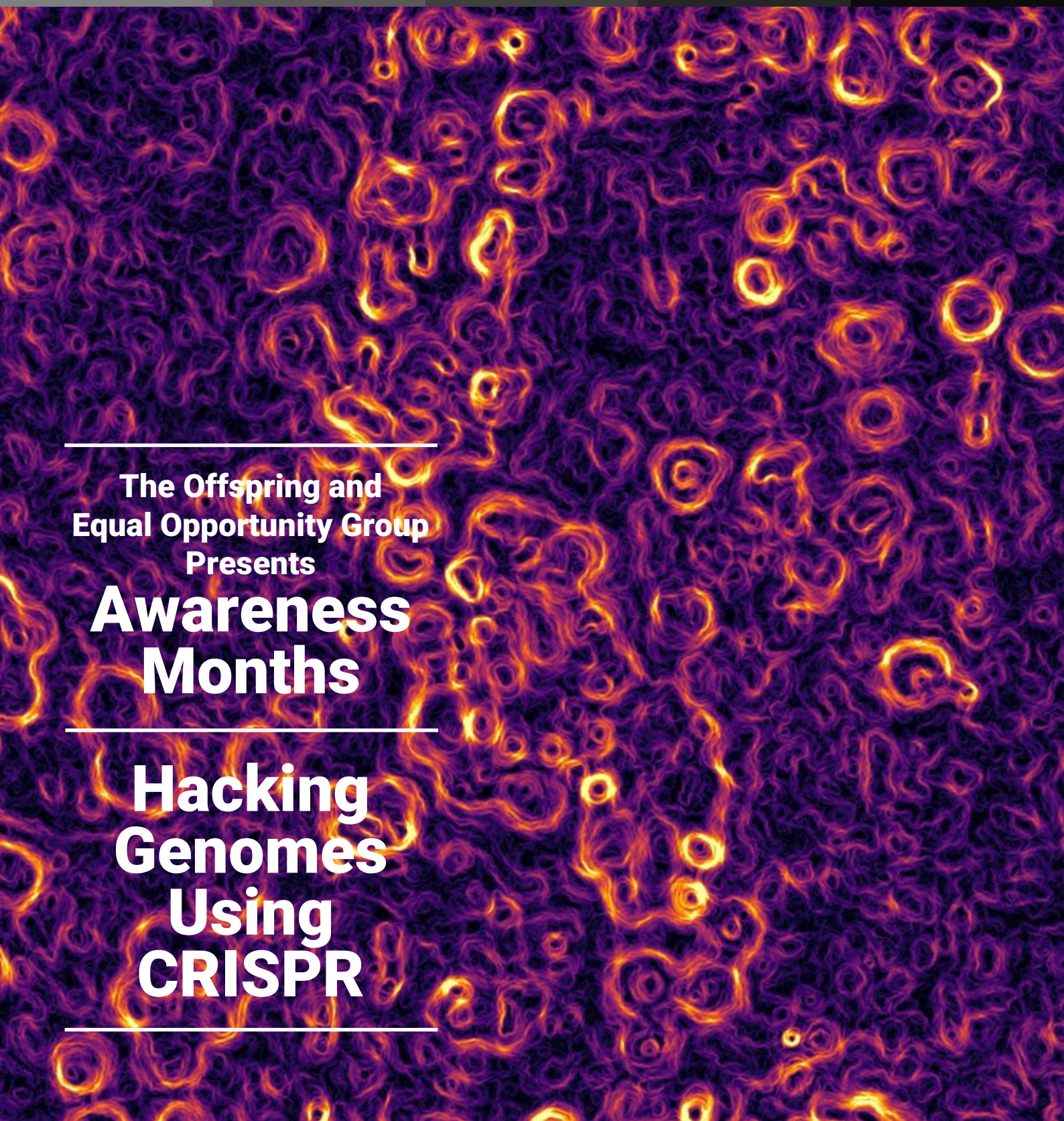
ISSUE 2017

The Offspring MAGAZINE

A publication of the Max Planck PhDnet



The Offspring and Equal Opportunity Group Presents

Awareness Months

Hacking Genomes Using CRISPR

Letter from the Editorial Team

We all work in science, and are undoubtedly passionate and excited by its questions and cutting edge research. However, "scientist", "researcher", and/or "student" are only one part of our identity as individuals. In our (collective) fervor for science, it is sometimes easy to forget or dismiss the qualities which make us unique, and the diversity of those amongst whom we do our research. To this end, the Max Planck PhDnet's Offspring and Equal Opportunity Groups have launched a new initiative in 2017 to highlight and raise dialogue about diversity and discrimination (see "The Offspring and Equal Opportunity Group Presents: Awareness Months" on page 4). This issue features a collection of blog posts and articles published under this new initiative.

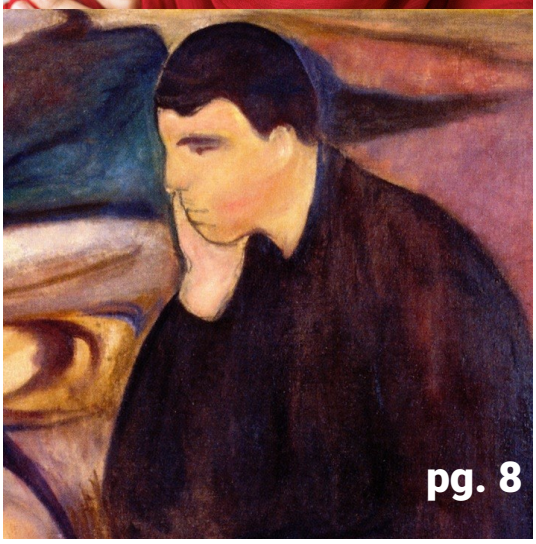
Unfortunately, the latest Awareness Month, for Ethnic Diversity, coincided with the preparations for the print of this magazine, and we were therefore unable to provide an article about this in October. However, as you can see from the individual profiles of the editorial team, we come from a variety of continents, countries, cultures and ethnic backgrounds, and we can certainly testify to the fact that this enriches our work as a team. We hope that you, as scientists, from time to time, slow down to realize that you have the privilege of working in possibly one of the most diverse work environments, and use the opportunity to take advantage.

In this issue, we also take a (small) step back from the nitty gritty of our research and look at science with a slightly different perspective: with appreciation for the artistic qualities of scientific images ("The Art of Science: From Laboratories to Galleries", page 14). We then take a look at the impact of scientific research outside the lab as we reflect on the importance of community engagement in order to inform and to build dialogue and trust. Community outreach groups such as Pro-Test Deutschland and Tierversuche verstehen are scientist-led groups who aim to remove the mystery (and undue terror) surrounding animals in research through transparency and education ("A New Initiative to Further Help Us Talk About Animal Research", page 16). Similarly, the "March for Science" movement, which began in spring this year, unified the voices of researchers and our communities all over the world as we called on evidence-based policy making – policies which ultimately affect our lives ("A March for Science: A Work in Progress!", page 18). Finally, we take a brief tour of the latest tool in gene editing, CRISPR, from its discovery to the legal battle surrounding it, and ponder its potential impact on our lives ("Hacking Genomes with CRISPR", page 20).

Although many of the articles in this issue are also available to read online at the Offspring blog (https://www.phdnet.mpg.de/22833/offspring), we appreciate the nicety of having something tangible in your hands! We are excited to share this issue of the Offspring with you, and hope you enjoy reading and discussing its contents!

Sincerely,
The Offspring


pg. 6


pg. 8

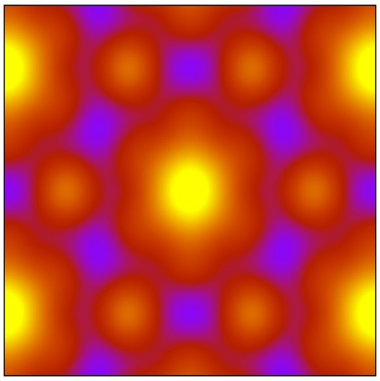

pg. 14

Table of Contents

Publisher

Max Planck PhDnet (2017)

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The Offspring and Equal Opportunity Group Presents:

Awareness Months

BY YORICK PETERSE, JUAN BERMEJO-VEGA & ALICE CEZANNE

Diversity and inclusion are essential to science. For this reason, the Offspring and Equal Opportunity groups decided to start a collaboration last year, which led to the article "Have you ever felt discriminated against? Discrimination in science is real" [The Offspring Issue 2016]. This was just the starting point of an initiative to discuss diversity- and inclusion-related topics in science and academia.

Now we take the next step, by presenting the phenomenon of:

Awareness Months!

Adopted from a by now a long-standing tradition in the UK, US and Canada, during certain months of the year organizations or governmental bodies typically communicate about topics related to a specific issue of diversity or discrimination. This may take the form of informative or historical articles, personal accounts and experiences or an academic institution reaching out about their current research related to the issue. The obvious goal is to raise awareness for the issue at hand, but also to inform people, and thereby increase tolerance and create equal opportunities for all.

Over the following months (and hopefully years) we are excited to deliver articles about the following topics:

February: LGBT History Month

March: Women´s History Month

May: Mental Health Awareness Month

October: Ethnic Diversity Month (adapted from Black History month in the UK/US)

December: Disability Month

As it is February already, we immediately kick-off with LGBT History month!

For the remainder of the month we will bring you articles and perspectives on the history and current experiences of the LGBTQIA+ community in science.

But first, let's start with the basics:

What does LGBTQIA+ stand for?

The first three letters refer to Lesbian, Gay and Bisexual, and refer to non-heterosexual orientations, i.e., whom you feel sexually attracted to, fall in love with etc.

The T, for Transgender, on the other hand, relates to gender identity: whether someone identifies as a man, woman, both, neither, or as something different.

The I stands for Intersex, a person with sexual characteristics that do not fit in the conventional definitions for male and female.

The A stands for Asexual, a person who experiences no or low sexual attraction or desire.

Finally, the Q for Queer and the + sign refer to people with any non-normative sexual orientation, sex, or gender identity, or people who do not feel associated to any of the aforementioned categories.

Keep an eye on the Offspring blog this month to read more about LGBTQIA+ history, science and life as a queer researcher.

Also, have a look at the LGBT History Month´s official UK page, and Berlin's Queer History Month:

http://lgbthistorymonth.org.uk/

http://queerhistory.de/

International Women's Day
Why is it important?

BY MARIANA ARMOND DIAS PAES & BJØRT KRAGESTEEN

March 8th, is International Women's Day.

What is it all about? And why?

International women's day (IWD) is an annual day when women globally memorialise their social, economic, cultural and political achievements and campaign for progressive change. This day of action is thought to have been initiated at the beginning of the 20th century, when women took to the streets to fight for better pay, improved working conditions, and the right to vote. The fruits of the seeds planted by these women are ever growing: in many countries, women have achieved some degree of equality, such as, the right to education, voting and representation in leading positions in society. However, there is still much more to accomplish. Equal payment, for example, is not yet a reality in most countries, with far-reaching implications: women are poorer than men, have less access to land or property, and are more strongly impacted by economic crises. Further, women still support the burden of domestic work, are poorly represented in politics and science, and face daily sexism in both social and working environments.

Who is behind the IWD?

The IWD has roots in the socialist and labour movements, but today no single institution is responsible for this day: governments, NGOs, charities, institutions, unions, social movements, etc. all take part. IWD is, therefore, a collective day, all about unity, celebrations, reflection, advocacy and action. Nowadays, the IWD demonstrations and events are held not only to highlight issues of gender but as an opportunity to reflect and fight for equal opportunities to all historically oppressed people. The feminist theories of today highlight intersections between different social identities and related structures of oppression (e.g. race, sexuality, and social class) and considers how these structures relate to one another and shape individual and group experiences in society. Thus, the ongoing fight against discrimination and oppression must be a matter of solidarity and group action, rather than an individual attitude.

What can we do in the Max Planck PhDnet?

As part of its recent activities advocating equal opportunities within the Max Planck Society (MPS), the Max Planck PhDnet has decided to promote March as Women's Awareness Month. Gender equality is still not a reality in the Max Planck Society; just looking at the percentage of directors, only 15 % are women. Moreover, the history of women in the MPS is not well-known, although an effort to change this has been made by the Harnack House of the MPS (Fritz Haber Institute, Berlin). Between 1929 and 1943, the Harnack House hosted foreign scientists that came to Berlin to give lectures or conduct research. Today, there are 156 postcards displayed in the Wintergarten Hall telling a short biography of these guests, of which 17 are women; some of them scientists, politicians and journalists. Lise Meitner (1878-1968), an Austrian-Swedish physicist researching radioactivity and nuclear physics, was one of them. In 1939, she (along with Otto Hahn) led the group of researchers who discovered the nuclear fission of uranium. Despite their collaboration, the 1944 Nobel Prize in Chemistry was awarded only to Otto Hahn.

The case of Lise Meitner is an example of the silencing of women and the roles they have played, not only in science but throughout history. In the Max Planck PhDnet, we believe that the Women's Awareness Month can be a tool to shed more light on the role that women have played primarily in science. This month we will bring you stories of women across the world who have shaped both science and history.

Get involved!

Gloria Steinem* once said, "the story of women's struggle for equality belongs to no singular feminist nor to any one organisation, but to the collective efforts of all who care about human rights". So, if you care about equal opportunities for everyone take this chance to go out there, celebrate diversity and fight against discrimination. Start by informing yourself: discuss the topic, listen to the stories of people affected and if you have the opportunity, take part in the IWD demonstrations and events throughout Germany to campaign for your rights or the rights of those around you.

*Gloria Steinem is a writer, lecturer, political activist, and feminist organizer.

http://www.gloriasteinem.com/

Further Information:

https://www.internationalwomensday.com/

Great Women through History

As part of the Offspring and Equal Opportunity Group's "Awareness Months" initiative, we highlight some of the women who have made and continue to make great contributions to society.

Fatima al-Fihri (c. 800-880)

We all attended it to get to the point we are at now: University – a place to grow and learn. But, did you know that the oldest university in the world was founded by a woman? Fatima al-Fihri, daughter of a successful business merchant, migrated from Qayrawan (former Tunisia) to Fes, Morocco, and together with her sister Mariam, inherited a fortune when their father died. Well-educated and religious, she decided to put her inheritance to build the Al Qarawiyyin mosque in 859 C.E. to devote her work to something the community would benefit from. Since the 10th century, the Al Qarawiyyin mosque has developed into a leading center of education with courses in rhetoric, mathematics, medicine, astronomy, chemistry, and history, becoming the first university granting degrees. Even today, the Erasmus Mundus Fatima Al Fihri Programme promotes higher European education and intercultural cooperation with North Africa – a scholarship program in Fatima`s name. Fatima was an outstanding Muslim woman who contributed to the development of knowledge access for everyone in the community and serves as an exceptional example of how women shaped the world we live in.

– By Maria Eichel

Ada Lovelace (1815-1852)

Ada Byron, Countess of Lovelace, was born in 1815 to Lady Byron and the Romantic poet Lord Byron during their short marriage. After their separation, Ada grew up with her mother and never met her father. Lady Byron, who remained bitter towards Ada's father, made sure Ada received tutoring in mathematics, logic and music to prevent her from developing any interest in poetics. Ada was talented in mathematics and began to work alongside her friend, the mathematician Charles Babbage, who called her the "Enchantress of Numbers". When she translated an article by the military engineer Louis Menebrea about Babbage's newest proposed machine, the "Analytical Engine", she complemented it with her own set of notes. These notes contained what was later considered to be the first computer program, an algorithm to be carried out by a machine. She anticipated that Babbage's machine could be used beyond simple calculations, such as for "developing and tabulating any function whatever…" and describes an algorithm to compute Bernoulli numbers, which is considered to be the first published algorithm to be implemented on a computer.

– By Alina Jeschke

Lilian Vaughan Morgan (1870-1952)

For over 100 years, the use of *Drosophila melanogaster* (the fruit fly) in biology research has been substantial to our understanding of genetics and development. Lilian Vaughan Morgan, working out of the lab of her husband Thomas Hunt Morgan, was among the pioneers of *Drosophila* research. Her research not only led to our understanding of sex determination, but also to an integral tool still used today in *Drosophila* research.

In addition to being a scientist, Lilian was also a mother of four children. She left the lab for 16 years to care for her children, and during this time founded the Children's School of Science. Her daughter Isabel Merrick Morgan would later become a virologist and develop the polio-vaccine. Lilian returned to active research only after her children grew up, performing her own experiments in her husband's laboratory. Although trained in marine biology, Lilian began studying *Drosophila* genetics upon her return to research, where she continued onto a long and accomplished career. Lilian's life and work demonstrated her tremendous passion for family, science, and scientific excellence.

– By Matthew HK Cheng

Henrietta Lacks (1920 - 1951)

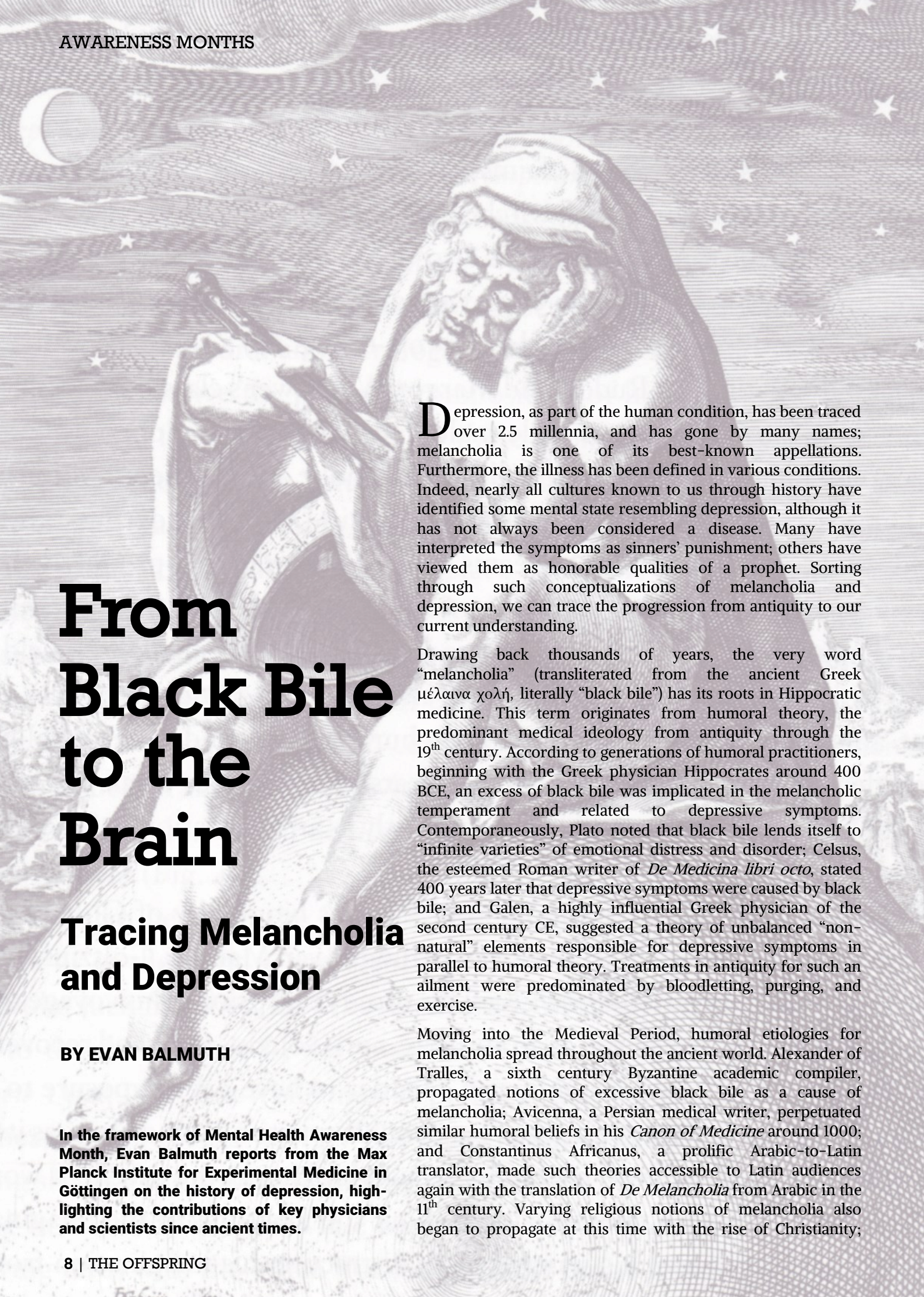
A woman who unknowingly contributed her life to scientific advancement. A story embedded with racial and gender discrimination, best explains the open-ended questions of cancer research. At a time when cancer treatment was unreliable and harsh on the human body, Henrietta remained strong, took care of her family, and did her best to cope with an unfortunate prognosis. In the end, what amounted were her HeLa cells transforming a whole field of research and driving the science of cell cultures.

– By Renee Hartig

Malala Yousafsai (Born 1997)

Even in the beginning of the 21st century, some countries still denied females the most basic rights. Thus, from January 2009, a blog created by BBC Urdu frequently reported on the banning of girls education and the bombing of girls' schools by Taliban militants in the Swat district, a river valley in Pakistan. At the early age of eleven, the blogger, Malala Yousafsai, was bravely raising her voice to draw attention to the discrimination of girls. Over the next few years, Malala stood up for women's and children's rights, using international media and becoming a well-known activist. As a reaction, death threats followed. In the wake of an assassination attempt on Malala in 2012, Malala's course received worldwide coverage, leading to protests and petitions pushing for girls' right to education. Two years later, Malala, who is still fighting for children's rights today, became the youngest person to ever receive the Nobel Peace Prize.

– By Andres Eduardo Rodriguez Cubillos



From Black Bile to the Brain

Tracing Melancholia and Depression

BY EVAN BALMUTH

In the framework of Mental Health Awareness Month, Evan Balmuth reports from the Max Planck Institute for Experimental Medicine in Göttingen on the history of depression, highlighting the contributions of key physicians and scientists since ancient times.

Depression, as part of the human condition, has been traced over 2.5 millennia, and has gone by many names; melancholia is one of its best-known appellations. Furthermore, the illness has been defined in various conditions. Indeed, nearly all cultures known to us through history have identified some mental state resembling depression, although it has not always been considered a disease. Many have interpreted the symptoms as sinners' punishment; others have viewed them as honorable qualities of a prophet. Sorting through such conceptualizations of melancholia and depression, we can trace the progression from antiquity to our current understanding.

Drawing back thousands of years, the very word "melancholia" (transliterated from the ancient Greek μέλαινα χολή, literally "black bile") has its roots in Hippocratic medicine. This term originates from humoral theory, the predominant medical ideology from antiquity through the 19th century. According to generations of humoral practitioners, beginning with the Greek physician Hippocrates around 400 BCE, an excess of black bile was implicated in the melancholic temperament and related to depressive symptoms. Contemporaneously, Plato noted that black bile lends itself to "infinite varieties" of emotional distress and disorder; Celsus, the esteemed Roman writer of *De Medicina libri octo*, stated 400 years later that depressive symptoms were caused by black bile; and Galen, a highly influential Greek physician of the second century CE, suggested a theory of unbalanced "non-natural" elements responsible for depressive symptoms in parallel to humoral theory. Treatments in antiquity for such an ailment were predominated by bloodletting, purging, and exercise.

Moving into the Medieval Period, humoral etiologies for melancholia spread throughout the ancient world. Alexander of Tralles, a sixth century Byzantine academic compiler, propagated notions of excessive black bile as a cause of melancholia; Avicenna, a Persian medical writer, perpetuated similar humoral beliefs in his *Canon of Medicine* around 1000; and Constantinus Africanus, a prolific Arabic-to-Latin translator, made such theories accessible to Latin audiences again with the translation of *De Melancholia* from Arabic in the 11th century. Varying religious notions of melancholia also began to propagate at this time with the rise of Christianity;

◀ *Saturn as Melancholy*

by Zacharias Dolendo after a design of Jacques de Gheyn (c. 1595/6).

predominantly, God and the Devil represented ultimate causes of mental disorder, while the Bible described prophetic traits associated with melancholia. Of note, treatments to this point had still not changed perceivably from antiquity, although religious interventions such as prayer and exorcism became more commonplace.

Influential physicians in the Renaissance Period, such as Timothie Bright in Britain and Felix Platter in Switzerland, insisted upon humoral etiologies while accommodating familiar notions of sin and the supernatural through the 16th century. It was not until the 17th century that humoral theories received their first major blows in favor of modernized physiological etiologies. One important contributor was Thomas Willis, a 17th century English physician who proposed theories of spleen malfunction, and even pathological brain morphology. Yet, despite this impressive shift toward modern physiology in explaining melancholia, Willis' and most other physicians' treatments remained grounded in humoral theory.

The 19th century brought perhaps the most significant theoretical progress toward today's treatments and understanding of depression. One key figure was the French physician Philippe Pinel, who influentially criticized humoral treatments for melancholia in favor of the psychological, with a goal of "interrupting the chain of [...] gloomy ideas." Another was Benjamin Rush, an American founding father nicknamed the "Father of American Psychiatry," who stated that "all the operations in the mind are the effects of motions previously excited in the brain ..." Most importantly, Rush considered mental illnesses to fall under the same category as other physical illnesses, with a physiological cause. Nonetheless, limited by the slow progress of medicine still grounded in ancient theories, his treatments remained dominated by the traditional bloodletting and purging. Lastly, two English psychiatrists, Daniel Tuke and John Bucknill, emphasized neurological causes of depression and promoted novel psychological treatments – along with opium for acute cases – in their 1858 *Manual of Psychological Medicine*.

In the 20th century, definitions and treatments of depression finally began to resemble those accepted

Melancholy

by Edvard Munch (1894)

today. Emil Kraepelin, a German psychiatrist, conducted some of the first longitudinal studies of mental patients and enumerated different forms of melancholia while proposing underlying neuropathological bases; Sigmund Freud proposed explanations of melancholia in terms of sexual development and grieving, and his theories inspired psychoanalytic therapies that remain prominent today. Diagnostics became standardized through clinical texts, with a foundation in the American Psychiatric Association's first *Diagnostic and Statistical Manual of Mental Disorders* (the DSM–I) published in 1952. This first edition described three types of depression – manic depressive reaction, psychotic depressive reaction, and involutional melancholia – while defining cardinal symptoms of each. Further editions of the DSM have been published since, appended with revisions and additional types of depression. Over the last century, biological perspectives of depression have also come to the forefront of our understanding with the development of novel imaging technologies such as the MRI. Structurally, brain regions including the prefrontal cortex and the limbic system were implicated in unbalanced neuronal activity; and molecularly, neurotransmitter theories propagated as inter–cellular signaling became the target of novel drugs. Lastly, in terms of depression treatment, three general categories blossomed: talk therapy, including the Freudian psychoanalytic therapy as well as cognitive–behavioral therapy, became standard; pharmaceuticals were developed, aiming to restore neurotransmitter balances; and alternative therapies, such as electroconvulsive therapy, have emerged continuously since the 1930s.

Today, we know more than ever before about depression and how to treat it. The DSM–V recognizes five main types of depression, each with sub–categories. Our understanding of its biological underpinnings is advancing rapidly, with developing technologies for imaging in humans and translational studies in animal models; moreover, genetic correlates of depression are being uncovered in ongoing studies. New classes of antidepressants are developed regularly with improving efficacies, alongside novel alternative treatments such as transcranial magnetic stimulation. Undoubtedly, we are living in a time of unprecedented innovation in psychiatric medicine and research.

In conclusion, two important lessons can be learned from the history of melancholia and depression. First, depression has persisted as a tangible, physical illness described in various cultures around the world since antiquity; and second, despite thousands of years of progress, we still know relatively little about its causes and mechanisms. Indeed, one third of patients do not respond to treatments even today. Though we appear to be on the right track, it is important not to overestimate our knowledge on the subject, and to remain precautionary regarding treatments that alter our sensitive neurochemistry. Nevertheless, significant progress has been made from the theories and treatments of antiquity, as our focus has shifted from black bile to the brain.

Author Information

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Melancholy Woman

by Pablo Picasso (1902)

(P)Sei Pate

A Student Project Aims at a National Issue

BY MARIA EICHEL

A large portion of the world's population is affected by a variety of mental health problems ranging from anxiety and depression to schizophrenia and bipolar disorders. Often, mental health problems result in social isolation, low quality of life or even suicide. On the other hand, science is constantly moving forward to decipher the genetic and environmental risk factors for these disorders. Psychotherapists are trained to discover, help, and treat patients who are suffering from mental health problems. Beyond that, it is also important for family and friends of the affected individual to be educated on how to behave when daily life seems out of the ordinary. The Mental Health Awareness Month is intended to spread the word that everyone should be informed and care about mental health issues – not only for ourselves, but also for our friends, family, and beyond.

It is the "beyond" with which a project called (P)Sei Pate is concerned. Over the last years, the number of refugees in Germany, Europe, and all over the world has grown significantly. Concurrently, the recognition of refugees suffering from mental health problems has risen. Studies in Germany have shown that 40–50% of adult refugees suffer from Posttraumatic stress disorder (PTSD) or depression, and both in some cases (Statement from the Chamber of Psychotherapists in Germany; BPtK, 2015). With regard to children and adolescents, childhood trauma can have a lasting impact on cognitive, moral, and personality development, as well as interpersonal relationships and coping abilities (Terr, 1983, Pynoos & Nader, 1988, Sack et al., 1993). Overall, the occurrence of PTSD is drastically increased in refugees compared to the overall German population, which can result in a powerlessness and inability to manage daily life or even suicidal thoughts. Thus far we have not been able to assess and effectively address the psychological needs of individual refugees. Not every refugee is able to access or need psychotherapeutic treatment. So why not help them get a better daily structure, teach them coping strategies, and actively help them with their integration into society in order to reduce mental risk factors? And why not have motivated psychology students, who have a chance to learn and teach at the same time, help out with this?

Jasmin Colic, a Bosnian psychology doctoral researcher at the Technical University Dresden, is the initiator of the (P)Sei Pate project. In 1992, his parents, his older sister, and he fled from Bosnia to Germany because of the civil war in his home country. He can still vividly remember how his parents had a hard time at the beginning dealing with the language barriers, a new "home", the constant worry for family and friends they had left behind, and of course the need and wish to integrate into an unfamiliar society. Driven by his childhood experiences and the experiences he gained during his internship at the psychiatric clinic of the University of Sarajevo, where he worked almost exclusively with PTSD patients, he decided to initiate a support system for refugees in Germany, in the form of one-to-one companionships between psychology students and refugees. During their time together, the psychology students use scientifically proven psychological techniques to explore interests, needs, and goals of individual refugees. With joint activities, that match those needs and interests, they aim to speed up recovery, to stabilize the life situations of refugees, and to lower stigmas; first by walking side by side with the refugees, but gradually empowering the refugees to be independent and integrate into society. This process is additionally supervised by certified psychotherapists to ensure professional care.

By now, the team has grown. Jasmin and the other members – Constantin Kleiner (also a psychology student), Dominik Muhs (a Computer Science major), and Tobias Vogel (a Business & Economy student) – have already helped establish several companionships for volunteering students. (P)Sei Pate now works together with clinics and other mental health institutions, the University of Technology Dresden, as well as local associations and plans to apply for financial grants. Up to this point, the project has generated a great deal of interest from supporters. Currently, the team constantly tries to improve the connection between regional clinics, therapists, and affected individuals, which will hopefully lead to better integration and care system for refugees in Dresden and the surrounding area. In addition, they aim to empirically evaluate their concept by initiating a study on the association between activity levels and increases in life satisfaction and psychological flexibility.

In conclusion, (P)Sei Pate addresses the refugees, who carry a great psychological burden and aims to develop a lasting connection to society. Not only does (P)Sei Pate spread the word about refugees suffering from mental health problems, it's volunteers/founders have also developed a creative and successful way to change the situation in a way that our society could also benefit from. Learn more about (P)Sei Pate: https://www.pseipate.de/

Pride Month Feature

Mental Health and Science of LGBT(QIA+) Individuals

BY YORICK PETERSE

In 1973, new psychological insights, scientific evidence, and most importantly, a strong societal pressure from the LGBT community, led the board of the American Psychiatric Association (APA) to abandon homosexuality as a mental health disorder. Fifteen years later, in 1987, all diagnoses related to same-sex attraction were finally removed from its manual in 1987. Notably, a transgender identity is still regarded as a psychiatric disorder by the APA and World Health Organization today, although this is debated and might be abandoned in the future.

Despite not being considered inherently ill because of one's sexual orientation, a disproportionate number of LGBT individuals suffer from psychiatric diseases such as depression and mood disorders, anxiety, post-traumatic stress disorder, substance abuse and suicidal thoughts or attempts. Here, it is important to note that virtually all studies did not include sufficient QIA+ individuals to draw any conclusions for that part of the community. The increased occurrence of mental health issues in LGBT persons is often explained by the minority stress model, which posits that people belonging to a minority experience unique and chronic stress directly related to their minority identity, in this case, sexual orientation or gender identity. Three sources are distinguished for this stress: direct discrimination and victimization by others, the individual's own expectation about being discriminated against and the resulting vigilance of that person to avoid negative situations, and last, a person's self-directed negative feelings about their sexuality/gender identity, also known as internalized homophobia.

With this model in mind, one can think of ways to minimize stress experienced by LGBTQIA+ individuals. In a supportive and tolerant environment, discrimination occurs less frequently, people feel more free to be themselves, and institutionalized expectations about how one "should be" are less rigid. Indeed, a number of studies have shown that LGBT persons living in supportive environments experience lower levels of depressive and anxious symptoms, as well as suicidal ideations, whereas an unsupportive or discriminatory environment is associated with more psychological problems. A supportive environment can take many forms, but notable examples are acceptance by family, friends and colleagues; actively being part of the LGBTQIA+ community; Gay-Straight Alliances (GSAs) in high schools and LGBTQIA+ societies in universities or at the workplace; and law and policy directed at preventing and punishing discrimination and promoting equality, including same-sex marriage.

In the light of awareness, being informed about the scientific facts related to LGBTQIA+ issues can contribute to an environment of tolerance and support. As a full review of all scientific evidence related to sexual orientation and identity is far beyond the scope of this article, the focus will be on some key psychological and biological facts that might help increase the understanding and acceptance of LGBTQIA+ persons.

For instance, on a societal level, the landmark studies by Kinsey in the 1940s and 50s (conducted among cis-gendered men) revealed that 46% of men reported to have had homosexual attractions and 37% had engaged in homosexual behaviour – far more common than previously assumed. Additionally, homosexual behaviour occurs in many non-human species, and its acceptance in human societies is dependent on the culture and historical context. Furthermore, in sexology, the trichotomy of hetero-, homo- or bisexuality is often regarded as not informative enough, and replaced by more dimensional scales for sexual attraction, behaviour and thoughts/fantasies. Together, these findings indicate that homosexual attraction is actually quite common, and can therefore hardly be considered as "abnormal". For gender identity, the number of people born as "intersex" (when the biological sex which cannot be classified as clearly male or female) is also much higher than many people think (1.7% according to one estimate), and as much as 0.4% of the population has a non-binary gender identity.

On a biological level, both gender identity and sexual orientation are mostly determined during prenatal development. Sexual behaviour is in turn largely "activated" by a renewed surge in sex hormone levels during puberty. Usually, a person with sex chromosomes XX develops a uterus and vagina, and identifies as a woman, whereas with XY chromosomes testes and a penis develop, and a person identifies as a man. However, the interplay of the sex hormones, chemicals and (until now largely unidentified) genes

that determine sexual development can deviate from the "normal pathways", and importantly, sexual differentiation of the sex organs and of the brain takes place at different time points during fetal development, allowing for a possible asynchrony between gender identity and the genitals of an individual and for the origination of a broader range of gender identities and a non-heterosexual orientation. For example, during fetal development, an absence or insensitivity of/for the hormones testosterone or aromatase lead to a brain differentiation usually associated with females, even in the presence of XY chromosomes. It should, however, be noted that there is a dimensional aspect to the "male or female brain structure", and there are not two clearly distinct gender-related groups of brain structures.

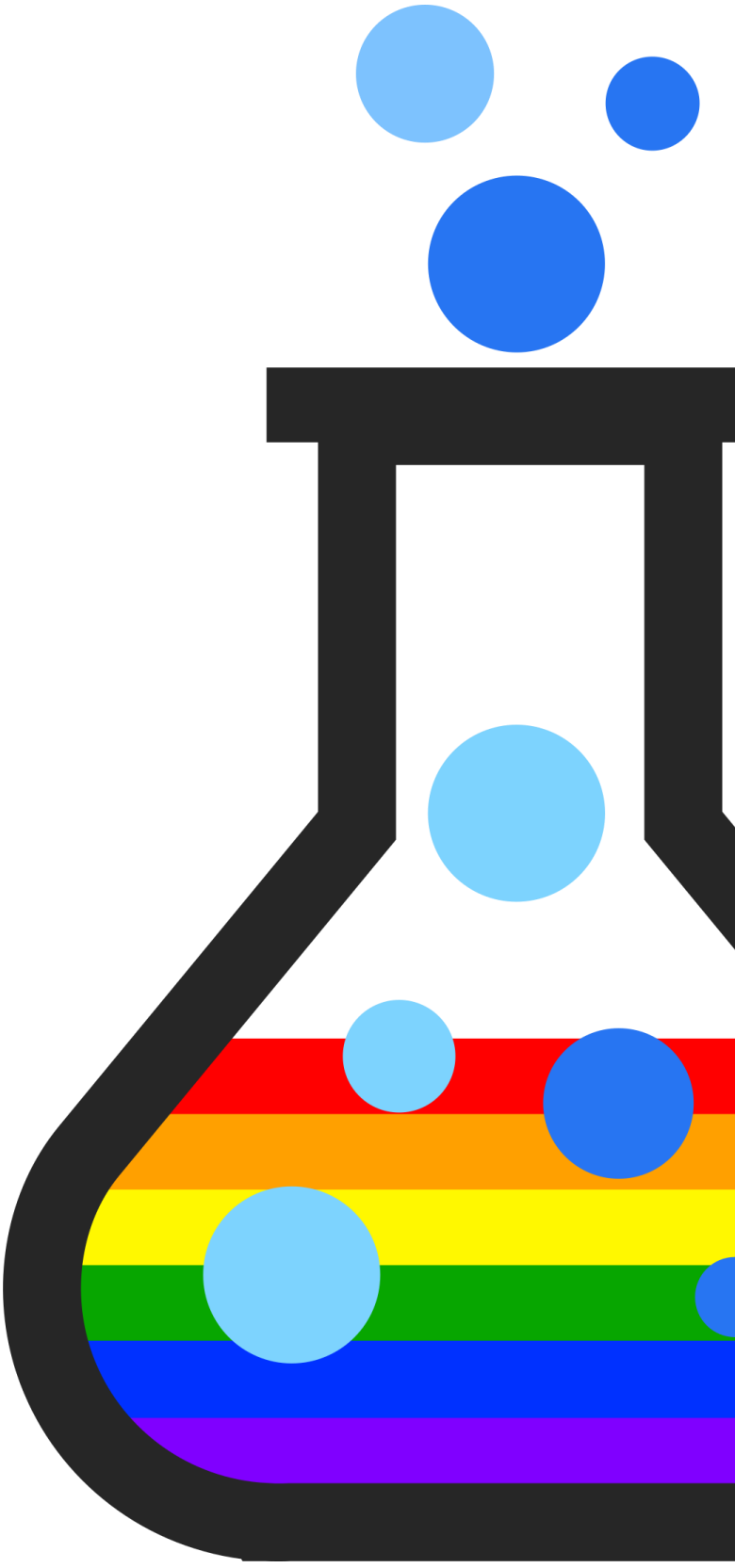
In relation to sexual orientation, family and twin studies have shown that this is determined by genetics for more than 50%, and again sex hormones and chemical factors play a large role in this process. In contrast, there is no proof for any substantial influence of the postnatal environment on sexual orientation, and actually children raised by lesbian couples were found to be heterosexual as often as children of opposite-sex couples. With many genes, hormones and chemicals involved, it is understandable that any deviation in the sexual development process can lead to a different, or fluid, gender identity than assumed purely based on the sex chromosomes of a person, or in a non-heterosexual orientation.

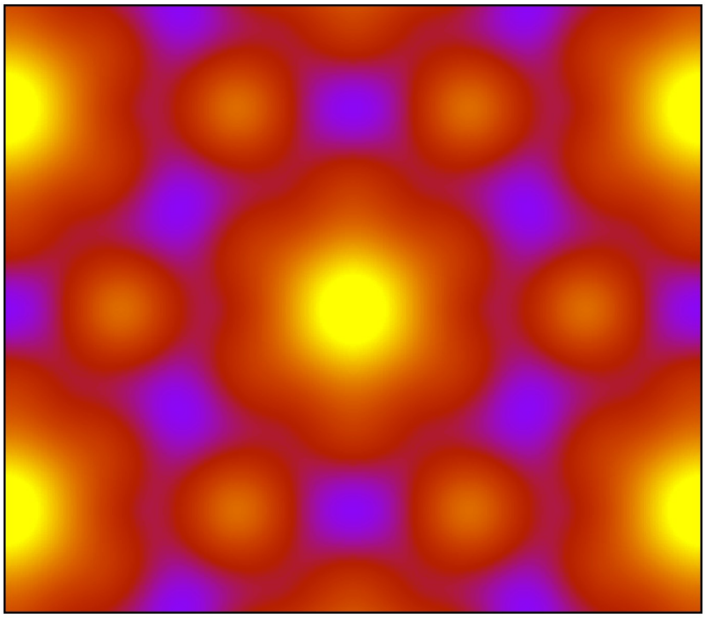
In conclusion, after initially having contributed to the stigmatization of LGBTQIA+ individuals, psychiatric, psychological and biological science has long moved on and actually provides an evidential basis for creating understanding, and thereby tolerance and acceptance. Science has shown that gender identity and sexual orientation have a strong biological basis, and a diverse range of expression of both can occur under social, cultural and societal influences. Importantly, non-normative does not equal "abnormal" or "ill". By being informed about this, stigmas, prejudices and discrimination can be reduced, creating an environment of lower stress, which in turn benefits the mental health of LGBTQIA+ individuals.

We certainly hope this is the case within the Max Planck Society, and that you as informed and highly educated individuals contribute to the spreading of an LGBTQIA+-friendly environment!

Suggested readings:

- Herek and Garnets. *Sexual orientation and mental health*. Annual Review Clinical Psychology (2007), vol. 3: 53–75
- Kealy-Bateman and Pryor. *Marriage equality is a mental health issue*. Australasian Psychiatry (2015), vol. 23: 540-543.
- Bao and Swaab. *Sexual differentiation of the human brain: Relation to gender identity, sexual orientation and neuropsychiatric disorders*. Frontiers in Neuroendocrinology (2011), vol. 32: 214–226.
- Joel et al. *Sex beyond the genitalia: the human brain mosaic*. PNAS (2015), vol. 112: 15468-15473.
- http://news.fnal.gov/2017/06/meet-spectrum-lab-resource-group-lgbtqa-community/





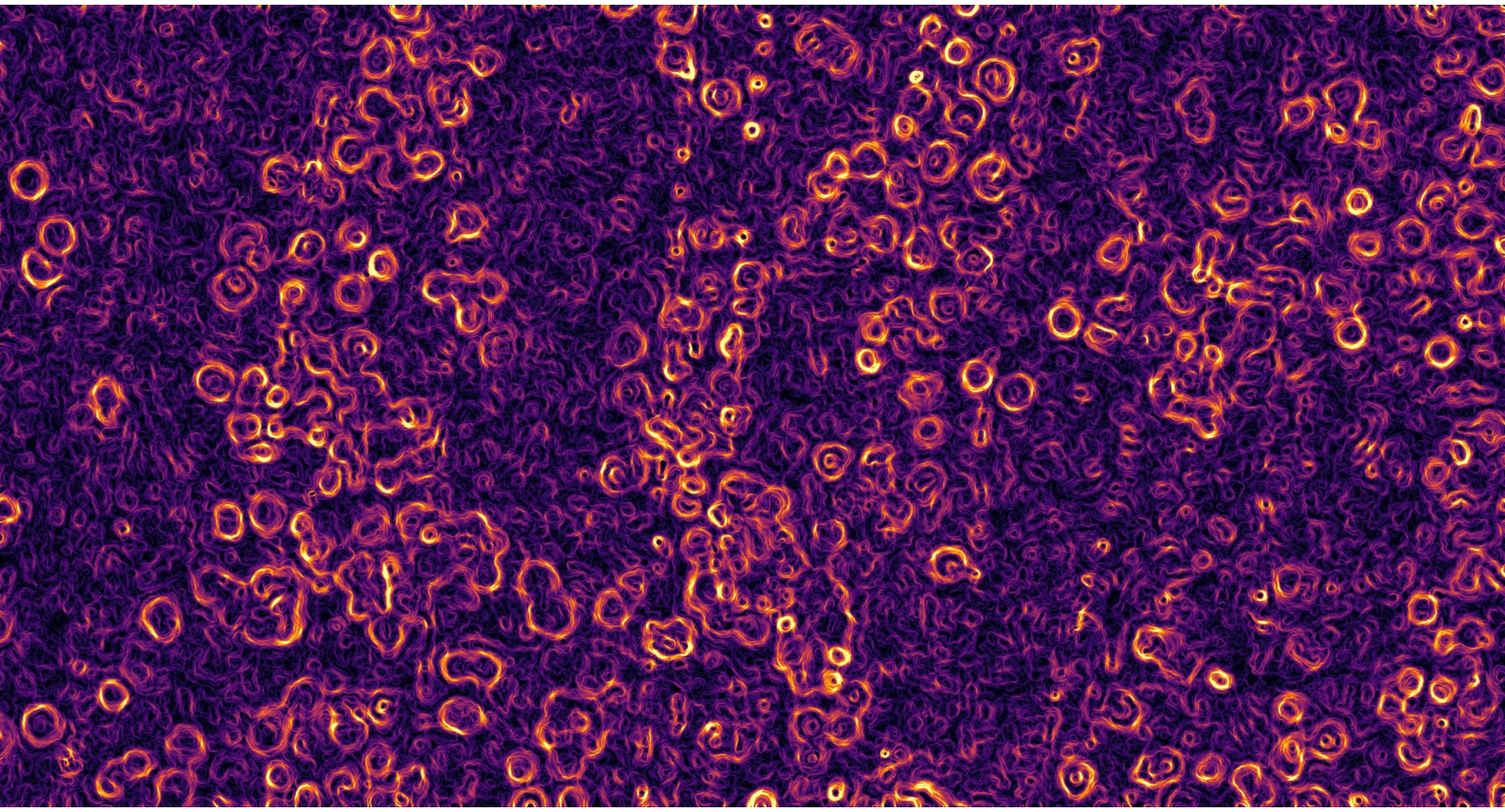
Kaleidoscopic Graphene

by Marvin Kammler (Department of Dynamics at Surfaces, MPI for Biophysical Chemistry)

The image shows the potential energy that a single hydrogen atom experiences at different positions at 1 Angstrom above a single layer of graphene. Blue rectangles indicate C-C bonds, red spheres between these bonds represent C-atoms, bright yellow spots show the center of six-membered C-rings. This is calculated from a DFT-based re-parametrization of the 2nd generation reactive empirical bond order potential.

The Art of Science from Laboratories to Galleries

BY MATTHEW HK CHENG



Rings of Fire

by Gero Hermsdorf (University of Tübingen, ZMBP, IMPRS Tübingen) and Shilpa George (University of Tübingen, Interfaculty Institute of Microbiology and Infection Medicine)

"We were performing test measurements together for a FISH experiment on Staphylococcus aureus *bacteria mounted on agarose. To optimize the segmentation with Matlab, we tried several filters for the wide field images and by coincidence found these beautiful fiery ring patterns."*

As researchers, we make observations everyday, using a vast array of tools to investigate scientific questions. These tools offer a unique perspective of the universe and world that few others have. Whether it be the colours and lights of distant nebulae or the intricate cellular patterns of living organisms, these images often blur into the realm of art. To celebrate the beauty and artistic qualities found in our everyday research, the Offspring invited our readers to share their most visually stunning and interesting images inspired by science or their own research.

The compound (light) microscope is one of the most important tools in biological research today. While observations made through a microscope (a micrograph) have been instrumental to scientific breakthroughs and discoveries, they have also shown us intricate patterns and vibrant colours in the microscopic world all around us. From the incredibly ordered microstructures of organisms to the dreamlike visuals of inorganic compounds, many micrographs could very well belong – and have hung – on the walls of art galleries and museums. Indeed, the artistic qualities innate in micrographs have been appreciated since the 16th century, through the illustrations of Dutch scientist Anton van Leeuwenhoek and English philosopher Robert Hooke (his publication *The Micrographia* helped popularize microscopy). With the invention of photography in the 19th century, production and sharing of micrographs has become more frequent and have also been used as a tool for art.

Today, research labs around the world are sharing micrographs not only as figures in scientific manuscripts but also as pieces of art to appreciate. Beginning in 1975, Nikon has hosted an annual photomicrography competition entitled "Small World" (http://www.nikonsmallworld.com/), opened to international submissions spanning many fields of scientific studies. As of 2011, "Small World" included a sister competition for movies captured through a microscope, highlighting the delicate and otherwise imperceptible movements surrounding us. As a testament to the popularity of finding art in science, Olympus has also hosted a similar competition since 2004 entitled "BioScapes" (http://www.olympusbioscapes.com/). These images and movies are not only visually stunning, but make us pause to admire the vibrant colours, the many layers of structures and details, as well as the subtlety of the world in which we live.

A New Initiative to Further Help Us Talk About Animal Experiments

Photo by George Shuklin

BY MARIA EICHEL

After starting my PhD, I went to a friend's place with a lot of new people. And, of course, these things always start with "Hi, and what are you doing". From then on, the same scenario takes place every time I say "I am doing my PhD in Neuroscience". After a big "wow" the conversation gradually turns into me killing animals. Most times the first questions are: "So you torture monkeys? Ah, ok mice – but where is the difference actually? Did you ever have pets? How can you cope with killing animals then? Nowadays, shouldn't you be able to use alternative methods?"

Often, I feel overpowered by this emotional point-of-view. As soon as I would start explaining what I do, why I need mice for my experiments and why I am of the opinion, people either lose interest or start heavily debating animal ethics. This has happened on several occasions, and at one point, I noticed that not only are others not understanding my point-of-view but also I am having difficulties discussing this essential topic.

Many times I wish for numbers and statistics in order to tell them that it is not so bad. For example, in Germany only 0.26% of all animals killed are in research whereas 99.15% are in the food industry. The same holds true for when people think we all work with primates when primates only make up 0.1% of all animal models used for research (data from the Versuchstierzahlen 2014-15 from the BMEL).

Sometimes, I begin explaining the topic using emotional and understandable arguments, such as, how medical treatments or drug development may help treat loved ones. But what about basic science research? How about all the rules and guidelines we have in the EU to protect animals from misuse and torture? How about my feelings when I face a long bureaucratic process before actually starting my research, and those long hours I spent on these things instead of doing what I love – solving puzzles in the lab and creating knowledge. The last point especially, I often do not dare to tell others outside of my field. I fear this will be misunderstood and people might think I do not care about the animals' protection, but rather about a fast experimental outcome. In the end, I am afraid that people would generalize the problem, thinking that scientists do not care about animal experiments as much as we actually do.

The good news? There are not only activists against animal research, but also alliances aiming to promote public awareness by providing reliable information to the public and motivating researchers to engage in this debate, such as, Pro-Test Deutschland e.V. and Tierversuche verstehen (TVV). For this article, the Offspring sat down and interviewed Roman Stilling of TVV about the group and its aims. For information about other advocacy groups, namely Pro-Test Deutschland, you can refer to an article written by Renee Hartig, one of the Offspring members and co-founder of the grass-roots organization [The Offspring Issue 2016].

Roman Stilling works for Tierversuche verstehen, which translates to Understanding animal experiments and is an advocacy group put forth by the Alliance of Science Organisations in Germany. He spoke to the Offspring about the aims of this initiative and how they try to publicly raise awareness about animal experiments. Launched in 2016, TVV provides reliable, transparent, and up-to-date information about animal experiments and why they are important. Also, availability and limitations of alternative methods, such as non-invasive methods or tissue engineering are explained by experts. The platform may not only be used by laypeople, journalists, and politicians but also scientists, teachers, technicians, animal caretakers and students as a source of information. In the long run, this will hopefully provide a basis for open and transparent discussions, increasing the acceptance of animal experiments within our society under the given circumstances. Most importantly, Roman points out that we as scientists need to communicate on- and off-line as well as use our fascination with science when it comes to talking about our methods. We are the experts in the field and are the most suitable people to spread the word on why animal research is important. For scientists at all stages, it is necessary to engage in this debate and shape the future of how things are communicated.

I, myself, decided to engage in this topic, have an open ear for people who want to discuss it with me, and not become too heated but rather to be honest, reliable, and fact-based. I am an expert in my field, and with a bit of thinking ahead, I will be able to communicate the topics that are close to my heart.

Find the full interview with Roman Stilling from Tierversuche verstehen on pages 25-26.

Website: https://www.tierversuche-verstehen.de/

Tierversuche verstehen

Eine Informationsinitiative der Wissenschaft

Tell us something about Tierversuche verstehen. How and when did it form? Who is collaborating with you? And who is working for Tierversuche verstehen?

R.S. In September 2016, the "Alliance of Science Organisations in Germany" (http://www.mpg.de/alliance) launched an initiative to offer transparent and reliable information about all aspects of animals used in research in a fact-based manner. It is called "Tierversuche verstehen" (translates to "understanding animal experiments") and its flagship part is the web platform www.tierversuche-verstehen.de. A steering committee consisting of scientists and communications professionals from each of the organisations within the Alliance is responsible for the activities of this initiative.

What is your general plan and main focus? Do you have a visionary idea and/or aim?

R.S. The initiative aims to provide up-to-date, first-hand, reliable information on why animals are used in research and why such research is crucial to medical progress. The vision of "Tierversuche verstehen" at this stage is to become the number one resource for information regarding the use of animals in research. However, it is extremely important to point out that the medium- to long-term goal is that every institution that uses animals for research has openly provided information on their research to the public. Responsible research goes together with transparency and openness. Together, this will hopefully contribute to a more evidence-based public discussion on whether our society accepts using animals for their benefit. We know from other European countries and the USA that a more rational debate is possible.

How do you aim to inform about animal research in general? And more specifically, where does your main focus lie regarding public awareness, education and how to involve/teach scientists?

R.S. We know that people want to know what is going on in laboratories that are publicly funded. And we know that people take an increasing interest in what is happening to animals in all areas of research that we use in modern societies. However, in the past science did not do a very good job explaining its methods and ethics, or how animals are treated and how much science relies on the animals that researchers are using. There needs to be a general rethinking of the approach science communicates with the public about controversial issues. Importantly, we also know that people need to perceive this communication as trustworthy, competent, and authentic. Thus, researchers cannot delegate this task and are themselves needed to talk about their research – and not spare the methods. "Tierversuche verstehen" is meant for the public, but of course "the public" is just a summary of multiple groups with different interests and needs. Therefore, the information that we provide is tailored towards different target audiences, including schools, journalists, doctors, and politicians.

Alternative methods which replace animal experiments are also a big topic nowadays. Do you also plan to engage in this topic?

R.S. If an alternative method exists to answer a certain scientific question, an experiment causing harm to an animal should not be done. This needs to be guaranteed by an extensive process of approval, which every new experiment needs to go through before it can start. Of course, we highlight this process, and extensively, all kinds of methods – both existing and in development. But, we always provide information about both the opportunities and limitations of current and future methods. Science has proven repeatedly that new methods are picked up quickly if they are superior to the current status quo. Nobody I know likes causing harm to animals he or she uses in experiments, and keeping animals for research is expensive and needs a lot of resources. New methods are developed by the community all the time, and every new method – given it achieves the same level of insight – is welcomed.

How can scientists join and/or help out?

R.S. As said above, it is the scientists themselves that need to communicate. Engaging with the public needs to happen both on- and off-line. We, therefore, offer an expert network that gathers scientists from all areas to provide their specific expertise, which we rely on for news stories, background research or answering questions that we receive from interested readers. Also, we need scientists to be available for local activities, such as forum discussions or open house days. Finally, we need researchers to push for more openness at their own institution – a process that involves discussions and coordination with colleagues, management, and PR offices.

Would you have a key message for young scientists on how to engage in the debate and behave when addressed with criticism?

R.S. The most important motivation for most scientists is fascination. As a young scientist you are well-prepared to talk about your research and highlight how important it is (e.g. to secure funding or pitch a project to your supervisor). This fascination needs to be visible also when it comes to the methods you use. It is important to be clear about the impact you have when you engage in public discussion both on- and off-line. Only you as scientists have the first-hand information that laypeople need to make up their minds and come to an opinion about a particular field of research or methods (i.e. using animals). There are many ways to become a communicator of science, locally or online. In addition, it is crucial to make sure that you have nothing to hide when it comes to your science: be the best you can be, adhere to good scientific practice and all legal requirements. Finally, there are many ways to contribute to the debate, e.g. by signing the Basel Declaration (http://www.basel-declaration.org/), join the Pro-Test movement (http://www.pro-test-deutschland.de/en/) and stay on top of the debate (e.g. follow @TVVde on Twitter).

We Marched for Science: A Work in Progress!

BY VINODH ILANGOVAN AND THE OFFSRPING GROUP

As practitioners of science most of us feel that science should always remain nonpartisan and never politicized. Nevertheless, policy makers and statesmen share something in common with scientists: both communities work for the betterment of society. On April 22, 2017, scientists and nonscientists alike marched together in over 500 distinct geographical locations, including 20 German cities, peacefully demonstrating their support for factual information and evidence-based policy making by joining the global March for Science.

The events held across various German cities included lectures, panel discussions and science exhibitions, along with colorful marches of diverse people, strengthening the message that "science is global, science is for everyone". One might argue if this single event had the potential to change anything better for science. The global scale of participation by not only scientists, but also individuals who care deeply about the distinction between verified facts and personal opinion, stands as proof that science unites more than it divides. The broader aim of such a march was to break down the barrier between scientists and society; to understand the interdependence and recognize our roles in making the world a better place.

"We haven't democratised science enough to be appreciated by the major stakeholders- the public. The March for Science was a first step in global public engagement"

– Vinodh Ilangovan, MPI for Biophysical Chemistry, Göttingen

"In Germany, scientific freedom is not threatened but trends all over the world matter to all of us. Therefore, transparent communication of scientific facts is important to nurture further development of independent science and shaping an open-minded global society"

– Maria Eichel, MPI for Experimental Medicine, Göttingen

"Fact-based science has an enormous impact on the lives of many people. Unfortunately, although scientists are working across borders, the impact of science can differ when crossing a border. The March of Science is a good step in creating awareness for science and its impact"

– Saskia Hekker, MPI for Solar System Research, Göttingen

"Traditionally, scientists have refrained from politicizing science. However, when it came to the point where the credibility of science was threatened by other public institutions, you can bet that many individuals felt empowered to band together, in essence, demanding truth and less lies. Factual-based discussions are the only way to communicate on a deep, intellectual level"

– Renee Hartig, MPI for Biological Cybernetics

"The march connected researchers with their communities. It pulled science out of an academic setting and put it into a world perspective. Additionally, we as a society used the march to voice our expectation of informed policy making based on scientific evidence. Science does not happen in isolation and neither do the consequences of ignoring it."

– Matthew HK Cheng, Interfaculty Institute of Biochemistry, University of Tübingen

"The march of science began as a voice of the scientific community against the disheveled politics, but grew into an empowered symphony celebrating science. It surely made a good attempt in engaging the people-non-scientists-everyone, and propagating a shared understanding and responsibility of science. I hope it also stirred minds beyond the borders of the profession. After all, science is intertwined into all of our daily lives, but to an unattested and inconspicuous manner."

– Mayank Chugh, Center for Plant Molecular Biology, University of Tübingen

MARCH FOR SCIENCE

April 22, 2017

Science explains what it means to be esoteric.
Photo from Martin Voegele, MPI for Biophysics, Frankfurt

Science knows what we don't know.
Photo from Somdatta Karak, University of Göttingen

Marching for Science in Göttingen - Die Stadt die Wissen schafft
Photo from Maria Eichel, MPI for Experimental Medicine, Göttingen

Without Know No How - Where Knowledge is missing, rumours spread.
Photo from Maria Eichel, MPI for Experimental Medicine, Göttingen

Gathering of marchers on the Tübingen Neckarinsel, awaiting the commencement of this year's March for Science.
Photo from Marie Schmit, Tübingen University

Many different groups banded together during the March, here Pro-Test Deutschland, e.V. members expressed their position on the use of animals for scientific research.
Photo from Marie Schmit, Tübingen University

Collage by Matthew HK Cheng

**Terms & Conditions : Only for those having "PAM" sites near the complementary sequence in their genome!!

Imagination into a CRISPR future....

by Dr. Vinita Bharat, Fuzzy Synapse (https://www.facebook.com/VBfunworld/) CC-BY-SA

Hacking Genomes Using CRISPR

BY RAED HMADI, ALINA JESCHKE, MAYANK CHUGH & VINODH ILANGOVAN

Imagine living in a world where you could change the pattern and colour of your dog's coat simply by feeding him a special diet. Or, imagine changing your eye or hair colour to match the latest trends. A cosmos where humanity thrives for perfection by contributing offspring with desired traits and characteristics achieved via genetic manipulation. Such fantasy may not be too far!

Scientists and engineers have been able to transform yeast into ethanol, thereby producing machines which promise a renewable future by altering DNA. Researchers in China have already tried their hand at altering human embryos. Gene editing today is easier, faster, and cheaper than it ever was thanks to the sweat and determination of hundreds of scientists across the globe. CRISPR/Cas9 is the new genome editing technique that everyone is talking about and has been a subject of ruthless legal and ethical debates. Let us discover together what makes CRISPR/Cas9 such a hot affair.

Decades after the structure of DNA was unveiled and DNA sequencing was realised as an emergent milestone, a large number of researchers began searching for the origin of life by sequencing full genomes of bacteria and other primitive microbes. These microbiologists noticed iterative sequences in bacterial and microbial DNA that read the same backwards and forwards – palindromes –and labelled them as clustered regularly interspaced short palindromic repeats (CRISPR). In 2007, CRISPR sequences were demonstrated to function in adaptive immune systems in bacteria. Bacteria may also be infected with viruses, like other living creatures. Upon viral invasion, a bacterium neatly chops segments of viral DNA and incorporates them into its own genomic DNA, within these CRISPR palindromic repeats. This serves as an immunological memory for the bacteria to fight back in case it encounters the same virus again.

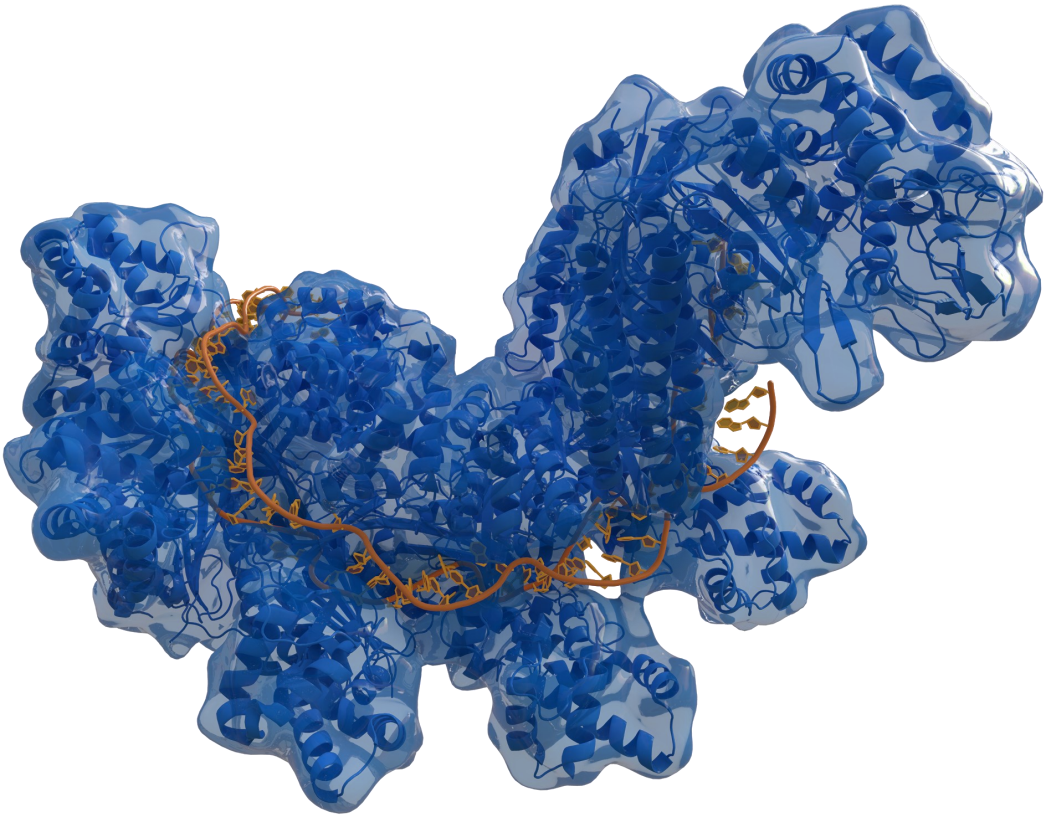
This discovery ignited curiosities worldwide because a unicellular organism had the power to edit genomes, and geneticists decided to explore the system in depth. The combined efforts of Emmanuelle Charpentier (Max

Planck Institute for Infection Biology) and Jennifer Doudna (University of California, Berkeley) revealed that CRISPR makes two strands of RNA and a corresponding protein called Cas9. The RNA strands are then activated and serve as "GPS" directions to viral DNA. Together with Cas9, these RNA strands hunt for a complementary site of 2 to 6 base pairs in the viral genome. After reaching the new "home" site, Cas9 starts gripping and snipping the viral DNA.

Inspired by this work, scientists were able to tweak the natural CRISPR potential and harness its powers to cut, copy, and replace any piece of DNA. For genome editing, the system requires two components: a guiding RNA molecule and a slicing enzyme, or Cas9. The guide RNA molecule directs the Cas9 enzyme to the target of interest in the genome, where the latter will edit and repair specific sequences with the genetic information of interest. The system can be easily administered to specific cells found within a myriad of organisms; such as, yeast, flies, mice, and plants. This system also works on cells that have been cultured in the lab. The first demonstration of the fundamentals and potential of the CRISPR system were revealed in a landmark research article published in June 2012 (http://science.sciencemag.org/content/337/6096/816). In 2013, genome editing via CRISPR in mouse and human cells by Feng Zhang (Broad Institute of MIT and Harvard) practically testified its colossal capability. From that moment onward, the rolling CRISPR snowball has gotten bigger and fiercer, as legal battles have arose between the University of California, Berkeley, Harvard University, the Massachusetts Institute of Technology (MIT), and the Broad Institute. The latest update from the U.S. Patent and Trademark Office granted a series of patents to the Broad Institute and Harvard University. On the other hand, the European Patent Office decided to grant the patents to the University of California instead.

Mechanistic principles and lawful battles apart, how is this DNA editing going to shape the world? This question has been lingering in all of our minds. Are researchers in the field cautious with their experiments and outcomes, or blindly excited? For example, there are research groups that are 'CRISPRing' the gene drivers in mosquitoes to suppress their populations to a level that does not support malarial transmission. This is serious work because any escapees from the lab could mate with the natural species, mutating the progenies, or wiping them out completely. However, the precautionary measures in such studies have been high and rigid. In April 2015, Chinese scientists published a study where they have tested the fidelity and efficiency of the CRISPR/Cas9 system in human embryos, aiming to target the gene that is mutated in people suffering from beta thalassemia, a potentially fatal blood disorder. The work was unsuccessful as the embryos were defective and CRISPR did not target embryonic genes with similar efficacy as it does in isolated cells. Nevertheless, the work sparked fears, grabbed attention worldwide, and led to a relaxation in the permissible codes in clinical trials by the US National Academy of Sciences. In fact, the genetic modifications for diseases such as HIV and leukemia are already underway in patient's non-reproductive cells.

At this stage, it remains undisputed among the scientific community that the CRISPR/Cas9 technology is a powerful and versatile tool to understand several elusive biological processes in an experimentally safe situation. Its successful clinical usage is great, yet it is a slippery slope towards unethical use or germline transmissions affecting future generations. In the end, any scientific discovery has the potential to be used for good and bad. Hence we should view CRISPR/Cas9 with caution and monitor its ability to treat diseases.



Type-I CRISPR RNA-guided surveillance complex (Cas, blue) bound to a ssDNA target (orange).
by Thomas Splettstoesser (www.scistyle.com)

What comes next? - Leaving Max Planck staying connected

BY MARIA EICHEL

After a long time of studying, the decision to absolve a PhD comes with its stumbling blocks. Long hours in the laboratory, the library, reading articles, attending meetings, supervising students, maybe engaging in extracurricular activities, and in between, trying to somehow manage a work-life balance. These intense three-to-five-years are often accompanied by the thought *"What comes next?"* This is a thought every doctoral researcher knows. Sometimes it is present in the back of your mind, but as soon as your PhD comes to its last phase, everyone – family, friends and colleagues – seems to be asking the same question. Not every one of us considers to stay in academia – the majority decides not to and indeed leaves science. When talking to my fellow doctoral researchers it seems like they all have the same problem: How to gather valuable information about (the thousands of) possible career paths? What additional skills are needed for those jobs outside academia? With whom can you discuss the questions you have in mind? "Career planning" and "networking" are two keywords when it comes to finding, choosing and actually performing the career that suits you best.

The Offspring will dedicate a section to finding answers to those questions and support doctoral researchers by showing you what else is out there and how you can actively engage in finding a suitable solution.

And who better to ask than people who have faced the same difficulties and found their own way? The Max Planck Alumni Association (MPAA) provides a platform of former Max Planck Society (MPS)-associated researchers from all around the globe – from early postdocs to professors, from young entrepreneurs to company CEOs, from the creative talents to the scientifically-committed and beyond. To learn more about the MPAA and strengthen the communication between the networks, I asked two of their members, Filippo Guarnieri and Irene Ferreira, to answer some questions put forth by the Offspring and Max Planck PhDNet (find the full interview and links below).

The story begins in 2013 when Filippo Guarnieri, at that time a 3rd year doctoral researcher, attended the Visions in Science Conference in Dresden. Motivated by this gathering and exchange of ideas between students and his wish for a future career in mentoring he met just the right person: Birgit Adam from the general administration in Munich. The idea of an alumni association was born and in the end the Max Planck Alumni Association e.V. was established in 2015.

Their vision? To build a community which provides communication inside and outside the MPS, promoting scientific values, supporting young entrepreneurs, and bringing industry and academia closer together. Honoring values, such as cultural exchange, tolerance and equality, motivated professionals to create this association on a purely voluntary basis. To bring together alumnae and alumni, regional groups (RGs) are formed, which provide a regional networking platform that doctoral researchers can also join. Further, common interests are brought together in a so-called shared interest group (SIG) with projects focusing on important areas, such as entrepreneurship, leadership, and social activism. As a discussion platform the MPAA will provide networks on their future website and social media. With a finished infrastructure by the end of 2017 and a growing community, the MPAA will soon be able to launch their first pilot projects, such as mentoring of PhDs and Postdocs by an MPAA member. After being at an MPI for at least 6 months you are eligible to apply for a MPAA membership.

But what is in it for you as a PhD student?

With access to professionals from various backgrounds you can easily network and ask for career advice. If that is not enough already, you can get support via the MPAA Mentoring Program and develop your career and soft skill portfolio with the help of the MPAA Career Network. Last but not least, why not get active yourself? As a volunteer you can already contribute and support the vision of the MPAA by coordinating a group, pilot project or help out as a webmaster. If you want to see for yourself what the MPAA community has to offer, then come to the next Max Planck Symposium for Alumni and Career researchers. Want to know more?

Find information about the MPAA here:
http://www.mpg-alumni.de/
https://www.facebook.com/MaxPlanckAlumniAssociation/?fref=ts

Map from Wikimedia Commons
modified by Kristin Krause

Max Planck Alumni Association – Offspring Questionnaire with Filippo Guarnieri and Irene Ferreira

BY MARIA EICHEL

How did the Max Planck Alumni Association form?

F.G. The concept of a community of Max Planck alumnae and alumni was first discussed at the Visions in Science conference in Dresden in the fall of 2013. At that time, I was a last-year PhD student at the MPI for Gravitational Physics in Berlin and I was wondering how could I keep in contact with the institute once my doctoral degree was conferred. But not only that. I was very enthusiastic about meeting so many brilliant students from so many different research fields. I envisioned a space where we could continue brainstorming and discussing our ideas, and which would persist after our time at the Max Planck. Last but not least, I was looking for a network of companies and experts who could provide me with career mentoring in case I wanted to transition outside of academia (that is, in the end, happening now, 3 years after earning my doctoral degree). As often happens, you needed the right person at the right moment. At the conference in Dresden I met Birgit Adam, who was working at the general administration and received with enthusiasm my idea of developing an alumni community. The project was first approved in 2014 by then-President Mr. Gruss and was strongly supported by the current President, Mr. Stratmann. The alumni project underwent several modifications and several stakeholders joined our organizing committee. In late 2015, we agreed on the establishment of an independent association, the Max Planck Alumni Association e.V.

Who is behind the MPAA?(Who are you? What are you doing besides building up the MPAA?)

F.G. It is a very diversified community. I am working as a postdoctoral fellow in theoretical physics at NORDITA, in Stockholm, but also establishing a company and a start-up. Among the board members we find CEOs and entrepreneurs like Dennis Fink and Norman Gerstner, scientists like Ali Shahmoradi and Ghazaleh Afshar who work at the German IT company SAP. Among the most active members you find professors, lawyers, entrepreneurs and professionals, each on their own career path.

What is the visionary plan of the MPAA? What visions are your driving force to build up this network next to your regular workload?

F.G. We envision an association that provides the same brilliant atmosphere you can find at the institute. A community that promotes scientific values like open access to knowledge, science divulgation, and one that fosters interdisciplinary communication within and outside of the Max Planck Society. We envisioned an association that promotes the reduction of the gap between industry and academia, in terms of (soft) skills training for scientists, internships, career support, and a space to foster entrepreneurship. Last but not least, an association that promotes cultural exchange and tolerance, with no discrimination of gender, color or religion. This vision and these values are the driving force behind the MPAA, motivating highly-qualified professionals to work on a purely voluntary basis to lay the foundations of the association.

How fast do you think will the MPAA evolve?

F.G. We have finished almost all the launching work necessary to open the MPAA to all 100,000 potential members from the 83 Max Planck Institutes. This launch includes: defining a statute that has key features of a successful large-size alumni organization and complies with the German laws; as well as designing and developing a database and a website,optimized for thousands of members. And of course, full-time professionals, like myself, who have undertaken this work in their spare time. We expect by the end of 2017 to be ready from an infrastructure and legal point-of-view. We will then switch gears, and focus mainly on community growth and pursuing our mission.

I.F. Two tools are important to foster community growth: the regional groups (RGs) and the shared interest groups (SIGs). In the regional groups, alumnae and alumni from a specific city (e.g., Munich and San Francisco) meet and organize activities together. In a SIG (e.g., MPAA entrepreneurs), a common goal or interest is the glue of the group. The MPAA database and website will have thus a vital role in the self-organization of these two types of groups, providing a playground for the development of projects in important areas, such as in entrepreneurship, leadership, and in social activism. Because of the diversity in professional backgrounds and interests of our pool of alumnae and alumni, I believe that the MPAA community will soon have an important global footprint.

F.G. And in addition to the RGs and SIGs, which are local communities with their own mission and activities, we also have networks, thematic spaces on social medias and on our website where our members can discuss online. And differently from the Groups, doctoral students can manage an MPAA Network!

Are there pilot projects? What are the ideas behind lifelong learning Max Planck Academy and MPAA Career Network?

F.G. We have several pilot projects in our pipeline. For example, the MPAA Career Network is running a pilot on how large-scale career strategy can take place at the MPAA. The lifelong learning project Max Planck Academy is another pilot meant to test if alumnae and alumni can attend (e.g. soft skills or writing) courses at the Max Planck Society. Irene can tell you more about the mentoring pilot program.

I.F. The mentoring pilot program is currently running with mentees of three MPIs in Munich: Biochemistry, Neurobiology and Psychiatry. This mentoring program aims to support PhD students and Postdocs either in turning their idea into a business, or developing their career outside of academia. The program will grow organically to cover all the MPIs. In the near future, both PhD students and Postdocs at all the 83 MPIs will have the opportunity to be mentored by a MPAA member.

Joining the MPAA: Who? How?

I.F. The MPAA has a very inclusive policy for membership. Everyone who was at least 6 months at one of the MPIs is eligible to apply for MPAA membership. This rule is also valid for visitors and current employees of the 83 MPIs. Currently, the registration platform is in the beta stage, nonetheless the registration will open very soon. However, one can already contribute actively to the MPAA as a volunteer; for instance, as a webmaster or as a coordinator of either a pilot project or a group. You can find these positions at www.mpg-alumni.de/volunteer.

Can you compare the MPAA database to regular career databases like Xing or LinkedIn?

F.G. Both portals have a database connected to user accounts but have different finalities. LinkedIn is a career portal, while our website provides the freedom to members to self-organize in groups, modify their own group webpage, etc., all using a single database. We have moreover implemented features like Google APIs to provide robust geographical statistics and we will provide a sync feature to update your job information directly from LinkedIn.

How could doctoral researchers benefit from joining the MPAA?

I.F. One of the biggest challenges faced by PhD students at the MPIs is the development of their professional network outside of academia. This network is essential to help them finding a career outside of academia. And according to different studies, a large percentage of PhDs will have to leave academia. Through the MPAA you can, for instance, access easily different pools of professionals to whom you can ask for career advice. If you are interested in a more formal form of guidance and support, you can have it too either through the MPAA Mentoring Program or the MPAA Career Network that Filippo and I already mentioned. And you can access all these programs immediately after 6 months of your PhD.

Is the next gathering of Alumni already planned?

I.F. The MPAA community is already very active. For example, regional groups in Stockholm and Berlin, meet already regularly. You are all invited to attend those meetings. Please have a look at www.mpg-alumni.de/events to find a meeting near you. However, to intensively experience the energy and vision of the MPAA community on a global scale, I have to recommend to you to join the "2nd Max Planck Symposium for Alumni and Career Researchers" that will take place in Berlin. This event is truly inspiring. Filippo and I are looking forward to meeting a lot of you there.

Staying connected through the MPAA enables researchers to establish networks within academia and industry, allowing for interdisciplinary communication and support of younger scientists.

by Kristin Krause

Career Portfolio - Roman Stilling: Scientific Officer at Tierversuche verstehen

BY MARIA EICHEL

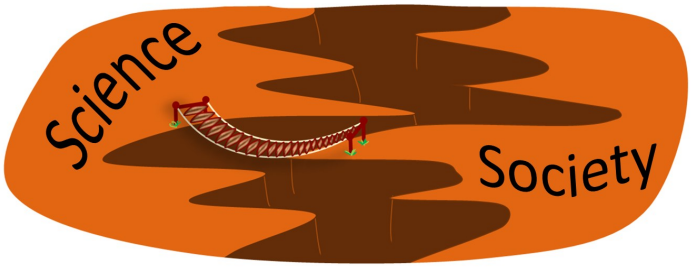
Considering career portfolios, we interviewed Roman Stilling from "Tierversuche verstehen" (TVV; translates to "Understanding animal experiments", also see pages 16–18) about his transition from academia to Scientific Officer.

Roman, who just turned 33-years-old and lives in Münster with his family, is a former member of the IMPRS Neuroscience Program in Göttingen. During his PhD, Roman focused on the epigenetic regulation of gene expression during aging, before moving to Ireland for a postdoc where he studied microbiome-brain communication. Roman left academia in 2016, but is still focusing on science communication. However, it is not about microbiomes anymore, but rather about bridging the gap between science and society.

In the interview below Roman speaks about his daily work life at TVV, his fascination about science and why his PhD is useful for his current position. He also has a brave message to young scientists struggling with career decisions: *"If I had problems to choose between two very good alternatives, given one alternative was to "go on like before", my decision making has often worked like this: I will apply, and if I succeed, I will take it.."*

Tell us something about yourself: who you are and what is your scientific background. What did you do in the past and where did you end up now?

R.S. I just turned 33, I live in Münster with my family and I like science in all its wonderful facettes. I studied bioscience in Münster, and then joined the IMPRS Neuroscience in Göttingen where I did my PhD in André Fischer's group on epigenetic regulation of gene expression in aging. After that, I did approximately 3 postdoc years in Cork, Ireland, in John Cryan's lab, studying microbiome-brain communication. Since September 2016, I have been working for the initiative "Tierversuche verstehen" because I am convinced that there is a deep gap between science and society when it comes to this delicate topic and I want to help bridge this gap.



Communicating science to the public is essential to clear up misconceptions and educate people. The initiative "Tierversuche verstehen" is trying to do exactly that.
by Kristin Krause

What fascinates you about science and research?

R.S. The scientific method is the only way of acquiring something like knowledge or truth. And I feel it is most interesting to see how these truths change over time. I like to see how new dogmata arise, and then fall apart again, only because we now know something we didn't know before. Nature's complexity has something beautiful to it and having a look at the inner works only makes it more fascinating. Personally, I really love that moment when you know that for a short time you are the only person in the world with that particular, tiny piece of new knowledge that nobody else knows about (but that you are about to share soon, hopefully).

What does your daily job look like? What kind of challenges do you face? Do you have a routine?

R.S. I don't really have a routine since my daily job is extremely versatile. From researching new topics for our website to engaging in public discussions and organising public events that we take part in. Most of my work is spent on the phone or writing emails, but I also travel a lot to meet with scientists, press officers, and science administrators.

How do you benefit from your gained skills/knowledge during your PhD? Do you miss something about your job in academia?

R.S. For my job, it is key that I know the mechanisms of the academic system and know first hand what it is like to work with lab animals. Also, I need to be able to understand a lot about the biomedical science that we cover and talk about – at least in basic terms. So, I do benefit a lot from my education up to the postdoc phase. What I do miss, if anything at all, is to really be at the forefront of my favorite topic and contribute to generate new knowledge about a specific question and discuss this with other researchers in the field. I always really enjoyed scientific conferences, and I am still going to some, but in a different role obviously.

Did you struggle with your decision to leave academia?

R.S. I think one always has to struggle with major life decisions and it is important to do so. I might as well have had a promising career with my own research. However, here I saw a great opportunity that I needed to seize.

How did you find out what you want to do? Any advice for young scientists on how to proceed with their own career decisions?

R.S. If you want to stay in academia doing your own research then this is exactly what you need to do:

do your own research. For instance, find a topic you are really interested in, one that motivates you. Ideally, this is also a niche that is not too overpopulated with other researchers who you need to compete with. Also, finding a mentor (ideally your supervisor in the early stages) at every step is extremely helpful. If I had to choose between two very good alternatives, given one alternative was to "go on like before", my decision making has often worked like this: I will apply, and if I succeed, I will take it. It's also good to listen to friends and family. For me, private developments factored into my decisions as well.

Last but not least: Would you do it all over again?
R.S. Absolutely. No regrets (yet).

An Interview with Dr. Erika Pearce

BY READ HMADI

Erika Pearce is a director at the Max Planck Institute for Immunobiology and Epigenetics in Freiburg, heading the newly established Department of Immunometabolism (September 2015). Her research focuses on investigating metabolic pathways in immune cells with the aim of targeting these pathways for therapy.

Dr. Pearce studied biology at Cornell University and earned her PhD in cell and molecular biology in 2005. She then completed her postdoctoral research at the University of Pennsylvania, where she studied how cellular metabolic processes govern the immune response to infection and cancer. From 2009 until 2011, she worked as an Assistant Member at the Trudeau Institute. In 2011, she begun a new assistant professorship at the Department of Pathology and Immunology at Washington University School of Medicine in St. Louis.

The Offspring had the chance to chat with Dr. Pearce about her research and her life in Germany as compared to the U.S.

How was the transition from the United States to Germany?
E.P. The transition was not easy. It took some time to adjust to the cultural differences between the two countries, especially when it comes to decision-making. In Germany, decisions seem to take a lot of time and careful consideration in order to make them as risk-free as possible, while in the United States, there is an acceptance of risk, and decisions are made quickly [and] flexibly, as people are influenced more by an entrepreneurial spirit.

Why did you decide to come to Freiburg?
E.P. The director position at the Max Planck Institute in Freiburg was a very appealing position. It offered more secure and generous funding than my previous position, and an opportunity for my family to experience living overseas.

What do you do in the lab?
E.P. In my lab we work on immunometabolism, studying metabolic changes in different immune cells. In fact, immune cells make a great model for research, with many biological readouts and phenotypes. Furthermore, immune cells undergo many metabolic changes in response to infection and cancer, making them particularly interesting for studying changes in metabolism.

Where do you see the field in 10 years?
E.P. We are beginning to understand that most diseases – for example, cancer, obesity, and neurodegenerative diseases, just to name a few – have an immunological component. Since cellular metabolic pathways offer new targets by which to manipulate immune cell function, the field of immunometabolism will definitely boom in the coming years toward developing therapies.

What motivates you as a scientist?
E.P. Curiosity plays an important role in my motivation as a scientist. It is a lot of fun when your job is all about trying to answer interesting questions.

What would you do if you were not a scientist?
E.P. I guess I would be a lawyer. In some ways, being a lawyer is similar to being a scientist. You take some facts as pieces of a puzzle and you bring it all together in order to see the bigger picture.

What are your next steps?
E.P. Definitely more science is coming my way. However, rather than academia, biotech sometimes seems like an interesting option.

What advice do you give to PhD students and early scientists?
E.P. Read, read, read. Often new students haven't gone back to understand the previous work in their area of research. Also, when you feel untethered and you are running around like a headless chicken, just take a step back, plan a simple experiment from A to Z, and do it well. Never underestimate the importance of small solid experiments in building new ideas and moving forward with the project.

One thing you cannot live without, inside and outside the lab.
E.P. My family and children. And, of course, my dog!

What is your favorite show?
E.P. Breaking Bad. I like how the show is divided between Walter White and Jesse Pinkman, and which side you want to take.

New initiative "Bar of Science", A Huge Success

Max Planck scientists discussed science at five different locations in Frankfurt

BY ARJAN VINK AND VINODH ILANGOVAN

On June 27 and 28, seven scientists from the Frankfurt-based Max Planck Institute for Brain Research brought neuroscience closer to the people by hosting eight lectures at five different bars and cafés in the Frankfurt region. The organisers of the Bar of Science event, Dr. Or Shahar (postdoc in the Schuman Department) and Dr. Arjan Vink (MPI's public relations and outreach officer), aimed to have people meet MPI-scientists and discuss science in cool locations outside of the institute.

The postdocs and and research group leaders gave 20-minute talks (both in German and English to attract a broader audience), in which they spoke about various themes in neuroscience, including learning and memory, microscopy, camouflage behaviour, selective attention, brain evolution and local protein synthesis. All speakers were open to discuss (neuro)science with the participants. Each bar was visited by 15 to 30 people, strongly depending on the location. The participants were very enthusiastic about the presentations and fully supported the idea. In addition, the speakers mentioned that it was a valuable experience and a lot of fun for them to present science to an audience of laymen, and in a more casual location outside of the institute. The organisers were very happy with the event and will aim to organise another Bar of Science event sometime next year.

HanseHUB Meeting in Plön

BY ALINA JESCHKE

On a sunny Saturday in the second week of June, groups of curious people were sighted wandering through the little town of Plön in Schleswig-Holstein. What might have looked like a conspiracy to the Plöners were actually doctoral researchers from the MPIs Meteorology, Structure and Dynamics of Matter, Comparative and International Private Law (all in Hamburg) and Plasma Physics (Greifswald). They were headed to one of the more remote MPIs, meeting their fellow PhD candidates to learn about Evolutionary Biology and talk about science over *Beer and Bratwurst.*

The day started with an introductory lecture by Plön's PhD representative Alina Jeschke, where guests learned about the lakes surrounding the institute – which is not a coincidence. The institute started off 125 years ago as a "Biological Station", investigating and characterizing the animals and plants living in the lakes around Plön. The scientists there learned about the different projects and questions addressed and the methods used for this research. For instance, using a fish and tapeworm model to answer questions about parasite life cycles. Other questions of study include how wild mice can be used as models to identify the genetic basis of personality? Why a marine mosquito loves the moon and what this tells us about biological clocks? How to answer biological questions, such as the dynamics of blood cancer, using mathematical models and computation? What a unicellular algae can teach us about the evolution of viruses, and many more.

With a lot of input to process, the audience was sent out in groups to examine some of the biological models and experiments live and close-up. It is a wonderful thing to tell students from other fields about our own work. With most of the guests being physicists, the biological approaches and systems were new to most; however this seemed to only increase their curiosity. It appeared as though everyone wanted to see and hear everything they could about the science presented to them, soaking up the new information and forgetting that they were already hungry for a barbeque.

While a few brave people dared to swim in the lake, everyone else stocked up for a laid-back barbeque on the institute's cafeteria terrace. So when the grill was finally hot and the Aldi-store emptied of all sausages, bread and salad, there seemed to be a hungry buzz like a beehive, which slowly calmed as stomachs filled. What a perfect use of a long and mild summer night – socializing over a beer with the people from other institutes, who are just as science-crazy as we are, sharing stories of things we have never heard of.

The HanseHUB is currently made up of the MPIs in Hamburg, Bremen, Plön and Greifswald. We meet every couple of months in one of the institutes and combine science with socializing. If you are from another northern MPI (you define what "northern" is ;) and want to be part of the HUB, contact hub coordinator Leo Borchert (leonard.borchert@mpimet.mpg.de) or Alina Jeschke (jeschke@evolbio.mpg.de)– the more people, the more fun!

The Mental Health of PhD Candidates

BY YORICK PETERSE

From August 31st to September 2nd 2017, the Max Planck Symposium for Alumni and Early Career Researchers (MPSAESCR) took place in Berlin. Its primary aim was to connect alumni and early career researchers from all over the world, and to provide an environment to discuss with and learn from each other. There was also the opportunity to be informed about specific topics in a range of networking sessions and workshops. Yorick Peterse and Maria Eichel of the Offspring Group hosted a workshop on "Improving the Mental Health of Employees", which focused on the work situation for PhD candidates. The rest of this article will recapture the core facts on mental health of PhD candidates that were mentioned during the workshop, and more importantly, the measures that the attendees came up with to improve working conditions. Click on the following respective links if you want to read more about the MPSAECR or the Max Planck Alumni Association (MPAA).

Some facts about mental health disorders

As many as one in three people will suffer from any mental health disorder at one point in their life. The form in which this occurs can differ widely, with mood and anxiety disorders being the most common psychiatric illnesses, but with significant contributions of other illnesses such as schizophrenia, autism spectrum disorders, eating disorders and substance (ab)use or addiction. Even though these disorders are rarely lethal, they cause a very high morbidity for the people suffering from them. In fact, seven out of twenty of the world's leading disabling conditions are neuropsychiatric disorders. A high level of disability inevitably means a high economic burden for society, and in 2013 the cost of psychiatric disorders for the US economy was estimated at 201 billion dollars. An important note is, that here we are still only talking about officially diagnosed illness. To fulfill the criteria for diagnosis with a mental health disorder, a minimum number of symptoms with a certain minimum duration have to be met. However, if someone experiences fewer symptoms, or for a shorter period of time, this of course does not mean that this person does not suffer, or is unimpaired in performing their daily activities. Generally speaking, people suffering from mental health issues are at increased risk for developing a full mental health disorder later.

Image at DrAfter123 /istock

Mental health issues in academia

In recent years, mental health on the work floor has been an increasingly trending topic in the media, and several big companies have started to pay attention to this aspect. The direct and indirect economic costs mentioned above should be enough to explain why – (partially) impaired employees will lead to impaired productivity. Just in the past year, several reports specific for the situation in academia have come out. One British report concluded that 37% of people working in academia suffer from a mental health disorder, and that many more suffered from psychological distress. The lack of job security, high work demands, and lack of support by management were found to be particularly stressful factors. A Belgian study specific for PhD students found that 52% of PhD students experienced psychological distress, and 32% were at very high risk for developing a mental health illness. Compared to three control groups: people who are also highly educated, people who are highly educated and who have a demanding job, and higher education students, this risk was respectively 2.43, 2.84 and 1.85 times higher. This indicates that there are factors specific to doing a PhD that result in a particularly bad situation for maintaining good mental health. Factors identified in the study included work–family conflict, job demands, family–work conflict, job control, leadership style (by the supervisor) and closed decision making.

The workshop

The group of workshop participants consisted of both alumni and early career researchers. They were divided into small groups and asked to discuss the situations they confronted while doing their PhD, and to identify stressful and positive aspects. After this, the main aim of the workshop was performed: formulating concrete measures that can be taken to improve and relief the stressful work conditions for PhDs. The proposed solutions are listed in the table below, together with the categories of problematic work conditions. Many of the stressful aspects that came up had to do with supervision. Among the mentioned situations were projects that had not been properly defined, too much work that needed to be completed in too little time, and a supervisor that was either not involved, or too controlling. The proposed solutions were defining a detailed PhD plan at the start of the PhD, which includes alternatives if research is not going as planned. Additionally, limiting the number of PhD candidates per supervisor, having mandatory regular meetings with the supervisor and providing leadership training to PhD supervisors was proposed.

Moreover, satisfaction of candidates that have completed their PhD with their former supervisor could be monitored, to avoid failing supervisors to continue with other PhD candidates, and to help supervisors improve their management style.

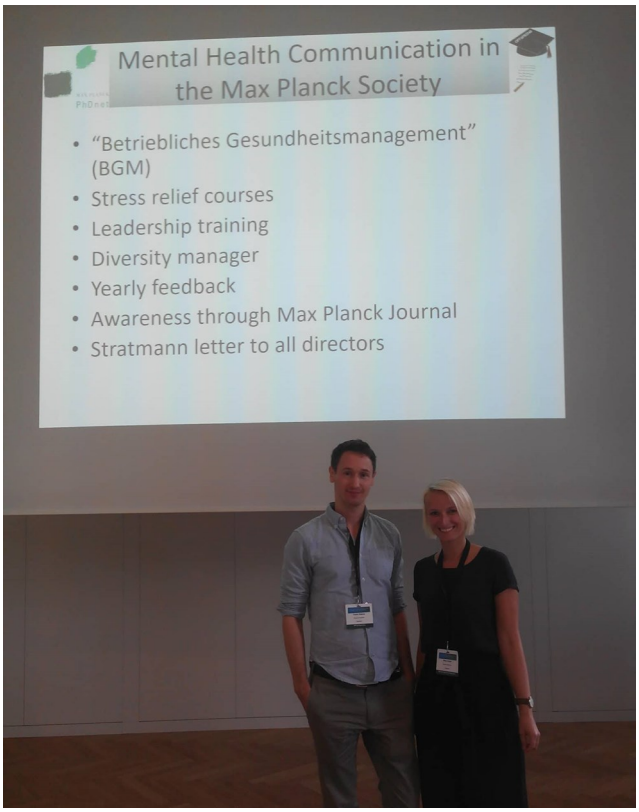
A second category of stressful aspects of doctoral research is the high level of job insecurity. The expected statements about low salaries were made, but most importantly the offering of multiple short-term contracts, despite knowing a PhD project will take several years to complete, was considered to be particularly stressful. Also the lack of an overview of career perspectives inside, and particularly outside of, academia was listed. Project-based PhD funding, where the completion of research and publishable results, rather than a time-period, is the determining factor, was mentioned as a solution. Also, providing a career-service for PhD candidates and other early-career researchers was recommended.

Generally, work demand for PhD candidates was considered high, with a high number of working hours, working on the weekends, and pressure to deliver publications and to compete with other researchers. Interestingly, the proposed measures were not necessarily changing these aspects (although closing research institutes entirely on the weekend was proposed), but focused more on providing the means to relieve the stress caused by these aspects. Mentioned solutions were mandatory work breaks, and free stress-relief courses provided by the institutes.

Some aspects of the administrative and material support were mentioned as distressing factors, e.g. in case of slow and complicated administrative processes to conduct research, or materials being unavailable. Apart from minimizing these issues, it was suggested to pay more attention to mental health issues during mdical check-ups, and to make sure quick-guides are available on where people can find psychological help, or on how to recognize mental health issues in themselves. Particular attention should be paid to non-German employees, that can experience problems finding appropriate assistance in English or a different language.

The workshop participants agreed that the aspects of planning a family and work-family balance, were crucially stressful aspects during the PhD phase of their career. However, since a lot of effort is currently being made to improve this situation in the Max Planck Society, they did not focus on proposing additional measures to the existing family-support programs.

Finally, several aspects of the social environment were identified. In the first place, contact with other PhD candidates and researchers was considered crucial for an environment to make friends, and to discuss problems that specifically occur in doctoral research situations. Secondary, the need for an open communication about mental health issues was considered crucial , as well as the need to de-normalize the occurrence of mental health problems while working in science. Solutions include setting up a structured social program for new PhD candidates, organizing social events (e.g. department-wise) and committing to awareness initiatives, such as the Awareness Months. Additionally, it should be stimulated that sick days can also apply to “mental health days”.



Yorick Peterse and Maria Eichel hosted the “Improving the Mental Health of Employees” workshop at this year’s MPSAESCR

Problem category	Examples of stressful aspects	Concrete solutions
Support / supervision	• Unrealistic time planning • No concrete plan for PhD • No plan B, if initial plan fails • Lack of involvement by supervisor • Lack of independence (too much control by supervisor) • No constructive feedback	• Definition of a clear PhD plan, with goals, alternatives, and a realistic time path • Limiting the number of allowed PhD students per supervisor (e.g. max. 4) • Mandatory interval meetings between supervisor and PhD • Mandatory management / leadership training for supervisors • Monitoring of outgoing-PhD satisfaction levels with supervisors
Job / financial security	• Low payment • Lack of security (i.e. no extension given) • Unclear view of career perspectives respecially non-academic)	• Increase of PhD salaries • A contract duration that is more dependent on actual project duration • A career service
Work demands	• High number of working hours • Expectation to publish in limited time period	• Stress-relief breaks at work • Stress-relief courses provided by institutes
Administrative and material support	• Administrative hurdles for conducting research • Lack of research supplies • Difficulty for non-German PhDs	• Inclusion of mental health in medical check-ups • Free psychological support • Guide on how and where to find psychological support, also for non-German speakers • Minimization of administrative hurdles for conducting research
Work-family balance	• Too little money to support family • No space in apartment for a family • Contract duration too short to make secure plans	• Elaboration of the family-support structures
Social environment	• Social isolation • Lack of contact with experienced PhDs or postdocs • Normalization of mental health symptoms	• Student peer groups • Regular social events • Awareness initiatives (for mental health, but also for other minorities, which are at increased risk) • Mental health days

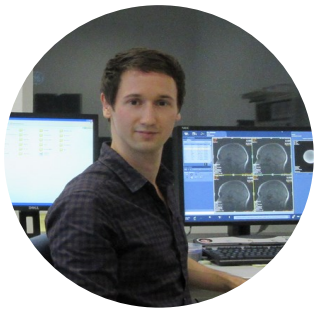
In conclusion, the workshop participants provided some concrete measures that can be taken by any research institution to reduce the stressful aspects of performing doctoral research, and we hope that this will inspire institutes to make some necessary changes. For any individual researcher, it remains crucial to contribute to an open communication about the mental health aspect of work, and to seek assistance when needed. There are many sources of information, or platforms to share experiences, available online. For instance, have a look at the Academic Mental Health Collective (AMHC).

If you want to have more information about the workshop, feel free to contact the organizers, or listen to the podcast, which will be published later on this year on the PhD Career Stories.

Meeting the Editorial Team

Alina Jeschke is a second-year doctoral researcher at the Max Planck Institute for Evolutionary Biology in Plön. She studied biochemistry and molecular biology in Kiel and Berlin and is currently working on meiotic recombination and genome instability in mammals. She enjoys sports and time spent outside, playing indoor volleyball and beach volleyball, but loves a cosy winter night with a cup of coffee and a good book just as much.

Yorick Peterse is a biomedical researcher and psychologist, specialized in mental health and neuroscience. He performed his education in Leiden, the Netherlands, and in London, and did a doctoral research project at the Max Planck Institute of Psychiatry in Munich. He enjoys communicating science to a wider public than the direct peers, and is interested in raising awareness on a range of topics. Apart from science and science communication, he is interested in literature, art, travelling, and having a beer and a laugh with friends.



Ana Rita da Costa is a doctoral researcher at the Max Planck Institute for Infection Biology in Berlin and a student of the International Max Planck Research School. Ana, originally from Portugal, focuses her studies on understanding the metabolic relationship between the host cell and the sexually transmitted bacteria, *Chlamydia trachomatis*. When not in the lab, Ana is organizing networking events, travelling or hanging out with friends, but mostly she is enjoying what the great city of Berlin has to offer.

Maria Eichel is a doctoral researcher at the Max Planck Institute of Experimental Medicine in Göttingen. Maria focuses her studies on the communication between glial cells and axons within the central and peripheral nervous system. Outside the lab she is also interested in science communication and joined the Offspring to contribute to a broader knowledge of career opportunities for young researchers. In her spare time Maria enjoys to read a good book with a hot cup of tea, loves to travel, meet friends for a beer and binge watch TV series.

Raed Hmadi is a third year doctoral researcher at the Max Planck Institute for Immunobiology and Epigenetics in Freiburg. He studied Molecular Biology in Lebanon. Currently, Raed is studying the process of dosage compensation, particularly X Chromosome Inactivation, in female mammals, using mouse embryonic stem cells as a model. Outside the lab, Raed is involved in sports and biking. He enjoys drinking coffee and baking with friends.

Mayank Chugh is a doctoral researcher at the Center for Plant Molecular Biology (ZMBP), University of Tübingen. Mayank joined his doctorate as an International Max Planck Research Fellow at Max Planck for Developmental Biology, Tübingen. Mayank is interested in developmental genetics and during his Ph.D., he is expanding this fondness to single-molecule biophysics to paint an interdisciplinary picture of developmental phenomena and processes. When not in lab., he is photographing, travelling, reading, partying, or cooking and baking in his kitchen.

Renee Hartig is a second year doctoral researcher at the Max Planck Institute for Biological Cybernetics and Centre for Integrative Neuroscience in Tübingen. Hartig, originally from New York, moved to Germany in 2013 to complete a Master Degree in Neural & Behavioural Sciences at the Graduate Training Centre of Neuroscience at Tübingen University. She works in the Functional and Comparative Neuroanatomy Laboratory of Dr. Henry Evrard studying visceral and interoceptive sensory processing in primates. She spends her personal time wisely by traveling, blogging, teaching, and organizing events to promote public awareness of various neuroscience-related topics.

Matthew HK Cheng is a doctoral researcher at the Interfaculty Institute for Biochemistry at Universität Tübingen and the International Max Planck Research School. Driven by his love for RNA biology, he is currently studying the potential for an RNA-binding protein to influence the aggregation and function of polyglutamine-containing proteins. He comes to Germany after completing his Master's thesis at the University of Toronto in Canada. Aside from science, Matthew is likely found exploring the visual arts, playing music, or on an ice-hockey rink.

Leonard Borchert is a third year doctoral researcher at the Institute for Oceanography at Universität Hamburg and the IMPRS on Earth System Modelling. While his research revolves around the non-stationarity of decadal temperature predictions in the North Atlantic region, he is also passionate about science politics and networking. He fulfills these passions as the 2017 Spokesperson of the Max Planck PhDnet. Aside from the Lab (which, in his case, is a supercomputer) or the phone coordinating PhDnet activities, Leo is likely to be found playing Football – the European kind – or Squash, reading, or travelling the world.

Vinodh Ilangovan is an early career research fellow at department of Genes and Behavior, Max Planck Institute for Biophysical Chemistry, Goettingen. He studies circadian clocks and sleep using an integrative approach by combining molecular genetics, neural circuits, animal behavior and evolutionary biology. He is also a Max Planck Open Access Ambassador and strongly advocates for the practice of responsible behaviors in scientific research. Vinodh enjoys experimenting with science communication through performing arts. He occasionally writes poetry in Tamil. He uses Indian stringed instrument Yaazh Veenai and rhythmic percussion of Parai as therapeutic tools to overcome exhaustion.

Kristin Krause is a doctoral researcher at the Max Planck Institute for Plant Breeding Research in Cologne and is part of the International Max Planck Research School. She studied molecular biotechnology and plant biology in Heidelberg (DE) and Uppsala (SE), respectively. Lead by her strong interest in epigenetics, she is presently investigating how Polycomb group proteins are recruited to specific target loci where they assume an integral role in the execution of transcriptional regulation. Apart from research, she enjoys travelling, never leaving her camera behind, creative work like painting, hanging out with friends, or just a good book.