MONDAY MONTHLY

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MONDAY MONTHLY





NEWS IN PICTURES

Breaking

With cuts and bruises and wearing a torn petticoat, filmmaker and UCT lecturer Meg Rickards attracted curious stares - as well as the emotional embraces of well-wishers - as she walked from Cape Town City Hall to Muizenberg on Friday 8 August. The bruises may have been the work of a make-up artist and the petticoat an item from a film wardrobe, but the message on the eve of Women's Day was loud and clear: break the silence around child and woman abuse. Rickards' walk also aimed to draw support (via the online crowdfunding website Thundafund) to finance her new film, Whiplash, based on the award-winning novel by Cape Town author Tracey Farren.

People are acred, says Tutu

Religious teachings that demonstrate how God takes special care of the weakest and most marginalised people in society could guide how humans treat each other, said Archbishop Emeritus Desmond Tutu. A noted social activist and the first black Archbishop of Cape Town, Tutu was addressing religious studies students at UCT on 5 August. Introducing a module on the intersection of religion and ethical decisionmaking, he maintained that humans are "Godcarriers". This should encourage people to approach each other with reverence, and failure to do so is essentially blasphemy, he said. "Can you imagine the revolution that would happen in the way that we treat one another [if we took this to heart]?" Tutu asked students.



Coach Patient Charumbira teaches Ntsikelelo Fisher good batting technique at a Holiday Clinic run by the Cricket School of Excellence (CSE) at UCT's Indoor Sports Centre in July. Twelve-year old Fisher, from Khayelitsha, was one of more than a dozen young cricketers who attended the coaching clinic. CSE was founded by UCT cricket's head coach, Ryan Maron, in 1999. Maron and colleagues run similar workshops across the country each year, the aim of which is to develop South Africa's cricketing superstars through a combination of fun and rigorous technical and behavioural training. More than 12 000 young cricketers have passed through CSE's coaching clinics since its inception.



Performers Bhekani Shabalala (left) and Bheki Khabela feature in a new work by renowned choreographer Boyzie Cekwana. They join a host of fellow artists to present performance artworks in the Gordon Institute for Performing and Creative Arts' 2nd Live Art Festival from 27 August to 6 September. Thirty-five collaborative works, incorporating visual arts, dance, theatre, music, architecture and literature, will be presented on Hiddingh Campus and other venues around the city. Audiences will be able to move from one work to another, viewing up to five works per evening. The 2014 Festival will premier several works that have been curated along six main themes: Framed, Republic, Body and Mortality, Abject Object, Femininities and The Periphery as Threshold.

EXPRESS OUTRAGE ABOUT GENDER VIOLENCE Story by Abigail Calata

Photo by Je'nine May

Jameson Hall recently provided the setting for a frank discussion on gender issues that included a contribution by President Michelle Bachelet of Chile, who was among the speakers hosted by UCT Chancellor Mrs Graça Machel.

UCT Chancellor Mrs Graça Machel believes there is not enough outrage concerning violence against women. "It strikes me that our society is not outraged about this violence. as well as between the speakers We know it exists and is a problem, was facilitated by AGI director but we don't see the same kind of outrage that says, 'This cannot and her colleague, Yaliwe Clark. continue'," Machel stated as she opened the discussion, in which Chilean President Michelle Bachelet participated, and which formed part of the 12th Nelson Mandela Annual Lecture series.

Women's Day.

Nombonisa Gasa, Sonke Gender 10 August.



very warm terms, calling her by her first name not out of disrespect for her office, but because she always thinks of her as "a good sister and friend". Bachelet is the first female president of Chile. Her speaking engagement at UCT was preceded by the 2014 Nelson Mandela Lecture, which she delivered on

Machel hosted the event, titled Gender in Dialogue, which saw prominent proponents of gender equity such as feminist writer

Justice activist Mbuyiselo Botha and UCT's Dr Zethu Matebeni address a packed Jameson Hall on

The event was organised in partnership with UCT's African Gender Institute (AGI), and interaction with the audience Associate Professor Jane Bennett

Machel went on to described violence against women as a global phenomenon in which women "are being killed at the hands of those (men) who claim to love them, should protect them, Machel welcomed Bachelet in and should be proud of their success". She observed that the empowerment of women socially and economically has led to men feeling increasingly powerless, which in turn has resulted in an increase in the abuse of women on the home front.

Bachelet agreed with this assessment, adding that "equal, inclusive and harmonic development is not possible in the world if we don't put gender equality at the top of the list of challenges that we states, NGOs and universities of the world must address".

Like Machel, she recognises that the legal framework set up to address gender parity is not adequate. "Sometimes the law

addresses the issue in a partial instead of a comprehensive way. Those in power understand that they need to do more for women; but what would happen is that you'd have a good law, but there would be no budget for its implementation. Or you have a law and the budget, but there is no political will to implement it.

"We need to have a comprehensive approach. We need to deal with many difficult and different things," Bachelet explained.

Respect diversity

She called for the development of "a culture of respect between people – men and women, girls and boys - a respect for diversity in our societies. We're not dealing well with diversity - whether ethnic, sexual, or any other kind".

Bachelet argued that a change in culture would generate the right conditions, in which women could make decisions that would affect every aspect of their lives. "We also need powerful women in leading positions, to serve as role models to other women."

Machel, in turn, believes the solution lies in the creation of a social movement of outrage,

"so that those who target women should feel absolutely isolated. They should be ashamed of leaving the house. It's up to women to engage in such a movement, that says, 'Enough is enough. We will no longer accept this'."

'We are angry'

In her response to the dialogue between Machel and Bachelet, UCT activist and host of the Queer in Africa events Matebeni expressed her and others' outrage at the violence exercised on women's bodies, psyches and spaces.

"We are angered that Nontsikelelo Tyatyeka's murderer continued to roam the streets, greeting Nontsikelelo's mother and bragging to friends about how he killed the 21-year-old woman. After she refused to sleep with him, he murdered her and wrapped her body in a blanket. Only a year later, her body was found dumped and decomposed in a rubbish bin, in a neighbour's yard in Nyanga," Matebeni said, adding, "How can we not be outraged when men think they can take our bodies without our consent? When they believe that a woman's sexuality is only the preserve of men?"

Her contribution to the discussion ended with this: "History has shown us that freedom comes with taking risks. Like many who have risked their lives, their children and their families for this nation and the liberation of her people, we continue this work, this work of liberation - until we all are free!"

Matebeni received a standing ovation for her passionate speech, after which her fellow speaker, Nombonisa Gasa, struggled to contain her tears.

Fathers are important

Feminist Gasa found the problems surrounding gender issues to be in their conceptualisation. She referred to a structural inequality that can only be countered if feminists remained curious: "We have to describe the problems anew. The situation calls for us to be very curious, and to have a daring imagination," she concluded.

The only man on the pane Mbuyiselo Botha of Sonke Gender Justice, held the opinion that "the elephant in the room is the role of men. It is important to centralise and to situate the important role we play as fathers, in a country that has normalised violence and poverty".



Mrs Graça Machel (left), UCT Chancellor, and Chilean President Michelle Bachelet shared similar views on the extent of gender violence in the world and what needs to be done about it. Both spoke at the Gender-in-Dialogue event, which formed part of the 12th Nelson Mandela Annual Lecture Series.

THE FINE ART **OF NATION-**BUILDING

Story by Abigail Calata Photo by Michael Hammond

The political situations in South Africa and Germany came under the spotlight recently, when a panel which included former Constitutional Court justice Albie Sachs and former UCT Vice-Chancellor Dr Mamphele Ramphele joined German MP Markus Meckel to discuss the role fear plays in the politics of both countries.

A fear of failure is holding South Africans back; and causing us, as a nation, to settle for mediocrity in education, healthcare and infrastructure.

This was Dr Mamphela Ramphele's assessment of South Africa two decades after democratisation. She opened a panel discussion, titled $2\hat{0}$ years of democracy in South Africa – 25 years since the fall of the Berlin Wall: two countries in transition, which formed part of the EU Inspiring Thinkers Series. Describing herself as a "failed politician", she added that 18 months ago she had embarked on something she knew nothing about - founding the political party Agang SA - and expressed gratitude that she had failed.

"Twenty years on, and we wrestle with success and the fear of failure. Forty years ago a young student - Steve Bantu Biko - stated that 'fear is the determinant of South African politics'. Back then we feared our white oppressors, and suffered from an inferiority complex. Today we are afraid to fail as individuals, as families and as institutions," she explained.

Former Constitutional Court justice Albie Sachs agreed with her, adding that although "there is far too much conceptual fear ... our people are not frightened of authority in the same way we

were afraid of authority before. People speak their minds, they protest – they go out in the street. When Marikana happened it was so terrible, ugly and shocking; but it wasn't accepted as normal. It sent a shock wave through the whole of the country. The shock was felt more profoundly by those of us who had fought against these kinds of things in the past."

On the role of fear in German politics, Markus Meckel - the third member of the panel, and a former foreign minister of East Germany and member of the German Bundestag (parliament) - pointed out that a regime like the one that operated in communist Germany could only be sustained by fear. "If (the people) lose that fear - that was our experience, but I think it's similar to that of South Africans - and are ready to suffer and sacrifice (for their freedom), then they can topple such a regime," he commented.

Bold steps necessary

Ramphele is of the opinion that South Africa can learn a lot from German reunification - which Meckel described as his country's "negotiated revolution".

"The Germans have shown us that by being bold and taking risks, they built themselves into a strong,



Mamphela Ramphele, and Markus Meckel, member of the German parliament, debate the similarities and differences between South Africa and Germany as both countries move forward from difficult political pasts.

resilient, peaceful society ... We have a task which is incomplete. The next 20 years have to be about dismantling the extractive economic and political institutions we inherited from the past. We need to build inclusive economic and political institutions to enable us to live up to the ideals of our society," Ramphele said.

She countered Sachs' optimism regarding South Africa's successes since becoming a democracy. "My concern is that the standard by which we measure success is so low that we are not challenging ourselves enough to have a vision of something bigger."

Sachs maintained that one of the country's successes had been the elections held post-1994. "We used to hear the story: 'One man, one vote. Once!', implying that black people cannot manage democracy, and that democracy is for Europe. We've had five elections that were overwhelmingly free and fair. We've had four presidents. We take that for granted."

Ramphele reacted to this by saying, "Regarding the free and elections, Albie, we are all fair very proud of the track record. You and I experience the best of the democracy that we have; but if you are with me in Philippi and see how people are treated at voter stations, there is nothing free – not

there, in the experiences of many people.

Sachs maintained that the greatest achievement of his generation was to secure permanent constitutional foundations to deal with current crises. "I feel deep personal, historic satisfaction with what we South Africans achieved (in the past), but dissatisfaction with so much that is going on in our society (today). I believe our satisfaction gives us the capacity and our past gives us the instruments to deal with our current dissatisfaction."

Reunification v Unification

Dr Zwelethu Jolobe from the Department of Political Studies, who joined the discussion when the panel took questions from the audience, had an interesting take on why the South African and German experiences were divergent, with some points of contact. "In Germany the story is one of reunification, which talks of coming back home to something which was there (before). Whereas here it is one of unification, with people who perhaps at a certain point never at all thought of themselves as being one people... And that's why it's a lot more messy, because the home that we want to build was never there," he concluded.

Meckel stated that the challenge facing both South Africa and Germany is how to deal with the past. "We looked to South Africa when the Truth and Reconciliation Commission was established because we had a similar struggle, which was: how do we deal with those who worked with the former communist dictatorship?'

He also observed that most Germans do not view theirs as a country in transition but that many from the former communist bloc disagreed. "In the former East Germany we have a doubledigit unemployment rate, and a lot of people feel like second-class citizens. In other words, they do not feel acknowledged as equals by their countrymen from the former West Germany.

The UCT debate was the second in the EU Inspiring Thinkers Series. It was organised jointly by the university's Department of Political Studies, the Delegation of the European Union to the Republic of South Africa, and the Embassy of the Federal Republic of Germany in South Africa. Professor Anthony Butler, head of the Department of Political Studies, hosted the speakers on behalf of the university

Story by Abigail Calata Photo by Je'nine May

UCT reached another milestone in its open access journey last month when the OpenUCT institutional repository was formally launched. The repository will enable UCT lecturers and researchers to legally and freely make available their research, teaching and engaged scholarship resources, to facilitate access, reuse and sharing of materials.

Master's and PhD theses and

dissertations will also be available

via an automatic process that will

be linked to the examination and

Anyone with access to the

internet will be able to access

the documents shared on this

platform. It is intended that the

repository will play an important

role in increasing the visibility of

The university's commitment to open

access and knowledge-sharing dates

back to 2008, when then-Deputy

Vice-Chancellor Professor Martin

Hall signed the Cape Town Open

Education Declaration, expressing

UCT's support for "creating a world

Earth can access and contribute to

the sum of all human knowledge".

In time, this would lead to what Price

referred to as the "democratisation

In 2011, Price – on behalf of

where each and every person on

graduation process.

African scholarship.

Long-standing

commitment

of knowledge".

http://open.uct.ac.za.

Speaking at the launch, Vice-Chancellor Dr Max Price explained that "the repository is a space where we as the UCT community can share research, social engagement and teaching materials online with the world... The OpenUCT repository takes a new approach in catering for the preservation, accessibility and discoverability of the full spectrum of our scholarly outputs" Unlike materials that are simply

international open-access principles. UCT staff will be able to upload

BRIEFS

Wood wins prestigious medal

Robin Wood - director of the Desmond Tutu HIV Cent Weber-Parkes Medal for 2014 from the Royal College of award – the Gilchrist Memorial Medal. Physicians of London.

treatment of tuberculosis. The prize is currently awarded influence of fishing and pollution on marine systems. for the best work already done on this same subject in the The citation lauded her services to marine science, The ABA praised her for devoting her career to "addressing the UK or abroad.

the Royal College of Physicians of London.

Moloney first woman to receive Gilchrist medal

The medal recognises Moloney, who is also the director of 2014 in Boston, USA.

the Harveian Oration - a prestigious annual lecture - at deserving students from educationally and economically on violence against women in 2009. disadvantaged backgrounds.

Manjoo wins International Human **Rights Award**

emeritus professor in the Department of Medicine and The Department of Biological Sciences' Associate Professor The American Bar Association (ABA) Section of Litigation full member of the Institute of Infectious Disease and Coleen Moloney has become the first woman to win the South presented United Nations special rapporteur on violence against Molecular Medicine (IDM) - has been awarded the African Network for Coastal and Oceanic Research's premier women and University of Cape Town Associate Professor Rashida Manjoo with the International Human Rights Award on 8 August

Founded in 1895, this prize was originally awarded UCT's Marine Research Institute, for her research into the Described as "one of the world's top experts and combatants triennially to the author of the best essay on some subject variability of marine food webs and ecosystems under global of violence against women", Manjoo was recognised for her connected with the aetiology, prevention, pathology or change. This includes the impact of climate change and the substantial and long-term contributions to the promotion of human rights outside the USA.

commending her committee work and her selfless brutality and oppression rooted in inequality and gender-based Wood will receive his prize in October on the occasion of service to others - especially finding funding to support discrimination." Manjoo was appointed as the UN special rapporteur

heralds change

2014.

will change.

GREATER STRIDES TOWARDS OPEN ACCESS

"If you want to go fast, go alone; if you want to go far, go together." This African proverb served as the inspiration for the collaboration between OpenUCT, the Centre for Innovation in Teaching and Learning (CILT), Information and Communication Technology Services (ICTS), the Research Office, UCT Libraries and academic contributors in disciplines across the university, which culminated in the newly launched OpenUCT institutional repository, available at

uploaded online, OpenUCT repository content will be professionally curated, and attention will be paid to ensuring that its resources are easy to find using search engines. It will serve as UCT's default Institutional Repository - a platform for preserving and exposing the scholarly output of UCT that has been developed in line with

any shareable research resources (such as academic papers, working

papers and policy briefs), as well the university – signed the Berlin as teaching and learning materials Declaration on Open Access to (such as lecture notes, videos, the Sciences and Humanities. simulations and blog posts). Here, the focus was on new knowledge and research, which Academics must have the right to make that content available (according to Price) would have the openly, either through contracts following consequences: with journals which allow • Breaking down physical barriers, postprints to be made available, so that users would not have to physically be at libraries to or through open licences such as Creative Commons licences.

- access journals; • Providing greater institutional access, since anyone - not only registered students and academics -could exploit resources situated at specific institutions;
- Posing a fundamental challenge to academic publishing and peer review: and. lastly
- Creating a different mindset, especially among scientists, who would put up their raw data for scrutiny.

"UCT strives to share knowledge and scholarly outputs - for the sake of knowledge, but also because it is good for the brand, our reputation, and the presence we have around the world," Price concluded.

mproved webometric

Gwenda Thomas, executive director of UCT Libraries, hailed the repository as "cyber-infrastructure to deliver content and an interface that will knock the digital socks off all other institutional repositories, locally and globally". UCT Libraries'



services are responsible for the implementation of the university's open-access policy. Other activities spearheaded by UCT Libraries' services include the setting of metadata standards to make open content visible and discoverable.

Additionally, a library team has been working on improving UCT's position in the webometric rankings, a ranking system based on university web presence, visibility and web access. "Currently the webometric performance of the digital repository (UCTScholar) has yielded great results, indicating that UCT has moved up from 1746th in the world to 477th, from 46th to 13th position in Africa, and from 22nd to 10th place in South Africa," Thomas revealed. With the launch of OpenUCT, we expect these rankings to shoot up even further – watch this space, she says.

Showcasing scholarly output

Associate Professor Laura Czerniewicz, OpenUCT director, described the repository as "the foundational infrastructure for a vision". She said that the repository is a means to several ends, including

a contribution to "meaning-making and knowledge creation in a globalised world"

She praised UCT scholarly output, emphasising that all the effort put into making these resources available and accessible is premised on the fact that UCT produces extraordinary scholarship and teaching resources. "In the process of developing the repository, we discovered how much fantastic research and social responsiveness activity is happening in this institution – and which has been invisible to date. No more!" she declared.

Shepointed out that the repository will enhance the ease with which knowledge generated by UCT scholars is found. "Discoverability is a requirement for participation in knowledge networks. What is found becomes what is engaged with, so discoverability is not a nice-to-have, but a condition for scholarly engagement."

She believes that the repository will influence how knowledge is produced and used, as "findable online content shapes what can be known; makes certain knowledge visible and legitimate; and consolidates power through normalisation".

Jammie Shuttle pilot project

move to the nearby Stop-and-Drop, and the timetable Thandabantu Nhlapo.

section on the UCT website.

These changes are part of a pilot project to ensure bodies, as well as outside consultation.

Petersen appointed as UCT Deputy Vice-Chancellor

The West Bus Stop will close, the South Bus Stop will his new role in October 2014, on the retirement of Professor Jameson Hall.

asked questions, a map of the new stops, and the new Engineering at the Cape Technikon (now the Cape Peninsula politicians and corporates". route information, can be found in the Jammie Shuttle University of Technology). He is a member of the UCT A veteran journalist, Du Preez received an honorary degree, a Master's Capital 2014.

long-term discussions with university and student position. Until this post is filled, Emeritus Professor Barry North-West University. Downing will serve as acting dean.

Max du Preez to deliver TB Davie memorial lecture

The Jammie Shuttle Service will be undergoing a Professor Francis Petersen, the dean of the Faculty of Accomplished columnist, social commentator and political analyst number of important changes from 8 September Engineering & the Built Environment (EBE) has been Max du Preez will deliver this year's annual TB Davie Memorial appointed as a UCT deputy vice-chancellor. He will take up Academic Freedom Lecture on Thursday, 28 August 2014, at 13h00 in

In a lecture titled *The mediocrity of intellectual discourse*: Petersen brings to this position his extensive experience of *misrepresenting South Africa in the academy and beyond*, Du Preez will During this time, commuters will make use of North management in both the industry and academic sectors. discuss how public intellectuals, academia and the media often fail to and new South bus stops to access the Jammie He has been the executive head of strategy at Anglo reflect the whole of SA to its citizens, and argues for a need to "move Shuttle. Further information, including frequently American Platinum and head of the Department of Chemical beyond the dominant and predictable discourse dictated by powerful

Council and chairs the board of the Cape Town World Design in Social Science, from UCT in 2002. He is also a fellow of the Centre for Leadership Ethics in Africa at the University of Fort Hare and a the sustainability of the Jammie Shuttle. It also follows Petersen's new appointment leaves a vacancy in the dean's visiting professor at the School of Communications Studies at the



MIND MATTER

It's the most complex organ in your body, capable of simultaneously processing thousands upon thousands of inputs at a time on the equivalent of 20 watts of electricity – a third of that required by your average lightbulb. What do we know about the human brain? The Centre for Open Learning recently hosted four public lectures focusing on key features of this incredible organ - starting with what newborns can teach us about neuroscience, and ending with the ageing of the brain (and what we can do to slow it down) - with studies on drug addiction and the difference between male and female brains presented in between.



It's an experience every human are today? For Dr Nils Bergman, an

long-term social behaviour. It all comes down to connection: of the child with the mother, and

Critical 1 000 minutes

SEX ON THE BRAIN

Story by Adele Baleta

There are basic physical differences between women's and men's brains, starting in the womb and continuing into later life, says UCT's Professor of Neuropsychology Mark Solms. The question is to what extent these differences are prewired, and what role socialisation plays.

"Sex differences [in the brain] are a fact, and documented across all primate species," says Solms. And the difference goes right down to genetic code.

It's in your DNA

Your genes are a combination of your parents' genes, and are fixed from the moment of conception in every cell of your body. In the womb, babies' bodies are initially female, but boy foetuses have an XY chromosome and girls have an XX chromosome. The difference on the Y chromosome, very specifically, is due to a single gene sequence that, when activated. produces a molecule called TDF (testisdetermining factor). This effectively turns the baby's gonads into testes.

Without the influence of TDF would become ovaries and the foetus would remain a girl. Solms says that this one gene sequence on the Y chromosome "is the only purely genetically determined difference between males and females – all that comes next flows from that tiny fact".

There is an environmental aspect to the story, however. The physiological process that happens in a cell will either switch on a gene sequence or not, and that determines what those genes do in the cell. "So it is difficult to separate the genetic from the environmental mechanisms that go towards making us who we are," Solms says. "The way in which genes work is

simply inextricable from the environment **Brain and behaviour** that they find themselves in."

The gendered brain

Further changes happen at the beginning of the second trimester of pregnancy, when the testes produce vast quantities of testosterone. This hormone is converted by an enzyme called 5-alpha reductase produced by the mother and results in the body becoming male. As a result, the male foetus' body gets bigger, changes shape, grows male genitals and gets more hair. That said, the brain at this stage is still female

Solms explains that this is what happens on average, and not every process is the same: "Not every testicle produces the same amount of testosterone, and not every mum produces the same amount of the required enzymes."

In biology, everything happens to different degrees, and not everyone "is equally masculinised" as a result.

At the end of the second trimester, another wave of testosterone is released from the testes, causing the baby's brain to become "masculinised". The mother produces the enzyme aromatase, which converts the testosterone into oestrogen (female hormone). This oestrogen then crosses the blood-brain barrier and masculinises the brain.

The result of this "masculinisation" is that the brain gets bigger, although Solms is quick to add that "there is no evidence that brain size correlates with intelligence". In boys, the corpus callosum, a beam of fibres that joins the right and left hemispheres of the brain, shrinks. This, on average, is what makes boys better at spatial understanding. In girls it is bigger, which means they talk earlier and become better linguistically than boys.

Then there is the amygdala, linked to emotional memory formation and survival instincts - which tend to be more active in men. Solms says this means males are, on average, more active and aggressive than females. Women, however, have a more active cingulate gyrus (the front of the 'collar' surrounding the corpus callosum), which has been linked to nurturing activity, empathy and pro-social behaviour.

The multiplier effect

While genes predispose us to certain behaviours, Solms dispels any notions of a "reductionist genetic story". Small differences in aggression, for example, may occur whether a brain has been masculinised or not. However, increased aggression in a person will lead to a different response from the environment - causing the multiplier effect, where

behaviour is reinforced and ultimately exaggerated. So while there may be a tiny genetically determined-difference, it will not be the same at the end of the maturation process, Solms explains.

Experiments with rats have shown evidence of this multiplier effect in action. The way mothers interact with their infants, and stress levels during pregnancy, had an "unquestionable" effect on the chemistry of the brain, resulting in massive consequences for the sexual life of the offspring

Solms says while differences in the brain are biologically determined, it's impossible to understand how these work and what the effects are, on the average and in the individual, unless interactions with the environmental factors, which activate and transcribe the genetic mechanisms, are understood.

Turning to memory as an example, Solms savs, "What we record in our longterm memory is our individual experience, which is socially or environmentally determined."

However, the mechanism by which longterm memories are formed is through the activation of genes by those experiences: "Even the mechanism through which you remember your own, personal, beautiful, beloved, individual history; is held in your brain through the activation of your genes."

Story by Judith Browne

What's happening in a baby's brain just after birth? Dr Nils Bergman talks us through the first 1 000 minutes of a child's life - and why bonding between mother and child is critical for the development of happy, healthy, social beings.

being shares, and yet few (if any) of us can remember it. What was our own birth like? What were we thinking and feeling as we left the warmth of our mother's bodies and entered a strange, new world? Does that earliest of experiences have any bearing on who we

honorary senior lecturer at UCT's Department Paediatrics and Child Health and an honorary research associate in the Department of Human Biology, the first hours of life – while we might have no working memory of our own - are absolutely critical for the development of a baby's brain and

of the circuits in the brain.

Nutritionists and those specialising in early childhood development speak of the significance of the first 1 000 days of human life. These 270 days of gestation, plus two years of life (adding neatly up to 1 000 days), are described as 'windows of opportunity' in which children's lives can be positively shaped. Bergman zooms in even closer. He speaks of the first 1 000 minutes of life – 16.6 hours, or one day – and why they matter. For Bergman, the quality of a child's connection with its mother during the first hours of life determines the quality of connections in that child's brain -

and memory is based. As such, he advocates for uninterrupted skinto-skin contact and breastfeeding -"zero separation" between mother and child on that critical first day. By Bergman's account, skin-toskin contact wires the baby's brain for emotional-social intelligence.

"Neural circuits that process basic information are wired earlier than those that process more complex information," explains Bergman, quoting the National Scientific Council on the Developing Child. "Higher circuits build on lower circuits, and development is much more difficult if those lower circuits aren't wired properly." That's why the earliest experiences matter most, because those are the ones that are building the foundation

Brain development after birth begins with instinctual behaviours. If a newborn is left, undrugged and undisturbed, on its mother's chest during the first hours of life, explains Bergman, innate behaviours kick in that help form the neural connections on which so much other brain development relies. Within 10 to 20 minutes after birth, the baby's eyes open and focus on the nipple. A baby will kick back its legs, arch its back, lift its head and smell its way to the nipple, where it will start suckling. Within 30 to 40 minutes, the baby focuses on the mother's eyes.

Social wiring

What is happening to the brain during this behaviour? A baby's sense of smell is particularly acute vital networks on which all learning after birth, and is particularly

sensitive to colostrum – a mother's first milk - during the first 24 hours. The smell and touch of its mother sends reassuring messages to the emotional processing unit of the baby's brain, the amygdala, telling it it's safe.

Newborn babies need to feel safe, to help counteract the incredible stress of being born. "The locus coeruleus – the part of brain that wakes you up with adrenaline – in a newborn baby is producing 50 nanomoles of adrenaline per litre," says Bergman. [to provide context, a fullgrown man, when exercising, is producing around six nanomoles]. "The baby will never ever be as awake as it was when it was born. You will never be as stressed as this again."

While that stress is absolutely necessary for birthing, the baby needs to calm down quickly to ensure that stress doesn't disrupt the brain architecture and alter development. High stress during the early years of a child's life is a strong indicator for poor health in later life.

Cortisol, the body's stress hormone, is counterbalanced by oxytocin, often known as the 'tend and befriend' hormone. A mother's smell and touch cause surges of oxytocin in the brain, connecting the emotional brain (the amygdala) with the social brain (the prefrontal cortex), specifically the left prefrontal cortex, associated with emotions that make you want to approach rather than withdraw.

'Your emotional-social intelligence is being embedded from the moment you're born," says Bergman.

"And it requires mother's smell and mother's skin to make this firing happen.'

Oxytocin is also what encourages the baby to open its eyes, and 'approach' its mother: It increases gaze to the eye region of a person's face, connecting the child's occipital lobe (responsible for visual processing) to its fusiform gyrus (responsible for reading emotions on faces and in bodies), and ultimately back to the amygdala.

"This lays the foundation for reading others' emotions, for knowing what another person is thinking, for empathy," Bergman explains. "Reading emotion on someone else's face and interpreting it against your own is one of the most sophisticated things you will try to do."

Brave new world

For Bergman, the beginning of healthier humans and a better social order lies in this first connection. "It matters how we're born,"

he observes. "Infancy cannot be rerun later."

This is why, for Bergman, mother-child bonding after birth is inviolable. Early bonding in the first 1 000 minutes leads to secure attachment in the first 1 000 days, affording a child "a safe base from which to explore the world".

"There are more synapses in the **Dr Nils Bergman** brain of a newborn child than there are stars in the galaxy. Every single newborn baby is born with the full potential of the universe - and that potential is about the quality of early experience, which

predicts our sociality. We are born to know others."

Behind the small, crumpled face of a newborn, vast networks of neurons are growing and connecting. Those first few simple acts of life - searching for the nipple, suckling, making eve contact - help us become who we are. Our earliest connection - with our caregiver - sets the stage for the connections we are to make throughout the rest of our lives.

C There are more synapses in the brain of a newborn child than there are stars in the galaxy. Every single newborn baby is born with the full potential of the universe - and that potential is about the quality of early experience, which predicts our sociality. We are born to know others. **>>**

YOUR BRAIN ON DRUGS

Story by Carla Calitz

In what is considered one of the most memorable anti-narcotics advertisements in history, commissioned by the Partnership for a Drug-Free America, an egg is shown frying in a pan with a voiceover proclaiming, "This is your brain on drugs. Any questions?" Yet there are many complex questions that still need answering when it comes to the neuroscience of drug addiction.

What scientists have been able to determine in the past generation is that drug addiction is a neurological disease - a biologically complex, progressive, insidious illness that rewires the brain's chemistry, and ultimately, your behaviour.

"Research shows how drugs hijack the brain and cause longlasting changes in brain function that are difficult to reverse," explains Dr Volker Hitzeroth, a Cape Town psychiatrist and author of The End of Addiction. "It is really difficult to beat the disease of addiction - a truly biological-psychological-social disease - because your brain cells gang up on you. It's an unwanted condition, because nobody goes out to become an addict."

How the brain is hijacked

To understand the neurobiological mechanisms of addiction, you need to know that drugs affect the brain's reward pathway - as well as the brain's centres of planning, emotional processing and memory (the prefrontal cortex, amygdala and hippocampus respectively).

The reward pathway starts at a group of nerve cells at the very centre of the brain, the ventral tegmental area (VTA), that receives messages on how well the body's fundamental needs are being met. and then forwards these messages along to another cluster of nerve cells, the neucleus accumbens. It transmits this information using a chemical messenger, dopamine.

The most basic explanation of what this pleasure circuit does is that it makes you feel motivated and rewarded. "However, what dopamine in this system actually does is it gives salience," explains Hitzeroth. "When something causes dopamine surges, your brain attributes meaning [to it], and prioritises this something as important for survival."

Addictive drugs hijack this system by increasing the VTA's ability to flood the circuit with dopamine, effectively creating a shortcut to pleasure. "Nowadays, drugs cause a much higher and quicker dopaminergic surge because they've been highly refined through chemical processes," says Hitzeroth. "This is why they are so much more dependency-forming."

Through brain-imaging studies, we now know that drug abuse also causes dysfunctionality in the prefrontal cortex – the part of the brain that regulates your impulses and emotions, and is important for analysing, regulating, rationalising and flexibility. "All these vital functions become less controlled as a dependency is formed and see an individual losing their willpower when it comes to abstaining from drugs," says Hitzeroth.

Drug abuse also affects

hippocampus (where memories are formed, modulated and stored) and the amygdala (where emotions are decoded). "These two bodies become responsible for storing the drug memories too: the emotional memories of the 'high', the temptation of drug abuse. And if you're unable to manage your memories, then you're more likely to be tempted to use drugs, because you only remember the 'high'," says Hitzeroth.

"Then add the additional influence of, for example, neurodevelopment, genetics, experience, peer pressure, social rules, whether you've been taught delayed gratification or not, and so on, and you've got a massively complex neurobiological system that has been hijacked by drug use over time, which then predisposes an individual to using drugs and relapsing."

The journey to addiction

key research paper titled Multistep General Theory of Transition to Addiction, by authors Pier Vincenzo Piazza and Véronique Deroche-Gamonet. published last year in the journal Psychopharmacology, provides a coherent theory on the latest thinking regarding neuroscience and addiction as a true psychiatric disease, says Hitzeroth.

"The major principles are, firstly, that the transition to addiction results from interactions between individual vulnerability and the degree or amount of drug exposure. Secondly, this transition involves a three-step sequential process, namely sporadic recreational use; then intensified, sustained, escalated use; and finally, loss of control.

More simply put, the first step towards addiction is when the centre of the brain's reward system, the nucleus accumbens, is flooded with dopamine, and the brain learns to associate drugs with pleasure. "Here, individuals learn to use drugs even if their first experience was awful.

"In the second step, there's a move from physiology to pathophysiology, so now there are changes made to the brain that are abnormal – the brain is being moulded."

This is particularly prevalent in individuals who have a hyperactive reward system or an impaired prefrontal cortex. "Here, sustained and prolonged drug use induces incentive sensitisation: the more drugs you take, the more your dopaminergic system revs up. This is the opposite of drug tolerance. At this stage, drugs become the new normal.

The final stage – loss of control - is only reached through longterm drug exposure. Your brain loses its synaptic plasticity: nerves become less flexible, and have trouble growing and making new

connections. This in turn crystallises drug-taking behaviour, and you lose control of your urges and intake. At this point, drugs are not only wanted and needed, but also pathologically mourned when absent

Healing the brain

If the neurological damage caused by drug addiction is so devastating, how long does the brain take to heal

"The short answer is, nobody knows," says Hitzeroth. "Some research says one to three years, while other studies say four to ten years - and the AA says, 'Once an addict, always an addict.' Their thinking isn't faulty, as the brain has been hardwired differently.

"So how do you change the hardwiring of the brain? Very slowly - and with abstinence."

Fortunately, the success rate of treatment is good, Hitzeroth adds: "A research paper has compared the recovery outcomes for the chronic diseases of addiction, diabetes and high blood pressure - addiction isn't worse than the others in terms of success rates. But this is only if the addict gets good, evidence-based treatment - with the assistance of a doctor, psychologist and social worker which there is a dire shortage of in South Africa."



A rat astrocyte (a star-like cell in the brain) growing in a Petri dish, courtesy of Drs Edward Nyatia and Dirk Lang, in collaboration with Damien Schumann and Brainstorm the City. • A cultured oligodendrocyte, which helps ensure fast and efficient electrical signalling of neurons, isolated from the spinal cord of a xenopus frog. Image courtesy of Dr Dirk Lang, in collaboration with Damien Schumann and Brainstorm the City. • Neuron in tissue culture by Gerry Shaw, licensed under Creative Commons Attribution-Share Alike 3.0 via Wikimedia Commons

Neumann, licensed under Creative **Commons Attribution-Share Alike** 2.0 via Wikimedia Commons.

MRI brain sagittal section by Adrian

Life stages of the brain

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HOW YOUR BRAIN AGES

Story by Ambre Nicolson

Ageing is inevitable, but what can we do to keep our brains young and limber as long as possible? According to neurologist Etienne van der Walt, what's good for your heart is good for your head too. Here's why.

"A human baby is born with roughly 100 billion brain cells," savs Dr Etienne van der Walt, a clinical neurologist and founder of Cape Town-based Neurozone, a business that uses brain science to enhance human capacity. According to Van der Walt, to understand the mature brain you first need to understand how much the brain

"The first thing a baby's brain does is to recognise the face of its mother, and shortly thereafter, its father. This is the first step in the creation of the 'social brain', which is a very human characteristic and one we all need if we are to survive

Walt explains, the brain is intent on exploration of the world and the creation of identity: "This is why, as teenagers, our estimation of our own capability is so high and our

geared to gather knowledge and skills that ultimately lead to expertise. This is the foundation of experience. "And it is this," says Van der Walt, "which the world needs. Aged brains are brains with experience - and therefore wisdom

different life stages of the brain is its cellular functioning: "Thoughts are physical and tangible," Van der Walt assures us. "They are the electrical impulses that travel through our neurons [brain cells] and along our synapses [the

neurotransmitters send chemical messages]. Each of our neurons is connected to other brain cells by thousands of cellular extensions [dendrites].'

Running around the neuron's axon (main wire) is the myelin sheath, which is a form of insulation, much like the plastic around electrical wire, Van der Walt explains.

The adaptable brain

Neuroplasticity is the name given to our brain's ability to adapt, regenerate and re-arrange itself, not just throughout our lifetime, but also in the case of disease and injury. "This is the amazing power of the brain and what is responsible for the brain's ability to regenerate after a stroke, for example," explains Van der Walt.

It is now thought that diminishing neuroplasticity is the main cause of diminished brain function in ageing brains.

So what happens to our brains as we age? It is not that we lose brain cells over time, but rather that the functioning of the connections between our brain cells diminishes. To illustrate this point, Van der Walt displays two brain scans side by side. The first scan is of a healthy young adult's brain, and shows plump white and grey matter that fills the skull. The second scan shows an elderly brain in which the white and grey matter has shrunk, leaving visible gaps between the skull and the brain itself.

Van der Walt is quick to point out that both scans would be considered normal.

"Then again," he says, "there is a difference between normal ageing and successful ageing."

As we grow older, we gradually lose brain function in four key areas: our senses become dulled, our working memory (the ability, for example, to remember a phone number long enough to dial it) becomes reduced, and both our retrieval of knowledge and our fluid intelligence (or reasoning speed) slows.

Oxygen: too much of a good thing?

"Oxygen," says Van der Walt, "will kill us all in the end."

While we literally depend on oxygen for every breath we take, the ever-ageing process of oxygen metabolism in our bodies can leave a residue of oxygen free radicals that cause damage to cells over

Oxidative stress is considered to play an important role in conditions such as dementia, motor neuron disease and other illnesses which affect brain function.

How then do we prevent or slow oxidative stress and its effects on the brain? According to Van der Walt, everything that is good for the heart is also good for the head. "There is a lot that we can do to help our brains age well," he says. "Ageing is inevitable, but it is important that we look after our brains. When we are old we need to be able to retrieve the knowledge and experience we have accumulated over a lifetime so that we can share our wisdom with the rest of the world.

HOW TO KEEP YOUR BRAIN YOUNG

Eight things Dr Etienne van der Walt recommends you do to keep your brain in good shape

1. Keep moving

"In my opinion, keeping active is one of the top two ways to keep your brain healthy."

2. Nurture a sense of belonging and meaning

"Being sedentary is really not good, but of equal importance is a sense of purpose and a feeling of community."

3. Avoid chronic stress

Ongoing stress has been shown to have a negative effect on how the brain functions, both for chemical reasons, and because chronic stress is often an indicator that you're not exercising, sleeping or eating properly.

4. Eat a balanced diet

What you put in your mouth affects your brain. Stay away from too much sugar and refined carbohydrates. Omega-3 fatty acids, found in oily fish and nuts, are essential. As for the efficacy of anti-oxidant supplements, in the form of vitamins. minerals or herbs, Van der Walt says that the evidence is not conclusive, and that for the most part, "taking supplements mostly results in poverty, rather than better brain function."

5. Align yourself to natural bio-rhythms

Van der Walt also emphasises the need to align ourselves with bio-rhythms such as our circadian clocks (our daily cycle of sleeping and waking): "Being out of sync with these rhythms is associated with changes in the brain, including higher levels of stress hormones being released into our systems."

6.Stretch your brain

If you don't use it, you really can lose it.

from a four-part lecture series on neuroscience, ComaCare. Balchin, a postdoctoral fellow in the Department in Observatory and Sutherland.

Schuur, specialising in care for coma patients) and resources of the university open to the School online: and Brainstorm the City. One of Cape Town's public throughout the year. Evening lectures on official World Design Capital 2014 projects, offer later this year include the start of a series @UCTSummerSchool Brainstorm the City is a campaign to raise commemorating World War I, and two sessions www.summerschool.uct.ac.za awareness around the extraordinary complexity focused on astronomy, as well as a full astronomy of the human brain, and is organised by Dr Ross course that includes outings to the observatories

This Monday Monthly feature on the brain comes of Psychology, and Janice Webster, director of If you want to hear more about how we're all made of stardust, or hear John Maytham read hosted by UCT's Centre for Open Learning, in The lectures also formed part of the Centre excerpts from WWI literature, join the Summer partnership with ComaCare (a research institute for Open Learning's Summer School Extended School mailing list by emailing ems@uct.ac.za, based in the neurosurgery section of Groote programme - which makes the knowledge calling 021 650 2888, or following UCT Summer



10 MONDAY MONTHLY

INTO AFRICA: HOMEGROWN PAEDIATRIC CARE

Story by Helen Swingler Photo by Je'nine May

Africa faces a crushing child-health burden, with diseases such as epilepsy often going undiagnosed. But UCT is training and supporting a corps of African paediatricians to manage these unique situations, said Professor Jo Wilmshurst in her inaugural lecture

Three years ago, newly-qualified paediatrician Dr Kondwani Kwazi returned home to Malawi and implemented two low-cost, lifesaving ideas at the neonatal unit in the hospital where he worked.

A 'graduate' of UCT's African Paediatric Fellowship Programme (APFP), Kwazi instituted kangaroo care - prolonged skin-to-skin contact between mothers and their premature babies, a method pioneered in Colombia and now used widely to support infants at risk.

He also introduced 'bubble CPAP', innovative breathing support for newborns using a simple tank of water and a pair of aquarium pumps to control the air pressure delivered to the baby.

The interventions were cheap and effective; important words in one of Africa's poorest nations, with its mortality rate of 71 per 1 000 live births for children under five, according to World Bank 2012 statistics.

In low-income countries worldwide, children are 16 times more likely to die before their fifth birthday; 75% of these deaths are due to avoidable diseases such as pneumonia, diarrhoea, malaria and measles.

Kwazi is one of 44 APFP fellows from 23 medical centres in 11 sub-Saharan African countries who have benefited from the training programme. The programme boosts their surgical and general paediatric skills - and helps them think on their feet in resourcepoor settings. Right now, there are training, education and research. 22 fellows in the pipeline.

Reverse the exodus

CORRECTION

Stories like Kwazi's were key to Professor Jo Wilmshurst's 30 July

Brain Drain.

Just the day before, SABC News quoted the Union for International Control's Cancer Riccardo Lampariello, who said that Africa had been hardest hit by the worldwide shortage of healthcare workers. Africa has 3% of the world's healthcare workers, but 24% of the global disease burden. African governments are well

aware of the problem, said Wilmshurst, but unable to staunch the flow African doctors sent abroad

to specialise usually don't come back. In 2000, Malawi had eight paediatricians for a population of over 15 million, but most were due to retire. Concerned, the overnment sent 18 doctors to the UK to train as paediatricians. Only one of the two who returned staved on.

In contrast, 98% of APFP fellows go home to plough their skills back into their communities, says Wilmshurst. (That's over five years; the one-year rate is 100%.) The APFP was established in 2008, after a request to formalise the training UCT provided.

Wilmshurst, head of paediatric neurology at the Red Cross War Memorial Children's Hospital and UCT's Department of Paediatrics and Child Health, has been director since 2009

She believes this growing network of Africa-trained paediatricians is creating a new wave of specialist care and capacity – and new energy to lobby for service provision,

Epilepsy as a microcosm

As a paediatric neurologist, epilepsy takes centre stage for Wilmshurst - and it provides a good mirror

inaugural lecture title: Reversing the for the kinds of problems doctors grapple with in Africa, where even standard levels of care are rare, and where HIV absorbs most resources. Epilepsy is the fourth most common neurological disorder worldwide, affecting 80 million people, according to the World Health Organisation (WHO).

At Red Cross, Wilmshurst and her team run 80 neurology clinics each month. Sixty percent of their patients have epilepsy.

"Epilepsy can be notoriously hard to diagnose, and affects every child differently. In some ways, being a paediatric neurologist is one of the ultimate detective jobs." Without adequate resources, nine

out of 10 Africans with epilepsy go undiagnosed and untreated this on a continent where there's huge cultural stigma attached to epilepsy.

"We deal with everything here," said Wilmshurst, referring to her unit and the ripple effect of epilepsy. "They [the families] often have nowhere else to go. These children need special support, and have special needs. The burden families is huge. We have on to manage the child and their family holistically."

She and her team have spearheaded several workshops in Africa, to strategically understand what occurs at the coalface and tease out key themes and rallying points

The first workshop, in Uganda, was held under the auspices of the International Child Neurology Association, and attended by representatives from 34 African countries. High among the priorities was the need for national guidelines for treating epilepsy.

"Only nine of the countries had guidelines; but when we delved deeper, we found they couldn't



facilities available." - Prof Jo Wilmshurst, head of paediatric neurology at the Red Cross War Memorial Children's Hospital and UCT's Department of Paediatrics and Child Health, which is home to the African Paediatric Fellowship Programme.

deliver the level of care required by the guidelines. We need to be innovative about how we can work with the resources and facilities available."

PARTNERING

Adapt and acclimatise

A case in point is oral phenobarbital, which is widely prescribed. It's an extremely effective antiepileptic drug, and essential to have available for emergency

management of prolonged seizures. "But it's rarely used in settings other than ours. It's particularly utilised in resource-poor countries, because it's cheap; and as such, more likely to be available. The limited usage in resource-equipped settings relates to concerns of learning and behavioural side effects reported to occur in children on the drug.

Wilmshurst also advocates that Africans should tap into resources that are specific to Africa, such as traditional healers.

"They have fantastic observation skills, which have been effectively incorporated into healthcare programmes in Kenya, Cameroon and Uganda for early identification and referral of patients for treatment interventions."

She also advocates that local clinicians adapt international trends and health guidelines to make these relevant to Africa. And she believes Africans should lobby big international groups such as the WHO to make themselves heard.

What did emerge from the workshops was a common call: "Empower us to move forward to better care. Give us more skilled personnel and we will change this backdrop, working in our own settings to change these discrepancies in health care."

Wilmshurst is working with

the International League Against Epilepsy, through the Paediatric Commission, to develop international guidelines for use at local level, with pilot studies in Kenya, South

America and India scheduled.

The right stuff

HEALTH SERVICE

As for the brain drain, training specialists in Africa does lead to better retention of the trainees when they return home.

"It means the training we give them is more relevant, and empowers them to cope better. The collaboration with the doctors we've worked with and trained has been phenomenal." The circle has been enlarged

to include nurses and allied personnel, under the leadership of Minette Coetzee and Brenda Morrow respectively.

"The APFP is developing hubs of expertise that will trickle all the way down from tertiary to primary care," said Wilmshurst.

> Epilepsy can be notoriously hard to diagnose, and affects every child differently. In some ways, being a paediatric neurologist is one of the ultimate detective jobs. **>>**

Prof Jo Wilmshurst

EVENTS

"From Waste to Wealth

www.greenchemistrynetwork.org"

VACANT POSTS

EXECUTIVE AND ACADEMIC POSTS:

Lecturer: Family Physician, Public August 2014 Lecturer/Senior Lecturer: History

1 September 2014 Professor, Computer Science, Faculty of Science, Closing date: 15 September 2014

RESEARCH AND PROFESSIONAL, ADMINISTRATIVE AND SUPPORT POSTS (PASS) POSTS:

Climate and development Initiative, Faculty of Science, Closing date: 18 August 2014 Research Officer, Paediatrics and Child Health, Faculty of Health Sciences, Closing date: 18

August 2014 August 2014

Head: Careers Service Advisory, Careers service, Centre for Higher Education Development, Closing date: 22 August 2014 Data Analyst, Southern Africa

Labour and Development Research Unit, Faculty of Commerce, Closing date: 24 August 2014 Senior Scientific Officer, Clinical Laboratory Sciences, Faculty of Health Sciences, Closing date: 25 August 2014

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Re: UCT's 2013 carbon footprint at a glance (Monday Monthly July 2014)

Readers may have been misled by the illustration of a blue bus used to signify the UCT vehicle fleet in the infographic on page 6. Jammie Shuttles are not owned by UCT and therefore their emissions are not part of the vehicle fleet's (0.55%). Instead they are included in the university's indirect, commute-related emissions (adding up to 11.29%). We apologise if this caused readers any confusion.

CLASSIFIEDS

G2C2 Workshop - Global Green ChemistryCentres.24-26August2014, Two Oceans Aquarium, Cape Town.

Health and Family Medicine, Faculty of Health Sciences, Closing date: 25

Education, School of Education, Faculty of Humanities, Closing date:

Administrative Manager, African

Senior Secretary, Biological Sciences, Faculty of Science, Closing date: 20

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WORDS WE HAVE LEARNED SINCE 9/11

What new words have you learnt since 11 September 2001? What words did you know that have taken on a new meaning? Los Angeles-based artist Clayton Campbell has travelled around the world asking these two questions, and photographing people's response. The result is an intercultural dialogue about difference and how people view their future. Campbell recently came to Cape Town – to the Gordon Institute for Performing and Creative Arts – to talk about his work, and add a few more photos to the collection.





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