Editorial: Insane(ly beautiful) in the Membrane

The brain is beautiful. From single cells to the sulci and gyri on an MRI, there is a lot to admire. In this issue of the newsletter, we dive into neuroaesthetics, an exciting field studying how beauty is created, understood and valued by the brain. To start things off, why not take a short primer course (page 3), or hear about it straight from the source: scientists working at the Max Planck Institute for Empirical Aesthetics (pages 8-11)? We also take a look at whether beauty is only skin-deep literally (pages 15 and 17) and figuratively (pages 13 and 18-19), and how a pretty face (or not...) impacts your chances in life and academia (pages 5 and 12). Do art and beauty always go hand in hand (pages 16-17 and 20)? What if drugs get into the mixture (page 21)?

As part of a recent scientific writing workshop, we are trying to give the newsletter a ‘makeover’. For this purpose we want to hear from YOU, dear readers! See our survey on the next page, give us your best elevator pitch (page 21) or get involved with writing or editing. On this note, a huge shout-out to new author Nina Stöberl, whose story on page 14 and beautiful image of the neuromuscular junction provided our cover art! Most importantly, we want to cover more topics that are directly relevant to our audience, to that end check out our great front-line reporting and critique on Charité PhD life (pages 22-24).

This issue, we are excited to welcome four new members of our proofreading and editorial team: Bettina Schmerl, Aarti Swaminathan, Malika Renz and Zara Khan. Unfortunately, we also have some sad news as well: Helge, one of co-editors-in-chief is about to finish his PhD, and will transition into the exciting and glamorous world of consulting. Thanks for everything Helge, and thanks for all of your hard work for the newsletter! Replacing Helge and joining Constance as the new EIC is Claudia Willmes, an alumna of AG Eickholt and Schmitz and current editor of our blog. We look forward to working with Claudia and expanding our presence both on the web and the written page.

Beautifully yours,

Constance Holman & Helge Hasselmann
Co-editors-in-chief

Contest

Like what you see? Interested in contributing? We are always looking for new authors and submission on anything related to the topic of neuroscience. Send us an article, some beautiful shots from your microscope, poems, short stories, critiques, reviews-anything! The best contribution will be rewarded with the book Welcome To Your Brain by Sandra Aamodt and Sam Wang.

Come on and write like there’s no tomorrow! Send your contribution to cns-newsletter@charite.de to win. Deadline for submission for the next issue is May 4th, 2018.

This issue’s winner is Alex Masurovsky, who gave us a brilliant first-hand account of neuroaesthetics research in Berlin. The “Golden Neuron Award” for bad wordplay and puns goes to our departing editor, Helge, for the title of the editorial.

Congratulations, and thank you very much for your contributions! http://bit.ly/1bVOQlB
A Makeover for the Newsletter?

Shortly before the winter holidays, the CNS newsletter team had the privilege to attend a scientific writing workshop hosted by Dr. Jochen Müller, a neuroscientist now working in consulting and scientific communication. Together with Jochen, we critically evaluated the last few issues of the newsletter and talked about ways in which we can expand our readership.

Although the CNS newsletter is a 100% volunteer-driven initiative, we still pride ourselves on trying to produce stories that are informative, original, and educational, even if readers don’t have a background in neuroscience. As Jochen pointed out, one of our strengths is covering a topic - for example Neuroaesthetics - from a variety of different angles. However, we were encouraged to move beyond purely covering “textbook-style” knowledge, and delve deeper into stories where we can provide a unique perspective.

To this end, we are going to try and write more about our number one area of expertise: being neuroscience students in Berlin! For example, in this issue, we have collected on-the-ground interviews with students (page 18), as well as covering advice on how to find a career entry after graduation (page 24), and taking a long, critical look at funding schemes for PhDs (page 22).

For upcoming issues, we have some new and interesting article types up our sleeve: “behind-the-scenes” of scientific discoveries in Berlin, critiques of neuroscience in books and on TV, debates on Big Questions of the field, and so much more. We’re really looking forward to sharing it with you!

A key part of our strategy to improve the newsletter depends on finding out more about YOU, dear reader. Please fill out a short reader survey (see link and QR code, below). It will help us to plan our future issues, and it takes less than five minutes!

Constance Holman
(on behalf of the CNS newsletter editorial team)

Link to Reader Survey:
https://goo.gl/forms/CV0rDaM20m1ecSOk2

Learn more about Dr. Müller’s work and writing philosophy here: http://www.jochen-mueller.net/

Basics of Neuroaesthetics
The concept of aesthetics is about beauty. Neuroaesthetics is a discipline within cognitive neuroscience that is concerned with understanding the biological bases of aesthetic experiences. This means researchers in the field of neuroaesthetics want to find out how the experience of art is processed in our brain. The term “neuroaesthetics” was introduced in 1999 by Semir Zeki, bringing together different scientific fields, such as psychology, neuroscience and human evolution [1]. Most of the research done within the past twenty years consists of functional imaging studies of the brain. These studies showed that visual works of art activate specific brain regions that are important for emotions and reward-related processes [2]. This might be an explanation why we can perceive art as beautiful. Neuroaesthetics is a growing discipline and broadens up. New approaches explore specific forms of art, like music, but some researchers are also interested in changes in aesthetic experience in disorders such as dementia [3].

The Association of Neuroaesthetics
The association of neuroaesthetics (AoN) is a platform aiming to cultivate the interdisciplinary efforts in the field of neuroaesthetics and to encourage a cooperation between arts and cognitive sciences. The AoN e.V. is a non-profit organization founded in 2008 in Berlin by neurosurgeon Alexander Abbushi in collaboration with the Charité and a group of leading international neuroscientists and curators from Paris, Munich and London. The association has organized a number of symposia and talk series, inviting both artists and neuroscientists for an interdisciplinary crosstalk. More information can be found on their website: http://aon.neurobureau.org.

Criticism on Neuroaesthetics
Neuroaesthetics emerged to its own research field in the neurosciences. But critics say that the discipline of neuroscience, which looks at events in the brain of individual people and cannot do more than describe and analyze them, may be the wrong empirical science for understanding art [9]. A fundamental question occurs when studying the aesthetic experience of art and how it is processed in our brain. How to define art and beauty? Beauty is not a scientific concept and a universal accepted definition is missing. Aesthetic experience is partly a question of culture and circumstance, and not a fundamental quality of the brain [10]. Researchers in the field of neuroaesthetics try to answer the question of how we perceive art and its beauty. We will see if they overcome the critics and find the explanations.

The Art Part: Mark Stephen Smith
Mark Stephen Smith is Associate Professor at Austin College in Sherman, Texas, but probably better known for his art. He is one example of a growing number of contemporary artists who create a convergence of science and paintings. His works explore fundamental visual analogies between neural functions and self-expression in abstract art. He tries to merge his interest in scientific processes with his dedication to abstract paintings. Smith describes his paintings as a “malagamation of science, technology and my own hand”. Smith’s work has been exhibited at many museums, including the Dallas Museum of Art and Grace Borngicht Gallery in New York. His recent series of works is called “Quantum States” and is inspired by theoretical physics [8].

The Science Part: Semir Zeki
Semir Zeki is Professor of Neuroaesthetics at UCL London and introduced the term “neuroaesthetics” as a neurobiological definition of art. His research focuses on the study of the visual brain, its organization and its functioning in health and in disease [4]. Within the last thirty years, he made many important findings for our understanding of the visual pathway [5,6]. More recently, he showed interest in the impact of visual arts on our brain. As we need our eyes to perceive the visual arts, his own groundwork may lead to a more profound understanding of aesthetic experience. Zeki started to investigate the experience of beauty derived from different emotions, such as sorrow and joy [7].

7. Ishizu and Zeki, Hum Brain Mapp, 2017
10. http://ip.nature.com/2Ifg4x/
Eye Candy: Beauty Under The Microscope

“I have a friend who’s an artist and has sometimes taken a view which I don’t agree with very well. He’ll hold up a flower and say “look how beautiful it is,” and I’ll agree. Then he says “I as an artist can see how beautiful this is but you, as a scientist, take this all apart and it becomes a dull thing,” and I think that he’s kind of nutty. First of all, the beauty that he sees is available to other people and to me, I believe. Although I may not be quite as refined artistically as he is... I can appreciate the beauty of a flower. At the same time, I see much more about the flower than he sees. I could imagine the cells in there, the complicated actions inside, which also have a beauty... It adds a question: does this aesthetic sense also exist in the lower forms? Why is it aesthetic? All kinds of interesting questions which the science knowledge only adds to the excitement, the mystery and the awe of a flower. It only adds. I don’t understand how it subtracts.” – Richard Feynman

Ever since Robert Hooke first wrote an elegant description of pieces of cork he observed under a microscope [1] to the advent of cutting-edge microscopes and digital imaging competitions, microscopic images have always piqued our interest. Microscopes have traditionally been taken as instruments for creating empirical knowledge about the molecular or sub-molecular realm. However, every so often images show up that encapsulate the art of science in such a crazy manner that one can’t help but admire the beauty of the image as much as the information that it conveys. When it comes to communicating, science is no different than other fields: A picture is worth a thousand words. (Don’t you lie: Almost everyone starts reading the paper by looking at the figures and then deciding whether the paper is worth reading further).

Needless to say that context is king. What is stunning and incredibly informative for the scientist may not be as visually appealing for the average viewer. For the general audience, the images may become inspiring when they understand and care about the narrative. This can also be true when the images follow the principles of design and composition that are deemed attractive across visual imagery. Sometimes an accompanying description of how difficult it was to acquire the image may increase the audience’s appreciation, but this is not a sure-fire recipe for stimulating interest [2].

Having said that, microscopy is a form of exploration and the process of acquiring images is not always a walk in the park. Imaging experiments do not always lend spectacular results and fail quite often. But when they do, the end result is ah-mazing! Without further ado, here is a sample of some stunning images sampled from famous annual imaging contests such as Photomicrography Competition by Olympus Small World [3] and International Digital Imaging Competition by Nikon Small World [4]. Many of these images were winners in the past competitions.

Imaging contests are not the only place to look for breathtaking scientific images. Over the past year, one of the grad students at MIT started a magazine called Interstellate to showcase images often (but not always) taken from failed experiments [5]. All of these images – be it from photomicrography competitions, published results or failed experiments – are some serious eye candy and the first time I looked at them, I remember becoming impatient to book a slot for confocal microscopy and channel some of Hooke’s fascination. Indulge!

References

Image captions:
1. Mouse embryonic fibroblasts showing actin filaments (red), mitochondria (green) and DNA (blue) (x40). Technique involved: Structured illumination microscopy (SIM) fluorescence. (credits: Dr. Dylan Burnett, National Institute of Health, USA) [6]
2. Individually labeled axons in an embryonic chick ciliary ganglion (x20). Technique involved: confocal microscopy, tissue clearing, brainbow (credits: Dr. Ryo Egawa, Nara University, Japan) [7]
3. Newborn rat cochleae with sensory hair cells (green) and spiral ganglion neurons (red) (x40). Techniques involved: Confocal microscopy (credits: Dr. Michael Perny, University of Bern, Switzerland) [7]
4. Ganglion cells expressing fluorescent proteins in a mouse retina (x40). Techniques involved: Confocal microscopy, large image stitching (credits: Dr. Kyeunyoung Kim, Wonkyu Ju and Mark Ellisman, National Center for Microscopy and Imaging Research, Department of Ophthalmology, University of California, San Diego, USA) [7]
5. Hippocampal neurons labeled with soluble tdTomato (credits: Christoph Straub, Harvard university, USA) [8]
6. Illustration of fiber tracts using diffusion MRI tractography. Trajectories are coloured according to their direction of travel; red: left-right, green: front-back, blue: up-down. Techniques involved: MRI tractography. (credits: Alexander Leemans, University Medical Center, The Netherlands) [9]
7. 3D-STORM image of an axonal growth cone labeled for actin (depth-color code). Technique involved: 3D-STORM (credits: Christophe Leteier, Marseille University, France) [10]
8. Section of the cerebellum (in a brain) stained for Purkinje cells (red) and nuclei (blue) (x40). Technique involved: Confocal microscopy (credits: Dr. Marc Leushacke, ASTAR Institute of Medical Biology, Singapore) [14]
9. Following a two-day induction protocol, Stem cell-derived Ngn2-accelerated progenitor cells (SNAPl) express neural progenitor cell markers NESTIN (green) and PAR6 (red) and form neural rosettes in culture. Nuclei are stained with DAPI (blue) (credits: Dr. Michael F. Wells, Broad Institute, Harvard University, USA) [11]
10. Fast flow motor neurons of abdominal ganglion 2 in the Louisiana and swamp crayfish. The ganglion was visualized with a cobalt backfill of nerve 3 of abdominal ganglion and precipitated with ammonium sulfide (credits: Dr. Zen Faulkes, University of Texas Rio Grande Valley, USA) [5]
11. Mouse hippocampus depicting cells activated during the acquisition of a fear memory (cfos driven ChR2-eYFP) (credits: Joseph Zaki, Harvard University, USA) [12]
Sexy and He Knows It – Evolutionary Aspects of Beauty

Beyond the varying societal definitions of beauty, there is one likely common denominator: beauty makes life easier. For example, several studies have shown that beautiful people are ascribed more positive characteristics such as intelligence [1] and even more astounding spend less time in jail when found guilty [2]. The deeper you dig, it seems, the more ludicrous (or scary) the advantages become. According to a recent and still unpublished study, physical attractiveness ranks second only to individual notoriety and familiarity when it comes to determining success in German politics [3]!

So attractiveness is not something that exists in a vacuum – on the contrary, it seems difficult to exaggerate its personal consequences. For individuals, it pays off to be attractive or to cater to society’s ideals thereof. This means that there is a substantial evolutionary benefit to being beautiful – among biologists, it probably does not need spelling out why attractive people are more likely to pass on their genes!

Curiously, and somewhat hard to believe, a lot of researchers have dedicated their lives to studying... the downsides of beauty. For example, being beautiful can be a boost for women in non-managerial positions [4]. It seems almost too obvious that some might struggle with the sexist notion that a woman can be both professionally successful and (you might almost say despite being) attractive. A recent review [5] highlights an even more worrying yet often overlooked aspect: if people associate attractiveness with health, does that mean that physicians will take your complaints less seriously when they think you are good-looking? To some extent, it seems so.

Beauty: Nature’s Version of the H-Index

While we do not always agree, there is at least some rudimentary kind of consensus on what is beautiful and what is not. The most common (but not only, as we’ll see below) explanation for this is that we subconsciously rely on beauty as an indicator of desirable traits – health, strength and so on. Attractiveness, or so the theory goes, offers cues that are easily accessible and seem to have been sufficiently predictive in the past (something like nature’s version of the h-index, if you excuse the geeky joke). This seems to apply to the face, in particular. Apparently, the face is not only a mirror to the soul, but also health or sexual fitness [6]. Conceptually, an attractive face can signal two things for both you and long-term your genes: first, a higher genetic quality of your offspring, increasing its chances of survival. Second, it indicates that whoever the bearer of this Adonic face is, they are able to protect you against threats or provide you and your offspring with food.

It is also not too surprising that there is a certain variability in tastes. After all, there are few things that work for everyone and why should it be different for beauty? It is not revolutionary to hypothesize that not only your own attractiveness, but also personality, relationship status, fertility, hormonal levels and much more impact your sense of what is beautiful [6].

Beauty Lies in the Eye of the Beholder – Or Does It?

Interestingly, it is not just humans who work on their tell-tale signs of evolutionary fitness. Across the animal kingdom, Darwin noted several curious occurrences that seemed to run contrary to this theory of natural selection. For example, peacocks carry lush ornamental feathers, which he thought did not make much practical sense for the birds. This laid the grounds for Darwin’s theory of sexual selection, the idea that these feathers existed... simply “because” females liked them. He argued that rather than being intrinsically adaptive (as in showing that its bearer was able to survive despite this self-inflicted handicap), they were a triumph of aesthetics over practicality – something that Darwin’s contemporaries did not take a liking to. A recent book by Yale ornithologist Richard Prum has now given further credence to Darwin’s theory [7]. He argues that the reason why animals (and by extension humans) consider certain characteristics beautiful was because of chance – some animals liked some arbitrary patterns and passed this preference on to their offspring. Evolution and the mechanisms of selection took it from there... Although this is likely an academic armchair battle, it has nonetheless proven influential in understanding these perplexing phenomena.

So what can we take away from evolution, aesthetics and psychology? First, that beauty is probably not in the eye of the beholder. In fact, there is a certain inborn consensus on what is generally considered beautiful and what is not. Second, it is probably true that individuals considered attractive enjoy certain advantages compared to their less endowed counterparts. Third, the jury is still out on why our biases towards beauty exist – is it because handsomeness signals desirable qualities, such as generosity, or is it by chance? In any case, whether or not the underlying reasons for why such preferences have developed over time still hold true in 2018 is quite a different matter.
Beauty and The Art of Perception

Confucius once said wisely “Everything has beauty but not everyone sees it”. It is interesting how Confucius thought beauty is perceived: with the eyes. What are people’s most common answers when asked about what beauty means to them? Initially, they think about physical attributes, especially of other humans. This probably is a consequence of the media’s focus on what a perfect body or face should look like. This especially seems to resonate with teenagers. Ideally, the older you get, the more beauty is also seen in subtle and, as many would probably agree, more valuable things of life. Beauty can mean a warm hot chocolate after a full day of skiing, the rewarding view from the top of a mountain after an energy-sapping five-hour hike or merely the joy a mother feels when she sees her child smile at her while going crazy on a trampoline. Beauty is conveyed by all different modes of perception: looking at something, but also touching, tasting or listening to it.

The “Aesthetic System”

In the early phase, research in neuroaesthetics restricted itself to visual perception. For example, scientists tried to assess the physical properties of human faces in order to find the basic neural mechanisms underlying our brain’s decision that something is beautiful [1, 2]. Key features are average, symmetry and hormones. The first factor that contributes to beauty is average, because it harbors greater genetic diversity and adaptability to the environment. The second factor is symmetry, because developmental abnormalities are often associated with asymmetry, while symmetry is an indicator for health. And the third factor are hormones, because high level of estrogen and testosterone play important roles in shaping features that people find attractive (when we confine ourselves to heterosexual norms).

I personally think that these features are what describes attractiveness and are partly evolutionary pre-determinations of how we consciously choose our life partners. Anyway, let us have a look what happens in the brain: Attractive faces activate a network of areas that range from the back of our brain to the frontal lobes. An area called fusiform gyrus, which is part of our visual cortex and temporal lobe, as well as the lateral occipital complex in the back of the brain are activated. The fusiform gyrus is especially attuned to process faces, while the occipital complex is especially attuned to process objects. In addition, attractive faces activate parts of our reward and pleasure center located in the front and deep in the brain. These areas are the ventral striatum, the orbitofrontal cortex and the ventromedial prefrontal cortex [3].

Since the field of neuroaesthetics is a new but rapidly expanding area, recent studies cover also other art forms, like music and performing art [4], as well as other senses, like smell, taste, hearing and touch. One consistently activated region in response to beautiful stimuli in neuroimaging studies was the anterior insula [5]. This small neural area that sits deep within the lateral sulcus of the cerebral cortex is implicated in a wide range of subjective feelings based on interoception, from cigarette craving to maternal love and, as the term interoception implies, integrates bodily sensations. Since tasting a favorite meal, listening to Beethoven’s Symphony No. 9 or looking at visually appealing art have all effects on the body, it is not surprising that a region that is meant to give feedback on how much an experience satisfies the physiological needs can also be part of an “aesthetic system” in the brain.

Things that Matter

Interestingly, the sense of beauty seems to require activation in the brain’s reward system. Thus, the brain’s output is a pleased feeling that we sense when we perceive beauty. Sadly, we choose quite often to be blind to beauty because of distraction, worry and daily stress. But it would be very beneficial for each of us to actively predispose ourselves to embrace beauty. Whatever it means for the individual, beauty means happiness at the end. And the good thing is, you decide what’s beautiful, because - if you allow me to adjust the popular saying - beauty is in the brain of the beholder.

Anahita Poshtiban
PhD Student, AG Plested

Does Beauty Lie in The Face?

As the saying goes, ‘beauty is only skin-deep’. However, many times we cannot help but fall for an attractive face: the first impressions of a person do create an impact on our minds. What is considered ‘beautiful’? Are there features of faces across cultures that people find more attractive?

Facial Symmetry

According to researchers, a face is perceived as beautiful if it is symmetrical and represents the average traits of the population. Our eyes recognize symmetrical faces with similar proportions on left and right side of the face. The quest to define a golden standard for a facial feature - for example, the size or shape of the eyes or lips - dates back to antiquity. The Ancient Greeks believed that the essence of beauty lied in the golden ratio of $\frac{1}{\sqrt{5}}$. More recently, researchers have discovered that people find a female face attractive when the distance between the eyes is just under half of the width of the face. They also found that the eye-to-mouth distance should be just over one-third of the height of the face. These two ratios have been termed as the ‘golden ratios’, which correspond to that of an average face [1].

What is the reason behind the choice of such features? This can be explained by two existing theories: one is an evolutionary aspect where humans tend to choose healthy mates with physical characteristics resembling the average population. The other is a cognitive aspect where, due to repeated exposures, we tend to prefer prototypical facial features which are easier to process.

So, are facial preferences based on nature or nurture? Do we have a preference for certain faces as babies? The answer seems to be: yes! Babies of 2-3 months tend to look at attractive faces for longer time than unattractive ones [2]. The perception of attractiveness is also affected by familiarity: Hazda people, hunter-gatherers from Tanzania who have not been exposed to European faces, found the average face of a Hazda more attractive than an European face [3]. But spatial aspects of the face are not the only determinants of attractiveness - sexually dimorphic features like full lips and longer eyelashes also influence what people find attractive [1].

The Power of a Smile

A smile has more powerful influence on people’s perception than facial features or makeup, according to psychologists. People with genuine smiles were seen as healthier and more attractive by virtue of being optimistic and cheerful than people with blank expressions [4,5]. Thus, the secret to healthy appearance and being attractive? Smile!

For the evolutionary basis of beauty, check out Helge’s article on page 5. Given the fact that there is an innate bias inside all of us towards ‘beautiful’ faces, it is even more important for us to think twice before making judgements on other people based just on their appearances!

Aarti Swaminathan
PhD Student, AG Schmitz

What future humans look like?

It has been predicted that globalization, cultural diffusion and interracial marriages will eventually homogenize the human population, averaging out more and more people’s traits such as hair, eye color, facial features, and eye shape. Dominant traits will be expressed more than recessive traits (which need not one but two copies of the gene to be expressed). In other words, we are going to become a huge amalgamated race!

References

Voices From the Field

Neuroaesthetics has become somewhat of a buzzword that has popped up recently in TED Talks and other popular media. To better understand what it is all about, I made contact with several members of the Einstein Group, a coalition between the Einstein Foundation and the Berlin School of Mind and Brain graduate program at Humboldt-Universität.

Einstein Group post-doctoral researcher Joerg Fingerhut, also the Scientific Director for the Charité’s Association of Neuroaesthetics (AoN) [1], says that neuroaesthetics “started in the late 1990’s, with some claims regarding artists’ ability to excite the brain in specific ways and the idea that the artistic experiments that artists initiated makes them similar to neuroscientists – both explore the human brain in their own ways.” Corinna Kühnapfel, an AoN intern who frequently works with the Einstein Group and recently completed her Bachelor’s thesis on neuroaesthetics at the University of Osnabrück, explains that neuroaesthetics “aims to describe aesthetic experience … by investigating underlying correlates involved in experiencing art using neuroimaging methods. It is a subfield of empirical aesthetics, the scientific study of aesthetic experience.”

Big Questions

According to Jesse Prinz, a philosopher and Einstein Group Visiting Fellow to the Mind and Brain program, ongoing research with the group includes several different projects. In one study, Master’s student Giulia Cabbia is taking physiological measures from people as they look at artworks. In another project, an eye-tracking study by Prinz and Fingerhut, along with doctoral student Antonia Reindl and Japanese collaborator Hideaki Kawabata, which Prinz describes as “a pioneering figure in neuroaesthetics”, investigates whether empty space in an image is more likely to be ignored by Germans and visually explored by viewers in Japan. Finally, a study by Prinz and collaborator Angelika Seidel, investigating how assessments of the quality of artworks relates to perceptions of their size. As Prinz suggests, “Works attributed to master [artists] look bigger!”

Perhaps not surprisingly, the focus of one current Einstein Group collaboration between Prinz, Fingerhut and Aenne Brielmann of NYU is beauty. “Beauty has somewhat received a bad reputation: it does not seem to be important for 21st century art anymore,” says Fingerhut. “We think this is misguided and there is still a lot to learn about the role beauty plays in our experience of art.” Prinz adds that beauty can be part of the equation, “even in work that has been described as anti-aesthetic … we think that neuroscience can play a role in confirming the centrality of beauty to aesthetic experience.”

Cabbia’s physiological study of aesthetic experience “focuses on the role of the body and its relationship with behavioral responses to artworks.” She draws on previous neuroimaging studies that show increased activation in brain regions related to emotion during moments of art appreciation, as well as research that finds people who have difficulty detecting their internal body sensations (interoception) have diminished interest in art [2,3] “The role of interoception in empirical aesthetics hasn’t been investigated yet,” says Cabbia. “By exploring individual differences in how interoceptive accuracy and physiological responses influence aesthetic evaluation, I aim to shed light on highly individualized responses to art.”

Neuroscience, Psychology or Philosophy? Or All of the Above?

Prinz, though a philosopher, considers much of his recent work to be the on psychology of art. “Thus”, he says, “most of my work is behavioral.” He is particularly interested in the importance of wonder: “Wonder has been a neglected emotion, but arises in some of the most distinctively human contexts: art, science and religion. We are showing that wonder has identifiable physiological expressions and working, through this embodied emotion, to understand what makes us human… [and] the profundity of aesthetic experience.”

A current collaborative study between Fingerhut and Katrin Heimann of the University of Aarhus shows viewers video clips of various camera approaches to an object and looks at differences in brain activity. Fingerhut believes this type of study is fundamental. “We have to understand the basic building blocks of our interaction with cultural artifacts, such as architecture, images and movies, before we can move on to more complex theories and experimental settings.”

Kühnapfel, in her bachelor’s thesis, focused primarily on the prospects and limitations of the discipline. “I believe that the power of neuroaesthetics itself, as a neuroscientist inquiry, lies more in finding out about the brain using art, the working of the brain during aesthetic experience, rather than understanding art beyond its visual and objective attributes.”
"In Art, as in Life, Diversity is Key"

“Generally our aim is to engender interdisciplinary research,” says Fingerhut, on the goals of the Einstein Group. “I am a philosopher by training, but we aim to convince philosophers to conduct experiments and collaborate with researchers in other areas. To this end, we invite researchers that are interested in such interdisciplinary work to join us and discuss possible collaborations and paradigms.” Prinz defines himself as a great believer in methodological pluralism: “Brain imaging tells us very little on its own, [but] combined with other approaches, neuroscience can be informative... [and] can help adjudicate on long-standing philosophical debates.”

Our colleagues in the Einstein Group are hard at work on an angle of brain research that they find fundamental to its understanding. “Aesthetic experiences are pervasive in human life...” says Prinz, “they help us decide what to wear in the morning, what to eat, what music to listen to, what television to watch, who to date.” Kühnapfel believes that “neuroaesthetics can use art and aesthetic stimuli to deepen understanding about the human brain and perception in general.” Fingerhut ponders a simple question, with perhaps a not-so-simple answer: “Why do we value art when its value is not immediately obvious value for our lives?”

Alex Masurovsky
M.A. Student, Berlin School of Mind and Brain

[1] For more about the AoN, visit: association-of-neuroaesthetics.org
Empirically Aesthetic? MPI Researchers Weigh In

It’s fascinating to read about big concepts like philosophy and beauty, but what is it like to study them in your daily job? Malika Renz sat down with two researchers from the Max Planck Institute for Empirical Aesthetics to find out.

Pauline Larrouy-Maestri

Pauline, you have a very diverse background – can you tell us how you got into neuroaesthetics?

Yes, I studied music, psychology and pedagogy and worked as a musician and a speech therapist. My PhD was in cognitive psychology, on the singing voice which is of course linked to aesthetics. But aesthetics wasn’t my main focus then – it’s more of a means of looking at how people interact with their environment, at auditory perception and processing. I’ve been working on this as a post-doc here at the MPI for 3 years now.

How do you start with something as vague and mysterious as beauty and end up learning about perception and processing mechanisms?

Suppose you start with the question: what makes something beautiful? Is it the same as being somehow correct? Or interesting? Recently, we’ve been working on pitch accuracy, so let’s take that as an example. Beautiful singing voices or melodies are often associated with being “correct”. Everyone can hear if a performance is in or out of tune - musicians, non-musicians, male, female, young and old - people usually agree on this. So what is it that makes all of us feel that one tone is correct and the other is not? It’s hard to put a label on this, it just sounds right or wrong. Somehow, people must become sensitive to the criteria for a correct melody without ever being aware of it! And we know this holds true not only for music but also for other domains - we learn rules and apply them to make an aesthetic judgment without even noticing.

But if we don’t even notice it – how are we learning those rules?

The brain is made for taking in stimuli and building rules, and thus knowledge from it. It’s similar to how children learn a language, a totally implicit process. To understand language you have to parse the auditory signal - you need to cut it into sensible units and concatenate them in a meaningful way. The same parsing and integrating of course happens in music appreciation as well and it is this process which I am interested in. Aesthetics is my vehicle to study how we learn auditory processing, what the minimal units and the rules of meaningful integration are.

How can you research music appreciation in the lab?

Me, I am doing psychophysics: I manipulate stimuli, I invite people to the lab and ask them to listen to these stimuli. We change single features of tones and ask something like “Which of these sounds is more in tune?”. The resulting data can tell us what differences are perceived and what magnitude of change is needed. That alone reveals a lot about the structure of sounds, its components and their relative importance. This was how we found out that the smallest meaningful units are not single notes – it’s the beginning and the end of a note that matters. Once you find these units and confirm their discerning value, you can play with them: find out how the changes influence the perceived agreeableness or pitch accuracy. And whether people even agree on the direction of effect of a specific parameter.

Pardon my impoliteness, but apart from being fascinating, what use is there in all this?

Aesthetic appreciation of course is very fundamental. Many things are related to what you see and hear, all around you. Interaction with people is about tastes, preferences, about your appreciation of the environment. We all function with that all the time. But we don’t understand the processes behind it very well: we know that the pleasure circuitry is based on automatic processes. For perceiving something as beautiful, however, indirect pathways, such as mediation by thought, are needed. Simply knowing how perception works has a clinical application. If someone has a speech impairment or a difficulty to understand language, is it because they cannot parse? Cannot concatenate? Didn’t learn the appropriate rules? As soon as we have a working model we can tick which box is malfunctioning and focus training or treatment there.

To save the best for last: what was your personal research highlight?

I showed that we are all musicians. Let me explain. For decades, we had in the scientific literature a separation between musicians and non-musicians. It is categorical, but the idea has been around for a while - and it’s nonsense! Take an opera performance. Who goes to the opera? No one does! Only a very small part of the general population, mostly educated people with a musical background or interest. And musicians agree to a very great extent on their judgment of what makes a beautiful opera voice. But here is what I found: people who have no idea what an opera voice is or should be apply the same criteria and come to the same conclusions. So, without ever going to the opera, without any explicit input, we build a representation that creates a link - between you and me, between people who are privileged enough to enjoy operas and those who aren’t. Our learning mechanisms are fundamentally the same and they take whatever they can get from the environment.
Ed Vessel

Ed, why don’t you start by telling us how you got into aesthetics research?

My background is in the visual domain of cognitive science: object recognition and scene perception. My PhD research did not investigate beauty as such, but rather how stimulus-driven pleasure works: how does a beautiful landscape, for example, evoke that wow-effect? Finally, during my post-doc at NYU I cooperated with Gabrielle Starr who focuses on 18th century literature and the philosophical aspects of aesthetics. We began wondering: are we even talking about the same thing? So we launched a series of experiments to advance beyond existing concepts of the neural basis of aesthetics.

What’s your methodological approach to beauty then?

I mostly do fMRI research. During my graduate work, I investigated the more basic processes underlying the perception of beauty - repetition effects, hedonic adaptation, the effect of mere exposure - all atomic, small changes. But beauty, the sublime, is much more complex. Prior studies mostly used categories like beautiful vs. ugly vs. neutral. Nowadays, beauty is no longer seen as the paradigmatic aesthetic emotion. It’s one of many ways people can aesthetically be moved. So as a counter point to the simplistic categorization, we asked people to what degree they are aesthetically moved, allowing for a much more complicated definition of aesthetic experience. And in the scans we found that we were right to do so: there are common systems involved in aesthetic experiences independent of the emotional content of the presented stimuli.

In the visual domain, aren't there things everyone finds beautiful and things only few people like?

In general, people are highly self-consistent but also deeply idiosyncratic. But there are differences in shared preference in different sub-domains: There is a high degree of shared taste for faces and also for landscapes, but very little for artwork and architecture. Since architecture and landscape are both presented as photographs, the medium is not the source of the difference. Rather, the line runs between cultural artifacts and natural kinds. We seem to tap into some shared set of criteria for beauty when judging natural kinds only. Twin studies show that this is not evolutionary driven: otherwise, monozygotic twins would agree more in their aesthetic judgment than dizygotic twins - and they don’t. Throughout life, something about our experience with faces and landscapes leads us to gravitate towards the same features.

While this is fascinating research, one might ask: why bother at all?

Because there is a link between normal sensory experience, including aesthetic experience, and well-being: we see this in sensory deprived people, who are imprisoned, work on an offshore oil rigs or as astronauts. In fact, I cooperated with NASA to develop a framework of the functions of sensory stimulation. They fall into four categories: preserving homeostatic balance, actively releasing stress, information seeking and restoring the capacity for focused attention. Knowing this, the need states of space travelers can be assessed and adequate countermeasures deployed. For the general population, it still holds true that aesthetic experience is a strong drive for curiosity and intrinsic motivation. And damage to the system that usually rewards us for venturing out into the world might be a risk factor for anhedonia, a major factor in depression, schizophrenia and post-traumatic stress disorder (PTSD).

What would you say was your personal research highlight?

We presented people with artwork while recording their fMRI and asked them to rate the art on a scale of 1 to 4. A 1 being “I don’t like it” and a 3, “I really do like it but it doesn’t give me goosebumps”. The mind-blowing artworks get a 4. What we saw was that the activated brain regions fell into clusters. Activation of posterior brain regions are to be expected for a visual task and the activation showed a nice linear correlation with the rating of the artwork. The better you like the art, the higher the posterior activation. It’s well conceivable that this information is fed into the “reward system” and contributes to the attribution of pleasure. In the frontal regions of the brain, we saw a different pattern: a binary coding, where artwork rated 1 to 3 was accompanied by the same activation level. Only when presented with art rated a 4 did the frontal activation increase, a step-wise relation instead of a linear correlation! Hence, two systems are involved: the first operates all the time, working stimulus-driven, whereas the second system only comes online when a stimulus passes the threshold to amazement. Interestingly, the structures of that second system overlap with regions known to be part of the default mode network. The default mode network is associated with mind-wandering, reflection on oneself and internally oriented attention - tasks with an element of self-relevance. At virtually all other times, either the sensory system or the default mode network are active - this is what we see for artwork rated a 1 to 3. Only when looking at art that really moves us are both systems activated simultaneously.

Thank you for these interviews!
Spot On: My Baby has a Haemangioma

We would never ask an adult why they have a wart or pimple, nor would we dare to poke our fingers in their face! Sadly, people seem to forget about this politeness when it comes to babies.

Lately, my son and I have faced many inappropriate encounters with strangers because my son has a “weird red spot” on his forehead, medically known as a haemangioma. A bank employee could not answer my bank-related question but asked me what had happened to my son and whether he had fallen down. A random old lady on the street couldn’t keep her fingers to herself and needed to touch my son’s face! The story goes on and on... I’m getting pretty tired of us being reduced to his spot and downright insulted. I am not sure why this is happening, are people really that concerned? I obviously would not walk around with my baby if the haemangioma were lethal! Are people trying to make conversation? Then they could choose a different topic. Why do strangers feel the need to put their fingers on his haemangioma? Maybe it’s tempting because it is bright red and shaped like a button.

I understand that it is difficult to ignore this cosmetic flaw; I myself had a hard time getting used to it. But whatever the cause might be for strangers forgetting their manners, I would like it to stop. Unfortunately, the haemangioma is hard to conceal and I don’t see why I have to cover the stroller and hide my baby. Also, I am getting tired of explaining what it is. For that purpose, I now keep small information sheets with me that I hand out to nosy strangers.

Don’t forget your manners

It's Hard to Ignore the Comments

Does it matter what others say? Yes, it does! Even though I know I should not listen to them, I still hurt. As I am repeatedly confronted with it, I get the impression that it is impossible to see past that red spot and acknowledge that my son is a beautiful baby. I even find myself wondering if we should let it remove surgically. Originally we decided against it, as neither my husband nor I would go under the knife ourselves because of a simple cosmetic flaw. Why should we expect our child to?

These uncomfortable encounters made me realize that it has become the norm to criticize aspects of our bodies. Whether this is intentional or not, body shaming is everywhere. You find it in every beauty and health magazine, in entertainment shows and even on the news. To prevent a vicious cycle of judgment and self-criticism, the only solution is to surround yourself with those who care about you and like you the way you are. Also, it is important to confront those who perpetuate body shaming and make them aware that they are hurting you. Last, but not least, find different things that you like about your body and be proud of them.

I have some advice for situations where you could potentially insult parents of a newborn: Don’t say anything at all or try to find something that you could compliment, like the babies hair or facial expression. If you are struggling to say anything nice, just smile at the parents and move the conversation along.

Claudia Wilmes
PhD Alumna, AG Eickholt / AG Schmitz

Don’t forget your manners

The Beauty of Science – for Non-Scientists

Or: How a Picture Sticks in Your Family’s Mind

Let me tell you a little story of a birthday brunch at my grandma’s house:

When I finished my Bachelor thesis, I proudly presented a printed copy of my work from the past months to my family. Three generations of non-scientists started to read through my thesis. And it did not take me long to realize that they did not understand it. I knew that my family was proud of my first university degree, even if they never quite understood what I was actually doing. I thought having a printed copy of the research would make things easier. I was wrong. I started to explain the background of the study, when my aunt interrupted me and said: “Darling, what a wonderful picture. What is that?” And with this she showed one of my figures around. Before I could think of an easy explanation, my grandma answered and said: “Isn’t that clear? A picture of roses!” What now? Should I have brought the conversation back to science and explained that these are not roses, but neuromuscular junctions, the connecting synapses between neurons and muscles? Should I have tried to explain that the green branches are the myelin sheath that wrap around neurons and that the figure illustrates remyelination after peripheral nerve injury? I decided to keep quiet and followed my grandma into the garden to take a look at her roses. We did not open my thesis again and the conversation about science was over. At that day I realized that my family does not perceive science as I do, but as least they can also find beauty in it.
The Creative Mind in an Altered State

Everything we feel and see is processed and analyzed by the brain. It is only natural that changes in brain activity change our perception, including our perception of beauty. These changes can result from neurological or psychiatric diseases or use of drugs. Many artists have a long history of mental illness and drug abuse, which ultimately both affect the activity of the brain. So the question is: Does the aesthetic perception change if the mind is affected?

Psychopathology and Creativity Seem to Go Hand in Hand

Some studies found a positive correlation between psychopathology and creativity, particularly for schizophrenia and bipolar disorders [1, 2]. Vincent van Gogh is a famous example of an artist with a history of psychiatric diseases. There are speculations that he might have suffered from schizophrenia, depression, mania, or bipolar disorder [3]. It is still unclear what causes schizophrenia, some studies suggest a link to changes in dopamine, serotonin or glutamate systems, which affect the whole brain [4].

Nevertheless, there are brain regions that play a very important role in creativity. For instance, the frontal lobe plays a crucial role in cognitive functions necessary for creative thinking. A study from the University of Florida looked at artists with frontotemporal dementia. Here, an artist improved her artistic technique during the course of her disease, but the emotional power of her work decreased [5]. The part of the brain that is affected by the disease, typically inhibits regions of the brain responsible for creativity. So when it is damaged, artistic talents can be unleashed.

The Beauty of Drugs

Many artists use drugs to change their state of mind, broaden their imagination, and push themselves to the limits of their creativity. Drugs influence brain activity in a definite way, by affecting specific regions or pathways. In a study published 2016, researchers found that under influence of LSD, regions in the brain that normally do not communicate started doing so. Particularly the visual cortex increases its communication with other brain areas, which could explain the intense and complex hallucinations experienced under LSD [6]. This enhanced communication could also lead to a new perception of beauty as well as a sudden peak in creativity. In addition, drugs such as alcohol that lower inhibition and attentional focus, have a reputation for fostering creative inspiration [7].

Bryan Lewis Saunders, a artist from Washington, DC, is famous for his many self-portraits, he drew some of them under the influence of drugs [8]. The difference between the portraits drawn under the influence of morphine and hashish (see image 1) shows the diverse effects drugs have on the brain. Under hashish, the picture has a positive feeling; Saunders appears happy and seems to be smiling in the picture. On the other hand, the picture drawn on cocaine has a negative, nearly daunting feeling (image 2). The artistic styles are completely different, even though painted by the same artist. It seems that Saunders perception of himself changed according to the influence of the drug he was under. Hashish is a cannabinoid and activates endocannabinoid receptors in the brain. These receptors downregulate neuronal activity and are involved in physiological processes like pain sensation, mood or memory. A well-known effect of hashish is a euphoric, drowsy or sedated sensation as well as a relief of anxiety. Cocaine boost the action of dopamine. Dopamine is important in the reward system, an over activation leads to an attenuation of system and ultimately to the need to take more drugs. Immediate mental effects include loss of contact with reality, an intense feeling of happiness, or agitation.

So did the drugs change Saunders perception of beauty or was he able to unlock certain pathways and let creativity flow more easily? What do we even deem beautiful? If it has taught something to us, it is this notion that the perception of beauty is mostly biased. Altering brain activity might, therefore, very well also change our perception of beauty.

Larissa Kraus
PhD Student, AG Holtkamp

References

Creative - your brain on drugs?
How Stress Gets Under Your Skin

With two square meters surface and 3.6 kg weight, the skin is the largest organ of the human body [1]. As first human organ to develop it represents the first line of communication within the womb. Some experts even call it the “social organ”. Culturally, skin defines our social standard of beauty. Youthful and smooth skin signals health and vitality [2].

The social pressure to be beautiful is used by global skincare markets, which make up a $121 billion industry [3]. According to the American Society of Plastic Surgeons, around 15 million cosmetic procedures were performed in the United States in 2013, 13.4 million of which being minimally invasive including Botox injections and chemical peels [4], with experts predicting an upward trend for the future [5]. Out of all the money spent for beauty, skin products are at the top. Beauty-wise our skin seems to be the most valuable organ to us. After all, it is the first thing people see.

The Deeper Reasons for Skin Problems

Let’s face it! We are skincare addicts. We love the idea that we can just apply aloe vera, jojoba and some Q10 and look young and fresh. We may not know what these ingredients actually do or where they come from, but if the package says it’s anti-aging, it’s worth a try. These products, however, rather treat the symptoms than the cause. We elegantly overlook in our everyday lives that there are causes to our (skin) problems that we could treat if only we cared to look a bit deeper.

During embryonic development, skin cells and cells of the nervous system develop from the same embryonic tissue, the ectoderm [6]. The strong connection between brain and skin is thus not surprising. If you have ever blushed from embarrassment or itched from agitation, you’ve experienced a typical phenotype of the brain-skin-interaction.

A huge contributor of skin problems and diseases is chronic psychological stress. Contrary to common belief, your stress system is absolutely necessary and extremely beneficial to your health. It ensures survival in the face of danger. However, problems start occurring when this system is activated over a long period of time and stress has become chronic [7]. There are several ways in which chronic stress can influence your skin.

Stress changes eating habits. Stress causes “emotional eating”, which refers to eating high-carbohydrate, high-calorie foods with low nutritional value due to emotional stress. Such a diet can lead to acne and impure skin [8].

Stress reduces blood circulation in the skin. During stress, blood accumulates in vital organs providing them with oxygen and energy to allow the body a quick reaction to the stressor. As the skin is not life-saving in most threatening situations, it is less well irrigated and dries out quicker, making it dull and rough [9].

Stress causes an increase in free radicals. Free radicals in high quantities attack the healthy skin cells and destroy their membrane. These cells quickly die, leading to saggy, wrinkly skin and more dark spots [11].

Stress speeds up the ageing process. Not only does stress and worrying provoke wrinkle causing facial expressions like frowning [9]. It also increases cortisol, which degrades collagen (for skin strength) and elastin fibers (for skin elasticity).

Skin conditions. Stress can also aggravate pre-existing skin disorders such as atopic dermatitis, herpes simplex, pruritus (itching) or psoriasis. Many people who suffer from chronic skin disorders report that their symptoms flare up when their stress levels are elevated [6].

The vicious cycle. The stress-related skin conditions can in turn cause psychological distress feeding in a vicious cycle of psychological stress and skin problems. It can be extremely difficult for affected people to break out of this cycle.

This is a lot of bad news for your skin. Does this mean everyone battling with blemished skin or wrinkles needs a therapist? Of course not. Not every skin problem or disease is necessarily stress-related. And there is an obvious flipside to all of this: positive experiences can be beneficial for your skin. An example of this is the famous “love glow”, which is the skin’s response to the release of oxytocin in the brain. Oxytocin is involved in social bonding such as between sexual partners or a mother and her child. It creates a feeling of deep attachment. Oxytocin is thought to reduce the body’s production of cortisol and inflammatory processes in the body that slow healing [12]. More oxytocin potentially leads to fewer skin irritation and may thereby promote the “love glow”.

It is important to recognize these strong interconnections between your brain and your skin, between your internal and external world. Keep in mind that any positive as well as any negative experiences can (quite literally) get under your skin.

The brain and the skin are strongly connected.

[10] Cheh and Uyoga, Inflamm Allergy Drug Targets, 2014
What Can Art Therapy Teach Us About Beauty?

Beauty and the brain are deeply intertwined. But when things go wrong, how can we use aesthetics to help individuals with mental illness or other disabilities? We spoke to practicing art therapist Renate Lutz about her work, and how art and creativity can be used as a powerful tool on the road to healing.

How did you first become interested in becoming an art therapist?
I have loved art since I was a child, and realized that painting for several hours could influence my mood. I often used painting and sketching to express feelings, long before I knew that something like art therapy (AT) existed. After briefly studying languages, and realizing it wasn't for me, my friend introduced me to the art therapy training program.

What kind of training did you have to do to become licensed in Germany?
There are different ways to do it - I chose to do a BA and a MA degree in AT, but it can also be done through an apprenticeship.

Could you please tell us a little bit about where you currently work?
I am currently working in a psychosomatic and psychiatric clinic. There, the patients have AT in a group setting, and some patients can have individual sessions.

What kinds of patients do you work with?
My main specialty is patients with psychosomatic problems. They mainly suffer from anxiety, treatment-resistant depression and psychosomatic symptoms. I also work with patients who suffer from addiction and patients from the psychiatric department who suffer from borderline personality disorder, narcissistic personality disorder and depression.

What types of projects do you work on with your clients? Do you have a favorite medium to work with?
My AT projects are based on resource- and patient-oriented methods with a variety of different materials. My goal is to support the patient in their individual artistic process, and express their feelings and conflicts. We use clay, stone, watercolors, acrylic paints and sculpting with wire and wood. In the first session the patient tries out different materials to find what they prefer. I work in such a free setting in which I don't dictate tasks because I am trying to let the patient figure out their autonomy and develop their own strategies. At the end of the process, the patients reflect their art pieces and I ask questions like: Can you identify with your art? Why did you choose this material? What feelings occurred during the process? The patients sometimes also get tasks from me like trying to create a sculpture out of up-cycled material. Or when we need to work on group dynamics, we work on creating a picture together ...

Our issue of the newsletter is focused on the concept of beauty, especially related to the mind and brain. For you as an art therapist, what is the most beautiful kind of art? In AT, thinking about beauty is critical, because the patients’ drawings and paintings are often very emotional and personal. When reflecting
on the art, I try and stay away from calling something beautiful (or not!), because it is very judgmental; I always need to be sensitive about the patient’s individual expression.

For art more broadly, beauty is, of course, also very critical. In my personal preferences art doesn’t need to be beautiful; more important is that it can present political or personal subjects which gives us a deeper knowledge about societal or personal problems..

For me, the personal process of a patient working through their ups and downs and expressing themselves through art, finding a way to cope with difficult feelings and discovering powers of self-healing, and finding a connection to other people through personal expression in their work is the most beautiful part at all.

**How important is it for you to value work with aesthetic imperfections (i.e. that is not traditionally beautiful or that has “mistakes”)?**

In clinical AT, every picture is important and has its own special value. Whether it’s a depiction of a painful experience, or an abstract creation or incorrect/ugly sketch of a person who has issues with self-worth, it’s all important... In these cases, it’s even more important to not judge the painting, but rather to look at it objectively and try to understand who the patient is and what processes he/she is working on.

**Many of your clients have mental health issues. In art therapy, how much do you have to know about psychology and psychiatry to effectively help your clients?**

In my opinion, I need experience and theoretical knowledge from both art and psychology to be able to work with the patient. In some settings I have patients with complex diagnoses and knowing a bit about psychology helps me to control situations which could be difficult. It gives me the opportunity to work therapeutically.

**Do you still create art in your free time?**

I do less than I used to do because of the lack of time, but I am working on some ideas and I will this year start my own art process again working with wire (I used to make wire installations and was part of a few exhibitions). I do miss it a lot, especially when seeing my patients work and feeling free to express themselves.

**What is the most challenging aspect of your job?**

It can be very tiring to deal with a lot of different people with different conflicts. When the patients talk about their difficult lives and their trauma, it is sometimes difficult to maintain a healthy distance and professional therapeutic relationship. It can be especially difficult when the patient is dealing with a topic or experience with which you, yourself have experience...

**What would you say to someone who is interested in starting a career in art therapy?**

I would say that it is an interesting job, and at first it seems that there are a lot of different situations which are ever-changing. After a while on the job, there will be more routine and you start to notice patterns and similarities in patients, but there is still so much more to explore and to learn! But I also would say that it is an underpaid job, where building and maintaining a good quality of life is very difficult. It is important to participate in pure observation sessions and do your own, personal AT to best understand your own conflicts and be most therapeutic for your patients.

**Do you have any tips for people who are interested in using art to improve their mental health (i.e. for dealing with anxiety, stress, or other issues)?**

Explore different materials, and take time for the artistic process; don’t follow any strict rules what art “should” be. Also join an atelier with others to create art together, or try a single art therapy session.

**Do you have a favorite story from your practice so far?**

I do. I was working with a woman in her 50s who had been raped, and was very hard on herself and had begun to hate her body and herself. She tried to compensate for the trauma by working herself to exhaustion. In the AT sessions she built a woman out of wire, and took a long time to form the wire to express the figure of the woman. She explained that she wanted to free herself from the pain in the past and that she wanted the woman in the statue to be strong, emotional and creative. These were aspects of herself with which she wanted to get in touch in her life, and feel the way she had before the incident. After working for weeks on her sculpture and talking about the men who treated her so badly, her positive energy and feelings came back. She realized that the past will always be with her, but that she didn’t need to be controlled by it, rather that she can control it herself. The wire sculpture got a layer of plaster and she painted it with powerful colors. The arms of the woman stood far open reaching for the sky, and the legs seemed to dance...

A big thank-you to Renate for her time and insights! We will keep you posted about future exhibitions featuring her work.

Constance Holman
PhD Student, AG Schmitz

All images courtesy Renate Lutz
The Weird and Wonderful World of Body Modifications

Body modification is the deliberate alteration of one’s physical appearance. It is the wilful action that produces a permanent or semi-permanent modification to the body that is not normally found in nature. In the last 30 years, body modifications have experienced a resurgence and increase in popularity, spanning a wider range of social classes and including a long list of practices.

From the simple haircut and earrings to the piercing of lips, nipples and genitals, from eyeball bleaching to subdermal horns or bars, or implantation of bio-polymers to augment the size of breast and buttocks; from anabolic steroid injections for bodybuilding, to extreme fasting—all are examples of altering one’s appearance over time [1]. Importantly, many of these practices are no longer related to cultural traditions and have become commercialized and legitimized by society. They are especially influenced by media that dictates the current ideals of beauty and fashion. The perception of beauty and morphing the body to obtain it, however, has evolved over time; and with it have also evolved the techniques and tastes for how to modify the body [2].

A Brief History of Body Modifications

History abounds with examples of body modifications. Culturally imposed body alterations have been performed for centuries with strong religious or socio-economical belief. The aristocratic class of Mayan civilization used to compress the skulls of new born babies. Their cranium was elongated into a shape believed to resemble that of the gods. In China, the feet of young girls were bound together tightly to resemble the shape of the gods. These women could hardly walk or work, while many of these practices have disappeared, other dehumanising and disfiguring operations, such as female genital mutilation, are still conducted to date. Although all the above examples can be considered forms of body modifications, today the term encompasses a different and largely less harmful set of transformative practices.

What Drives Body Modification Today?

The definition of body modification today is based firstly on the concept of voluntarism. It is a practice undertaken by active subjects, often after long consideration of the results and side effects. A second distinction must also be made between voluntary body modification and that due to medical purposes. These include all operations that are required and performed by the medical establishment. Prosthetic fittings, gender reassignment and cosmetic surgery, therefore, while broadly falling under the idea of a physical modification, should not be considered as such [4]. Body modification, according to the community that endorses and promotes it today, means piercing, tattooing and cutting—in its extreme forms. Simply piercing one’s ears is considered ornamental rather than transformative. Bearers of body modifications sit through hours of extremely painful procedures to obtain what they want. The reasons behind extensive remodelling of the self have been the subject of much investigation—and are, indeed, most fascinating to understand from a psychological point of view. A sense of belonging to subcultural or religious groups or a demonstration of resistance against society are strong motivations driving body alteration. However, the primary force driving the desire to modify some part of the body is embellishment. The transformation is seen as a work of art, a novel quality that renders one more beautiful. Through this piece, the bearer also establishes their identity. They are special and exhibit their distinctive and unique trait to prove it. Reshaping some part of the body may also involve an act of catharsis: either to forget something or to never forget it, and it becomes part of one’s personal narrative of life. The pain felt during the actual operations is another common reason to undergo transformative operations. Testing one’s limit, enduring the hardness, feeling the endorphins rush: all generate a sense of pleasure and reward alongside the physical pain, and a potential sense of atonement. Finally, reckless impulsivity also often leads to body modification [5]. But would you not regret waking up with the Chinese symbol for “soup” tattooed on your arm?

Body Modification of the Future?

Body modification today is enjoying a rise in popularity, promoted by tattoo conferences and websites dedicated exclusively to body alteration (for those adventurous, check out BME.com). But what could be the body modifications of the future? Some college students are experimenting with subdermal implants of magnets to perceive the energy fields of metal objects—a sort of sixth sense [6]. But while the power to feel when a mobile phone is charged might be more useful than attractive, will the body modification community accept other forms of aesthetic transformation or enhancement? For example those that could be moulded by genetic modification? It’s a brave new world.

Maria Lucia Pigazzini
PhD Student, AG Kirstein
What is beautiful about (y)our brain?

MSc MedNeuro student Annika Reinhold wanted to know what neuroscientists find fascinating and beautiful about their favorite object of study - the brain. Here are their responses:

... how it allows me to experience and interpret my life. It ultimately shapes who I am and how I act.
Jelena Brasanac, 27, PhD student

... its amazing plasticity: How it adapts to everything, for example, learning an instrument.
Marisa Brockmann, 34, Postdoc

... cannot be defined. Beauty is an unmeasurable quality.
Nick Kadobianski, 25, PhD student

... that it is an incredibly complex entity, more sophisticated than every machine humans can build so far.
Martin Weygandt, 43, PI

... that it takes care of us even if we do not consciously do ourselves.
Karina Lyras, 29, PhD program coordination and PhD student

... its appearance in a CT scan.
Maximilian Hoffmann, 28, PhD student

... how it can elegantly perform the two contradictory tasks of logical analysis and feeling emotions.
Majed Kikhia, 24, MSc student

... that it is unique and able to do complicated dis- and reassemblies.
Maria Gorbati, 28, PhD student & Franziska Bender, 31, PhD
What does (y)our brain find beautiful?

... seeing complexity and simplicity in nature like patterns and simple beautiful details.
Majed Kikhia, 26, MSc student

... finding coherence and solving riddles.
Marisa Brockmann, 34, Postdoc

... people I like and the smell of the sea.
Karina Lyras, 29, PhD program coordination and PhD student

... that exterior reality comprises so many products of our brains which in turn are represented by our neural system. This beautiful circular arrangement sometimes makes it hard to believe that the two are really separate.
Martin Weygandt, 43, PI

... things it can positively relate to, especially nature and light.
Maria Gorbati, 28, PhD student
& Franziska Bender, 31, PhD

... I know what I find beautiful, but I am not my brain.
Maximilian Hoffmann, 28, PhD student

... objects with a special structure like mandalas.
Nick Kadobianski, 25, PhD student

... genuine human connections and kindness towards all living beings.
Jelena Brasanac, 27, PhD student
**Documentary Review: The Cave of Forgotten Dreams**

“It is as if the human soul had awakened here”, says Werner Herzog in his distinctive voice-over with his heavy German accent. He is talking about the Chauvet cave discovered in 1994 in southern France. For thousands of years, fallen rocks protected this cave from the passage of time until a group of French speleologists followed a breeze of air coming from a hole: what they found inside was an incalculable treasure of Paleolithic art that dates back to 32 000 years ago. The huge cave, with its different chambers, is full with extensive rock paintings of extraordinary beauty and detail. In his documentary, ‘The Cave of Forgotten Dreams’ from 2010, Herzog is given the unique chance to go inside the cave with a small crew and a 3D camera to follow the scientists that conduct research in the cave and record the paintings.

The documentary is moving right from the beginning: the choral and hypnotic music emphasizes the breathtaking experience of being in front of a message from a lost faraway past. I was struck by the emotions he had experienced. He does not exaggerate. During the documentary, I could also feel the wonder of unraveling of the secrets of the cave - like the fact that it was never inhabited by humans but was only used for the paintings (probably for ceremonial purposes). Feeling almost like I was among those scientists, I was captivated to discover the numerous bones of fossilized wild animals (some of them already extinct) and to see the skull of a bear deliberately placed over a pile of stones resembling an altar. And of course, I had the chance to admire the paintings: the pack of wild horses running, the lions mating, the rhinoceros fighting, the hands and the mysterious human female pubis drawn between a bison and a feline in the deepest part of the cave. Most of the paintings could be traced to a single artist that could be recognized by a distinctive signature, which make it even more fascinating.

This documentary is a magnificent example of how scientific interest can be directly linked with a deep sense of aesthetic appreciation and aesthetic experiences. After all, this is not a usual documentation: as in all Herzog documentaries, his enigmatic, ironic and at times surreal worldview reminds the viewer that his films are also a conceptual and abstract thinking, long-term planning, self-awareness, theory of mind and creativity.

He does not exaggerate. During the documentary, I could also feel the wonder of unraveling of the secrets of the cave - like the fact that it was never inhabited by humans but was only used for the paintings (probably for ceremonial purposes). Feeling almost like I was among those scientists, I was captivated to discover the numerous bones of fossilized wild animals (some of them already extinct) and to see the skull of a bear deliberately placed over a pile of stones resembling an altar. And of course, I had the chance to admire the paintings: the pack of wild horses running, the lions mating, the rhinoceros fighting, the hands and the mysterious human female pubis drawn between a bison and a feline in the deepest part of the cave. Most of the paintings could be traced to a single artist that could be recognized by a distinctive signature, which make it even more fascinating.

This documentary is a magnificent example of how scientific interest can be directly linked with a deep sense of aesthetic appreciation and aesthetic experiences. After all, this is not a usual documentation: as in all Herzog documentaries, his enigmatic, ironic and at times surreal worldview reminds the viewer that his films are also a conceptual and abstract thinking, long-term planning, self-awareness, theory of mind and creativity.

**References:**

1. [http://bbc.in/2sGe8pE](http://bbc.in/2sGe8pE)
4. Zaidel, Prog Brain Res, 2013

---

**The First Artists**

Although most likely the first art to emerge in the history of humanity was vocal music, the obvious lack of records makes researchers follow the tracks of visual art that was left by our ancestors. The production of art reflects cognitive abilities that were evolutionarily advantageous and that set our species apart from the rest of the animals; such as symbolic, conceptual and abstract thinking, long-term planning, self-awareness, theory of mind and creativity.

**Who Were the Artists?**

It was initially (not surprisingly) assumed that men were the ones producing the paintings, but research that analyzed the handprints suggests that it was performed by women. Young men or women could also have created them. It is also proposed that shamans were the artists at the time [2]. Interestingly, the Neanderthals also lived in Western Europe during the Paleolithic age but the evidence that they produced art is controversial [3].

**Here to Stay**

The hominids produced tools much before producing (visual) art. So the mere appearance of motor and cognitive abilities to build tools is not enough for the emergence of art. Like the peacock tail, art production should have been an attractive characteristic for mates. Thus, even if it did not have any obvious immediate function, art making survived by sexual selection because it signaled cognitive abilities. Its maintenance should have been closely linked to language development and to an increase in the social complexity of the group [4]. The basic function of art is to attract attention and to communicate an idea. This kind of social communication must have been essential to keep an increasingly heterogeneous group together to facilitate cooperation and survival.

**What Was Trending?**

Most of the paintings found are negative (stencil-like) and positive handprints, human figures, feminine shapes, animals and abstract figures. The famous Venus figurines are sculptures that usually exaggerate some aspects of the female body carved in stones, bones or ceramic. The oldest was found in Swabia, Germany made of mammoth ivory.

**When Did It All Start?**

Hominids appeared around 4-7 million years ago in Africa. Homo erectus already created symmetrically shaped hand axes around 1 million years ago. The Homo sapiens appeared about 300,000 years ago. One of the oldest hints of art production was found in the Blombos Cave in South Africa: a painting toolkit with engraved ochre blocks, charcoal, shells with ochre residues and stone hammers and grinders that dates back to 100,000-70,000 years ago (1). However, an “artistic explosion” appeared in the Upper Paleolithic (between 50,000 and 10,000 years ago) in Western Europe.

---

*Silvina Romero Suárez*

*PhD Student, AG Infante*


*References:*

1. [http://bbc.in/2sGe8pE](http://bbc.in/2sGe8pE)
4. Zaidel, Prog Brain Res, 2013
EDGE – an exhibition blurring the border between art and neuroscience

Neuroscience is beautiful, no doubt about it, and this exhibition hopes to be a presentation of the intricacies of the field, shared with other students and the public. The pieces displayed can be anything from the stunning images created by fluorescence imaging techniques, a portrait series of lab mates, sculptures, video pieces, songs, or Cajal style paintings, just to name a few examples...

On the opening night of the showcase, artists are encouraged to invite friends, family, and the arriving year students too. They will be able to read bios and information about the techniques/ideas in short text displayed beside the pieces. If you think you might like to submit something, please reply by the 31st March. If you already have an idea, you are welcome to share your concept, but at this point it is not necessary as this is just a submission of interest.

Printing costs of images will hopefully be covered or supplemented, but we first need to gauge how many people are interested, also in order to find a suitable location which we hope to have secured end of April.

Do let me know if you have questions or suggestions.

Your sincerely,

Amy Young
amelia.young@charite.de

Images courtesy of Amelia Young

Report: Tag der Wissenschaften

On February 19th, Mariana Cerdeira, Benedikt Salmen and I visited the high school Friedrich-Gymnasium in Luckenwalde, a small town about 80 km south of Berlin. For the past few years, I have been taking part in the annual Tag der Wissenschaften (Science Day), where high school students attend talks by scientists, participate in experiments, and learn about science careers.

Mariana’s talk was split between speaking about the academic structure from Bachelor’s to post-doc, an introduction to the life in a laboratory, as well as the stroke models she uses.

I spoke about the very sensitive and emotional topic of animal research. The discussion with the students showed me once again how important it is to inform the public about what we, scientists, really do. I was shocked to hear the misconception that cosmetic products would be tested on animals and was confronted with the idea that animal research is unnecessary. I could clarify which kind of experiments are allowed, and which not, explain the importance of animal research for the advancement of medical treatment, and answer many more questions. The students were especially surprised when they learned that only 0.26% of animals in Germany are used for research, but 99.15% for food production [1].

Overall, I enjoyed helping the students to understand the importance of animal research and to bust the myth about the kind of experiments researchers do.

And the Winner Is ... Underpaid and Uninsured

Stipends in the End of the PhD

The financial situation of a PhD student is not secure; this is no secret. You can be lucky and accomplish your PhD as employee with guaranteed funding for your project, but most likely you are financed by stipends: Most of us either start the PhD on a stipend and hope to get employed as soon as there is enough money, or are fully funded by stipends. Some might be lucky to get a contract for the first years, but have to apply for a stipend such as a Promotionsabschlussstipendium in order to finish their PhD.

A Lower Income and Plenty of Disadvantages

Winning a stipend is not always as good as it sounds. Yes, it is competitive and might look good on your CV. On the other hand, you will put a serious amount of your time and energy into the application - all at the expense of your research - just to obtain less money than you would get with a contract and no health and social insurances. The Abschlussstipendium from the Charité e.g. grants you 1,200 € per month [1], if you are married or have a child the stipend can be increased by 154€. From that are to deduct at least 14.6% health insurance fees (plus individually defined rates by your insurance) [2] and 2.55% obligatory long term care insurance [3]. If you wonder about the high rates: the health insurance views the stipend as income, even though there is no employer contribution. The government however does not count the stipend as income, meaning you are not socially secured anymore. This means, you do not pay into the unemployment insurance fund and thus can’t claim any benefits for this period of time, if your PhD is over and you did not find a new position right away. If you have family plans, it means you don’t have the right to receive income-dependent parental benefit [4]. At least, if you have a child within the period of your stipend, the funding can be extended for three months [1]. If you plan to live beyond 67 years, you want to take care of your future and pay into a pension insurance: another matter of expense, where there is no subsidy from the stipend. We can all do the math, in the end you have around 1000€ per month and a lot of disadvantages at hand. This is below the German “Mindestlohn” of 8,84 €, if you work a 40 hours week [5].

Stipends Often Dive Below Minimum Wage

Here comes more: even if you have a supportive boss who understands how little money that is and wants to top up your salary, so that you earn comparably to your colleagues on a contract, he or she can only do that to a certain extent. According to the stipend rules, which are referring to DFG stipend standards [6], you are only allowed to top up for 1365 Euros maximum [1], out of fiscal reasons [7]. You are not allowed to improve your income by working elsewhere, or it will be deducted from your stipend. One exception is a scientific employment in another institute besides Charité, but even here only up to 3000 € per year [1]. Understand we should focus on our thesis instead of working part-time elsewhere, but wouldn’t it make sense to set the fellowship compensation at a reasonable level comparable to PhD students who are employed on a contract? This would make an additional job obsolete and after all we are doing the same job, it would be only fair if we get paid the same.

However, the Abschlussstipendium from the Charité is one of the better options. There are stipends such as Elsa-Neumann or Sonnenfeld that grant less, 1,100 or 1,000 € per month, respectively [8,9]. Money that should pay for health insurance, rent, food, telephone bills, and transportation, just to mention the basics. With the rental prices in Berlin constantly increasing, I imagine that is quite difficult for most. As scholarship recipient, you have earned something extraordinary, not only for yourself, but also prestige for your group, your boss, and your institute. You have put effort and time into the application and justly outperformed the competition. Shouldn’t you be rewarded, instead of being taken away all the social security from and receiving a minuscule salary?

Is the Stipend a Price WE pay for OUR Dedication to Science?

How come we need stipends in the first place? One factor is certainly that research money depends on good results. Once a group receives a good research grant it can employ staff, afford expensive material, techniques and technical devices. This allows them in turn to produce better and faster results, leading to more success when applying for grants. On the other end, once you go through a period with no results, you have to struggle even harder to obtain funding. No results, no grants. It is a self-reinforcing circle. The ones who bear the consequences are foremost the students, in the first case for the better in the last case for the worst, in most cases even without self-infliction. And the consequences are timely delayed. If you don’t get good results the generation of students after you will have less money for their research, because the grants are lost.

Should we be grateful for being uninsured?

The conditions need to change!

Why are there no laws to protect PhD students like us from this kind of situation? Why not make it a standard that funding has to be ensured for the full PhD project before taking someone on board? Our system seems to be built on self-exploitation. It seems to be generally accepted that the working conditions in science are bad and that this is somehow the price we have to pay because we are dedicated to science. On top, we are in a special kind of dependency because we need and want the PhD title. Even more with every year of lifetime we invest in it. The determination to get the PhD title lets us tolerate bad working conditions, financial insecurity and everything that comes with them. How else can it happen that we, as highly trained scientists that we are, - especially at the end of our PhDs! - have a lower hourly wage than a lot of people without any degree?
From Academia to The Authorities

Let’s start with the basics. My name is Henriette, I am 28 years old and I will soon be an alumna from the MedNeuro MSc and PhD programs at the Charité. I started my PhD in 2014 in the group “Experimental Psychiatry” with Prof. Christine Winter. My focus revolved around neuropsychiatric disorders and my daily work contained a mix of performing stereotactic surgeries, behavioral experiments and electrophysiological recordings. My thesis is written and ready to go, the plan is to open the procedure this summer.

However, a lot has happened since I finished lab work in 2017. I moved back to Denmark, mainly with the purpose of getting closer to my family (I am a dane) and finding a job. Luckily, all of this fell into place rather quickly.

I started looking for jobs a few months before moving back to Denmark. I spent a lot of time figuring out what kind of job I wanted, which wasn’t easy. Moving from research into the “real world” seemed rather daunting. I mainly saw myself as a researcher and was interested in continuing in this field. Yet, after almost three years of working with rats, I wanted to get out of the lab. I did quite a lot of soul searching to figure out what kind of position met my requirements and to understand what qualifications the PhD had given me. In this period, I even wrote an article in the CNS news-letter about this topic – simply because I had to put my own doubts into words and let go of the imposter syndrome.

I eventually boiled all my qualifications down to a proper CV that included my PhD, but also some organizational work I had been doing on the side. I made sure that the focus was not on my published papers nor my everyday handling with rats, since this is only relevant if you want to stay in academia. Back in Denmark, I sent out a bunch of applications. To make the story short: I am now an Academic Employee at the Danish Health Authorities in Copenhagen.

What I miss, though, is being able to sit down and scientifically analyze and interpret data. I miss the flexibility that comes with being a PhD student, including structuring the day myself. I miss my friends and colleagues in Berlin and the thrill of being abroad. With that said, right now, I would not change it for the world. My new position offers other interesting possibilities and I get to grow in a different direction than what I would have if I had stayed in academia.

So, to all of you currently in academia who are thinking about changing tracks: first of all, yes, your PhD is a valuable asset that can land you a job in the “real world”. However, be aware that when promoting yourself, employers outside academia value other aspects of your work than a potential PI. There are indeed jobs out there, where you can combine research and regular working hours. Seriously, let go of the imposter syndrome that many PhD students have. Use your qualifications wisely, take a leap and go for it.

Henriette Edemann Callesen
MSc and PhD Alumna, MedNeuro

[1] Promotionsstipendium Merkblatt as online 18.01.2018
[6] Stipendienordnung Charité 2015 as online 18.01.2018
In recent years, we got used to seeing movies where scientists have become no less than superheros, saving humanity from natural disasters and alien invasions. Whether it is the super engineer Tony Stark (Iron Man) or the nuclear physicist Bruce Banner (The Incredible Hulk), scientists are usually portrayed by males who lead their teams to that great discovery or solution that will ensure the survival of the human species. Is it any coincidence that studies have shown that children aged 5 to 11 tend to draw scientists as men, not women [1]? In part, this gender stereotyping seems to be promoting the (incorrect!) reasoning that professions requiring higher cognitive abilities and problem-solving skills (like the scientific ones) are not for girls. Accordingly, recent research has demonstrated that girls as young as 6 tend to divert from novel games said to be for bright children, as they see ‘genius’ and ‘excellence’ as male traits [3]. Further, the number of women scientists holding a PhD in academic disciplines believed to require higher levels of ‘brilliance’ (e.g. physics, math, philosophy) is lower than the number of men [4].

Rain or Shine, Female Scientists Are Here to Stay!

As an attempt to overcome these implicit biases instigated by gender inequality in the scientific world, Nathalie Pettorelli and Seirian Sumner (ZSL and UCL, respectively) founded the Soapbox Science platform, an initiative that gives visibility to women scientists through open-air public events that foster scientific discussion and public learning. On June 4th 2017, Berlin hosted its first Soapbox Science event at the Tempelhofer Feld. Twelve female scientists from all over Germany took part of the Soapbox Science Berlin (SSB) 2017 and talked about the science they do in the fields of psychology, biology or engineering. Despite unexpected rain and wind, the first Germany-based Soapbox Science event had over 150 participants from different nationalities and educational backgrounds, whose contribution enabled a dynamic exchange of ideas between female scientists and the public. Yet, the lively scientific discussions and the number of participants were not the only predictors of this Soapbox Science event success – the Berlin team was invited to organize another event as part of the Berlin Science Week 2017. This second event took place at the Sony Center, Potsdamer Platz and brought together 8 women scientists from various research areas: biomaterials, neuroscience, ecology and biomedicine. This time, 256 participants (12 to 89 years) craving for scientific knowledge showed up. Given the goal of eliminating the biased generalization that only boys can be scientists, the Berlin team invited high school students to attend the event with the objective of empowering teenagers of both genders to pursue scientific careers.

What’s Next for the Team

After two amazing and successful events, the SSB team is preparing for the next happening and for further integrating the Berlin team into the worldwide network of Soapbox Science summer initiatives. Join the 2018 speakers in Berlin, June 1st (from 2 to 5pm; location TBD) and challenge your scientific knowledge with some sun and fun! Besides promoting science gender equality, the SSB team hopes to broaden girls’ views about their future career choices and increase the number of German women scientists. Even though the proportion of female researchers in Germany has already increased from 28.2% in 2010 to 30.9% in 2014 [5], the gender gap is far from being closed. Soapbox Science Berlin aims to close the gap and empower young girls to be the scientists of tomorrow.

Ana I. Faustino
Postdoc, AG Judkewitz
Former Soapbox Science Berlin Co-head

References:
Finding a Career Entry That Suits You

With far fewer academic positions available than there are people with PhDs, the traditional path from student to postdoc to professor is no longer the norm. But besides that, there are many reasons why you might want to leave academia. Maybe you want a more secure job, want to get in contact with clients, or just don't like research anymore. Luckily, there are more jobs out there than you might realize! The process of job hunting can be confusing and intimidating. This collection of tips will help you to identify your strengths and the industry you want to move into and finally find a career entry that fits your interests.

**How do I start?**
The most important building block for a successful career is to be honest in defining your interests and strengths. The first question should be: do I want to apply for jobs in a technical, creative or management sector? But don't build up too much pressure: you don't have to make the perfect decision. A career is a path that arises from many decisions. Of course, the first job sets the direction, but you can always transition to another position. Especially when looking for your first "real world job", you might need to compromise on one or two things.

**Where can I get inspiration?**
Use conferences, social events, career fairs, meet-ups and career talks to question others about their work and explore the realities of these possibilities. A great opportunity to get in touch with scientists working outside of academia is the Career Development Seminar every second Wednesday at noon in the CCO Auditorium. Find people with a similar academic background who share your view on life and ask them about their careers. You might not only get inspired but also make important contacts. Even getting to know what you don't like will shape your idea of what you might want to do. Think outside the box: scientists are not only needed in science but also in jobs like consulting, the public sector, non-profit organizations, management, communication, and many more. There are plenty reports from scientists that escaped academia on Science, Nature and Reddit. Reflect when you read advertisements in newspapers or scientific journals: why were you attracted to this advertisement? Could you imagine working for this company or in this sector?

**What are my strengths?**
Pinpoint moments when you really enjoyed or really didn't enjoy doing something, instead of trying to imagine what you would enjoy doing, because a lot of things aren't what they seem to be. Find out what you are good at by asking yourself “what do people ask me to help them with?”. Ask people around you what you are good at and what they think is special about you. Consider also your life beyond the lab and think about your strengths outside of your field of study.

**What are my interests?**
Maybe you are graduating in neuroscience, but you have always been attracted by nutrition science, or you are more interested in the bigger picture of science - all this is worth considering. Only if your career satisfies your interests, will it make you happy. Figure out what it is that drives you. Think about moments when you were really happy, inspired or content with what you were doing.

**What is important to me?**
Consider what is important to you and prioritize. This might be the work environment, career perspectives within a company, working hours, the salary, or additional benefits. Make sure your prospect job fits your lifestyle and incorporates your personal life plan. If you want kids and would like to take a break from work, would this be compatible with the career you are aiming at? Do you want to stay in this city or are you willing to relocate? Can you commit to a job that needs a lot of traveling or working on the weekends? Do you want to work in a highly competitive environment? Answering these questions will help you to further narrow down career options.

**Where can I get insights into specific positions?**
We all know former lab members or fellow students who have moved on to non-academic careers. Ask them what they do now, if they are happy, and what kind of additional qualifications they had, suggests career coach Ulrike Schneeberg (http://deinemonster.de/), whom I met last year at a career day organized by the FU in Dahlem. Job shadowing is also a great opportunity to find out if a job will suit you. Some universities offer programs, but you can as well just ask your acquaintances who work in a job you would like to get to know better. If you are eager and self-confident, you can also directly contact companies; it will for sure make a good impression. If you are about to graduate, do not cancel your studentships just yet: companies prefer to give away internships to students than to recent graduates.

**How do I get familiar with the job lingo?**
Online job portals will help you figure out what names the jobs have and what specific skills are listed for the different job titles. Check the job descriptions of your networking contacts and contact those whose job descriptions sound interesting to you. Most people are happy to report about their job and how they got there. Reach out to people in different jobs, ask if you could meet them for a coffee to ask career questions or interview them for a few minutes on the phone. I can personally report that it is incredibly helpful to get some inside information.

**Do I have the right skills?**
Browse through job offers and carefully read the descriptions. Ask yourself if you have the essential qualifications. If not, what could you do to gain additional expertise? Maybe you can join a project from a befriended lab, or take a course at your university or online while finishing your degree? However, don’t let the lists of desired qualifications intimidate you. Most employers are open for applicants who do not have a final degree that exactly matches the industrial sector or job opening if the application is convincing.

**How do I structure my job search?**
Career coach Ulrike Schneeberg suggests making a timeline to structure your job hunt efficiently. For example: by the end of next month you should have interviewed five people with jobs that sound interesting. Upon completion, reflect if your view has changed and eventually schedule another round of browsing job options and setting up informational interviews. Then narrow your career options down to a few choices that align best with your skills and interests. Having completed this step, it makes sense to start writing your resume, CV and parts of a cover letter tailored to the specific positions and industry. This is a very crucial step - take your time and go over it several times. Show them to your friends and colleagues (maybe even to this person who holds
How do I get the attention of prospect employers?
Tell your friends and colleagues that you are looking for a new job. This will increase the likelihood of being offered a position which is not on the public market.
At career fairs, you can get directly in contact with recruitment managers. If you make a good impression and give them your contact detail, you are already one step closer to your dream job.
According to recruiting managers, it is highly recommended to participate in online job portals. More and more companies follow the trend to search suitable candidates themselves or work with recruiting agencies. If you want to be found, make sure to include the right buzzwords in your profile.

Where do I find job adverts?
Most companies advertise their openings online. The biggest resources are LinkedIn (for the international job search), Xing (the most important platform in Germany) and Indeed, but don’t forget to check out more local portals and those specific to the sector you are looking at, such as your firm, jobmehappy, jobworld, or stepstone.
However, also check out individual company homepages, as not all openings are shared in online job portals. Interestingly, many small- and medium-sized businesses still advertise in print media. Thus getting a copy of your local newspaper might be a good idea as well.

Where do I get information about prospect employers?
Always use more than one source: the company webpage, press releases, social media and rating portals such as glassdoor or kununu. Also check whether local and/or daily news reported about the companies you are interested in. If you want to move into the biotech scene, you should definitely check out labiotech.eu. The different pieces of information will help you to shape an image of the company. Ideal would be, if you could talk to current or former employees. This is possible at career fairs or by directly contacting employees who hold positions you find interesting.

Where can I get help?
A very helpful tool is the “individual development plan” from science careers (http://bit.ly/1RUQcP6). You may also get help from your university. Charité students may contact the stud-hotline(at)charite.de to get career advice, even after completion of studies. For students enrolled at the Humboldt University, these links might be helpful (http://bit.ly/2EBMFU, http://bit.ly/2ZBMjLW) and you can also attend their events even after you graduated. There are also many helpful events organized by the Agentur für Arbeit (http://bit.ly/2Bq8J29). If you are looking for individual help, I can recommend to meet with a career coach.
And stay tuned for the new Career Development Program for Berlin Neuroscience graduate students, currently being developed by SPARK with the help of MedNeuro students.
Get in touch with recruitment agencies specific for the sector you want to move into. Generally their services are free of charge for the job seeker and they have a genuine interest to get you a position because they will be paid by the companies upon success. Furthermore, recruitment agencies have a great portfolio of companies, you might not be aware of.

Claudia Willmes
PhD Alumna, AG Eickholt / AG Schmitz
+++ Master’s Applications 2018: Numbers Dropped Significantly +++

Our call for applications was even less well received compared to last year. The number of applications plummeted from – the even small number of – 120 to roughly 70 candidates, as most would not spend 10,000 EUR for a Master’s program in Germany. The fact that we cannot guarantee scholarships made our program even less attractive. After a thorough evaluation of the applications, we invited 43 candidates to sit the admission test. For our statistics enthusiasts: 61.2% of the applicants were women, 38.2% men. The majority were from the Middle East, Africa, India, Pakistan and Bangladesh, only 10 applications were from Europe, from which two came from Germany.

+++ Eight New PhD Students Joined the Program +++

We warmly welcome eight new PhD students to our program: Ahmed Alfaar (AG Strauß), Jelena Brasanac (AG Paul), Adriana van Casteren (AG Dirnagl), Carolin Gehr (AG Winter), Anja Heß (AG Yildirim), Shirin Schneeberger (AG Heppner), Stefanie Schreyer (AG Steiner) and Felix Töpfer (AG Haynes). Anja is our first candidate who applied, according to the new regulations of 2017, as a medical student to our program. Jelena, Adriana, Carolin, Shirin, and Felix are NeuroCure fellows.

+++ Courses Offered by HGS or DRS +++

Please note that our office is not able to cover the costs of courses offered by the Humboldt Graduate School (HGS) or Dahlem Research School (DRS). Students have to take care of the fees, that is, either by you or your PI. Links: http://bit.ly/2GFfdpp (HGS), http://bit.ly/2I1Mtr9 (DRS).

+++ New Master’s Program’s Regulation in Place +++

The new regulations of our Master’s program started with the admission of the 2017 students. While the contents remain roughly the same, the structure changed. For example, the Clinical Neuroscience module has been merged with the Neuropathophysiology module. Other modules have been split into smaller parts (e.g. Basic Neurobiology consists now of two modules, methods lectures and the lab rotation). The new modules Data and Statistics and Critical Thinking, already integrated in the curriculum of 2016, are now compulsory and are held in collaboration with our partner program Molecular Medicine. The Individual Focus module does not require a presentation anymore and will be granted only 5 ECTS. Overall, the first year is now more lecture-based, while the second year focuses on practical work. Check out the new program’s structure at http://bit.ly/2ELaPm6.

We are also happy to announce that our first-semester Erasmus student decided to stay in our program for the summer term, and that another Erasmus student will join us during this semester.

+++ New Summer Elective Courses +++

Dr. Hadar will offer a new elective course in the summer term, covering the topic of Animal Models of Neuro-Psychiatric Disorders. Dr. Hadar works in the laboratory of experimental psychiatry of the clinic for psychiatry and psychotherapy. More on the course: http://bit.ly/2CIxOlz.

This summer, you are encouraged once again to participate in the elective course Functional Neuroanatomy taught by Prof. Wil Smeets of Vrije Universiteit Amsterdam (VU). We will keep you posted.

+++ Einstein Fellows to Begin Their PhDs +++

The first cohort of our Einstein fellows will soon finish their third lab rotation and begin their PhD project. Depending on their focus, some fellows will join the Medical Neurosciences program. The Einstein Center for Neurosciences Berlin (ECN) was initiated by the Berlin School of Mind and Brain, Bernstein Center for Computational Neuroscience Berlin, Center for Stroke Research Berlin, and Cluster of Excellence NeuroCure, jointly supported by Charité – Universitätsmedizin Berlin, Freie Universität, Humboldt-Universität, Technische Universität, and the non-university partners Max Delbrück Center for Molecular Medicine and the Leibniz-Institut for Molecular Pharmacology.

Imprint

Charité NeuroScience (CNS) Newsletter

Correspondence
Charité – Universitätsmedizin Berlin
International Graduate Program Medical Neurosciences, Charitéplatz 1, 10117 Berlin

Contact
info@cns-newsletter@charite.de

Editors-in-Chief
Helge Hasselmann
Constance Holman

Editors
Mariana Cerdeira
Silvina Romero Suárez
Claudia Willmes
Aartí Swaminathan
Malika Renz
James Kerr
Pina Knauß
Bettina Schmerl
Zara Khan

Cover and Design
Zentrale Mediendienstleistungen (ZMD)
Charité – Universitätsmedizin Berlin
Cover: Nina Stöberl, MSc Student MedNeuro

Volume 11, Issue 1
Stand: 03/2018
„Die TK ist meine Nr. 1:
Denn sie kümmert sich ganz persönlich um uns Studenten.
Gleich hier an der Uni.“

Die TK für Studierende:

➤ Betreuung vor Ort
Wir sind persönlich für Sie da

➤ Bei Anruf Hilfe
TK-Mitarbeiter und Ärzte sind 24 Stunden erreichbar

➤ Reiseimpfungen
Kostenübernahme bei empfohlenen Impfungen

Das sind nur drei Beispiele für unser umfangreiches Leistungsangebot. Ich berate Sie gern ausführlich.

Lutz Matuschke
Tel. 040 - 460 66 10 20 54
lutz.matuschke@tk.de
www.tk.de/vt/Lutz.Matuschke

„Wie die TK mich durchs Studium begleitet: Respekt!“

Katerina Mihova, TK-versichert seit 2009