annual report 2016-17





BECKLEY FOUNDATION

Psychedelic Research, Changing Minds



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The Beckley Foundation Annual Report 2016-17

CONTENTS

THE FOUNDATION 04/05

MESSAGE FROM THE DIRECTOR 06/07

SCIENTIFIC ADVISORS 08/09

SCIENCE PROGRAMME 10/11

LSD BRAIN IMAGING 12/13

PSILOCYBIN & DEPRESSION

14

AYAHUASCA & NEUROGENESIS
15

NEUROPLASTICITY & DMT

SCIENTIFIC COLLABORATIONS

POLICY PROGRAMME 19/20

MEDIA HIGHLIGHTS
21

HIGHLIGHTS FOR 2018



THE FOUNDATION

The Beckley Foundation was created by Amanda Feilding in 1998 in order to conduct pioneering research into the therapeutic potential of psychedelic substances and cannabis, and to drive global drug policy reform.

In the 19 years since the Foundation's inception, Amanda has established research collaborations with internationally renowned institutions, and has brought together leading scientists to investigate how psychedelics, MDMA and cannabis affect brain activity and generate altered states of consciousness. The Beckley Foundation's Scientific Programme is dedicated to exploring how these substances can be harnessed to treat a wide range of mental and physical disorders, as well as to improve well-being, mood and cognitive functioning.

The work of the Foundation is inspired by a firm belief that the legal regulation of drugs is the best way to reduce the risks associated with drug-use and to counteract the harms of prohibition. The Beckley Foundation's Policy Programme brings together political leaders, scientists and other experts in order to develop evidence-based alternatives to current global drug policies. We conduct governmental advisory work, produce reports, convene seminars, and bring our recommendations to the attention of international policymakers.

'We are at the foothills of understanding how psychedelics can benefit humanity.'



Amanda Feilding at Beckley Park. Image credit: ©Imogen Freeland

After almost two decades of rigorous scientific research and campaigning, we have finally reached a tipping point in our efforts to revive psychedelic science, in order to develop new treatments for a wide variety of mental health disorders, and to advance our understanding of consciousness. The research of the Beckley Foundation over the past twelve months has cast new light on the therapeutic potential of these compounds, capturing the attention of the global scientific community and the world's media.

For me, the publication of the world's first LSD brain imaging study within the Beckley/Imperial Research Programme in April 2016 carried great personal significance. It marked the fulfilment of a promise I had made to Albert Hofmann - the inventor of LSD - that I would uncover the neurological mechanisms by which his socalled 'problem child' brings about its profound alterations to consciousness. Our research provided new insights into how LSD alters brain activity in order to loosen the repressive control of the ego, and how this flexibility may be utilised to overcome conditions such as treatmentresistant depression and addiction, while also enhancing wellbeing and creativity. In doing so, this study has validated and refined the theories put forward by pioneering scientists whose work has helped to shape my own hypotheses on the nature of consciousness, and upon whose shoulders contemporary psychedelic researchers build their evidence.

Among the significant challenges facing those of us who are researching the medicinal benefits of psychedelics, is the need to change the nature of the dialogue surrounding these substances in mainstream circles. This debate was transformed in May 2016 when over a billion people around the world read news reports of the *Beckley/Imperial Research Programme's* study of **psilocybinassisted psychotherapy for severe depression**. Participants had suffered from the condition for an average of 18 years and had failed to respond to all other treatments, yet one week after their psilocybin session, 67% were free of depression, with 42% remaining so after three months.

When I established the Beckley Foundation in 1998, I did so with a vision of working with leading scientists from around the world, in order to break the taboo surrounding psychedelics by providing robust scientific evidence as to their true effects. Several of these research collaborations are now bearing fruit, generating the data with which we can overcome the stigma that has maintained the prohibitionist approach to global drug policies. We are now at the foothills of understanding how psychedelics can benefit humanity, and our future studies - many of which are already in the pipeline - will expand upon what we have uncovered so far.

The recent success of the Beckley Foundation's research programme fills me with hope and optimism that we can create a scientific evidencebase that will drive the development of new treatments for those suffering from mental health disorders, increase well-being and pave the way for new, global drug policies that protect public health, reduce social and economic costs, and uphold human rights.

Amanda Feilding

Founder and Director of the Beckley Foundation

SCIENTIFIC ADVISORY BOARD



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The Beckley Foundation Scientific Advisory Board includes leading international scientists on the topics of consciousness, neuroscience, biochemistry, psychiatry and psychology.

IN MEMORIAM



Dr Albert Hofmann The Beckley Foundation's first Scientific Advisor

"I believe that if people would learn to use LSD's vision-inducing capability more wisely, under suitable conditions, in medical practice and in conjunction with meditation, then in the future this problem child could become a wonderchild."



Dr Alexander Shulgin An early member of the Scientific Advisory Board

"Use them with care, and use them with respect as to the transformations they can achieve, and you have an extraordinary research tool. [...] They're not addictive, and they're certainly not escapist, either, but they're exceptionally valuable tools for understanding the human mind, and how it works."

THE TRUSTEES



Dr José Ramón López-Portillo



Dr The Earl of Wemyss



The Honourable Anthony Ramsay

SCIENCE PROGRAMME HIGHLIGHTS OF THE YEAR

The Beckley Foundation's Scientific Programme, led by Amanda, develops and conducts psychedelic and cannabis research, collaborating with an international network of scientists and institutions. Using the latest developments in neuroscience we investigate the action of psychedelics in the human brain. In doing so, we aim to increase our understanding of consciousness itself, and to use this knowledge to treat mental and physical illnesses, expand awareness, and enhance well-being, cognitive functioning and creativity.

RESEARCH COMPOUNDS

PSILOCYBIN

A Beckley/Imperial study, published in The Lancet Psychiatry in April 2016, became one of the 100 highest-impact papers that year. The study looked at psilocybin with psychological support for treatmentresistant depression, achieving a remission rate of 67% that, even after three months with no further treatment, remained at 42%. Amanda is also collaborating with the University of Maastricht on a study investigating how psilocybin may increase neuroplasticity and creativity, with the intention of helping overcome Post-Traumatic Stress Disorder. Our collaboration on the very successful pilot study at Johns Hopkins using psilocybin-assisted psychotherapy to overcome nicotine addiction is now being extended with a double-blind protocol.



Since April of 2016, the *Beckley/Imperial Research Programme* has published a series of groundbreaking papers describing the findings of the world's first LSD brain-imaging study. Wellknown psychedelic experiences such as visual hallucinations, enhanced emotional response to music, and disruption to the sense of self were, for the first time, linked to changes taking place at the psychological and neurological levels.

AYAHUASCA & DMT

Our recent studies in collaboration with the Sant Pau Institute of Biomedical Research in Barcelona, have revealed that compounds in ayahuasca stimulate the birth of new brain cells. This could prove profoundly important for the treatment of certain disorders, such as Parkinson's disease. Our research has also shown how taking ayahuasca increases scores of mindfulness, openness and optimism in regular users.

CANNABIS

The Beckley Foundation has an ongoing collaborative brain-imaging study with *University College London* (UCL) to investigate the neural effects of two different strains of cannabis, with different THC/CBD ratios, on brain function. We are also developing the *Beckley/Exeter Cannabis Programme* to become a centre of excellence for the research of cannabis. This programme is currently carrying out an investigation of CBD for the treatment of nicotine addiction.



MDMA

Our collaborative *Beckley/Imperial* research using brain-imaging has revealed how MDMA reduces the brain's response to negative memories, increases its response to positive ones, and increases the empathy between therapist and patient, all of which have implications for the treatment of PTSD.

WORLD'S FIRST LSD Brain imaging study

In April 2016, we released the world's first images of the brain on LSD – the result of a two-year study carried out within the *Beckley/Imperial Research Programme*. The findings were published in the esteemed scientific journal, *Proceedings of the National Academy of Sciences (PNAS)*. Subsequent papers, exploring different aspects of our findings, have since been published in numerous other scientific journals.

We discovered that LSD induces a profound shift in connectivity-patterns between different regions of the brain. Normally, regions communicate primarily with a fixed set of other regions, that together make up a brain network. Under LSD, regions began communicating more freely with regions outside their network. This spectacular increase in connectivity throughout the brain may be responsible for many of LSD's best-known effects, such as increased depth and breadth of experiences, and creativity of thought.



Beckley/Imperial Research Programme - 2016 PNAS Neural correlates of the LSD experience revealed by multimodal neuroimaging shows dramatically increased connectivity between the visual centre and the rest of the brain.

At the same time, communication between regions *within* the same network *decreased*; an effect known as *network disintegration*. Of special interest was the disintegration of the *Default Mode Network* (DMN), which processes various aspects of selfhood and has been described as the 'neural correlate of the ego'. The disintegration of the DMN was found to coincide with participants reporting a subjective experience of 'ego-dissolution', characterised by feelings of universal oneness and unity.

These findings help elucidate how LSD may be able to achieve its therapeutic effect: by shaking loose the restrictive control of the DMN, and replacing it with a more fluid and flexible mode of cognition. This opens up a 'therapeutic window' in which the rigid and negative patterns of thought and behaviour underlying conditions such as depression, anxiety, and addiction, can be examined and modified. It is like pressing a 'reset' button on a computer. This altered state of consciousness gives the individual a better chance of overcoming maladaptive behavioural patterns. Interestingly, we found that the degree of 'ego-dissolution' reported by the participants correlated with the efficacy of the treatment.

LSD REVEALED LAUNCHED AT THE ROYAL SOCIETY

The results of this ground-breaking study were presented at a symposium hosted by Amanda Feilding and David Nutt, co-directors of the *Beckley/Imperial Research Programme*, at the Royal Society in London in April 2016.

Presentations by Amanda and David were followed by Robin Carhart-Harris, lead investigator of the study, and Mendel Kaelen, who researched the effect of music combined with the psychedelic experience. Attendees included approximately 300 scientists, donors and journalists.



Robin Carhart-Harris, David Nutt and Amanda Feilding

PSILOCYBIN FOR TREATMENT-RESISTANT DEPRESSION

This *Beckley/Imperial* study, which was published in *The Lancet Psychiatry* in May 2016, is the first to provide clinical evidence for the efficacy of psilocybin in the treatment of depression.

We gave oral psilocybin to 12 participants with treatment-resistant depression, all of whom had suffered from the condition for an average of 18 years, having been unresponsive to all previous therapies. Each participant was given one small and one moderate dose of psilocybin, a week apart, and received psychological support before, during and after their psilocybin sessions.

All of those involved in the study experienced an improvement in symptoms. **67% no longer met the criteria for a depression diagnosis one week after completing the treatment.** Three months later, 42% remained free of depression.



Graph shows patients' average depression scores following psilocybin-assisted psychotherapy. The red line indicates the threshold for clinical depression.

PSILOCYBIN-FACILITATED SMOKING-CESSATION

This Beckley-initiated and sponsored pilot study in collaboration with *Johns Hopkins University*, was the first in modern times to investigate the efficacy of psilocybin as an aid to psychotherapy in the treatment of smoking cessation. With an unprecedented success rate of 80% abstinence at the 6-month follow-up, and 67% at 12 months, results from this study clearly indicate the considerable potential that psilocybin holds as a treatment for nicotine addiction. A larger trial, using fMRI, is now being undertaken to help uncover the neural mechanisms underlying psilocybin's anti-addictive properties.

AYAHUASCA COMPOUNDS STIMULATE NEUROGENESIS







Images: Both harmine and tetrahydroharmine caused stem cells to grow and develop into mature neurons at a significantly higher rate than saline solution.

Neurogenesis - the birth of new neurons - mainly occurs in the hippocampus, a brain-region associated with memory. Yet, as people age, their hippocampal neurons may become damaged at a faster rate, leading to dementia and other forms of cognitive decline.

In the summer of 2016, the *Beckley/Sant Pau Research Programme* announced the results of a study which revealed that certain compounds present in the visionary brew ayahuasca, stimulate the creation of new neurons. Dr Jordi Riba and his research team placed harmine and tetrahydroharmine - both found in ayahuasca - in a petri dish with hippocampal stem cells, and found that this significantly increased both the production of new cells and the rate at which they matured into neurons.

Now published in the journal *Scientific Reports*, the results of this study could pave the way for new treatments for age-related cognitive disorders, such as Alzheimer's disease and Parkinson's disease.

"If this process can be replicated in vivo it could be a significant step towards finding a novel treatment for neurodegenerative disease. It will be interesting to investigate if other psychedelic compounds, such as LSD have a similar action..."

Amanda Feilding

NEUROPLASTICITY/ INCREASE IN MINDFULNESS

Another study in the collaboration between Jordi Riba and Amanda Feilding, published in July 2016, looked at the role of the 5- HT_{2A} receptor in the effects of ayahuasca. Almost all psychedelic drugs achieve their effects by stimulating the 5- HT_{2A} receptor, which is found on neurons throughout the brain and body.



Amanda Feilding and Jordi Riba; Sant Pau Hospital, Barcelona; Jordi Riba - Image credit: ©Brian Kiney/Shutterstock.com

Results showed that DMT (the psychoactive ingredient in ayahuasca) interacts significantly with the 5-HT_{2A} receptor, as well as with several other receptors, while also acting upon transporters that move molecules across the cell-membranes of neurons. Future studies will help to elucidate how these various mechanisms of action work together to produce the profound alterations of consciousness brought about by DMT, and how and why different psychedelic compounds have their individual effects.

DMT RESEARCH

In September 2016, the Beckley/Imperial Research Programme began an important new brainimaging study that aims to shed more light on the neurobiological processes underlying the effects of DMT. Electroencephalography (EEG), and questionnaires are being used to examine how alterations in brain-activity relate to changes in subjective experience. The study is led by Chris Timmerman.

This study will provide new insights into the therapeutic properties of this powerful psychedelic compound, and reveal how DMT's modes of action differ from those of LSD and other psychedelics.



A particpant sits reading with an EEG cap on during the DMT study. Image credit: Chris Timmermann.

AMANDA'S SCIENTIFIC COLLABORATIONS



Amanda Feilding viewing fMRI data at the Beckley/Exeter Cannabis Programme.

The field of psychedelic science has developed significantly over the last five years, with a select number of researchers around the world embarking on new projects within this sphere of scientific investigation. Amanda Feilding has played a significant role in much of this expansion. Building on her pioneering work, she has established new research collaborations and devised a number of novel studies that now shape the landscape of psychedelic science worldwide.

.. "The combination of brain imaging and the use of psychedelic compounds, which alter consciousness in such a reliable and profound way, is an incredible microscope with which to study the mechanisms underlying changing states of consciousness and the workings of the mind." Amanda Feilding

Collaborations with over 20 universities

ONGOING COLLABORATIONS

The Beckley/Exeter Cannabis Programme at Exeter University will use innovative technology to investigate the effects and therapeutic potential of different strains of cannabis, and also investigate the potential of CBD to help individuals overcome a wide variety of conditions such as addiction, anxiety and PTSD.

A neuroimaging investigation into the effects of different strains of cannabis on the brain (with different ratios of THC and CBD), in collaboration with UCL (University College London).

A study investigating how psilocybin induces creative and open-ended thinking, and enhances neuroplasticity, in collaboration with Dr Jan Ramaekers at the *University of Maastricht*.

In collaboration with Jordi Riba of *Sant Pau Hospital*, Amanda is working on a series of studies investigating the effects of ayahuasca. They are also designing the first protocol to investigate the effects of 5-MeO-DMT in the brain, a project which will expand as funding permits.

In collaboration with Dr Chris Martin at the *University of Sheffield,* Amanda is working on a study using 1P-LSD (an LSD analogue) to investigate its mechanisms of action on cerebral blood flow and neuronal functioning.

The expansion of the highly successful pilot study of psilocybin-aided psychotherapy, as a means of overcoming treatment-resistant tobacco addiction, is now in its second phase. This study was originally initiated and supported by Amanda, and is led by Prof Roland Griffiths and Dr Matthew Johnson at *Johns Hopkins University*.



An fMRI scan for the Beckley/Exeter Cannabis Programme.

POLICY PROGRAMME HIGHLIGHTS OF THE YEAR

The Beckley Foundation Policy Programme brings together leading international scientists, politicians and experts to provide a rigorous, independent review of current global drug policies, and to develop a scientific evidence-base on which to build balanced alternative policies.

Since 2000, Amanda has convened seminars (mainly held at the House of Lords) and produced influential policy-reports to explore and highlight how the legal regulation of drug markets could reduce both the harms caused by the drugs themselves, and the devastating collateral consequences of prohibition.





Amanda Feilding and Senator Mark Golding at UNGASS in NYC.

In April 2016, Amanda Feilding led a Beckley Foundation delegation to the United Nations General Assembly Special Session on Drugs (UNGASS), at the UN headquarters in New York. Convened in order to review and debate the effectiveness of current global drug policies, the UNGASS drew the attention of leading policymakers worldwide. The Beckley Foundation used this as a stage to launch the Beckley Foundation Public Letter 2016. This highlighted the continued failures of the prohibitionist approach, the need to

decriminalize drug-use, and to **reschedule** cannabis and the psychedelics from Schedule I to Schedule II. This would enable research to be more easily carried out into their potentials for medical and therapeutic interventions, and allow physicians to precribe their use where appropriate.

ADVISORY WORK IN JAMAICA

In 2016, Amanda Feilding was invited by the Jamaican Minister of Justice to advise him and the government on how best to establish a regulated cannabis industry. While in Jamaica, Amanda also began working on the development of the Hope Project at the *Hope Institute*, an oncology hospital in Kingston which offers palliative care to patients with terminal cancer. This project will assess the use of cannabis for the management of pain and the emotional distress of dying.



The Honourable G. Anthony Hylton, Minister of Industry, Investment & Commerce, Jamaica, and Amanda Feilding.

ROADMAPS TO REGULATION

In collaboration with leading policy experts from around the world, the Beckley Foundation is releasing a series of reports entitled *Roadmaps to Regulation*. These each take as their focus a different substance or class of substances: cannabis, psychedelics, MDMA, and new psychoactive substances (NPS).

The reports provide an in-depth analysis of the failures of prohibition to effectively minimise the harms associated with these substances. Drawing on data from a multitude of sources, we demonstrate that these harms are exacerbated by, and in some cases caused by, prohibition itself, while the potential benefits of these compounds remain untapped.

Each report proposes alternative models of regulation tailored to each substance's unique cultural and scientific context. We advocate a strictly regulated legal market for cannabis, psychedelics, MDMA, and NPS, and call for a reduction in the legal restrictions which currently obstruct scientific and medical research.

NEW PSYCHOACTIVE SUBSTANCES

The passing into law of the *Psychoactive Substances Act* by the UK government in May 2016 made it illegal to produce, supply, or possess with the intent to supply, any substance with psychoactive properties. In response, the Beckley Foundation released the *New Psychoactive Substances* report from the forthcoming *Roadmaps to Regulation* series.

As this report shows, new psychoactive substances (NPS) present, in most cases, either unknown risks or demonstrably higher risks to recreational users than the traditional recreational drugs. However, their proliferation is largely the result of the prohibition of the traditional drugs. They thus entered the market as 'legal highs', before being banned, which in turn leads to the production of yet more unknown alternatives. While the *Psychoactive Substances Act* may appear to have ended this cat and mouse game, in fact it is too late to reverse the damage done by decades of reactive prohibition.

The report contends that an evidence-led policy, which responds sensitively to the harms and benefits posed by this wide range of substances, would better serve the public health.

The publication of this report generated a significant deal of media interest, and resulted in opinion pieces written by Amanda Feilding being published in outlets such as *The Guardian*, *Metro* and *Vice*.





MEDIA HIGHLIGHTS OF THE YEAR

Articles about Amanda Feilding and the Beckley Foundation appeared in *Rolling Stone, The Guardian, New Scientist, Scientific American, Nature, Vice, IFL Science, the BBC, The Telegraph, The Independent, The Daily Mail* and many other prestigious media outlets worldwide.

In print: The release of the world's first LSD brain-imaging study in April 2016 captured the attention of the global media, with more than 3,500 articles written internationally. Among the major outlets to report on this study were the *BBC*, *The Guardian*, *CNN* and *Vice*.

News reports: News reports of our study into psilocybin to treat depression were read by over 1 billion people globally, according to Altmetric calculations, propelling it into the top 100 highest-impact papers of that year. This research was also reported on by *Sky News, The Daily Mail, The Daily Telegraph, The Sun, The Guardian, the BBC* and many other major news outlets around the world.

TV/Video: Amanda Feilding was a central figure in an episode of National Geographic's *Breakthrough* series. Entitled *Addiction: A Psychedelic Cure?* this has been aired in the US and will have its worldwide release in 2018.

Web: The Beckley Foundation website was rebranded and relaunched in April 2016. Our social media reach also continues to grow, with video content now being seen by over 280,000 people and tweets receiving over 320,000 monthly impressions as of March 2017.

RESEARCH

MICRODOSING

The use of barely-perceptible doses of LSD (and other psychedelics) to boost productivity and creativity, has captured worldwide interest in recent years, but has never been studied in the lab – until now. The *Beckley/Imperial Research Programme* will undertake the world's first scientific study of this phenomenon, using the ancient Chinese strategy game of Go to investigate whether small doses of LSD can enhance intuitive pattern-recognition, mood and wellbeing. Led by Amanda Feilding, this highly original study will make use of brain-imaging technology to reveal the neurological mechanisms behind the effects of microdosing.

PSILOCYBIN

Working in collaboration with *Maastricht University* this study will use behavioural and biological measures and brain-imaging to investigate how psilocybin can facilitate an individual's ability to devalue previously-learned associations by enhancing creative thinking. This research will deepen our understanding of how psychedelics can expand creative capacity, and in doing so, will reveal potential therapeutic targets for altering maladaptive learning mechanisms by which mental illness is characterized.

LSD

In collaboration with scientists at the Universidad Federal do Rio Grande do Norte (UFRN) and the D'Or Institute in Brazil, Amanda Feilding will co-lead a series of experiments to characterise the effects of LSD at the molecular and cellular level, with a particular focus on its action on key mechanisms such as neurogenesis, inflammation or neurodegeneration. Another arm of the programme will examine the effects of varying doses of LSD (from 10mcg to 250mcg) on brain function. Using fMRI we will specifically investigate changes in functional connectivity and cerebral blood flow.

POLICY REPORTS

2018 will see the launch of the seminal reports which Amanda commissioned as part of the Beckley Foundation's Global Initiative for Drug Policy Reform. They consist of *The Cocaine Papers* and *Roadmaps to Regulation: Cannabis, Psychedelics, and MDMA*. These reports received funding from the John Paul Getty Foundation, The Open Society Foundation and the Flora Family Foundation.

THE COCAINE PAPERS

This report brings together over 25 leading international experts from different disciplines to make the case for the legal regulation of coca, cocaine and its derivatives, in order to reduce the harms associated with the use of cocaine and to more effectively tackle the devastating violence, corruption and political instability associated with the criminal market.

ROADMAPS TO REGULATION: CANNABIS, PSYCHEDELICS AND MDMA

These 3 reports review the harms and benefits associated with cannabis, psychedelics and MDMA, and demonstrate that most of the risks to users and society are direct consequences of prohibitionist policies, and could be significantly reduced by regulatory change. We also highlight the need for policy reform in order to remove the obstacles currently blocking research into the therapeutic potential of these compounds.

Image credit: ©panaramka -stock.adobe.com

'Our proposals have the goal not just of eliminating the many harms caused or exacerbated by the prohibition of recreational cannabis, but of providing access to medical cannabis to the millions of patients who could benefit.' – **Roadmaps to Regulation: Cannabis**

WITH MANY THANKS

We would like to thank the individuals and Trusts that support our work. We are particularly grateful to the Flora Family Foundation (through the Tides Foundation), The Betsy Gordon Foundation, The Sarlo Foundation, and the following generous private donors: Laure Sudreau, Peter Ariowitsch, Patrick Vernon, Anja Saunders, Daniel Creig, Luca Venturini, and Chris Warnock, among others.



In 2018, the Beckley Foundation will celebrate its 20th anniversary as a pioneer of psychedelic research and drug policy reform. To support the work we do, please visit our website and help contribute to the funding we so urgently need: **www.beckleyfoundation.org/donate**



The Beckley Foundation is UK registered charity, № SC033546