamental disconnect between what researchers want to do and what information providers think they need?

Part of the challenge comes down to defining text and data mining (TDM). At one extreme it's a large-scale, deep search to generate specialised datasets. For example, Shreejoy Tripathy, a PhD candidate in the Neural Computation Center for the Neural Basis of Cognition at Carnegie Mellon University, USA, said of his research, 'I use full-text literature text mining to extract information about the electrical properties of different neuron types in the brain. I then analyse the resulting dataset to better understand the electrical diversity of neurons throughout the brain. Because this data is useful to other researchers who can use it for purposes different from my intended use, I also provide the extracted information (but not the publications themselves) back to the field at www.neuroelectro.org.'

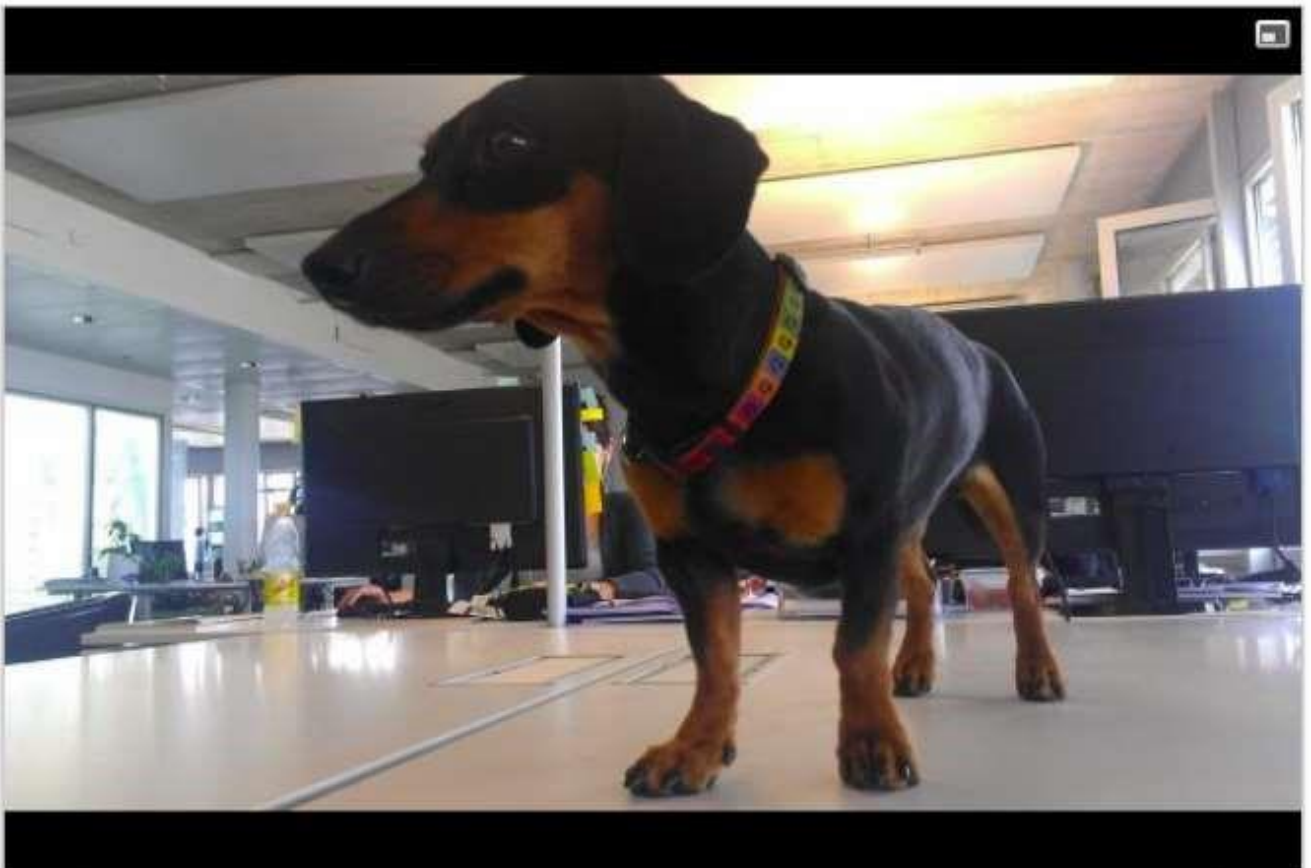
20 Minutes: On devrait cloner Lencsi pour tous les bureau (We should clone Lencsi to have one in every office) ↗

2 August 2013



«On devrait cloner Lencsi pour tous les bureaux»

Un petit Teckel est devenu la coqueluche d'une entreprise vaudoise. La chienne miniature a été citée en exemple par une grande revue scientifique.



1|8

Lencsi est un mini Teckel venu de Hongrie. Passant ses journées au bureau avec sa maîtresse, elle est devenue la nouvelle coqueluche de Frontiers, une société de publication scientifique vaudoise.

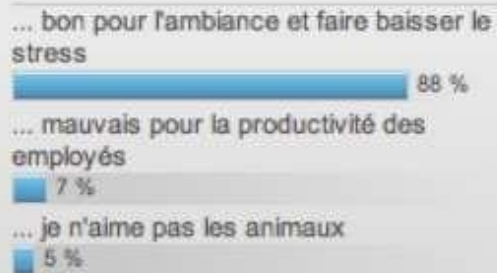
28

Au milieu du bruit de claviers d'ordinateurs, on ne l'entend pas et on la remarque à peine. Pourtant Lencsi («lentilles» en hongrois) est la nouvelle mascotte de **Frontiers**, société de publication scientifique basée sur le campus de l'EPFL. La propriétaire du toutou, Szilvia, effectue un stage de 4 mois dans l'entreprise.

Le dernier post **Facebook**, mentionnant la petite saucisse a même été repris par la prestigieuse revue scientifique «**Nature**» (dont **Frontiers** est partenaire). Le magazine mettait en parallèle une étude montrant les bienfaits d'un animal de compagnie sur le lieu de travail.

Sondage

Pour vous, avoir un animal de compagnie au bureaux, c'est...



2941 participants

Mieux qu'un chat?

«Lencsi est la partenaire idéale pour faire passer le stress, elle crée une atmosphère positive dans notre open space et permet de rapprocher les gens entre-eux et les rend tout simplement heureux», raconte Gozde Zorlu, responsable de la communication à **Frontiers**. «Cela aurait peut-être été plus compliqué dans un espace plus petit», concède-t-elle. «Tout le monde l'adore, renchérit Mischa, un des cinquante employés de l'entreprise fondée en 2007. On peut jouer avec elle n'importe quand, même pendant un téléphone».

Et la petite saucisse de Budapest l'a bien compris: dandinant de la queue, elle se balade de poste en poste, en demandant aux employés de lui lancer son jouet. «On devrait la cloner pour tous les bureaux de Suisse», s'enflamme le trentenaire qui travaille à **Frontiers** depuis 5 mois. Un petit chien, à poils court et joueur, est, selon lui, l'idéal dans un bureau. «Si nous avions eu un chat, beaucoup de personne ne l'aurait même pas remarqué», conclut Gozde.

RTS: Les revues scientifiques sont peu connues du grand public mais brassent des milliards (Scientific publications aren't well known to the laymen but generate billions) ↗

29 June 2013

RTS.ch

29 juin 2013

Les revues scientifiques sont peu connues du grand public mais brassent des milliards

Elles tirent surtout profit de recherches universitaires qui sont financées en général par de l'argent public.

Twitter 68 **+1** 5 **Partager** 375 **+ Partager**

RTS INFO 29 / 06

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2 May 2013

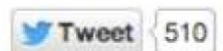
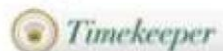
The
Economist

Academic publishing

Free-for-all

Open-access scientific publishing is gaining ground

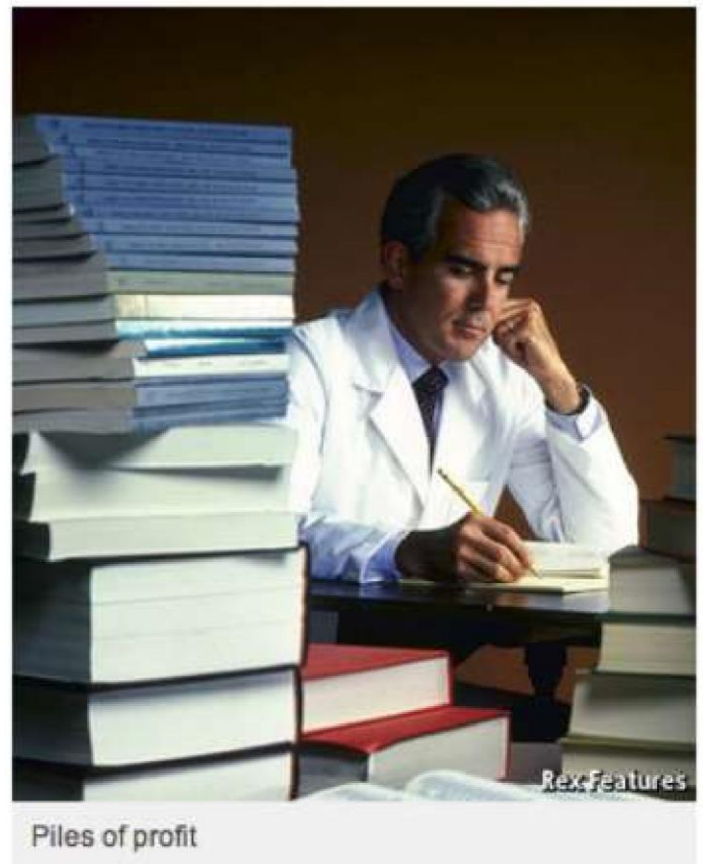
May 4th 2013 | From the print edition



AT THE beginning of April, Research Councils UK, a conduit through which the government transmits taxpayers' money to academic researchers, changed the rules on how the results of studies it pays for are made public. From now on they will have to be published in journals that make them available free—preferably immediately, but certainly within a year.

In February the White House Office of Science and Technology Policy told federal agencies to make similar plans. A week before that, a bill which would require free access to government-financed research after six months had begun to wend its way through Congress. The European Union is

moving in the same direction. So are charities. And SCOAP³, a consortium of particle-physics laboratories, libraries and funding agencies, is pressing all 12 of the field's leading journals to make the 7,000 articles they publish each year free to read. For scientific publishers, it seems, the party may soon be over.



Piles of profit

Outsell, a Californian consultancy, estimates that open-access journals generated \$172m in 2012. That was just 2.8% of the total revenue journals brought their publishers (some \$6 billion a year), but it was up by 34% from 2011 and is expected to reach \$336m in 2015. The number of open-access papers is forecast to grow from 194,000 (out of a total of 1.7m publications) to 352,000 in the same period.

Open-access publishers are also looking at new ways of doing business. *Frontiers*, for example, does not try to judge a paper's significance during peer review, only its accuracy—an approach also adopted by the Public Library of Science (PLOS), a non-commercial organisation based in San Francisco that was one of the pioneers of open-access publishing. It thus accepts 80-90% of submissions.

Instead, a *Frontiers* paper's merit is gauged after publication, using measures like the number of downloads. *Frontiers* also doubles as a social network for researchers to share news, job offers and information about conferences and events. This network currently has around 70,000 members.

PeerJ, founded last year, makes an even more dramatic departure from tradition. Rather than being charged publication fees, authors pay a one-off membership fee, which ranges from \$99 to \$298, depending on how many papers they want to publish each year. All co-authors must be members. The firm also deals neatly with the question of peer review. Members must review at least one paper a year.

Non-commercial open-access publishers, though, are fighting back. The Wellcome Trust (a British medical charity), the Max Planck Society (which runs a lot of German research institutes) and the Howard Hughes Medical Institute (an American charity) have set up *eLife*, a peer-reviewed journal that does not charge publication fees. And in January Jean-Pierre Demailly, of the University of Grenoble, in France, and a handful of fellow mathematicians launched the Episciences Project. This aims to show that researchers themselves can turn out refereed papers cheaply, bypassing traditional purveyors.

Episciences will piggyback on *ArXiv*, an online repository beloved of physicists and mathematicians—who often post work there as "preprints" before submitting it to journals. *ArXiv* is hosted by Cornell University at a cost of \$830,000 a year. Tacking on an "epijournal", so that refereed papers would sit alongside the preprints, should not add much to that.

24 April 2013



SCIENTIFIC METHOD / SCIENCE & EXPLORATION

Open access science news is mostly good, with a bit of ugly

Open access is expanding and just may solve some of the peer review's problems.

by John Timmer - Apr 24 2013, 3:00pm CEST

SCIENCE POLICY AND EDUCATION

24

To see the papers that describe the latest science results, you need to have a subscription to the journals they're published in (or at least your library does). That leaves most of the public, and even many scientists, on the wrong side of a paywall from knowing the latest goings on in their fields.

To help speed the flow of scientific information, the National Institutes of Health has mandated a policy where any papers derived from research it funds are made public within a year of their publication; the Obama administration is now **trying to expand that policy** so it covers all federal agencies. Meanwhile, lots of journals have been founded that are open access from the start—as soon as a paper is available, anyone can download a copy.

There have been many developments in open access publishing lately, so we thought we'd do a rundown of the latest news.

Nature Publishing goes open access. The Nature Publishing Group (which is behind—wait for it—*Nature* and a host of other high-quality journals) isn't quite ready to let its top end journals leave paywalls behind. But it is interested in the potential of open access publishing. So, it has decided to invest in an open access publisher called **Frontiers**, which has a large collection of journals in the sciences and medicine. The publications of the Frontiers journals are all covered by a Creative Commons license.

17 April 2013

Opening Up Peer Review

Interactive Peer Review: What's In It for Reviewers?

By Elisabeth Pain

April 17, 2013

This is the fourth post in a series on new, interactive methods of peer review and their advantages — and disadvantages — for early-career scientists. You may want to read part 1, "[How Interactive Peer Review Works](#)," part 2, "[Advantages for Authors](#)," and part 3, "[For Authors, Potential Downsides](#)."

"Interactive and public review gives the opportunity to shortly/specifically comment on a paper without the burden of a full evaluation." —Davide Zanchettin

There are two ways that a scientist can participate in the peer-review process, as an author and as a reviewer. Being a reviewer is a good experience for early-career scientists, and a more open, interactive peer-review process offers some advantages and some disadvantages. What are they?

More recognition. One thing that "is broken in the current review process is that it requires an extraordinary amount of labor on the part of the peer reviewers involved, who remain anonymous [and] do the work for free," says Kathleen Fitzpatrick, director of scholarly communication for the Modern Language Association and a visiting professor at New York University in New York City. Fitzpatrick studies how networked communication technologies affect scholarship. "When ... this kind of review takes place in an open environment in a conversational process, we can begin to give credit to reviewers."

While the *Frontiers* journals do not make the individual contributions of reviewers public (they share them only with authors), they do offer reviewers exposure, says Henry Markram, a neuroscientist at the Swiss Federal Institute of Technology in Lausanne, who is the co-founder and co-executive manager of *Frontiers*. They do so first by naming them in the publication and second by giving them the opportunity to publish a joint statement to accompany the article they have reviewed. *Frontiers* also publishes reviewer profiles on their Web site.

10 April 2013

Opening Up Peer Review

Interactive Peer Review: Advantages for Authors

By Elisabeth Pain
April 10, 2013

This is the second post in a series on new, interactive methods of peer review and their advantages—and disadvantages—for early-career scientists. If you haven't already, we recommend that you first read ["Part 1: How Interactive Peer Review Works."](#)

At its best, interactive peer review can offer authors several advantages:

A collaborative effort. In essence, interactive peer review is a form of collaboration between authors and reviewers; the latter group may include just a handpicked few or the whole scientific community. At open access publisher Frontiers, where reviewers are nominated, they may edit text, correct statistical analyses, suggest clarifications for figures, make suggestions about conclusions, and highlight previous work that should be cited. The reviewers "are very collaborative," says Henry Markram, a neuroscientist at the Swiss Federal Institute of Technology in Lausanne, who is the co-founder and co-executive manager of Frontiers. Because reviewers' names eventually get published on accepted manuscripts, "they don't want their name with a mistaken paper, so they really work on the paper."

Observing the dynamics of the conversation during peer review can also be helpful to authors. Kathleen Fitzpatrick, director of scholarly communication for the Modern Language Association and a visiting professor at New York University in New York City who studies how networked communication technologies affect scholarship, submitted a book manuscript for online public discussion on MediaCommons Press. MediaCommons, which Fitzpatrick co-founded in 2007 and has been co-editing, is a community network of media studies scholars who investigate and promote new forms of publishing in that field. She found that watching other scholars argue about your work is "really useful." It gave her, she says, a sense of "where there was an issue that I really needed to clarify because it was being misunderstood." Because many of the scholars identified themselves, she was able to contextualize their comments and improve her revisions.

"The review process becomes much more supportive and much less about just sort of weeding out the stuff that shouldn't be in the journal." —Kathleen Fitzpatrick



Courtesy of the Modern Language Association

Kathleen Fitzpatrick



Opening Up Peer Review

How Interactive Peer Review Works

By Elisabeth Pain
April 09, 2013

Over the last couple of decades, new technologies and calls for a better system have challenged traditional peer review at scientific journals. Plenty of journals still do things the old-fashioned way, more or less—but these days, several open-access journals are employing alternative procedures, aiming to make peer review more open and collaborative. While the success of these initiatives has varied, several of these journals have become major players.

[At ACP,] designated referees—who may identify themselves or not, as they wish—interact online with the authors and other interested scientists.

Interactive peer review can offer advantages for researchers. Among the most important: turning a blind, mostly one-way process into a conversation with established researchers. "The primary benefit, particularly for young scholars, is getting their work not just out into circulation but out into active conversation with the people in the field," says Kathleen Fitzpatrick, a visiting professor at New York University in New York City who studies how networked communication technologies affect scholarship. But there are disadvantages, too: Some of these journals have no or low impact factors, for now at least, and more conservative scientists on review committees may not give you much credit for publishing there.

Among the most successful journals experimenting with more open peer review, different ones have different ways of integrating an interactive discussion into the process. At [Frontiers](#), an initiative that was launched in 2007 by two neuroscientists at the Swiss Federal Institute of Technology in Lausanne that now publishes more than 200 journals in chemistry, biology, and the health sciences, the [review process](#) starts in pretty much the traditional way. The editor in charge passes all manuscripts that are submitted free of serious errors (i.e., ethical issues or unacceptable writing) on to invited reviewers, who send back independent reports. That's when things get interesting: Regardless of how favorable the reviews are, authors take part in an online discussion on the Frontiers interactive review forum, read the reviews, and discuss them with reviewers (who are still anonymous and can also interact with each other).



Scientific publishing

Changing Nature

Feb 27th 2013, 22:47 by J.P.



Log In



194

IN THE world of academic publishing, it is hard to get more traditional than *Nature*. The British scholarly weekly has been reporting scientific breakthroughs since 1869. It hews to the time-honoured, and time-consuming, process of peer review, in which papers' worth is judged by anonymous experts prior to publication. Fewer than one in ten submissions make the cut. Successful ones are printed on dead trees and dispatched by post to subscribers, who pay for the privilege of reading about the latest important findings. Their authors win kudos just for getting their paper in.

Contrast this with *Frontiers*. The Swiss publisher has been posting online papers since 2007. Its peer reviewers, whose names are known, accept 80-90% of submissions, rejecting only those which are fatally flawed. Authors of successful manuscripts pay a publication fee, ranging from \$750 to \$2,600, so that readers can have free access to articles. A paper's merit is gauged after publication, using assorted internet metrics like the number of downloads.

For all the differences, the fates of *Nature* and *Frontiers* have become intertwined. On February 27th Nature Publishing Group (NPG), which owns *Nature* and 81 other scholarly journals, announced that it has bought a controlling stake in *Frontiers* for an undisclosed sum. Besides 30 titles in 14 scientific fields the Swiss upstart brings a social-networking platform—a LinkedIn for boffins, if you like—to share not just research, but news, job offers and information about conferences and events. It currently boasts around 80,000 members.



Nature Publishing Group buys into open-access publisher

27 Feb 2013 | 23:15 BST | Posted by Richard Van Noorden | Category: Lab life, Publishing, Science communication

One of the fastest-growing open-access publishers, [Frontiers](#), has been snapped up by Nature Publishing Group (NPG, which publishes this blog as part of Nature.com), the company [announced](#) today.

Frontiers was co-founded in 2007 by its current chief executive Kamila Markram, who is a neuroscientist studying autism at the Swiss Federal Institute of Lausanne. (The company itself, a private firm, is headquartered at a technology park in Lausanne. For more on the firm, see [Nature's 2010 article 'Publisher seeks patent'](#).)

Last year, Frontiers published 5,000 articles in 14 journals, to become the world's fifth-largest open-access publisher. (NPG itself published just more than 2,000 open-access articles in 2012.) But Frontiers' unique selling point is its concept as a community-driven networking platform, says Markram.

Academic editors can commission special topics around particular subjects; apart from regular CC-BY open-access articles at [fees](#) of between €770 (US\$1,006) and €1,600 (\$2,090), authors contribute (at no publishing charge) news about seminars, conferences and other events, as well as blogs and other content.

Because every one of the 80,000 or so scientists on the platform registers their details, authors can see not just how many people cite and download their articles, but also age groups and other demographic splits of readers. "It is highly addictive," says Markram.

The peer-review process is also cooperative: after initial review, authors and reviewers discuss the paper together in an online forum, and reviewers' names appear publicly on the final paper. The journal ends up rejecting only about 5–10% of its submissions, partly because of this review process, which aims at improving the final article, Markram says.

"We started off as a foundation, but realized that there are a lot of costs to produce high-quality open-access articles," Markram adds. The company turned cash-positive in 2011.

On NPG's side, the company said it was taking a majority investment but wouldn't say how much that cost. The two said that Frontiers would expand in 2013–14 and would work with NPG on innovations in open-science tools, networking and publication processes.

NPG invests in Swiss OA publisher

27 February 2013



Nature Publishing Group (NPG) has announced a majority investment in the Swiss open-access (OA) publisher Frontiers.

According to the companies, NPG and Frontiers will work together to empower researchers to change the way science is communicated, through OA publication and open science tools.

Frontiers was founded by scientists from École Polytechnique Fédérale de Lausanne (EPFL) in 2007. Since then it is said to have more than doubled articles published year on year and it now has OA journals in 14 fields of science and medicine. In 2012 Frontiers published over 5,000 OA articles. NPG currently offers OA options on 63 journals and published over 2,000 OA articles last year.

Frontiers will continue to be led by CEO and neuroscientist Kamila Markram and to operate with its own platform, brands, and policies. However, working with NPG should enable the journal series "Frontiers in" to expand significantly in 2013-2014.

In addition, the deal will bring bilateral links between the two publisher sites, making OA articles from the two companies visible on both. The companies will also work together on innovations in open science tools, networking, and publication processes.

'Combining NPG's established publishing expertise with Frontiers' innovative solutions for researchers opens up a wealth of opportunities for transforming the landscape of science communication. Frontiers is not only aiming to innovate in open access, but also to provide a more transparent and constructive peer review process, and offer an ecosystem of tools for scientists to build their academic standing,' commented Kamila Markram, CEO of Frontiers.

'Frontiers is innovating in many ways that are of interest to us and to the scientific community,' added Philip Campbell editor-in-chief of *Nature*. 'Referees and handling editors are named on published papers, which is very unusual in the life sciences community. Nature has experimented with open peer review in the past, and we continue to be interested in researchers' attitudes. Frontiers also encourages non-peer reviewed open access commentary, empowering the academic community to openly discuss some of the grand challenges of science with a wide audience.'

Bilan: Les publications suisses Frontiers vont connaître une grande expansion (The Swiss publisher Frontiers' publications will experience a fast expansion) ↗

27 February 2013



Les publications suisses Frontiers vont connaître une grande expansion

28 Février 2013

PAR DINO AUCIELLO Nature Publishing Group, éditeur de la revue Nature, investit massivement dans la maison d'édition scientifique basée à l'EPFL. Objectif : renforcer les publications en accès libre.



Dr Kamila Markram, neuroscientifique et directrice générale des publications Frontiers.

Frontiers



SCIENCES Le groupe de presse scientifique britannique Nature Publishing (NPG), qui édite la revue Nature, a annoncé, sans le chiffrer, un investissement majoritaire dans la maison d'édition en accès libre Frontiers basée à l'Ecole Polytechnique de Lausanne.

Objectif, d'après le communiqué: former une alliance stratégique pour permettre aux chercheurs de changer la façon de diffuser la science via des publications en accès libre et des outils de science ouverte.

« Frontiers souhaite non seulement innover dans le domaine de l'accès libre mais aussi offrir un processus d'examen par des pairs plus transparent et constructif, tout en créant un écosystème d'outils permettant aux scientifiques de bâtir leur réputation », déclare le Dr Kamila Markram, neuroscientifique et directrice générale des publications Frontiers.

Fondée par des scientifiques de l'EPFL en 2007, Frontiers possède aujourd'hui un portefeuille de revues dans 14 domaines scientifiques et médicaux, et a publié plus de 5000 articles en accès libre en 2012.

Selon le communiqué, la série de revues « Frontiers in » connaîtra une importante expansion en 2013-2014 grâce à l'investissement de NPG.

À l'heure actuelle, NPG a publié plus de 2000 articles en accès libre en 2012. Des liens bilatéraux entre nature.com et frontiersin.org permettront

The Chronicle of Higher Education: [Rethinking Peer Review in Academic Publishing: An Interview with Frontiers](#) ↗

11 January 2013

THE CHRONICLE OF HIGHER EDUCATION

January 10, 2013 by [Adeline Koh](#)

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Rethinking Peer Review in Academic Publishing: An Interview with Frontiers



This is the eighth interview in a series, [Digital Challenges to Academic Publishing](#), by [Adeline Koh](#). Each article in this series features an interview with an academic publisher, press or journal editor on how their organization is changing in response to the digital world. The series has featured interviews with [Anvil Academic](#), [Stanford Highwire Press](#), [NYU Press](#), [MIT Press](#) and the [Penn State University Press](#).

Today I speak with [Kamila Markram](#), president of Frontiers, a new online platform for open access publishing in science fields. Frontiers is a grassroots initiative started by scientists for scientists, with an [immensely innovative new peer review system](#). Our discussion today covers Frontiers' scope and goals, and how it plans to contribute to the changing landscape of academic publishing.

AK: Could you explain what [Frontiers](#) is about, and what makes it distinct from other open access publishers such as [Ubiquity Press](#), [Scholastica](#) and [Anvil Academic](#)?

FM: Perhaps a more valid comparison would be with [PLOS](#) or [BioMed Central](#): Frontiers will have published five thousand peer-reviewed open-access papers across twelve disciplines in the life sciences by the end of 2012. Some of our journals already have impact factors and we've been in the major archives for a few years now.

Frontiers was founded by academic scientists out of a collective desire for a better publishing option – one that's driven by the needs of working researchers, and that puts the responsibility for publishing back into the hands of researchers themselves. We started in the life sciences in 2008 and are currently expanding into all other fields of science, and soon into the social sciences and humanities. We're rooted in communities of researchers and we're deeply focused on those communities. Our editorial boards are top notch and global, our system makes peer review fast and fair, and we protect authors' rights to fair treatment while assuring the integrity and quality of peer review. Frontiers has built a sustainable, scalable model of open access, equal-opportunity scholarly communication, based on a stress-tested and

Media coverage of Frontiers research

[BBC: Study creates 'time travel' illusion ↗](#)

22 August 2014

[Frontiers in Psychology: A method for generating an illusion of backwards time travel using immersive virtual reality—an exploratory study ↗](#)



22 August 2014 Last updated at 10:28 GMT



Study creates 'time travel' illusion

By **Melissa Hogenboom**

Science reporter, BBC Radio Science



Participants see and hear their previous virtual selves when they go back in time

Virtual reality can be used to give the illusion of going "back in time", according to an exploratory study.

In this virtual world, subjects were able to reduce how many people a gunman killed, an event they had unknowingly been part of.

Going into "the past" increased the level of guilt the participants felt.

Writing in the journal *Frontiers in Psychology*, the team says that virtual time travel could help people overcome traumatic experiences.

Most interesting, the researchers add, was the emotional impact virtual time travel had on the participants.

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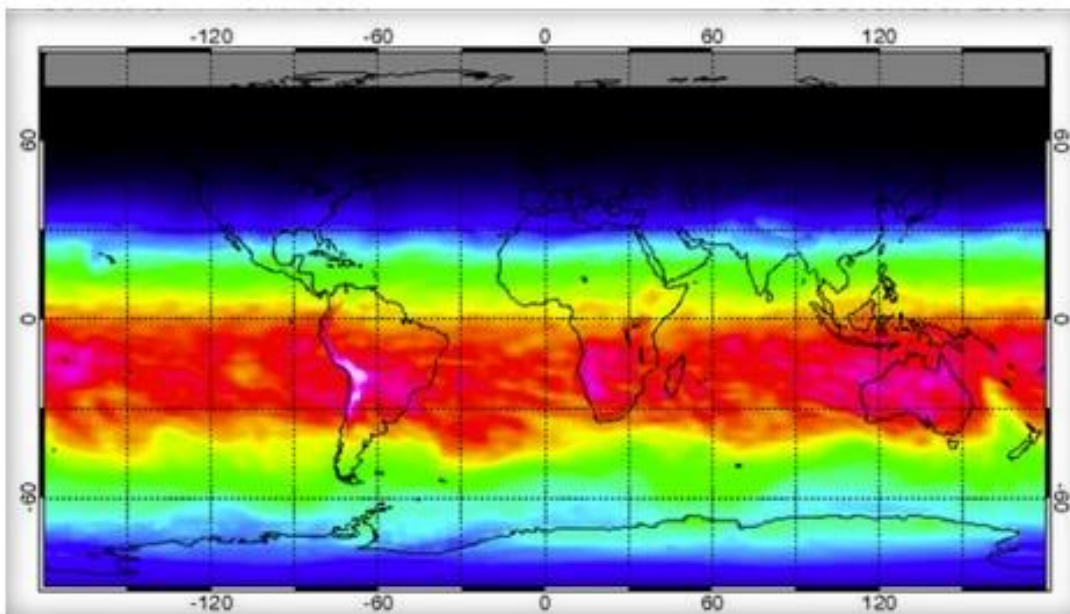
[Frontiers in Environmental Science: Record solar UV irradiance in the tropical Andes ↗](#)

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By **BECKY OSKIN** / **LIVESCIENCE.COM** / July 8, 2014, 5:00 PM

Blazing world record: Strongest UV rays ever measured on Earth



The global UV index on Dec. 29, 2003, when the world-record UV index was measured in Bolivia. **TEMES**

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A "perfect storm" of ozone-destroying chemicals sent cancer-causing UV-B radiation soaring at the top of a South American volcano in 2003, a new study reports.

On Dec. 29, 2003, a world-record **UV index** of 43.3 was detected at Bolivia's Licancabur volcano. The UV index is used to forecast the strength of the sun's ultraviolet rays.

A radiation detector left on the 19,423-foot-tall (5,920 meters) peak picked up the extreme spike in **UV-B radiation** during the Southern Hemisphere summer. A UV index of 43 is more similar to surface radiation on Mars than typical conditions on Earth, and the reading is well above the mid-20s routinely measured in the high Andes, said lead study author Nathalie Cabrol, a planetary scientist at the SETI Institute in Mountain View, California.

Washington Post: [How humans learned how to talk: By listening to birds](#) ↗

13 June 2014

Frontiers in Psychology: [The integration hypothesis of human language evolution and the nature of contemporary languages](#) ↗

The Washington Post

rrrence_mccoy



A young white-handed gibbon in South Korea. (EPA/JEON HEON-KYUN)

One of the most defining traits of humanity — our capacity for language — also presents one of our longest-lasting mysteries: How did we begin to talk? And where? And to what end?

Two professors at the Massachusetts Institute of Technology think they have perhaps answered that question in a [new study](#) published this week in *Frontiers in Psychology*. “How did human language arise? It’s far enough in the past that we can’t just go back and figure it out directly,” MIT linguist Shigeru Miyagawa, the lead author on the study, [told his university press office](#). “The best we can do is come up with a theory that is broadly compatible with what we know about human language and other similar systems in nature.”

New York Times: [Can Exercise Reduce Alzheimer's Risk?](#) ↗

2 July 2014

Frontiers in Aging Neuroscience: [Physical activity reduces hippocampal atrophy in elders at genetic risk for Alzheimer's disease](#) ↗

The New York Times

PHYS ED

Can Exercise Reduce Alzheimer's Risk?

By GRETCHEN REYNOLDS JULY 2, 2014 12:01 AM 122 Comments



Karen Kasmauski/Getty Images

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Exercise may help to keep the brain robust in people who have an increased risk of developing Alzheimer's disease, according to an inspiring new study. The findings suggests that even moderate amounts of physical activity may help to slow the progression of one of the most dreaded diseases of aging.

For the new study, which was [published in May in Frontiers in Aging Neuroscience](#), researchers at the Cleveland Clinic in Ohio recruited almost 100 older men and women, aged 65 to 89, many of whom had a family history of Alzheimer's disease.

PHYS ED

Gretchen Reynolds on the science of fitness.



[Guardian: Man develops powerful love of Johnny Cash following deep brain stimulation](#) ↗

27 May 2014

[Frontiers in Behavioral Neuroscience: A case of musical preference for Johnny Cash following deep brain stimulation of the nucleus accumbens](#) ↗

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Man develops powerful love of Johnny Cash following deep brain stimulation

Dutch man has sudden urge to listen to country singer following pattern of localised electrical pulses to his brain

Nicky Woolf

theguardian.com, Tuesday 27 May 2014 14.29 BST

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Johnny Cash. When the electrode batteries died down, the test subject's musical tastes returned to normal. Photograph: Marvin Koner/Corbis

Brain implants have had the unexpected and intriguing side effect of causing a 60-year-old Dutch man to develop a sudden and powerful love for the music of Johnny Cash, a new paper reveals.

A case study in the journal *Frontiers in Behavioural Neuroscience* describes how "Mr B", a married man with a very severe form of obsessive compulsive disorder, developed the urge to listen to the country singer while receiving a form of treatment called deep brain stimulation.

The New York Times: [How a Lizard Gets Rid of a Suitor](#) ↗

3 March 2014

Frontiers in Ecology and Evolution: [Female ornamentation influences male courtship investment in a lizard](#) ↗

The New York Times



A female dragon lizard.

Dr. Devi Stuart-Fox/Frontiers in Ecology and Evolution

Female dragon lizards in Australia develop orange patches on their underbellies when they are fertile; the patches disappear only after they lay their eggs.

A new study finds that the intensity of the color and the size of the patches help males in their search for mates.

The researchers — Devi Stuart-Fox and Jennifer Goode of the University of Melbourne in Australia — collected lizards from their arid homes under the salt crust of Lake Eyre and then used paint to manipulate the amount of orange on females in various stages of fertility. Then they observed how males responded.

Regardless of a female's reproductive state, the males preferred those with orange patches, particularly small, bright patches, according to [the study](#), which appears in the journal Frontiers in Ecology and Evolution. They were

[BBC: Virtual arm eases phantom limb pain](#) ↗

26 February 2014

Frontiers in Neuroscience: [Treatment of phantom limb pain \(PLP\) based on augmented reality and gaming controlled by myoelectric pattern recognition: a case study of a chronic PLP patient](#) ↗



26 February 2014 Last updated at 01:07 GMT



Virtual arm eases phantom limb pain

By Michelle Roberts

Health editor, BBC News online



Amputee Ture Johanson moves his virtual hand on the computer screen

Doctors have devised a new way to treat amputees with phantom limb pain.

Using computer-generated augmented reality, the patient can see and move a virtual arm controlled by their stump.

Electric signals from the muscles in the amputated limb "talk" to the computer, allowing real-time movement.

Amputee Ture Johanson says his pain has reduced dramatically thanks to the new computer program, which he now uses regularly in his home.

He now has periods when he is free of pain and he is no longer woken at night by intense periods of pain.

Mr Johanson, who is 73 and lives in Sweden, lost half of his right arm in a car accident 48 years ago.

After a below-elbow amputation he faced daily pain and discomfort emanating from his now missing arm and hand.

Related Stories

[How can mirrors fix phantom limbs?](#)

[Amputee uses freezer to numb pain](#)



For 48 years my hand was in a fist but after some weeks with this training I found

[BBC: Mathematics: Why the brain sees maths as beauty](#) ↗

13 February 2014

Frontiers in Human Neuroscience: [The experience of mathematical beauty and its neural correlates](#) ↗



13 February 2014 Last updated at 02:12 GMT



Mathematics: Why the brain sees maths as beauty

By James Gallagher

Health and science reporter, BBC News

Brain scans show a complex string of numbers and letters in mathematical formulae can evoke the same sense of beauty as artistic masterpieces and music from the greatest composers.

Mathematicians were shown "ugly" and "beautiful" equations while in a brain scanner at University College London.

The same emotional brain centres used to appreciate art were being activated by "beautiful" maths.

The researchers suggest there may be a neurobiological basis to beauty.

The likes of Euler's identity or the Pythagorean identity are rarely mentioned in the same breath as the best of Mozart, Shakespeare and Van Gogh.

The study [in the journal Frontiers in Human Neuroscience](#) gave 15 mathematicians 60 formula to rate.

New Scientist: [Learning drugs reawaken grown-up brain's inner child](#) ↗

8 January 2014

Frontiers in Systems Neuroscience: [Valproate reopens critical-period learning of absolute pitch](#) ↗

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Learning drugs reawaken grown-up brain's inner c

› 13:17 08 January 2014 by [Helen Thomson](#)

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A drug for perfect pitch is just the start: mastering new skills could become easy if we can restore the brain's youthful ability to create new circuits

WANNABE maestros, listen up. A mood-stabilising drug can help you achieve perfect pitch – the ability to identify any note you hear without inferring it from a reference note.

Since this is a skill that is usually acquired only early in life, the discovery is the first evidence that it may be possible to revert the human brain to a childlike state, enabling us to treat disorders and unlock skills that are difficult, if not impossible, to acquire beyond a certain age.

From bilingualism to sporting prowess, many abilities rely on neural circuits that are laid down by our early experiences. Until the age of 7 or so, the brain goes through several "critical periods" during which it can be radically changed by the environment. During these times, the brain is said to have increased plasticity.

In order to take advantage of these critical periods, the brain needs to be stimulated appropriately so it lays down the neuronal circuitry needed for a particular ability. For example, young children with poor sight in one eye may develop lazy eye, or amblyopia. It can be treated by covering the better eye, forcing the child to use the lazy eye – but this strategy only works during the critical period.

These windows of opportunity are fleeting, but now researchers are beginning to understand what closes them and how they might be reopened.

Wired: [Otogenetics used to stop rats binge drinking](#) ↗

6 January 2014

[Frontiers in Behavioral Neuroscience: Optogenetic stimulation of VTA dopamine neurons reveals that tonic but not phasic patterns of dopamine transmission reduce ethanol self-administration](#) ↗

WIRED

SCIENCE / 06 JANUARY 14 / by LIAT CLARK



A team of neurobiologists taught rats to binge on alcohol, then watched as each refused a drink when their dopamine-controlling neurons were stimulated.

The team from Wake Forest University and the University at Buffalo (UB) managed to convince the rats to go cold turkey using **optogenetics**, where specific neurons are made light-sensitive using proteins so they can be easily stimulated using implanted optic fibres.

"ChR2 was selectively expressed on the ventral tegmental area dopamine cells and delivery of blue light pulses induced dopamine release," wrote the team in a paper published in *Frontiers in Behavioural Neuroscience*.

Huffington Post: [Aerobic Exercise can improve your memory and slow aging](#) ↗

11 December 2013

Frontiers in Aging Neuroscience: [Shorter term aerobic exercise improves brain, cognition, and cardiovascular fitness in aging](#) ↗

THE HUFFINGTON POST

Aerobic Exercise Can Improve Your Memory And Slow Aging, Study Shows

Posted: 11/12/2013 10:43 am EST | Updated: 11/12/2013 10:43 am EST



631	209	70	0	76	25
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While we've known for some time about the many long-term benefits of exercise, from increased strength to a revved up metabolism, new research shows aerobic exercise also may have considerable effects on aging and brain health in the short term.

A study published in the "Frontiers in Aging Neuroscience" says exercise can help older adults improve their memory and overall cognitive health as they age.

Researchers at the Center for BrainHealth at the University of Texas-Dallas studied a group of 37 adults ages 57 to 75 with sedentary lifestyles. They were split into two groups, one control group and one physically active group. The fitness group spent one hour a day, three times a week, either on the stationary bike or treadmill over the course of 12 weeks.

[NBC: Wolves can also be man's best friend](#) ↗

4 December 2013

[Frontiers in Psychology: Social learning from humans or conspecifics: differences and similarities between wolves and dogs](#) ↗



Wolves can also be man's best friend, scientists say

BY ALAN BOYLE, SCIENCE EDITOR

Scientific games of hide-and-seek have shown that tamed wolves can pick up on a human's hints as well as dogs can — adding yet another twist to the long-running debate over the domestication of man's best friend.

The experiments at Austria's Wolf Science Center, [described in Tuesday's issue of Frontiers in Psychology](#), support the view that wolves had a pre-existing capacity to learn from social partners — and that humans [capitalized on that capacity more than 18,000 years ago](#).

"If you take wolves and socialize them properly at a young age, and work with them on a daily basis, then yes, you can get them to be cooperative and attentive to humans," said Friederike Range, a researcher at the Messerli Research Institute at the University of Veterinary Medicine Vienna.

Genetic analysis shows that dogs descended from gray wolves, and they're still so genetically similar that they're regarded as belonging to the same species, *Canis lupus*. But some researchers have suggested that dogs have a unique capacity for interaction with humans.

Range and a colleague at the institute, Zsofia Viranyi, designed a series of food-hiding games to assess the social skills of 11 North American gray wolves as well as 14 dogs. All of the animals were between 5 and 7 months old, born in captivity, bottle-fed and hand-raised in packs.

During each game, a dead chick was hidden in one of three locations in a park meadow. Sometimes the wolves and the dogs were allowed to watch while a human hid the snack. Sometimes the humans only pretended to hide it. And sometimes the canines watched while a dog looked around for the snack.

9 October 2013

Frontiers in Genetics: [Páramo is the world's fastest evolving and coolest biodiversity hotspot](#) ↗

The New York Times

MATTER

Fast-Paced Evolution in the Andes



Santiago Madriñán Restrepo

Páramos, mountainous grasslands that flourish thousands of feet above sea level in the Andes, are hot spots of evolutionary change.

By CARL ZIMMER

Published: November 7, 2013

In 1799 the great naturalist Alexander von Humboldt and his companions set out from Caracas, Venezuela, to climb the Andes. They struggled up a mountainside enveloped in mist so thick they had to clamber over rocks by hand. When the fog cleared, von Humboldt was left astonished by the view. Vast grasslands stretched all around him, home to an astonishing number of different trees, shrubs and flowers.

More 'Matter' Columns

Matter: [Afraid of Snakes? Your Pulvinar May Be to Blame](#) (October 31, 2013)

Matter: [Christening the Earliest Members of Our Genus](#) (October

“Nowhere, perhaps, can be found collected together, in so small a space, productions so beautiful and so remarkable in regard to the geography of plants,” he later [wrote](#).

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