

THE HORSE IN MOTION

INTERVIEW WITH DR.
SAMANTHA BROOKS
EDITED BY
MEGAN DEMARIA

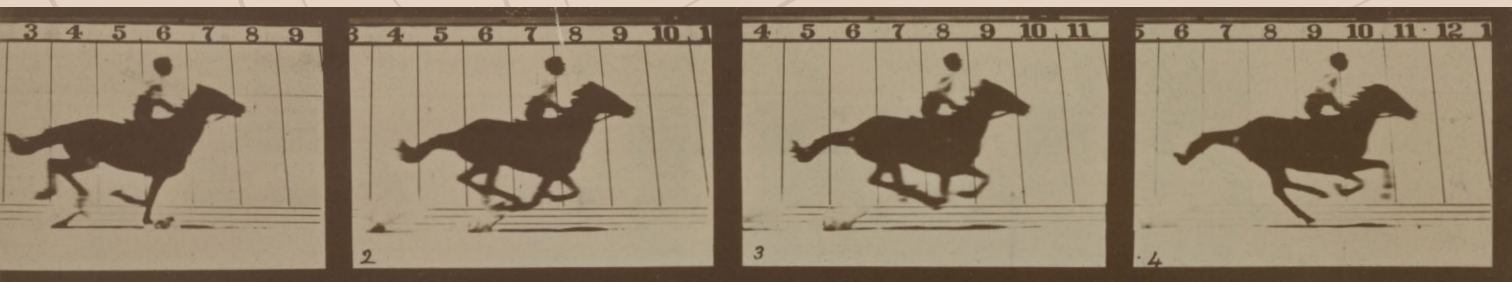
Q: Tell us a bit about yourself and your research.

My name is Samantha A. Brooks. I am an associate professor of equine physiology and genetics here at the University of Florida.

responses [which includes heart rate and locomotive behavior] changed from birth to two years and to see who stayed consistent and who did not. In her first preliminary examination of the data, she found that

Q: How do you distinguish which fraction of those seconds is genetic and which isn't?

Well, it's tough. We keep close records of the experimental trials when we expose them to the



Stills from the *The Horse in Motion* by Eadweard Muybridge, the first example of chronophotography.

My appointment here at the university involves both teaching and research—70% research though. My program focuses on using genetics and genomics tools to improve the health, welfare, and performance of primarily horses, but sometimes other species as well. I say I'm a geneticist by training and a horse person by genetics. I have been fascinated with the horse from my first conscious memory. I grew up in a tiny little place and didn't have access to horses for many, many years, but I just had the bug.

Q: What research methods does your lab use?

We do some very classic behavioral experiments to examine the startle reflex, which is a subconscious reflexive behavior. My graduate student, Barclay Powell, looked at the first set of about 60 or 70 horses to see how their spook

the reflexive response happened in the first three seconds from when they are given a little spook. That initial first three seconds, by our calculations, was about two-thirds due to their genetics. But after those three seconds, the heritability fell off very quickly. We had horses who maybe did or did not feel that reflexive startle response (based largely on genetics). For those who did feel it, some of them reacted to the startle with fear and some of them were less worried about it. They had the startle reflex, but they weren't concerned enough to go into fight or flight. That provides a great opportunity because if we can identify horses who might be prone to fear, startle, or a lack of startle based on their genetics, then we could target their training to help shape that reflex into a valuable skill rather than a dangerous liability.

startle response. We watch their physiological, subconscious, and conscious changes in behavior second by second, both through video and in our tracking data. Based on the physiological data, we hypothesized that it was unlikely what we saw was physiological prior to three seconds because you hardly have time to recognize what has happened. We created a threshold in the data to examine responses between zero and three seconds and three seconds and beyond based on conserved mechanisms well-studied in neuroscience. Everything from simple worms all the way up to very complex mammals has a startle response. It is a very innate set of neural circuitries that's common across many, many different species.

Q: The theme of our current issue is Movement, which we use broadly to describe both the

physical and philosophical aspects of change and development. What comes to mind first when you hear the word "movement?"

The thing about the horse that is very different from virtually every other species—I mean, there's a couple of things that are strikingly different from every other domesticated species—is that our relationship with horses has always been about movement. Either they're able to take us for a leisurely walk down the beach, or they're galloping into battle, or they're carrying people thousands of miles to find new lands and new cultures. We still have this fascination with watching the movement of the horse. Most of our horse sports and horse activities all involve some very intricate, very well-defined type of movement. They are like movement embodied in an animal. Now, that movement requires some impressive biomechanics. Really, I would say, improbable and remarkable physiological adaptations to get an animal that large and that powerful to move that fast. They also have to be pretty darn smart and coordinated.

On top of that, there's a remarkable ability for interspecies



communication. Dogs are often quoted as being the animal that has the largest vocabulary. That's a very human-centric way to look at interspecies communication because we are so verbal. We think body lan-

guage is the subtlety we add on top of words. But when you look at a horse, the vast majority of their communication is nonverbal. And when you look at a horse and rider, it's 99.9% nonverbal. That vocabulary spans millions of situations, contexts, and subtleties that are almost instantaneous for both horse and rider, but it is so difficult to quantify that we've never really succeeded in doing so in a way that captures how special that is for someone who hasn't experienced it.

Q: Outside of work and research, what role do horses play in your personal life?

What's interesting about the horse is that it, because of its strong herd social structure, finds it quite natural to bond with another animal and to be really closely involved with them. So, it's easy to get sucked into your horse's family. That is definitely endearing and has provided a level of stability. They live a long time, too, easily to 30 years. Once you're sucked into a horse's family, you're often there for a long time, and they're with you for a long time. Because they rely so much on body language and are so good at detecting emotional cues, they can

life. Once you're in, there's no going back.

Q: How has movement in your own life led you to where you are today?

As a scientist working with the horse and being part of this global community of the horse, I have had opportunities to travel to places around the globe that I really never expected when I thought about becoming a scientist—certainly not when I thought I was going to be a veterinarian. Working with the horse and with science in general has created this pattern of movement in my life that I think that most people don't realize they're missing out on. One of my most interesting memories was when I was giving a talk at a conference for a breed of horses in the Middle East. There were delegations from Israel and delegations from Iran and delegations from lots of different areas. It was funny because during the formal parts of the meeting, everybody's sitting in their chairs, kind of looking sideways at everyone, but at the dinner, everybody mixed and sat together. I look over there and there's the Israeli group and there's the Iranian group. And what are they talking about?

read you like a book. You cannot be emotionally dishonest with a horse. I certainly had my share of drama as a youngster, but horses inevitably proved to be a center—a safe space. And as a result, I was sucked into serving them for the rest of my

They're talking about their favorite horses. It didn't really matter what their religious disagreements were or what their unusual cultural adversities were because, fundamentally, they were horse people underneath it all.